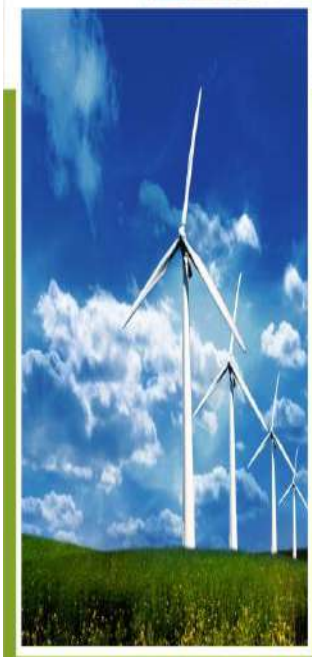

NATIONAL CONFERENCE ON NATURAL RESOURCES MANAGEMENT FOR SUSTAINABLE AGRICULTURE (NRMSA), TUESDAY, 25 OCTOBER, 2016

NATIONAL CONFERENCE

on

NATURAL RESOURCES MANAGEMENT FOR SUSTAINABLE AGRICULTURE (NRMSA)

Tuesday, 25 October, 2016

Organized by

Agricultural Technology Development Society

(ATDS)

www.agriinventionjournal.com

Edited by:

Dr. Joginder Singh
Convener/Organizing Secretary

Dr. Rashmi Nigam
Co-organizing Secretary

VENUE:

CONFERENCE HALL, JANTA VEDIC COLLEGE, BARAUT, BAGHPAT

(NAAC Accredited "A" Grade College with "3.39/4.00" C.G.P.A)

Website: www.jvc.ac.in

सरदार वल्लभभाई पटेल कृषि एवं प्रौद्योगिक विश्वविद्यालय, मेरठ 250110
SARDAR VALLABHBHAI PATEL UNIVERSITY OF AGRI. & TECH. MEERUT - 250 110

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Message

It gives me immense pleasure to know that Department of Horticulture, Janta Vedic College, Baraut, Baghpat (U.P.) is organizing a national conference on "Natural Resources Management for Sustainable Agriculture" on 25th Oct. 2016 in collaboration with Agricultural Technology Development Society (ATDS) Ghaziabad, (U.P.). The theme of the conference is both relevant and contemporary. I am confident that the national conference will provide an unique platform for researchers, scientists, academicians and other stakeholders to discuss and interact with each other in different areas of natural resource management and agriculture.

I convey my warm wishes to the conference organizers and participants for the grand success of the conference.

(Gaya Prasad)

Ram Naik
Governor, Uttar Pradesh

Raj Bhavan
Lucknow-226027

12 October, 2016

Message

I am indeed happy to learn that the Agricultural Technology Development Society is organizing a National Conference on Natural Resources Management for Sustainable Agriculture on 25 October 2016 at Janta Vedic College Baraut, Baghpat (U.P.) It is matter of great satisfaction that the society is engaged in conducting the Conference on above important topic. I do hope that the efforts will bear fruits.

I extend my best wishes to the organizers and wish the seminar a grand success.

(Ram Naik)

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दूरभाष:PBX-2762021, 22, 24
चौधरी चरण सिंह विश्वविद्यालय, मेरठ
Chaudhary Charan Singh University, Meerut

पत्रांक...Hort/532
दिनांक...05/10/2016

Professor Jitendra Kumar
Head, Department of Horticulture
Chief Proctor, C.C.S. University, Meerut

MESSAGE

It is a matter of immense pleasure that Department of Horticulture, Janta Vedic College, Baraut (Baghpat) is organizing a National Conference on "Natural Resources Management for Sustainable Agriculture (NRMSA)" on 25th October, 2016. I hope the deliberations in the conference shall go a long way in affecting the dimensions of the discourse in this important area concerning human welfare.

I convey my good wishes and felicitations to the Principal, faculty and students of the College for a grand success of the conference.

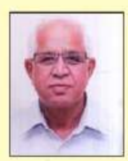
(Jitendra Kumar)

Dr. Joginder Singh
Department of Horticulture
Janta Vedic College
Baraut- 250611 (Baghpat)

CHAUDHARY CHARAN SINGH, UNIVERSITY
MEERUT (U.P.) INDIA

PROFESSOR N.K. TANEJA
Ph.D.(Economics)
Vice-Chancellor

Ref. No. SVC/20/ 451
Dated : 23.09.2016



MESSAGE

It is a matter of immense pleasure that Department of Horticulture, Janta Vedic College, Baraut (Baghpat) is organizing a National Conference on ***"Natural Resources Management for Sustainable Agriculture (NRMSA)"*** on 25th October, 2016. I hope the deliberations in the conference shall go a long way in affecting the dimensions of the discourse in this important area concerning human welfare.

I convey my good wishes and felicitations to the Principal, faculty and students of the College for a grand success of the conference.

(N. K. Taneja)

Dr. Joginder Singh
Department of Horticulture,
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भा.कृ.अनु.प.–केंद्रीय आलू अनुसंधान संस्थान
परिसर मोदीपुरम–250110, मेरठ (उ.प्र.)
ICAR-Central Potato Research Institute
Campus Modipuram-250110, Meerut (UP)

Message

Managing natural resources in efficient, precise and timely manner is key to mitigate climate change and formulation of adaptation strategy. Agriculture cannot be sustained if it is not climate resilient. Therefore, the topic chosen for the national conference "Natural Resources Management for Sustainable Agriculture" is very well timed and effort in this direction by the **Agricultural Technology Development Society** and **Janta Vedic College**, is very appreciable. Theme areas covered in the conference is very wide and exhaustive and cover entire gamut from climate change to biotechnology, to IT and to technology transfer innovations.

A large number of delegates with widely divergent profile are likely to participate in the conference. I hope this will be an excellent common platform for the academicians, scientists, NGOs, students and farmers to interact and come up with practical recommendations to be implemented by the policy makers and implementing agencies.

I wish the conference a great success.

(Manoj Kumar)

Telephones: 0121-2575497 (O) **Fax**: 0121-2576584; **Email**: cpric.modipuram@gmail.com **Website**: http://cpric.res.in

मुख्य महाप्रबन्धक
Chief General Manager

NABARD

Message

In the present economic and environmental scenario, sustainability of agriculture is of prime importance which largely depends upon the effective management of natural resources. I am happy to note that the Department of Horticulture, Janta Vedic College, Baraut, Baghpat (UP) is organizing a national conference on "Natural Resource Management for Sustainable Agriculture on 25 October 2016 which is very relevant in the present context. I am sure that the conference will provide a platform for the researchers, academicians and all stakeholders in the field of natural resource management and come out with suggestions for appropriate policy framework.

All my best wishes are with the organisers and participants for the grand success of the conference.

A K Panda
19 October 2016

राष्ट्रीय कृषि और ग्रामीण विकास बैंक
National Bank for Agriculture and Rural Development
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सचिव एवं महानिदेशक
TRILOCHAN MOHAPATRA, Ph.D.
FNA, FNASc, FNAAS
SECRETARY & DIRECTOR GENERAL

भारत सरकार
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भारतीय कृषि अनुसंधान परिषद
कृषि एवं किसान कल्याण मंत्रालय, कृषि भवन, नई दिल्ली 110 001

GOVERNMENT OF INDIA
DEPARTMENT OF AGRICULTURAL RESEARCH & EDUCATION
AND
INDIAN COUNCIL OF AGRICULTURAL RESEARCH
MINISTRY OF AGRICULTURE AND FARMERS WELFARE
KRISHI BHAVAN, NEW DELHI 110 001
Tel.: 23382629; 23386711 Fax: 91-11-23384773
E-mail: dg.icar@nic.in

MESSAGE

It is a pleasure to know that the Agricultural Technology Development Society, Ghaziabad (Uttar Pradesh) is organizing a National Conference on 'Natural Resources Management for Sustainable Agriculture (NRMSA)' at Baghpat on 25th October, 2016.

It is known that enhancement of production and productivity of agricultural crops depends on efficient use of land, water and genetic resources. The nutrient supply to the crop plants is linked to physico-chemical and biological properties of soil and water. Optimized use of these resources can yield environmental and social benefits from agricultural systems. Growing human population and climate change are twin formidable challenges that warrant development of appropriate climate resilient varieties and technologies for sustainable agriculture.

I am sure, this Conference will dwell upon the relevant issues and challenges, and evolve strategies for effective management of natural resources for sustainable and profitable agriculture.

I wish the Conference a grand success.

13/10/16
(T. MOHAPATRA)

Dated the 13th October, 2016
New Delhi

पंजीकृत संख्या 1001/1920-21

॥ ओ३म् ॥

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सभा कार्यालय : 295265

जाट शिक्षा सभा

बड़ौत–250611 जनपद–बागपत (उ०प्र०)

द्वारा संचालित

जनता वैदिक महाविद्यालय, बड़ौत • जनता वैदिक इण्टर कालिज, बड़ौत • जनता वैदिक औद्योगिक प्रशिक्षण संस्थान, बड़ौत
जनता वैदिक मॉडर्न स्कूल, बड़ौत • जनता वैदिक कोचिंग संस्थान, बड़ौत

पत्रांक ....

दिनांक ....

श्री वीरेन्द्र पाल सिहँ
अध्यक्ष
जाट शिक्षा सभा एवं प्रबन्ध समिति
जनता वैदिक कॉलिज बड़ौत (बागपत)

संदेश

अति प्रसन्नता का विषय हैं, कि जनता वैदिक कॉलिज बड़ौत (बागपत) के उद्यान विज्ञान विभाग एंव एग्रीकल्चर टैक्नोलॉजी डवलपमेंट सोसायटी द्वारा दिनांक 25 अक्टूबर 2016 को सम्मेलन कक्ष में "टिकाऊ कृषि के लिये प्राकृतिक संसाधनो का प्रबन्धन" के विषय पर एक दिवसीय राष्ट्रीय संगोष्ठी का आयोजन किया जा है, जो कि एक सराहनीय प्रयास है। प्राकृतिक संसाधनों को ध्यान में रखतें हुए उनके प्रबन्धन के द्वारा टिकाऊ कृषि को पर्यावरण के अनुकूल और भी अधिक प्रभावशाली बनाकर आने वाली पीढ़ियों के लिए अधिक उपयोगी साबित होगी। मुझें आशा ही नही, अपितु पूर्ण विश्वास हैं कि प्रतिभागी छात्र, विद्वान एंव वैज्ञानिक अपनें मूल्यवान विचारों, सम्मतियों एंव शोध कार्यों का सफल आदान प्रदान करेंगे।

संगोष्ठी की सफलता के लिये मेरी ओर से हार्दिक शुभकामनाएं।

(वीरेन्द्र पाल सिहँ)

SUSTAINABLE TECHNOLOGIES FOR MANAGEMENT OF SUGARCANE DISEASES AND ENHANCING CANE PRODUCTIVITY

Ram Ji Lal
Division of Crop Protection
ICAR-Indian Institute of Sugarcane Research, Lucknow

Sugarcane plays a significant role in Indian agriculture. It is one of the most anortant cash crop grown in an area of about 5.03 million hectares with an average yield of 69.0 t/ha. It is major source for the production of white sugar, *jaggery khandsari* etc. in the country. In recent years its demand is increasing in view of expanding horizon of agro-industrial use of sugarcane, particularly in co-generation of electricity and production of ethanol for blending with petrol. About 6.0 million farmers and a large number of agricultural laborers are involved in cane cultivation, Besides, more than half a million skilled and semi-skilled workers, mostly from rural areas are engaged in the sugar industry, the largest agro processing industry of the country next to cotton. India's population is expected to be around 1.5 billion by 2030 AD at the present compound growth rate of 1.6 per cent per annum. The country may require nearly 33 million tonnes of white sugar for domestic consumption alone by 2030 AD. In future, the production of alcohol for partial replacement of fossil fule and use of bagasse in co-generation of electricity have great potential and thus requirement of cane will increase further. Therefore, in order to meet the growing demand of sugar and energy by 2030 AD, the country will require around 520 million tonnes of sugarcane with a recovery of 10.75%. This will entail an increase in sugarcane productivity to the tune of 100 to 110 t/ha, as area may stabilize around 5.0 million hectares. However, the cane productivity is not increasing as per expectation. Several factors *viz.*, natural resource degradation, higher cost of cultivation, inadequate irrigation facilities, excessive and untimely use of irrigation water, inappropriate use of fertilizers and pesticides, replacement of a rich traditional varieties with high yielding varieties, breakdown of resistance of varieties to insect-pests and diseases, climate change and other natural calamities etc., are responsible for low/stable cane productivity. At the current prices, the monetary value of the total losses due to various diseases, pests (insects, nematodes and weeds) may exceed Rs. 25,000 corers annually.There is worldwide need to move towards the practice of sustainable agriculture, using environmental friendly, less dependent on agricultural chemicals and less damaging to soil and water resources.Sugarcane is vulnerable to number of diseases right from the seed/sett is sown until the crop is harvested. The diseases alone cause about 15-20% loss in yield and quality and are major cause for the reduction in cane productivity and sugar recovery. Sugarcane diseases can be classified in two categories (i) Seed piece transmissible diseases like red rot, smut, wilt, grassy shoot disease, leaf scald, ratoon stunting, mosaic and yellow leaf disease and Non-seed piece transmissible diseases and Non-seed piece diseases like leaf spots (Brown spot, yellow spot), sett rot (Pine apple disease), rust and root rot (*Pythium* root rot) and physiological disorders/diseases. The both growers and miller suffer the losses due to these diseases.

ROLE OF VEGETABLES IN ENSURING LIVELIHOOD SECURITY OF FARMERS OF WESTERN UTTAR PRADESH

Poonam Kashyap and A. S. Panwar
ICAR- Indian Institute of Farming Systems Research, Modipuram, Meerut, Uttar Pradesh, 250 110
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Monoculture of Rice-wheat rotation has not only devastated the agro-eco systems in western Uttar Pradesh but has also resulted in water depletion, over exploitation of soil and water resources. The situation is alarming and posing a threat to the rural community. The present situation of Uttar Pradesh demands a diversification from rice, wheat or sugarcane based system to more remunerative and sustainable farming systems.Besides improving the diversification, there is an urgency to develop and promote productive farming systems that can better adapt to and mitigate the effects of climate change. The weather vagaries make farming risky for small categories of farmers. Vertical expansion in small farms is possible by integrating suitable farming systems components requiring less space, time and ensuring periodic income to the farmers. The horticultural based system has enough potential to pave a path for enhancing the livelihood security. The consumption pattern is also undergoing a major change with the improvement in per capita income, especially in urban areas. Diversification with vegetables based cropping systems aims to provide the alternative avenues available for enhancing income in a sustainable way. A horticulture based integrated farming system can not only increase the livelihood of the small and marginal farmers but also provide them steady income throughout the year, ensure nutritional security, minimize the external inputs thereby protects the natural eco-system, retains and improves the soil health and productivity. Studies conducted at research farm of Indian institute of Farming Systems Research, Modipuram, Meerut (Year 2014-2015) have shown vegetable based systems as beneficial alternate cropping systems when compared to the traditional cropping systems (Sugarcane- Sugarcane Ratoon-Wheat and Rice- Wheat: CS-1). The crop based system (CS-1) when compared with the vegetable

based system (CS-2 Turmeric; Bottlegourd-cauliflower-Tomato; Brinjal-Potato-Beans)gave highest net returns of Rupees 2,63,912 for CS-1 system while CS-2 gave net returns worth Rupees 2,04,714. But when the economic efficiency of these two systems were compared,CS-2 gave higher economic efficiency (Rupees 565/ha/day) as compared to CS-1 (Rupees 512.45/ha/day) showing that vegetable based systems have more potential in rendering the cash returns to the farmers as compared to the crops like sugarcane, wheat and rice. Vegetable crops are highly income intensive if improved management practices are adopted along with development of appropriate market linkages apart from ensuring the nutritional and livelihood security.

Keywords: Farmers, Livelihood security, Profitability, Vegetables

SUSTAINABLE AGRICULTURE: NEED OF THE PRESENT ERA

Vikram Kumar, Sunil Kumar, K. Hemalatha, Neelam Bisenand R. K. Singh
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Agriculture has changed greatly in the past few decades. During the 1960s and 1970s farmers depended on cheap energy, plentiful water supplies, and extensive use of chemical fertilizers and pesticides to produce high yields with decreasing labor on reduced amounts of land. In recent years the costs for fuel and chemicals have increased sharply, the high use of pesticides has led to development of resistance in many pest species, and concern has developed over environmental contamination by fertilizers and pesticides. Increasing attention, therefore, is being given to means of reducing the reliance of farmers on highly chemical means of production. To produce high yields, protect soil productivity, and maintain environmental quality, farming must be based on sustainable manner. Sustainable crop production is the key component for present decade. According to sustainable crop production, it is a way of growing or raising food in an ecologically and ethically responsible manner. Which satisfy human food, feed, and fiber needs, and contribute to biofuel needs along withenhance environmental quality and the resource base,sustain the economic viability of agriculture andenhance the quality of life for farmers, farm workers, and society as a whole.

DETOXIFICATION OF HEXAVALANT CHROMIUM BY HALOTOLERANT FUNGUS *Penicillium oxalicum* ISOLATED FROM TANNERY WASTE WATER

Prem Chandra and Ram Ji Lal[1]
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Division of Crop Protection, Indian Institute of sugarcane Research, Lucknow-226 002[1]
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Removal of Cr (VI) by halotolerant fungal strain *Penicillium oxalicum*was studied. The growth of fungal strain was monitored in terms dry biomass at different concentrations 0 - 20 % NaCl and 0 to 120 µg mL^{-1} of Cr (VI) on 1^{st}, 3^{rd}, 5^{th}, 7^{th} and 9^{th} day of incubation period. About 51.4 and 53.9% inhibition of mycelial growth was observed at 20% NaCl, 120 µg mL^{-1}Cr (VI) concentration, respectively on 9^{th} day of incubation. Effect of different chromium concentration 30 to 120 µg $mL^{-1}$the metal removal efficiency reached to its maximum level 100, 93.97, 42.24 and 20.89% on 7^{th} day of incubation. And at different pH (4 - 8) with constant concentration of metal 60 µg mL^{-1} removal efficiency was found 91.23% at pH 7.0 on 7^{th} day. FTIR spectrum was used to evaluate the binding of Cr (VI). The results indicated the in-volvement of hydroxyl(3800-3600) cm^{-1}, methyle group 2934.4 cm^{-1}, amino 1647.3, 1544.4 cm^{-1} and aliphatic nitro groups at wavenumber 833.6cm^{-1}. The spectral change at wavenumber 1236.0 $cm^{-1}$was suggested phospholipids and played key role in Cr (VI) binding.The aim of this study was to evaluate the potential of *P. oxalicum*for the removal of chromium from saline aquatic systems.

Keywords:*P. oxalicum*, FTIR, Tannery waste water, NaCl, Chromium hexavalant

MANAGEMENT OF SEPTORIA LEAF SPOT OF TOMATO BY CULTURAL PRACTICES

Morajdhwaj Singh, Devesh Nagar, Divyantika Mishra, Umesh Prakash
Chandra Shekhar Azad University of Agriculture & Technology, Kanpur (U.P.)
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Septoria leaf spot by *Septoria lycopersici* are potentially serious disease that affects the leaves, stems, and fruit. They may occur on any age of plants, but they first notice the small, circular spots on the upper surface of the lower leaves. There is often a

corresponding water soaked spot on the lower surface of leaf. Initial infection occurs on the lower leaves and spreads upward in the plant as spores from infected leaves are splashed into clean foliage by rain or irrigation water. Use disease-free seed and inspect purchased transplants for leaf spots before transplanting into the field. Select a well-drained site with good exposure to the sun and wind to promote drying of the foliage after rain or dew. Staking or caging plants also helps speed drying of plants after wetting and keeps fruit and leaves off the soil. Do not water late in the day unless you are using trickle irrigation. Mulch will act as a barrier between the soil and foliage to prevent spores from splashing onto the leaves and fruit. Due to pruning destroying the lowest leaves will improve air circulation and hasten drying of the foliage after wetting. Removing leaves at the first sign of infection will also help slow the spread of the disease. Do notcompost infected vines unless you practice stringent composting practices that will assure prolonged heating to kill the disease organisms. It may be necessary to treat tomatoes with protectant fungicides to control Septoria leaf spot. Begin treatment when the first fruit clusters start to develop or when the first symptoms are observed. Applications of fungicide may be needed every 7–10 days when the weather is wet and warm. Observe the new foliage regularly to be sure that the sprays are effective.

Keywords: Symptoms, Cusal Organism, Disease Cycle, Control

COMMUNITRY RADIO AS A CATALYST OF A SOCIAL CHANGE AND INNOVATION OF HUMANITY

Ashwani Kumar and Surjeet Kumar Arun
Dept.of Ag Extension, C.S.S.S (P.G.)College Machhra, Meerut

Community Radio is a social process or event in wich members of community associate together to design programmes and produce and air time. The information and communication technology have transformed social life more than any of prcviouswavs of technology innovation that amanged humanity.Community Radio can play avery important role in Social change of humunity of a country, Community radio covers all dovelopmental and right based issued and updated listeners on the latest innovative information in enviormental. Policy related and other issues. Community radio is a measure of the level of democracy good governance and accountability in a society. CR is effective in ensuring inclusion of marginalized CR is effective in poverity reduction. It is effective in peace building and empowering women.That is why I Think of Community radio as the Communities speaking to each other acting together for common goals.

Keywords: Community, Technology, Innovative, Environment.

BIOTECHNOLOGY AND THE NEW INFORMATION TECHNOLOGY IN AGRICULTURE DEVELOPMENT

Surjeet Kumar Arun, Ashwani Kumar
Dept.of Ag Extension, C.S.S.S (P.G.) College Machhra, Meerut

A major innovation that could bring about major changes is presently beginning to spread to agriculture. As to other economics sector biotechnology and the new information technology(data processing, electronic Communication systems.Automation etc.) Biotechnology constitutes a new technological paradigm in that it represents a shift from the exploitation of inert matter that characterized the industrial revoluation of the 19th country and the last agriculture revoulation to the exploition of better known and internally modified living matter.The article discusses development and prospect for the application of biotechnology and informationtechnology to agriculture. There issues and their input on the agriculture production model in developed countries. It first sets out their different possible applications in the various sectiors of agriculture production and them present stage of development it then examines their potential impact. Highlighting their ambivalence lastly. It deals with the New technology faced with the changing demands made on agriculture (emphases on product Quality the techniques used.)The terms "new information technology"(NIT) covers a certain number of technology based computers etectronic communications system. Electronic in farm machinery robots remote sensingBiotechnology particularly genetic engineering is the subject ofcontroversythet why we sought the present paper same aspect of its development prospects. Impact and issued.

Keywords: Biotechnology, Information, Development

TRAINING NEEDS OF POTATO GROWERS TOWARDS IMPROVED TECHNOLOGIES

Lokendra Kumar Singh

Dept. of Ag. Extension, Janta Vedic Collage, Baraut, Baghpat

Potato production along with brinjal, tomato, cabbage and cauliflower account approxmetly 60 percent of total vegetable production in India. Potato is the most important vegetable crops in India. The India exported of Potato production to different countries of the world. Commercial cultivation of potato is highly remunerative in such situation since it provides higher yield/ unit area and high economic return in short time. The sample consisted of 120 potato growers. The results revealed that a majority of farmers needed a medium to high level of training in areas like seed treatment, optimum dose of fertilizer, identification of insects/disease & their control measures, identification of weeds storage, proper use of rain water and marketing of storage.

Kewords:Potato, Training need, Technology and Practice, etc.

GENETIC ANALYSIS FOR ELUCIDATION OF YIELD CONTRIBUTING CHARACTERS IN GARLIC (*Allium sativum* L.) GERMPLASM

Mukesh Kumar, Manoj Kumar Singh and Sunil Malik
Sardar Vallabhbhai Patel University of Agriculture & Technology, Meerut, UP, India

Breeding crops for good ideotype will lead to enhancement of production is a well-known fact for which identification of associated characters contributing to higher yields is necessary. An experiment with 53 diverse garlic genotypes was conducted at SVBPUA&T, Meerut (UP) to elucidate the genetic architecture for productivity augmentation and detection of latent yield attributes. Highly significant varietal differences were observed among the characters indicated the presence of wide spectrum of variation among the genotypes. The characters like maximum number of clove per bulb (F-2-R genotype) maximum weight of one clove and bulb diameter (genotype Jawa) and delayed seedling early vigour (PG-20) were identified to be significantly influencing the higher yields. Genotype PG-20, a slower seedling growth genotype, had highest bulb weight among the genotypes imparts the significance of delayed seedling early vigour High values of genetic analysis parameters for characters, weight of one clove and bulb weight, advocated high genetic progress and indicated that these characters are governed by additive genes and could be effectively improved through selection.

EVALUATION OF AGE OF ROOTSTOCK, GROWING MEDIA AND GROWING CONDITIONS ON THE SUCCESS AND SURVIVAL OF EPICOTYL GRAFTING IN MANGO (*Mangifera indica* L.)

Pallavi Chaudhary, Ankur Kumar, Satya Prakash and V.P. Rahul
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Mango is commercially propagated vegetatively due to its heterozygous nature. The techniques of vegetative propagation have been standardized in most of the fruit crops have substantially revolutionized fruit industry in our country. Therefore, propagation study was conducted atHorticultural Research Centre (HRC) of Sardar Vallabhbhai Patel University of Agriculture and Technology, Meerut, Uttar Pradesh, during the rainy-winter to spring season of 2013-14 and 2014-15, to ascertain the performance of epicotyl grafting in different container mixtures (growing media) and growing conditions with different age of rootstock. The experiment was conducted using two age of rootstock (7 and 9 days old seedling rootstock), twelve growing medium and two growing conditions (open and shade) in a Factorial Randomized Block Design with twelve treatments and four replications. Based on the results of two years study, it can therefore be concluded that epicotyl grafting in mango was found to be most successful in terms of bud sprouting and survival percent when performed on 7 days old seedling rootstock (17.39 % increase in percent success over 9 days old seedling rootstock) grown in poly bag mixture of Soil+ Sawdust+ Vermicompost (17.39 % increase in percent success over 9 days old seedling rootstock). Epicotyl grafting when performed under shade condition exhibited better performance over open condition (17.80 % increases in percent success over open condition).

Keywords: Epicotyl grafting, survival percentage, growing media, growing conditions

STUDIES ON FLORAL BIOLOGY AND FRUIT SET IN VARIOUS CULTIVARS OF MANGO (*Mangifera indica* L.) UNDER WESTERN UTTAR PRADESH CONDITION

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Mango (*Mangifera indica* L.*)* exhibits wide variations in flowering and fruiting due to its strong dependency on environment. Flowering of mango is an important physiological event that sets the start of fruit production. Enormous utility of mango in various forms and kinds have attracted the attention of world for understanding its inherent nature of vegetative growth, flowering, fruiting and their physiological manipulation to the benefits of grower and consumer alike.Therefore, the present investigation entitled studies on floral biology, fruit set and yield in different cultivars of mango (*Mangifera indica* L.) was carried out at Horticultural Research Centre (HRC) of Sardar Vallabhbhai Patel University of Agriculture and Technology, Meerut, Uttar Pradesh, during 2014-15 and 2015-16. The experiment was conducted in randomized block design (RBD) having 23 treatments with three replication. The wide variation was observed in relation to the panicle emergence (3rd Feb- 8th March), panicle length (27.81-40.56 cm), panicle width (13.45-25.00 cm), thickness of rachis (0.56- 0.64cm), duration of flowering (18.32 days), total numbers of flowers per panicle (17.25-32.41), fruit retention (6.34%-15.21%), fruit weight(96.24-364.40 g), fruit length(6.45- 10.36 cm), width (4.12-8.94 cm) and number of fruits per tree (32.66- 101.54). Among the cultivars Bombay green has registered the higher panicle length, panicle width and fruit set per panicle. The duration of flowering and was found maximum in cultivarRasgulla and Surkharu. The cultivar Dashehri has registered maximum number of flowers per panicle and number of fruits per tree. The fruit length ad fruit weight has been found more in cultivar Mallika and Chausa.Hence, present result revealed that quantification of variation for horticultural traits in mango cultivars would help to understand the potentiality of these cultivars undernorth Indian conditions and would assist in selection of cultivars as potential donor in the hybridization programmes.

Keywords: Vegetative growth, Flowering, Fruiting, Panicle emergence

ASSESSMENT OF HEAVY METALS IN SOILS OF MEERUT DISTRICT IRRIGATED BY SEWAGE WATER AND TUBE-WELLS

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This study was conducted to assess the levels of selected heavy metals in soil of Meerut district, Western Uttar Pradesh. A total of 06 surface soil samples irrigated by sewage water and tube-well were collected and analyzed for major heavy metals (Zn, Cu Fe Mn, Cd, and Pb,) by using flame atomic absorption spectrophotometer. The data revealed that the soils in the study area are significantly higher contaminated by sewage water as compared to tube-well water. The ranges of heavy metals in sewage water varied from, Zn (1.94-5.64 mg/kg), Cu (1.25-4.98 mg/kg), Fe (3.86-29.80 mg/kg), Mn (1.20-6.24 mg/kg), Cd (0.14-1.86 mg/kg) and Pb (1.65-3.00 mg/kg), and in tube-well water its ranged from Zn (0.22-1.12 mg/kg), Cu (0.45-0.96 mg/kg), Fe (1.46-5.94 mg/kg), Mn (2.20-4.50 mg/kg), Cd (0.01-0.04 mg/kg) and Pb (0.07-0.8 mg/kg) respectively. The results indicated that the concentrations of Zn, Cu, Fe, Mn, Cd and Pb in both types of soil samples do not exceed the limits established by national and international regulations. The findings in this study will serve to create awareness to the society in regards to heavy metal pollution in soil.

POLICY OPTIONS TO LEVERAGE AGRICULTURE TO IMPROVE NUTRITION SECURITY

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Accelerating undernutrition reduction in India requires realigning agriculture and rural development policy to empower women in agriculture. Resources targeted to women and women's groups significantly improve agricultural productivity, women's control of resources or assets, and health and nutrition outcomes. The country should promote women's cooperatives, producer women's groups, and other forms of group efforts, where they do not already exist. This would enable women to overcome the constraints of small, marginally profitable land holdings, thereby improving the dissemination of agricultural technology and other inputs, as well as marketing of produce. The National Rural Livelihoods Mission (NRLM) under the Ministry of Rural Development offers a significant potential for convergence with the agriculture sector to empower women to care for themselves and their children. NRLM's federations of Self-Help Groups (SHGs) could radically alter the balance of power not only in the markets they participate in as both producers and consumers, but also in their communities and households. Women's groups, including SHGs under NRLM, can become instrumental in meaningful convergence of health, nutrition, education, and other broad-based schemes addressing the deep rooted causes of undernutrition. Examples of such group-centric pro-nutrition approaches include producing and consuming nutrient-rich foods through homestead horticulture and poultry interventions; establishing and maintaining micronutrient food fortification units; producing and marketing low-cost, nutrient dense supplementary foods; developing primary food processing; enabling women and their children to access essential health and nutrition services; and catalyzing critical

behavior change for optimal health and nutrition outcomes in the long run through community mobilization, including the involvement of Panchayati Raj Institutions, around nutrition-specific issues and actions. Empowering women in agriculture—which is essential to India's nutrition security—requires securing women's rights to land, providing efficient and effective legal support, and enhancing women farmers' access to inputs. For example, entitling women in land records as cultivators on family farms, where women operate the land registered under the name of the male household members, would make a significant difference in accessing various government program benefits.

Keywords: Undernutrition, Policy, Women, Agriculture

EFFECT OF ORGANIC MANURE AND INORGANIC FERTILIZERS ON GROWTH AND LEAF YIELD OF ALOE (*Aloe vera* L.)

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An experiment was conducted in a factorial randomized block design at Horticulture Research Centre of Sardar Vallabh Bhai Patel University of Agriculture and Technology, Meerut during 2015-16 to find out the effect of organic manure (farmyard manure) and inorganic fertilizers (nitrogen and sulphur) alone and combine application of farmyard manure, graded levels of nitrogen and sulphur on growth and leaf yield of *Aloe*. The quintessence of results relating to the mean data revealed that the treatments involving combination of higher levels of FYM, nitrogen and sulphur viz: farmyard manure at 25t. per hectare along with nitrogen 50kg/ha and sulphur 20kg/ha., recorded the highest leaf yield (52.78t./ha). The leaf yield increases are different growth parameters viz: Plant height, plant spread, number of leaves per plant, leaf length, leaf thickness and leaf width. The enhanced leaf yield due to combined application FYM, nitrogen and sulphur viz: FYM increased the uptake of nitrogen and sulphur.

RESPONSE OF BIOVITA ON PLANT GROWTH, YIELD AND QUALITY OF BASIL (*Ocimumsanctum* L.)

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An experiment was conducted in a simple randomized block design with three replications at Horticulture unit of Krishi Vigyan Kendra, Muradnagar, Ghaziabad under Sardar VallabhBhai Patel University of Agriculture and Technology, Meerut during 2015 (One Year period) to find out the response of biovita alone application on plant growth, whole plant yield and quality of basil. There are six treatments of biovita i.e. (B_0 B_1, B_2, B_3 (B_0=0kg/ha no biovita, B_2=10kg/ha, B_3=12kg/ha, B_4=-14kg/ha, B_5=-16kg/ha and B_6=-18kg/ha biovita) was applied. The treatment was applied at two times of top dressed after 30 and 60 days of sowing seeds. The quintessence of results relating to the mean data revealed that the recorded the highest plant height, yield and quality. The plant yield increases are different growth parameters viz: Plant height, plant spread, number of leaves per plant, leaf length, and leaf width. The enhanced plant growth, yield and quality of basil due to biovita is a store house of over naturally major and minor nutrients, amino acid and trace minerals such as boron, molybdenum, copper, iron, zinc, etc. and plant growth hormones viz. cytokinin, gibberellins, auxin etc. The biovita 18kg/hectare was found to be superior of plant growth, herb yield and quality parameters of basil.

EFFECT OF METHOD OF PLANTING ON YIELD OF SUGARCANE

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A field experiment was carried out during 2014-2015 spring planted sugarcane to evaluate the effect of methods of planting on yield. The experiment was conducted in Ghaziabad district with three treatments i.e. method of trench planting, planting in double row (90-30-90) and planting in furrows (farmers practice).The maximum average yield 1037 q/ha was recorded in trench planting followed by double row q/ha and q/ha in farmers practice which is recorded as minimum . The method of trench planting and double row planting methods recorded 58.32 and 23.96 % more yield as compared to farmers practice.

IS PLASTICS FRIEND OR FOE: A HIDDEN STORY

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Globally plastic is one of the most used materials. It is being used in almost every area of expertise. Plastics have been with us for more than a century and still everybody is focused on unveiling the limitations as well as the adverse effects of plastics on environment rather than considering its benefits for human welfare. But it is well said "every coin has two facets" which is also true with plastics, despite its limitations it is also having a large number of fringe benefits of which the scenario is not aware of. There are several advantages with plastics which can't be compared with others like cost effectiveness, durability, light in weight, less chances of wear and tear making its handling easy. It can be molded to form various decorative and accessories, also it is the least contributor of pollution in comparison to its alternatives. Plastics can be reused, reduced and recycled. Even several biodegradable plastics are also available in market. Merely cursing the plastics for something it is not responsible does not solve any purpose. Thus, the objective is to basically make everyone aware of the positive implications of plastics. This includes production of plastics, classification of plastics, statistics, uses and merits of plastics, superiority of plastics over its alternatives, Researches being done by various scientists. Finally, Plastic is like a double edged sword and we must to use it carefully to avoid future complication and environmental problems.

Keywords:biodegradable plastics, curbstone, metal roads, spacecraft fuel.

POST HARVEST-LOSSES IN WINTER VEGETABLES IN VARANASI DISTRICT OF UTTAR PRADESH

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India is the world's largest producer of many fresh fruits and vegetables, etc. and ranked amongst the world's five largest producers of over 80% agricultural produce items, including many cash crops such as coffee and cotton. India's vast geographical area coupled with varied climate conditions facilitates to grow a variety of fruits and vegetables. At producer level, the post- harvest losses have been found maximum in tomato (14.29%), followed by okra (11.15%) and brinjal (9.55%) and minimum in cabbage (5.44%). At the retail level also, tomato has registered maximum loss, followed by okra, brinjal and capsicum. The maximum aggregate post-harvest losses have been found in tomato.

Keyword: Harvesting,Storages, Transpotation and intermediatries.

IMPACT OF FOLIAR APPLICATION OF NPK ON SUGARCANE YIELD

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Krishi Vigyan Kendra, Nagina (Bijnor) play very important role in dispersion of proven technology on farmer's field through different extension tools viz. front line demonstrations, farmer's trainings, farmer's fairs, kisan goshthi etc. due to these extension tools many farmers motivated for newly developed technologies and establish direct contact to scientist. Those farmers conducted your farming under direct supervision of the scientists and time to time they asked many question to scientist how to increase the productivity of crops by minimum cost.KVK scientists given many technical suggestions to farmers one of them foliar application of water soluble NPK (19:19:19) fertilizer was given and under advisory service ten innovative sugarcane growers were selected to increase the productivity of sugarcane through use water soluble fertilizer during 2010–11. Foliar application of NPK (19:19:19) fertilizer was made in the two split doses, first dose was sprayed at 50 days after sowing and second at 75 days after sowing. Other agronomic practices were carried out uniformly according to the farmers practice. Sowing of sugarcane was done in between 10 to 20 March 2010. It was observed that foliar application of nutrients directly affected all the growth parameters of sugarcane such as plant height, cane diameter and cane length was increased by the application of NPK fertilizer over the control. The average yield of sugarcane was recorded under NPK treated plot 720 q/ha whereas control plot was given only 610 q/ha.

IMPACT OF PLANTING METHOD ON SUGARCANE YIELD

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Sugarcane (*Saccharum officinarum* L.) is the major cash crop of western Uttar Pradesh. It is not only provides main stay to sugar industries but also provides raw material to many allied industries like alcohol, power and paper etc., and a source of employment directly or indirectly peoples of country. The major causes of low yield at farmer's field are conventional planting method, delayed

sowing, poor seed management, poor germination, imbalanced nutrient management, lodging and damage by wild animals. Conventionally sugarcane is planted in 60-75 cm spacing which may result increased plant population per unit area but hinders various management practices. Therefore, it is necessary to maintain proper plant population, facilitating light penetration, air circulation, water saving and inter-tillage operations. Trench planting may be convenient and efficient planting system in saving irrigation water and reducing lodging due to easiness in inter-culture and earthing-up operations. Cane lodging importantly reduces the crop yield and also increased the juice quality. Krishi Vigyan Kendra, Nagina (Bijnor) played very important role in popularization of trench method among the farming community through different mechanism. In this method sugarcane yield was increased about 35-40% in comparison to traditional method of planting. The average yield of farmers field was recorded 98.50 tons /ha where as traditional method gave only 58.5 ton / ha. Planting of sugarcane under trenches gave higher economic returns than conventional method of planting. Now area under this technology has spread more than 35000 ha and 18% area of traditional method was successfully replaced in district by this method.

POLLUTION ECOLOGY OF FRESH WATER BODIES IN DISTRICT OF ETAH.

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Fresh water bodies are being polluted by a multitude insecticides used in agricultural practice for best control .Insecticides are carried through food chain,their concentration increase at each link and present a threat to man when we consume the hydrobionts from polluted water .The present study was carried out over a period of 2014-2015 .The sample were subjected to investigation of various physico chemical parameters and biotic factors .Water temperatur colour ,pH,DO,BOD,alkalinity and phosphate. Community consisted of protozoans ,rotifersand arthopods.

Keywords: Pollution ecology,lakes microorganisms

ENDOPHYTIC (*Trichodermasp.*) FROM SUGARCANE AND THEIR INHIBITORY POTENTIAL AGAINST THE RED ROT PATHOGEN (*Colletotrichum falcatum*WENT)

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*Trichoderma*speciesare cosmopolitan fungi which exist in nature as free living soil fungior in endophytic association with various plant species. In recent years a number of studies have explored the diversity of endophytic *Trichoderma* from various crop plants as well as their potential for management of plant diseases. Sugarcane is an important commercial crop of India cultivated in approximately 5 million hectares area in the country. Red rot of sugarcane,caused by the fungus *Colletotrichum falcatum*Went,is the most important disease affecting sugarcane. However, there is scanty information on endophytic *Trichoderma* sp. from sugarcane and their potential as antagonists of *C. falcatum*. The present study was carried out to isolate and characterize endophytic *Trichoderma*sp. from sugarcane and study their inhibitory activity against *C. falcatum*. In the present study we established 16 endophytic *Trichoderma* isolates from roots and leaves of six (Co 1148, CoJ 64, CoS 767, Co 7701, CoLk 94184, Co 0238) sugarcane varieties. Frequency of isolation of *Trichoderma* was considerably higher from roots than leaves with 15 isolates recovered from the root samples alone.There was considerable variability in cultural characters and growth rates among the isolates. At 30^0C after 72 hours, the radial growth among isolates ranged from 51 mm to >80 mm and bright yellow pigmentation in agar was observed in five isolates. In dual culture studies, percent inhibition in growth of *C. falcatum* by different endophytic isolates was in the range of 32.4 to 67.5%. These results indicate that endophytic *Trichoderma* has the potential to manage red rot and needs to be explored further.

PHYSIOLOGICAL AND BIOCHEMICAL CHARACTERIZATION OF SALINITY TOLERANCE IN FENUGREEK(*Trigonella foenum-graecum* L.)

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In India, the problem of salinity increases every year as a result of secondary salinization which is an ever-present threat to the yield and quality of vegetables. Fenugreek (*Trigonella foenum-graecum L.*) is small-seeded annual legume belonging to family Leguminosae, which is grown as a spice and a forage crop. In order to investigate salinity stress on fenugreek germination indices, an experiment was carried out in complete randomized design. Ten varieties of fenugreek namely RMt-1, RMt-303, RMt-305, RMt-351, Pant Ragini, Azad Methi, Pusa Early Bunching, Desi, Gujrat Methi and Kasuri were explored to screen salt tolerance. To create salt stress, sodium chloride at the levels of 0 (as control), 100 mM and 200 mM were used. Results showed significance difference between evaluated indices with respect to salinity and varieties. Increasing stress levels lead to reduction of germination and growth indices. Results also exhibited a significant correlation between physio-biochemical indices with respect to varietal difference in stress tolerance. The present study concluded that among fenugreek varieties Kasuri and Azad Methi are highly salt sensitive and desi, RMt-1 and RMt-305 are salt tolerant.

Keywords: Germination percentage, Growth parameters, Salt tolerance, *Trigonella foenum-graecum* L, vigour index

MOLECULAR IDENTIFICATION OF BILE TOLERANT *LACTOBACILLUSFERMENTUM* STRAINS ISOLATED FROM HUMAN FAECES

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Lactic acid bacteria are very significant to human health due to their probiotic attributes, production of antimicrobial substances and subsequently to inhibit pathogenic bacteria. The identification of a microbial isolate to genus level imparts a partial characterization of the isolate revealing a lot of information about that organism. Conventional procedures of identification are laborious and time consuming. Moreover, some organisms may be misidentified either at genus or species level. Bile tolerance has been one of the major probiotic criterion while selecting the isolate for probiotic properties. This work aims at looking directly at the genome of Lactobacillus spp. using its genotypic and phenotypic characteristics. The isolates were identified by sequencing specific sections of 16 S r DNA segment, after amplification by PCR, and then comparing the results to sequences from related database. The results from both conventional and molecular methods were then compared. Twenty five isolates (25) of *Lactobacillus fermentum* were isolated from colostrum & fecal samples and identified using API-50 CH. The isolates were further identified using molecular methods by polymerase chain reaction (PCR) amplification of 16S rRNA gene to confirm their identities. The genotypic characterization however showed that 84% of the organisms identified using conventional method as *L. fermentum* correlated, while 16% did not correlate; 2 were identified as *Lactobacillus planterum*, 01 as *L. delbrueckii subsp. bulgaricus*and 01 as *L. paraplanterum*. The molecular methods are superior and widely accepted because of generating a large number of copies of a specific DNA sequence for the identification of unknown isolates enabling to solve the problem of poor identification.

Keywords: *Lactobacillus fermentum*, Conventional methods and Molecular identification

TO ASSESS THE EFFECT OF DIFFERENCE WEED CONTROL METHODS TO YIELD OF LOWLAND TRANSPLANTED RICE IN THE JAUNPUR DISTRICT OF UTTAR PRADESH

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Rice is the principal food for Indian people, being grown in 43.95 million ha, with a production of 104.54 million tonnes in 2014. In Uttar Pradesh area covered 5.98 million ha with the production of 14.63 million tonnes and productivity 24.47 quintal per ha (Anonymous 2014). The rice production has to be increased to meet demand due to population growth. One of the important things on increasing rice production is to minimize crop loss which is caused by weed competition because weeds do not only reduce the rice production but also have an adverse effect on rice grain quality. Mostly weeds offer intense competition with the rice plant for all critical growth factors, viz. space, sunlight, soil water and nutrients thus causing considerable yield losses. Keeping the above point of view an experiment was conducted during kharif season of 2014 at crop cafeteria form of Krishi Vigyan Kendra, Jaunpur to assess the effect of different weed control methods to yield of low land rice (*Orgza sativa* L.). Weed competition will reduce rice yield. It has been conducted from 15 June 2014 until October 2014 with variety Pusa Sugandha-5 (It is non basmati variety but aromatic) nursery was done on 15 June and 23 days old seedling were transplanted. The experiment laid out using Randomized Block design with five treatments (A = unweed control (Weedy check), B = manual weeding (Two hand weeding), C = herbicide

containing Penoxulam + Cyhalofop-butyl, D = Bispyribac sodium, and E = 2, 4 D + Methyl metsulfuron). The results showed that weed control using herbicides containing Bispyribac sodium and 2.4 D + Methyl metsulfuron showed similar results as manual weed control on rice yield. The highest panicle length (19.42cm), grains per panicle (118.92) and test weight (24.47 g) was recorded under herbicide used Bispyribac sodium and all herbicide accepting manual weeding were at par with each other but significantly higher than weedy check. The maximum weed index was observed in weedy check plots.

GILOY (*Tinospora cordifolia*): THOUSAND PROBLEM ONE SOLUTION

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In current scenario, the herbal products are the symbol of safety in contrast to the synthetic drug, that are regarded as unsafe to human being and environment. Medicinal plants are the primary life supporting system for rural and tribal communities and over 800 species of plant have been estimated to be used in indigenous health system. *Tinospora cordifolia* (Giloy) is one of the most important medicinal and endangered rasayana herb. They are mostly found in tropical and subtropical area of India. It is a reservoir of several bioactive compounds such as Alkaloids (tinoporin, palmetine), Diterpenoid lactones (furanolactone, clerodane derivates), glycosides (tinocordiside), steroid (giloinsterol), sesquiterpenoid (Tinocordifolin) and some aliphatic compounds (octacosanol) which possess immunostimulant, antioxidant, antiinflammatory, anticancer and antidiabetic properties. The current paper focused on active components and its therapeutic properties. Giloy posses great potential to treat different ailments like diabetes, jaundice, debility, tuberculosis, rheumatism, ulcer, fever, HIV, cancer, cardiovascular disease, parkinson's disease, etc. Now-a-days this herb is also well known for treatment of epidemic dengue and chikangunia.

Keywords: medicinal plants, secondary metabolites, *Tinospora cordifolia*

DATEPALM: AN OVERLOOKED DIAMOND, EMPOWERING BUNDELKHAND REGION, JHANSI (U.P.)

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Bundelkhand region is characterized by some of the lowest levels of per unit capita income and human development in the country. Five decades of development planning in India has been unable to ensure a decent living for a large number of people residing in the rural areas. Despite many large scale rural development schemes the absolute number of people has not declined substantially; abject poverty still remains ubiquitous in rural region of Bundelkhand.Date palm (*Phoenix dactylifera* L.) belongs to the palm family Arecaceae. Date palm being a drought resistant, highly salt tolerant grown in subtropics and tropical conditions, now days mainly concentrated to south west –Punjab, northern –Rajasthan in north India.Bundelhand region Khajuraho 'Kahjur' is the Indian word for the date palm and Khajurapura the original name of the city, when translated alludes to the imagery of tall date palms, which used to guard the city gates. Datepalm earlier was unheeded, overlooked for many years, but now it has emerged all the way not only in Bundelkhand but progressing to the new levels of success across countries. Datepalm in Jhansi of Bundelkhand due to the region existing in the centre of the map. Jhansi experience a long hot and dry summer and moderate winter temperature, thus the temperature requirement is fulfilled for the Datepalm over Jhansi north central region of the hemisphere. However without being noticed over the decades, date palm exist randomly in Jhansi. In the local atlas of the city Jhansi i.e. Hasari, Sadarbazar, Civillines, Mission Compound, Nagra. Datepalm exists randomly without being notice by the grower and the progressive farmers as its urgency never felt before and now also due to the communication gap and extension activities.In the initial phase, date palm has been proved to be a valuable plant in combating desertification. It creates a unique micro climate for other plant to survive in the mottled sunshine that penetrates through the canopy of the date palms.Date palm global production -5.4 metric tonnes per year. The date palm bears in 4-5 years at 175 plants/hectare, it does not require enough water for planting, estimated yielding rate for 3rd year is 100kg per tree. Datepalm fruit have iron, potassium, calcium; rich source of sugar 70-75%.one kg of fresh fruit of date palm gives about 3,000 calories of energy. Varieties such as Medjool, Shamran, khadarawy, Halawy, Zahidi, Khajoor, the most commonly and easily grown is Barhee, khajoor in Bundelkhand region (Jhansi). Thus datepalm is advocated for Jhansi region of bundelkhand giving their maximum input, with the fruit industry cooperating Agriculture and serving as avita sector of economy in the country, as this plant requires scanty nutrition and water for growth as this plant earlier used to be grown in the gulf countries now it has raised its standard and thus providing employment to the poors as there is a huge scope of products marketing extracted from the date palm.

'MARKET': A PROBLEM OF SUBTROPICAL FRUITS IN BUNDELKHAND REGION (JHANSI)

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Bundelkhand region holds a vast potential for supplying a variety of subtropical fruits throughout the year but due to the prevailing deficiencies in the marketing system for inputs and outputs, losses are enormously high and producers are unable to realize the benefit. The Indian rural market with its enormous size put forward a vast opportunity with 128 million households as the rural population of Bundelkhand region is increased three times more than the multinational cities. In this study, the marketing of subtropical fruits in jhansi district of uttarpradesh have been reported considering major subtropical fruits viz. jamun bael, mango, custard apple, citrus, guava, papaya etc. It has been observed that the major problem faced are high cost of packing material, high commission charges, high cost of transportation, non-payment of time and malpractices. The other problems related to the prevailing, marketing system is the high marketing costs, some other befitting issues have also been mentioned which need to be looked into the policy makers and officials of the mandi committee, so that this bowl of offseason fruits receives its due from its unique potential, particularly in the emerging economic scenario in the country. Linkage with the processors would further help them in getting assured market for equally subtropical fruits in Bundelkhand region Jhansi. The present paper is being brought about with a view to innovate and motivate marketers for product, price, place and distribution of the product.

EFFECT OF NADEP COMPOST ON GROWTH AND YIELD OF DOLICHOS BEAN(*Dolichos lablab* LINN.)

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The experiment was conducted during kharif season to study the effect of different NADEP compost on growth and yield of dolichos bean (*Dolichos lablab* L.). The experiment comprised 12 treatment of different NADEP, chemical fertilizers and both. The results reveal that application of 375 Q NADEP (N2) / hac. provide maximum pod yield (278.40 Q/ha) in treatment T5, followed by T7 (238.93 Q/ha) by using 175 Q NADEP (N5) + 50% RDF of NPK through fertilizers., while minimum pod yield (196.73 Q/Ha) was found in treatment (T12). The pod size, No. of pods /plant and other quantitative parameters were also better with application of NADEP compost.

Keywords: Biofertilizers, NADEP Compost, Dolichos bean

TO STUDY THE EFFECT OF LEVELS OF NITROGEN AND GIBBERELLIC ACID, ON GROWTH, YIELD AND QUALITY OF OKRA(*Albelmoschus esculentus*L. MOENCH) CV. AZAD KRANTI

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A field experiment was conducted of "To study the effect of levels of nitrogen and gibberellic acid, on growth, yield and quality of okra (Albelmoschus esculentusL. Moench) c.v. Azad Kranti"was, carried out at the Horticultural Research Farm, Institute of Agricultural Sciences, Jhansi during kharif season of the year 2015-16.The experiment was laid out in R.B.D. randomized block design with 12 treatment combinations consisting of 4 levels of nitrogen (75, 100, 125 and 150 kg/ha) and three concentrations of GA_3(0, 50 and 100 ppm) replicated three times. Okra cultivar Azad Kranti was shown on 20/08/2015.The salient findings emerge from the results obtained are summarized hereunder. The growth parameters like plant height plant spread, diameter of stem and number of leaves per plant increased with increasing levels of nitrogen from 75 to 150 kg N/ha. The characters were significantly superior under 150 kg N/ha over lower levels of nitrogen.Application of 150 kg N/ha induced the plant to early flowering, fruiting and maturity over rest of the doses.Successive increase in the dose of nitrogen up to 150 kg/ha resulted, in significant increase in number of flowers. The maximum number of flowers 28.93 were registered with the application of 150 kg N/ha.Application of 150 kg N/ha resulted in significantly longest fruit 20.97 cm.Application of 150 kg N/ha resulted in significantly higher girth and weight of fruit over rest of the nitrogen levels.The fruit yield of okra variety Azad Kranti was maximum (121.11 and 89.72 q/ha) in plots receiving 150 kg N/ha and it proved significantly superior over lower levels, of nitrogen. About 11.91, 43.32 and 90.25 per cent enhancement in. production of green fruits over 125, 100 and 75 kg N/ha were noted due to the application of 150 kg N/ha.

Application of Kg N/ha produced significantly more dry weight of 100 g fruits and plant biomass over rest of the nitrogen levels.AH growth parameters, physiological parameter like number of flowers per plant, yield attributing length and girth of fruit, weight per fruit and quality parameter like dry weight o of 100 g fruits and plant biomass were significantly influenced by GA_3. Application of GA_3 at 50 and 100 ppm as seed treatment being at pet to each other resulted in significantly higher value of yield per hectare.None of thecombinations of thenitrogen and gibberellic acid hasshown significant effect on various characters recorded.

IMPORTANCE OF GENETICALLY MODIFIED CROP

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Transgenic crops attracted greater attention at global level. India is facing many major problems that are becoming incurable day by day like climate change, population growth, water and food needs. Climate changes are decreasing the land for cultivation by increasing the drought condition and making India unable to meet water and food needs. All these problems are making India at alarming situation of hunger and it is very difficult to cope up with the demands of the increasing population. By considering this problem we should think about genetically modified crops. The first GM crop approved for commercial cultivation in India is the Bt- cotton which gaining momentum in India, confers resistance to boll worm which create drastic condition in cotton field. The other transgenic crops are brinjal, potato, tomato,bhendi and cabbage under experimental stage. According to ISAAA (International Service for the Acquisition of Agri-Biotech Applications) India has the fourth largest area planted under GM crops, Farmers in India planted a total 11.6 million hectares under transgenicsin 2015.The GM crop acreage in India far surpassed China's 3.9 mh, while equalling that of Canada's 11.6 mh.GM crops are viable solution for malnourishrd, resistance against virus, insect, herbicides, drought and resulting in yield and quality. GM crops can utilized for present and future food and nutritional security. One of the example of biofertfied crop is biotech maize and papaya saved the staple crop of many places. Golden rice, enriched with pro- vitamin A helped many children to overcome from the blindness. So the GM crops are the unavoidable wave of the future and proved as a tool in a toolbox.

CURRENT TRENDS IN PLANT TISSUE CULTURE TECHNIQUES

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Plant tissue culture relies on the fact that many plant cells have the ability to regenerate a whole plant (Totipotency). Single cells, plant cells without cell walls (protoplasts), pieces of leaves, stems or roots can often be used to generate a new plant on culture media given the required nutrients and plant hormones. Plant Tissue Culture is an integral part of molecular approaches to plant improvement and acts as an intermediary whereby advances made by the molecular biologists in gene isolation and modification are transferred to plant cells. Some of the simpler techniques that are more approachable and have been found to be applied directly in plant propagation and genetic improvement of plants are (i) micropropagation, (ii) meristem culture, (iii) somatic embryogenesis, (iv) somaclonal variation, (v) embryo culture, (vi) *in vitro* selection, (vii) anther culture, and (viii) protoplast culture.Plant Tissue Culture (PTC) can be defined as the culture of all types of plant cells, tissues and organs under aseptic conditions. At time when Recombinant D.N.A Technology (Transgenics) facing some problems due to some legal issues raised by some environment and social activists, Plant Tissue Culture based techniques may be boon for farmers to increase their income and production. Micropropagation techniques are being highly explored by scientist to produce disease free plants. The commercial multiplication of a large number of diverse plants species represents one of the major success stories of utilizing tissue culture technology profitably.

Keywords: Plant Tissue Culture, Totipotency, Micropropagation, Crop improvement

POPULATION DYNAMICS OF SHOOT AND FRUIT BORER *Earias vittella* FABRICIUS IN OKRA

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Okra [*Abelmoschus esculentus* (L.) Moench], a native of South-Africa and commonly known as 'Bhindi', is an annual malvaceous vegetable crop, especially grown in tropical and subtropical climatesAmong, several biotic and abiotic factors, the incidence of insect pests are one of the major factors reducing the yield of okra. Twenty different insect species are known to attack okra, inflicting qualitative and quantitative production losses (Butani and Verma, 1976). Nayar *et al.*, (1976) reported more than three dozen insect pests are attacking okra. Unfortunately many of the pests occurring on cotton are found ravaging this crop. Since both cotton and okra belong to family Malvaceae, nineteen insect pests have been reported on okra (Anon, 2009) of which the fruit borer complex create loss by causing both quantitative and qualitative damage to the crop. The present investigation was carried out on "Population dynamics of shoot and fruit borer, *Earias vittella* Fab. in okra" during *kharif*, 2013 at Crop Research Centre, Sardar Vallabhbhai Patel University of Agriculture and Technology, Meerut. The aimed at evaluating the insect fauna associated with okra crop at Meerut. The experiment comprised of nine treatments and laid out in randomized block design with three replications. The population of *Earias vittella* recorded on third week of July and continued till first week of October. Highest population of the pest (25 per cent shoot damage) recorded during last week of August. when average temperature and relative humidity were 30.15ºC and 83.20 per cent, respectively.

EVALUATION OF NEWER INSECTICIDES AGAINST JASSID (*Empoasca kerri*PURTHI) ON BLACK GRAM [*Vigna mungo* (L.) HEPPER

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Direct damage by insect-pests is one of the major causes limiting the yield potential of the crop in different seasons. Indirect damage by insect vector like white fly and aphids that transmit the Yellow Mosaic Virus (YMV) and Leaf Crinkle Virus (LCV) further reduce the yield. Among the major problems known to limit the yields of the pulse crop, incidence of insect-pests are main constrains. The annual loss due to the insect pests has been estimated at about 30% in Black gram (Rabindra *et al*. 2004). Among the various insecticides evaluated against the jassid, Emamectin benzoate 5SG @10ga.i/ha treated black gram crop showed highest reduction in crop damage and gave highest crop yield (11.00q/ha) followed by Emamectin benzoate 5SG @8ga.i/ha (10.30q/ha) treated plots. The highest net income and cost benefit ratio was obtained from Emamectin benzoate 5SG @ 10g a.i/ha, Rs13500 and (1:6.00) followed by Emamectin benzoate 5SG 8g a.i./ha Rs 10350(1:547) and Flubendiamide480SC@37.5ga.i./haRs 9000/ha(1:4.17) and were economical then others. Efficacy of the treatments in order to their superiority were Emamectine benzoate 5 SG @ 10g a.i./ha >Emamectine benzoate 5 SG @ 8g a.i./ha>Flubendiamide 480SC @ 37.5g a.i./ha>Flubendiamide 480SC @ 30g a.i./ha>nuvaluron 10EC @50ml a.i./ha >>Nunaluron 10EC @ 100ml a.i. /ha>Profenophos 50%EC @ 625ml a.i./ha >Profenophos 50%EC 500ml a.i./ha respectively.

GLOBAL WARMING AND ITS IMPACTS ON CLIMATE

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Global warming is the term used to describe a gradual increase in the average temperature of the Earth's atmosphere and its oceans, a change that is believed to be permanently changing the Earth's climate. There is great debate among many people, and sometimes in the news, on whether global warming is real. But climate scientists looking at the data and facts agree the planet is warming. While many view the effects of global warming to be more substantial and more rapidly occurring than others do, the scientific consensus on climatic changes related to global warming is that the average temperature of the Earth has risen between 0.4 and 0.8 °C over the past 100 years. The increased volumes of carbon dioxide and other greenhouse gases released by the burning of fossil fuels, land clearing, agriculture, and other human activities, are believed to be the primary sources of the global warming that has occurred over the past 50 years. Scientists from the Intergovernmental Panel on Climate carrying out global warming research have recently predicted that average global temperatures could increase between 1.4 and 5.8 °C by the year 2100. Changes resulting from global warming may include rising sea levels due to the melting of the polar ice caps, as well as an increase in occurrence and severity of storms and other severe weather events. We cannot just depend on what our respective Governments are doing for the motion; we have to proactive steps towards rendering stability to the environment through energy-conscious systematization at home."

Keywords: Environment, green house gases, biosphere, climate, global warming, temperature

EFFECT OF ORGANIC MANURES AND INORGANIC FERTILIZERS ON PLANT GROWTH, YIELD, FRUIT QUALITY AND SHELF LIFE OF TOMATO (*Solanum lycopersicon*L.)C.V. KS-2

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The field experiment was carried out during the Rabi season 2015-16 to study the "Effect of Organic manures and Inorganic fertilizersson plant growth, yield, fruit quality and shelf life of Tomato (*Solanum lycopersicon* L.) c.v. KS-2", was under taken at Department of Horticulture,Bundelkhand University,Jhansi, The experiment was laid out in randomized block design with 13 treatments replicated thrice. The treatments consisted of different combinations of organic manures i.e., FYM, Poultry manure and Vermicompost and inorganic fertilizers. Among thirteen treatments under study, treatment T_7 (50% RDF + 50% FYM) recorded maximum plant height (133.53 cm), minimum days to first flowering (29.47), maximum number of flower clusters per plant (8.67), maximum number of flowers per cluster (7.27), maximum number of fruits per cluster (5.67), maximum number of fruits per plant (36.72), maximum average fruit weight (41.67g), maximum fruit yield per plant (849 g), maximum fruit yield per plot (13.50 kg) and maximum fruit yield per ha (33.77 t) followed by the treatment T_8 (50% RDF + 50% Poultry manure). Among quality parameters TSS (5.0^0B) was found maximum in T_7 (50% RDF + 50% FYM) followed by treatment T_9 (50% RDF + 50% Vermicompost) whereas juiciness (33.84%), titrable acidity (1.06%), Ascorbic acid content (26.54mg/100 g fruit juice) and shelf life (11.67 days at normal room temperature) was maximum in treatment T_9 (50% RDF + 50% Vermicompost) followed by T_7 (50% RDF + 50% FYM). Maximum gross returns (Rs.3,37,700 ha^{-1}), net returns (Rs.2,14,925 ha^{-1}) and B:C ratio (2.75:1) was found with T_7 (50% RDF + 50% FYM).

EARTH WORMS AND EUSOCIAL INSECTS AS POTENTIAL ALTERNATIVE SOURCES OF PROTEIN FOR POULTRY FARM

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This study set out the nutritional composition of termites and earthworms and their potential value as alternative sources of animal protein in poultry diets. It has been demonstrated that termites and earthworms have high nutritional value and that they may be an important source of protein, carbohydrate, fats, vitamins and minerals. In U.P., feed costs account for over 65% of the total production costs in commercial poultry production, as nearly all the ingredients used in manufacturing feeds are imported. This makes the prospect of utilizing insects which are available in nature for most part of the years as alternative sources of proteins feasible. Nutritionally, it has been shown that termites and earthworms compare favourably with fish meal, which is the main animal protein source in poultry diets. Based on the high nutritive value of termites and earthworms, it seems that there is need to carry out extensive research on their production in order to enable their use in smallholder poultry production.

Keywords: Earthworms, fish meal, nutrition, poultry

MALATHION INDUCED SUB-LETHAL RESPONSE ON HEMATOLOGICAL PARAMETERS OF *Heteropneustes fossilis*.

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The effect of three different sub-lethal concentrations of Malathion pesticide was tested with two time intervals on the hematological parameters of a cattish*Heteropneustes fossilis*. The hematological indices studied were : erythrocyte number (RBC), hemoglobin concentration (Hb), packed cell volume (PCV), mean corpuscular hemoglobin (MCH), mean corpuscular volume (MCV), mean corpuscular hemoglobin conceptration (MCHC) and differential counts (lymphocyte, monocyte and eosinophil). In both the time duration (6 days and 10 days) studies, the effect of pesticide was concentration dependent. In general, RBC, Hb, PCV, MCH, MCHC, monocyte and eosinophil count decreased significantly where as MCV and lymphocyte count increased significantly. The percentage changes in different indices were relatively higher in fish exposed to the pesticide for 10 days.

Keywords:Malethoin, hematology, *Heteropneustes fossilis*.

THE EFFECTS OF POLLUTION ON FISH HEALTH

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Globally, water bodies are primary means for disposal of waste especially. The effluents from industrial, municipal, sewage and agricultural practices near the water body. The harmful substances e.g. heavy metals, insecticides and hydrocarbons are often released in to the aquatic environment. When large quantities of pollutants are released there may be immediate impacts of measured by large scale sudden mortalities of aquatic organisms e.g. Fish kills resulting from contamination of water ways with agricultural insecticides. The end results, which may occur long after the pollutants have passed through the environment, include immunosuppressant, reduced metabolism, and damaged to gills and epithelia. Effluents and wastes produced by industries should be minimized by using low and non waste technologies; and effluents should be property treated before they are discharged in to aquatic environment.

Keywords: Pollution, fish, environment

CLIMATE CHANGE AND BIOGEOCHEMICAL IMPACTS

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Human activities are causing a significant build-up of heat-trapping greenhouse gases (e.g. carbon dioxide, methane and nitrous oxide) and aerosols in the atmosphere driven by emissions from fossil fuel combustion, industry, agriculture and deforestation. Atmospheric carbon dioxide is more than 40% above preindustrial levels and growing, and levels would be even higher without modulation by land biosphere. Model projections for the coming century suggest that these changes in atmospheric composition will result in substantial global warming and strengthening of the hydrological cycle and there is growing observational evidence of a substantial alteration in climate patterns. Carbon cycle (CO_2 and CH_4) feedbacks to climate, from the land and ocean can significantly affect future climate, but current projections of these effects are highly uncertain. Climate change and other human-driven processes such as land-use changes and ocean acidification will have profound impacts of global biogeochemistry and terrestrial and marine ecosystems.

Keywords: Climate, Biogeochemical, Global Warming

ACCEPTABILITY OF CASSIA FISTULA STARCH ON COTTON FABRIC BY CONSUMERS

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With the emerging worldwide interest in adopting and studying traditional starching methods and exploiting their potential based on different plant source. The essential values of some plants have long been published but a large number of them remain unexplored as yet. In this regard, one such plant is cassia fistula. With this in mind the present research was undertaken to assess the acceptability of starched fabric by consumer. 30 respondents were selected for assessment of the acceptability of starched duptta in term of physical parameters. In order to assess the acceptability of the developed starch a rating Performa was developed based on five point rating scale and was given to respondents to find its relative ranking it was found that cassia fistula starched duptta was acceptable by majority of the respondents. It can be concluded that muslin fabric can be successfully sized with natural starch of cassia fistula seeds.

IMPACT OF NITROGEN FERTILIZERS ON METHANE EMISSIONS FROM FLOODED RICE

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Methane is second most potent greenhouse gas emitted under anaerobic condition in rice soils. Effects of different nitrogen fertilizer application on methane emissions in flooded paddy field were studied. The experiment was laid out in a randomized complete block design with three treatments and three replications. The treatments were control (0 kg N ha^{-1}), urea (120 kg N ha^{-1}) and ammonium sulfate (120 kg N ha^{-1}). In all treatments P (60 kg P_2O_5 ha^{-1}) along with K (40 kg K_2O ha^{-1}) were also applied as basal dose. The cumulative seasonal methane flux was highest in urea 36.3 (kg ha^{-1}) followed by control 35.2 (kg ha^{-1}) and ammonium sulfate 28.5 (kg ha^{-1}). Ammonium sulfate application reduced total seasonal emission by 19.5% as compared to control while it reduced CH_4 emissions by 21.6% as compared to urea application. On the basis of this study we can conclude that application of ammonium sulfate is an effective tool for mitigating methane emissions from rice soils.

Keywords: Rice, Methane, Urea, Ammonium sulfate

IMPORTANT OF PIGEONPEA AS DIETARY SUPPLEMENT FOR INDIAN POPULATION

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Pulses play an important role in Indian agriculture. Besides have high-protein content (21%) with high protein digestibility (68%) and high dietary fibers, these sustain the productivity of cropping system by fixing atmospheric nitrogen through biological process and improving soil fertility. Therefore, the protein rich grain legumes have a special importance in this country. In order to meet requirement of protein for increasing population, it is necessary to increase the production of pulses in Indian.Globally pigeon pea is cultivated on 4.58 million hectare of land with annual production of 3.27 million tones and productivity of 714 kg ha. India is the major pigeon pea growing country and it accounts for 3.5 million hectare area and 2.4 million tonnes of production. Indian peoples consumed Pigenpea as Dal, Dal makhani, Dal bhat, dal Biji. It contain rich in starch, protein, calcium, magnesium, Phosphorous, crude fiber, fat, trace elements and mineral which are essential for human growth and development. Besides, its high nutrition values, Pigenpea are also used as traditional folk medicine in Indian, China, Philippines, and some other nation. The pigeon pea area, production and productivity trends in India in last five decades shown that there was about 2 % increase in the area but yield levels were stagnated around 600-700 kg. The per capita availability of pigeon pea in India gradually is declining and one of the main reasons for this is widening demand and supply gap due to mis-match in growth of human population and production of protein rich pulses. Though, India ranks first in area and production of pigeon pea but the average productivity of crop in low (around 650 kg ha). As a general estimate, poor storage techniques alone contribute up to 10% of the stored seed loss in the tropics.

POPULARIZATION OF MAIZE PRODUCTION TECHNOLOGY THROUGH FRONT LINE DEMONSTRATION IN JAUNPUR DISTRICT (U.P.)

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Maize (*Zea mays* L.) is the most important world's leading cereal crop which can be grown in diverse seasons, ecologies and uses and known as queen of cereal due to unparallel productivity among cereal crops. In India, maize occupies third position both in area and production after rice and wheat. According to advance estimate, maize is cultivated in 8.7 m ha (2010-11) mainly during Kharif season which covers 80 per cent area. In Uttar Pradesh it is grown on 8.12 Lakh ha area with production of 1.16 MT and productivity of 14.37 q/ha. Farmers of area are preferring maize as a suitable alternative to rice in rice – wheat cropping system. Water-limiting potential yield for a site could be determined by growing crops without any growth constraints, except water availability (Singh et al,2001) However, the productivity of maize in Jaunpur district is very low as compared to average national productivity(17.7 q/ha). Lack of suitable high yielding varieties as well as poor knowledge about production practices are described as main reasons for low productivity of maize in the district. The study was carried out during 2012-14 at farmer's fields of five adapted villages of District Jaunpur of Uttar Pradesh. Front Line Demonstration on maize crop was conducted on an area of 20 ha with active participation of 50 farmers with improved technologies composed of Pro-316 variety and integrated crop management (deep ploughing + seed treated with thiram 75% WP @ 3g/kg seed). The results revealed that maximum mean grain yield 30.5 q/ha with an increase in 39 per cent over local check (22.0 q/ha). Improved technologies of maize recorded progressively increased average grain yield during two years of study.The extension gap can be bridged by popularizing package of practices of maize including improved variety (Pro-316), use of optimum seed rate, balanced nutrition and recommended plant protection measures.

Improved technologies gave higher net return of Rs. 30,367/-ha with benefit cost ratio 2.65 as compared to local check (Rs. 18,065/-ha, benefit cost ratio 2.05).

BIOLOGY OF *Lipaphis erysimi* KALT (HOMOPTERA: APHIDIDAE) ON TWO SPECIES OF BRASSICACEAE FAMILY

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The Studies on biology of *Lipaphis erysimi* (Kalt.) were carried out in two rabi season i.e 2014-15 and 2015-16 under agroclimatic condition of District, Muzaffarnagar on yellow sarson and peela raya. Total nymphal period of *Lipaphis erysimi* observed high (7.37 ± 4.26 days) on peela raya as compare to (6.78 ±3.9 days) on yellow sarson. The average life span of *L. erysimi* was found 20.6 ± 14.5 days on peela raya and 16 ± 9.2 days on yellow sarson. The average fecundity per female was 43.3 days on peela raya and 42.6 days on yellow sarson. The information so gathered on biological studies of *Lipaphis erysimi* could be useful to predict the population of aphid at any given and we can develop effective control practice to avoid the high yield loss.
Keyword: *Lipaphis erysimi, Brassicaceae*, Biology.

EFFECT OF VARIOUS ORGANIC MANURES ON GROWTH, YIELD AND QUALITY OF SCENTED RICE (*Oryza sativa* L.)

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The study was undertaken to evaluate the effect of organic management practices against integrated use of nutrient sources and chemical fertilizer treatments on growth, yield and quality of scented rice. The integrated use of nutrient sources *viz.*, 50% recommended doses of NPK and Zn through chemical fertilizer and 50% N through FYM provided highest grain yield, yield attributes and total uptake of N, P, K which was at par to the 100% chemical fertilizer (NPK and Zn) treatment. The organic treatments received 100% recommended N combindly through FYM + neem cake + vermicompost (1/3 from each source) along with different management practices provided lower yields. The reduction in dose of nutrients (50% FYM along with PSB and *Azotobacter*)provided significantly lower yield and nutrient (NPK) uptake. The regular application of 100% nutrients through organic sources (FYM, VC and NC) showed appreciable increase in organic carbon and availability of nutrients (NPK) and higher decline in soil pH and EC as compared to INM and fertilizer treatments. The availability of nutrients in 100% NPK through chemical fertilizers and INM treatment was at par. The higher profit was obtained in INM treatment followed by 100% chemical fertilizer treatment. The conjunctive use of organic sources and fertilizer (INM) proved conducive in sustaining soil fertility and productivity of scented rice in long run.

STUDIES ON PHYSICO-CHEMICAL CHARACTERISTICS OF BLOOD FRUIT (*Haematocarpus validus*BAKH.): AN IMPORTANT INDIGENOUS FRUIT OF MEGHALAYA

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Blood fruit (*Haematocarpus validus* Bakh.) is a very promising ethnic fruit plant grows in Garo Hills andother adjoining regions of Meghalaya. It is an evergreen perennial dioecious woody climber belonging to the family Menispermaceae. Locally, it is consumed as fresh fruits and as processed product like Juice/squash, RTS and other fermented products. Fruits are slightly acidic sweet taste. A detail study on the fruit morphology and nutritional status of this fruit was conducted to popularize this ethnic fruit. The physical characteristics of fruits were studied for the average weight (17.49 g), size (L-37.69 mm, B-28.51 mm), shape (oval to sperical), colour of mesocarp (blood red) and pericarp (pink or dark red), seed size (L-32.54 mm, B-18.81 mm), seed weight (7.22 g), number of fruits per bunch (48), and pulp weight (10.27 g) respectively. The biochemical value of the fresh fruit was analysed for TSS (14.93 °Brix), total sugar (13.33%), reducing (6.66%) and non-reducing sugar (6.54%), acidity(1.024%), ascorbic acid (2.25 mg/100g), protein (12.36 %), β-carotene (39.26 I.U) and anthocyanin (68.67 mg/100g)respectively. From the above result it can be concluded that the fruit contain high amount of nutritional value which could contribute medicinal supplements to the consumers.

Keywords:Blood fruit, physico-chemical, indigenous and ethnomedicinal fruit

ALPHA-AMYLASE ACTIVITY IN GERMINATING SEEDS OF SOME LEGUMINOUS CROPS IN RESPONSE TO SULPHUR DIOXIDE FUMIGATION

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The present study was carried out on the germinating seeds of some widely cultivated leguminous crops of western Uttar Pradesh, viz. *Vignamungo* L. cv.T-9, *Pisumsativum* L. cv. Arkil, *Cajanuscajan* L. cv. UPAS – 120 and *Cicerarietinum* L. cv. Avrodhi on exposure to four different concentrations of sulphur dioxide, viz. 653, 1306, 2612 and 3918 µg m^{-3}. Alpha - amylase activity was calculated as the amount of starch hydrolysed by the germinating seeds. It wasfound to decrease upon increasing the concentration of the pollutant in *Vignamungo*and *Cicerarietinum*. A slight increase was observed in *Pisumsativum* at 653 and 1306 µg m^{-3} and *Cajanuscajan*at 653 µg m^{-3} of SO_2.The maximum decrease was observed at 3918 which was 24.14, 15.48, 28.66 and 9.88 percent in*Vignamungo*, *Pisumsativum*, *Cajanuscajan* and *Cicerarietinum* respectively.The results obtained were tabulated and statistically analysed for the critical difference.

Keywords: legumes, air pollution, sulphur dioxide, alpha-amylase

EFFECT OF CHAMICAL FERTILIZERS ON GROWTH AND YIELD OF OKRA

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The present investigation was conducted at Horticulture research farm A. S. College, Lakhaoti, Bulandshahr. The experiment was carried out in randomized block design with three replication of twenty eight treatment combinations including three levels of nitrogen , three levels of phosphorus and three levels of potash .In which Okra (*Abelmoschus esculentus* L.Moench) cv. Pusa Sawani,was usedto study on growth and fruits yield response of nitrogen(85,60 and 35Kg/ha) , phosphorus (40,60,and 20 Kg/ha) and potash(40,60,and 20 Kg/ha). It revealed that the application of 85 kg/ha. nitrogen ,phosphorus 60kg/ha and normal dose of potash 40kg/ha. produced significantly maximum, plant height, days to 50% flowering, length and width of broad leaf , diameter of fruit and green fruit yield compared to 60 kg/ha, 35 kg/ha nitrogen , 40 kg/ha and 20 kg/ha phosphorus and 60kg/ha and 20kg/ha potash. The green fruit yield could be economical and profitable with application@ 85 kg/ha nitrogen,@ 60 kg/ha phosphorus and normal dose of potash 40 kg/ha of okra in western Uttar Pradesh condition.

Keywords: Okra, Nitrogen, Phosphorus, Potash and Fruit Yield

CONSERVATION OF PlANT BIO-DIVERSITY

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Each organism in this world whether it is a plant an animal or micro organism is unique in itself .This uniqueness of individuals forms the basis of the diversity among the living organism. Indian sub continent is one of the twelve mega biodiversity centres and represents two of the eight Vavlovian centres of origin and diversity of crops plants and two hot spots of biological diversity also occur in India ,one of in the western Ghats and other in the north-eastern Hamalys.Genetic diversity is essential to develop improved cultivars with broad genetic base and wide adoptability .So therefore ,collection of germplasm is essential to conserve the genetic diversity and to minimize its loss due genetic erosion and extinct. The main reason loss of bio-diversity leads reduction of the genetic base of a species due to human intervension and environmental changes. The genetic erosion replacement of landraces varieties with improved varieties ,modernization of agriculture extension of farming into wild habitats and grazing into wild habitats .Interest constitute an invaluable reservoir of genetic .Conservation of plant biodiversity can be conserved in India . *ex-situ* conservation, conservation of germplasm away from its natural habitat *ie*. whole plant such as field gene bank (on

farm conservation),of landraces and indigenous cultivars , botanical/ herbal garden ,arboreta and other method of conservation plants parts are conserve in gene bank / seed gene bank ,pollen bank ,tissue culture repository DNA library and other method of *in-situ* conservation in its natural habitat or in the area where it grows *ie*. Identified biosphere reserves, nationalpark, gene sanctuaries and wild life sanctuaries

WATER POLLUTION: CAUSES, EFFECTS AND CONTROL

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Water pollution is a serious problem for the entire world. It threatens the health and well being of humans, plants, and animals. As the world became more industrial and smaller due to communications and trade, accidental and purposive hazardous dumping has contributed to the problem of sea pollution. All water pollution is dangerous to the health of living organisms, but sea and river pollution can be especially detrimental to the health of humans and animals. Another serious consequence of this pollution is the effect of this pollution on trade in the polluted areas. This paper tries to discuss basically what water pollution is and equally to address the causes, effect and control as a whole.

Keyword: Water Pollution, Effects, Control and Environmental Education

AGRICULTURAL MARKETING SCENARIO OF INDIA

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Agricultural marketing scenario in the country has undergone a sea-change over the last five decades owing to the increases in the output of agricultural commodities and consequently in their marketed surpluses; increase in urbanization and income levels and thereby changes in the pattern of demand for farm products and their derivatives; slow and steady increase in the link-ages with the overseas markets; and changes in the form and degree of government intervention in agricultural markets. Therefore, the framework under which agricultural produce markets function and factors which influence the prices received by the farmers now need to be understood in a different perspective compared to that in the past. The role of marketing now starts right from the time of decision relating to what to produce, which variety to produce and how to prepare the product for marketing rather than limiting it to when, where and to whom to Sell. Agricultural marketing plays a crucial role not only in stimulating production and consumption, but in accelerating the pace of economic development. Its dynamic functions are of primary importance in promoting economic development. For this reason, it has been described as the most important multiplier of agricultural development. The agricultural marketing system plays a dual role in economic development in countries whose resources are primarily agricultural. Increasing demands for money with which to purchase other goods leads to increasing sensitivity to relative prices in the part of producers, and specialization the cultivation of those crops on which the returns are the greatest, subject to socio-cultural, ecological and economic constraints.To protect the farmers' interests and to ensure adequate availability of food grains for official procurement from the unfair practices by private grain traders, a large number of restrictions were imposed by the central and state government. However, excessive regulations of domestic marketing had resulted in increased marketing costs, risks and uncertainty, which impacted the performance of agriculture sector. Excessive regulations dampen growth through suppressing competition in the market. Further, India has achieved food security at the national level through its interventionist policies in input and output markets. However, it is not sustainable to continue with controlled markets for long time. To achieve higher growth and move the sector in long term sustainable growth trajectory, market reforms in agriculture need to be undertaken.As a result a broad consensus has emerged about the need for reforms in agriculturalmarket policies and quite significant reforms have been implemented in recent years, as part of the ongoing policy reform process in India. In a liberalized trade regime for both domestic and foreign trade, prices stabilize across the states and there are welfare gains to producers, consumers and wholesale traders at the national level. Deregulating domestic trade results in steep decline in government costs of procurement and storage of cereals. Decentralised procurement at market prices for safety net programme can be used in a cost effective manner.Efficient markets encourage efficient allocation of land resources across crops. Better and hindrance-free transportation infrastructure reduces transaction costs of private traders and hence adds to welfare gains. Agricultural commodities move in the marketing chain through different channels. The marketing channels are distinguished from each other on the basis of market functionaries involved in carrying the produce from the farmers to the ultimate consumers. There are various organizations and institutions that provide direct or indirect assistance to agricultural marketing in India. Depending on the objectives and role, the marketing institutions can be grouped into public organisations and co operatives and other informal bodies.Law is one of the key tools available to policy

makers wishing to reform agricultural**.** Marketing system Programme to liberalize agricultural marketing have to be based on adequate understanding of relationship between law and the functioning of marketing system. A series of measures, such as the Agricultural Produce Market Act, the Weights and Measures Act, the Agricultural Produce (Grading and Marketing) Act, etc. have been enacted for the marketing of agricultural produce in more orderly manner beneficial to the farmers. Under these measures, marketing practices are regulated, marketing charges are clearly defined and specified, unwarranted deductions are prohibited, correct weighments are ensured, suitable arrangements for the settlement of disputes regarding quality- weighments, deductions, etc. are made, reliable and correct information of prices is supplied and suitable quality standards and standard contracts for buying and selling are enforced. The Karnataka Agricultural Produce Marketing (Regulation) Act, 1966, came into force on 1st May, 1968. Section 154(1) of the Act repeals the previous Acts on the subject in force and provides for the continuance of the market committees constituted under those Acts until the constitution of market committees under the new Act. The Karnataka Act provides for a well organised regulation of marketing of agricultural produce in the state. However in order to bring the Act in tune with the provisions of Model Act it has been amended several times. Reforms in Indian agricultural markets need to be introduced with caution. A proper regulation and competition regimen needs to be put in place before liberalizing agricultural markets in favour of major privatisation. Due diligence needs to be adopted lest undesirable anti-competitive behaviour may offset the likely gains. There has been evidence that a greater number of market participants does not always lead to superior outcomes. Agricultural markets tend to suffer from vertical market failures, which impair the performance of input markets and output supply chains.

Keywords: Agriculture Marketing, Commodity Price, Agriculture Produce and Procurement.

PATTERNS OF CROP DIVERSIFICATION IN INDIAN SCENARIO

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Patterns of crop diversification of modern agricultural technology, especially during the period of the Green Revolution in the late sixties and early seventies, there is a continuous surge for diversified agriculture in terms of crops, primarily on economic considerations. Indian agriculture is increasingly getting influenced more and more by economic factors. This need not be surprising because irrigation expansion, infrastructure development, penetration of rural markets, development and spread of short duration and drought resistant crop technologies have all contributed to minimizing the role of non- economic factors in crop choice of even small farmers. What is liberalization and globalization policies are also going to further strengthen the role of price related economic incentives in determining crop composition both at the micro and macro levels. Obviously, such a changing economic environment will also ensure that government price and trade policies will become still more powerful Instruments for directing area allocation decisions of farmers, aligning thereby the crop pattern changes in line with the changing demand-supply conditions. In a condition where agricultural growth results more from productivity improvement than from area expansion, the increasing role that price related economic incentives play in crop choice can also pave the way for the next stage of agricultural evolution where growth originates more and more from value- added productions.

Keywords:Crop Diversification, Crop Composition, Economic Environment, Green Revolution and Cropping Pattern.

ESTIMATE OF CORRELATION COEFFICIENTS OF YIELD CONTRIBUTING CHARACTERS IN WHEAT (*T. astivum L.em. Thell)*

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Wheat (*Triticum aestivum L. em. Thell)* is the second most important staple food crop of the world after rice. It is cultivated widely around the world due to wide adaptation and greater role in human nutrition as well as in agricultural economy. 42germplasm of bread wheat, showing wide spectrum of variation for various characters, were evaluated in normal soil under timely sown and irrigated conditions in randomized block design having 3 blocks at the main experiment station of Janta Vedic College Baraut (Baghpat).The observation were recorded 11 yield contributing characters and statistical analyzed. The phenotypic correlation coefficients were higher than genotypic correlation coefficient. At phenotypic level, seed per plant positive and significant correlation with harvest index, biological yield per plant and affective tillers per plant.

Effect of Radiation (Gamma rays stimulation and Ethyl Methane Sulphonate (EMS) on Quantitative Traits in Cowpea (*Vigna unguiculata* (L.) Walp)

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Cowpea is an important food legume and an integral part of traditional cropping system in the semi-arid regions of the tropics. Its grain and leaves are rich sources of high quality protein and vitamins. Mutation breeding has employed successful for crop improvement to supplement the efforts being made through conventional methods of plant breeding. Gamma rays can damage or modify important components of plant cells. The experimental materials for this study consist of two varieties of cowpea viz; Pusa Komal and V-240 (Rambha) were treated with different doses of gamma rays, EMS and their combination. The experiment was extended over three cropping seasons i.e. M_1, M_2 and M_3 generation were raised. The data were recorded in M_1 for germination percentage, pollen sterility and pollen survival. The immediate effect of mutagenic treatments on germination, plant survival and pollen sterility was studied. All the mutagenic treatments caused considerable damage to the genetic material. Dose dependent increase in biological damage was recorded with all the three mutagens used. Among the three mutagens treated, gamma rays caused maximum biological damage, followed by EMS and combined in M_1 generation. The highly damaged plants can be identified early, as they are expected to yield mutation with higher frequency in the succeeding generations.

Keywords: Mutation, EMS, gamma rays, frequency

DBMS FOR PHYSICAL PROPERTIES OF SOIL HEALTH TO INCREASE THE PRODUCTIVITY

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Database Management System is an organized collection of data. It is the collection of schemes, tables, queries, reports, view and other objects. The Database Management System in Agriculture needs to empower farmers, agricultural planner and learner. Soil health is most important for agriculture. Soil is a mixture of minerals, organic matter gases, liquid and countless organisms that together support life on earth. All soil has some physical (texture, structure etc.), chemical (pH, salinity etc.) and biological properties (photosynthesis, reproduction etc.). A database can be created with the help of entity-relationship (E-R) diagram to analyze the physical properties of soil by its various physical properties as tables (entity) and sub properties as fields (attribute). There are several methods to draw E-R diagram, example Chen style, Information Engineering Style etc. A database of physical properties of soil could be help to the farmers to maintain their soil's health and fertility in terms of production.

Keywords: Database, soil, E-R diagram

ROLE OF LYCOPENE IN HUMAN HEALTH

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Tomato *(Lycopersicon esculentum)* now enjoys worldwide distribution and is integral to the culinary disposition of multiple cultures. They are relatively easy to grow, produce large yields of fruit and are a flavorful addition to many meals. Tomato is so poupular as its several thousands of varieties are available in local nurseries and can grown in home gardens. Tomato plants are generally not especially drought-tolerant, but some will perform better than others under drought conditions. Specifically, Tomato ranked 16 among all fruits and vegetables as a source of vitamin A, 13th in vitamin C and when adjusted for consumption, the most important provider of these two vitamins in the diet. Tomatoes also contain significant amounts of lycopene, $-carotene, magnesium, niacin, iron, phosphorus, potassium, riboflavin, sodium and thiamine. Lycopene is the most abundant carotenoid found in human serum, and therefore, most important in terms of net antioxidant activity. Like other carotenoids, it has been implicated in the prevention of several types of cancer and degenerative diseases. It has been shown by several studies to be the most effective singlet oxygen quencher among all carotenoids. Lycopene controlled mammary tumorogenesis in a high-tumor-strain of mice Habitual consumption of lycopene via tomatoes has been demonstrated to reduce the incidence of digestive tract cancer.

Keywords: Antioxident, Cancer, Lycopene, Tomato.

BIO-EFFICACY OF THE PETROLEUM ETHER EXTRACT OF *Azadirachta indica* (*A. juss.)* SEEDS AGAINST MUSTARD APHID *Lipaphis erysimi* KALTENBACH AND ITS NATURAL PREDATOR *Coccinella septempunctata*(LINN).

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The Indian neem tree *Azadirachta indica* (*A. juss.)* is well known for its insecticidal properties, each and every part of this tree shows its insecticidal effect in different insect species. The use of plant extracts as insecticides is gaining global importance due to their biodegradable and ecologically compatible nature and ill effects of synthetic and chemical pesticides such as pest resistance, pest resurgence, detrimental effects on non target organisms and environment. Present experiment was conducted to examine the efficacy of petroleum ether extract of neem seeds against mustard aphid *Lipaphis erysimi* Kalt which is known to cause a serious damage to *Brassica* oil seed crop of our country and its natural predator *Coccinella septempunctata* (Linn.). A stock solution of 8% concentration was prepared in distilled water. The control consisted of distilled water only. Present study reveals on bio efficacy of the neem seeds against mustard aphid *L. erysimi* shows significant effectiveness as 4% extract caused complete mortality of 3rd instar nymphs and adults of apterous viviparous females after 96 hrs. of a single spray, lower concentrations found also effective but required more time for complete mortality. Fecundity was also affected significantly, since all the apterous viviparous females died within 72 hrs. aftera spray of 4% conc. The number of young ones produced after 48 hrs. of the spray of 2, 3 and 4% was found to be 21,14 and 13 respectively against 37 in control. The extract was however, found to be non toxic for the natural predator of aphid *Coccinella septempunctata* in the present study.

REVIEW: MANAGEMENT OF PHYTOPHTHORA BLIGHT OF PIGEONPEA CAUSED BY *Phytophthora drechslerif.sp.cajani*

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Pigeonpea is one of the major legumes and it is one of the most important among edible legumes of the world. Diseases are major constraints affecting both production and yield stability of pigeonpea (Kannaiyan and Nene, 1984). In IndiaFusarium wilt, Sterility mosaic, Phytophthora blight and Phoma stem canker are considered most important diseases of pigeonpea causing extensive damage to the crop. Pal and Grewal (1976) reported that the addition of potassium at 50 kg/ha in the form of potassium sulfate decreased the incidence of Phytophthora blight of pigeonpea, regardless of the presence or absence of nitrogen or phosphorous in the soil. According to Chauhan and Singh (1991), the weed canopy reduced splash dispersal of *Phytophthora drechsleri* f. sp. *cajani*from soil to aerial plant parts, thus reducing disease intensity. One isolate each of *Pseudomonas fluorescens* and *Bacillus subtilis*, and two species of *Trichoderma* (*T. viride* and *T. hamatum*) were effective against *Phytophthora drechsleri* f. sp. *cajani*in in vitro tests. Mycelium of *Phytophthora drechsleri* f. sp. *cajani*lysed by *P. fluorescens* and *B. subtilis*, whereas *Trichoderma* species overgrew in dual culture (Singh, 1996). In addition to antagonistic potential, *P. fluorescens* was also compatible with metalaxyl, mancozeb + metalaxyl, captan, thiram and carbendazim. *T. viride* and *T. hamatum* were compatible at 0.6 and 0.3% of metalaxyl and 0.3% of mancozeb + metalaxyl, whereas, *B. subtilis* was compatible with metalaxyl only at 0.3%. Growth and sporulation of *Trichoderma sp.* and *T. viride* was not adversely affected at 1000 ppm of metalaxyl and 100 ppm of mancozeb + metalaxyl. However, *T. hamatum* was sensitive at higher levels of treatment. Singh *et al.* (1997) investigated 258 pigeonpea genotypes to locate field resistance against *Phytophthora drechsleri* f. sp. *cajani*. They placed 93.5% entries in the highly susceptible category compared with only 7 resistant genotypes (BDN 627, Sehore 197, Sehore 197-1, ICPL 187-1, ICPL 84052, ICPL 84023 and ICPL 88009).

CHARACTERIZATION OF *Rhizoctonia solani* ISOLATES ASSOCIATED WITH SHEATH BLIGHT DISEASE OF RICE IN INDIA

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Sheath blight is one of the most important diseases of rice, resulting in significant yield loss in rice every year. It is caused by *Rhizoctonia solani* Kuhn. The reasons for this disease severity have been attributed to the variation in host genotype, virulence of

the pathogen, prevalence of congenial soil physico-chemical and plants' surrounding environment and cultural practices. The rice-based intensified cropping system, edapho-climatological and host variations make the disease problem more complicated. However, the incidence and severity of the disease differ from one location to other, one geographical area to other and even differs from country and region wise. Frequent assessment of pathogen diversity is one of the most important criteria in designing disease management programmes. A study on diversity of field isolates of *Rhizoctonia solani* from sheath blight-infected rice fields of Northern India has been carried out. Thirty-five number of isolates of *R. solani* from rice obtained from 45 locations in the surveyed area and 2 no. of *R. solani* isolated from potato were used in the present study. Cultural and morphological characteristics revealed considerable diversity among the *R. solani* isolates. Cultural and morphological analysis of Northern Indian isolates of rice has indicated that the diversity among the isolates does not correlated with their origin. Sclerotial features such as colour, size and shape and distribution pattern were varying among isolates. Majority of the *R. solani* isolates were fast growers as they attained complete mycelial growth within 2 days in a 90-mm Petri plate and the emergence of sclerotial structures was seen even in 4 days of incubation. Colony size, colony growth, colour and sclerotia formation (central, peripheral or scattered), location (aerial or surface) and texture (smooth or rough) varied in these isolates. Knowledge of variations in *Rhizoctonia Solani* causing rice sheath blight disease in different geographic regions may be a useful tool for examining the nature and spread of population, disease epidemiology and host-pathogen interaction within rice patho-system.

Keywords:Rice sheath blight; *Rhizoctonia solani* morphological diversity; sclerotial variability, mycelial characters

ENVIRONMENT P0LLUTION, CONTROL AND MANAGEMENT

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Pollution is an undesirable change in physical, chemical or biological characteristics of air , water and soil that may harmfully affect on men , animals and plant life, industrial progress, living conditions and cultural assets. Environment pollution is actually the result of urban – industrial technological revolution and speedy exploitation of every bit of natural resources. Pollution are of various types: Air, Water and Soil pollution. Air pollution occurs due to the presence in the outdoor atmosphere of one or more contaminants such as fumes, dust, mist, grease, smoke or vapour in the considerable quantities and of such duration which is injurious to men, animal and plant life or which unreasonably interferes with the comfortable enjoyment of life and property. Water pollution is caused due to addition of excess of undesirable substances to water that make it harmful to men, animal and aquatic life or cause departures from normal activities of various industrial wastes, urban wastes[plastics, glasses, metallic cans, fibres, paper] and chemical pollutants. Various environmental laws are made to control pollution. Environment [Protection] Act 1986: This meant for prevention, control and abatement of environmental pollution control boards. Insecticide Act 1968: It regulates manufacture, import, sale transport, and use of insecticides laying down various rules to reduce risk to human health and health of other organisms. Water [prevention and control of pollution] Act1974: It specifies quality of water for various to control water pollution. Air [prevention and control of pollution] Act 1981: This act is meant for preserving quality of air and preventing air pollution.

GLOBAL WARMING: ISSUES AND CHALLENGINGS

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Particularly in last few years, the winter have lasted longer than usual untimely rains before cutting of crops and sudden rise of temperature during the day. America and Europe had unprecedented show fall. The intensity of Cyclones has also increased. The change of climate world over is being attributed to global warming. It is a phenomenon in winter the temperature of the earth is increasing due to burning of FOSSIL – fuel [Coal, oil and gases] The gases produced by burning this fuel are called green house gases. These are Carbon-di-oxide, Methane, nitrous oxide, hydroflurocarbons, perflurocarbons and Hexafluroxide. The sunrays winning from the sun are shortwave radiation. However, they absorb some of the longer infra-red radiation cooling and hence raising the temperature of Earth. This causes the rise in global temperature by the end of this century temperature is increased 1.5 to 4 degree Celsius.

ROLE OF BIOPESTICIDES IN INTEGRATED PEST MANAGEMENT AND SUSTAINABLE AGRICULTURE

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Over the past 50 years, crop protection has relied heavily on synthetic chemical pesticides but their availability is now declining as a result of new legislation and the evolution of resistance in pest populations. Pesticide use in agriculture can cause undesirable effects on humans and the natural environment. Pesticides can contaminate soil, water, turf, and other vegetation. The environmental impact of pesticides consists of its effects on non-target species. Therefore, alternative pest management tactics are needed. Biopesticides are pest management agents based on living microorganisms or natural products. They have proven potential for pest management and they are being used across the world. Biopesticides are biochemical pesticides that are naturally occurring substances that control pests by nontoxic mechanisms. Biopesticides are living organisms (natural enemies) or their products (phytochemicals, microbial products) or byproducts (semiochemicals) which can be used for the management of pests that are injurious to plants. Biopesticides have an important role in crop protection, although most commonly in combination with other tools including chemical pesticides as part of Bio-intensive Integrated Pest Management. Biopesticides are a vital component of sustainable agriculture. The review outlines the current state of knowledge on the potential role and use of biopesticides in global control of pests.

GENETIC DIVERSITY ON SOME ACCESSIONS OF CHICKPEA *(Cicer arietinum* L.*)*

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Presence of genetic diversity in the base material is very important for crop improvement programme because genetically diverse parents when crossed can bring to gather diversity gene combinations allowing exploitation of selection of superior recombinants. Eco-geographic divergence has often been considered as an index of genetic diversity in the past in want of precise statically method to estimate genetic divergence. The experimental material for present study consisted of 57 genotypes of chickpea from India and exotic origin. The experimental material was evaluated in RBD with three replication at the Farm of C.C.S, University, Meerut and G B P Pant University of Agriculture and Technology, PantNagar during Rabi season . Based on D^2 analysis grouped into ten clusters. An attempt to draw a relationship between the place of origin of varieties and the genetic divergence reveled that the genotypes originated/released from different places were often found to occur in the same cluster while varieties originated from the someplace found place in different cluster. Three important points are to be considered while selecting genotypes. **1-** Choice of particular cluster from which genotypes to be used as parents, 2- Selection of particular genotypes from the selected cluster and **3-** Relative contribution of characters to total divergence. For this purpose intra and inter cluster distance and cluster means were examined.Based on these facts genotypes C-235 of cluster II (Having maximum cluster means for **days to 50% flowering**) PG-93009 of cluster VI(Having maximum cluster means for **days to maturing and harvest index**) PG97-6 of cluster VII(Having maximum cluster means for grain yield per plant) are expected to give promising segregates following hybridization. On the basis of genetic divergence data and breeding performance of the different clusters following combination are suggested to be used in hybridization programme. C-235xPG93009,C-235XPG97-6 and PG93009XPG97-6. These combinations are expected to yield superior segregate in the segregating generation following hybridization.

INTEGRATED NITROGEN MANAGEMENT ON AVAILABILITY OF NUTRIENT AND YIELD OF WHEAT (*Triticum aestivum* L.).

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The experiment was conducted at the Instructional Farm of N. D. University of Agriculture & Technology, Narendra Nagar (Kumarganj), Faizabad (U.P.) to evaluate the integrated nitrogen management on availability of nutrient and yield of wheat (*Triticum eastivum* L.)during Rabi season of 2015-2016. The experiment were comprised of nine treatments viz. absolute Control, 100% RDN through chemical fertilizer, 125% RDN through chemical fertilizer, 75% RDN through chemical fertilizer + 25% N through FYM, 50% RDN through chemical fertilizer + 50% N through FYM , 75% RDN through chemical fertilizer + 25% N through vermi compost, 50% RDN through chemical fertilizer + 50% N through vermi compost, 75% RDN through chemical fertilizer + 25% N through poultry manure , 50% RDN through chemical fertilizer + 50% N through poultry manure , replicated thrice in Randomized Block Design (Factorial).Wheat variety PBW-502 was taken as test crop. The data revealed that the application of 125% RDN through chemical fertilizer significantly increased growth parameters such as plant height, number of tillers and effective tillers running m^{-1}. The same treatment proved most effective in improving the yield and yield contributing

characters viz. number of grains spike^{-1}, grain yield and straw yield excepted test weight. The application of 125% RDN through chemical fertilizer ha^{-1} produced highest uptake of nitrogen, phosphorus and potassium by grain and straw.

Keywords: Wheat, Nitrogen, Growth and Yield.

RESPONSE OF INM ON GROWTH, YIELD AND SOIL FERTILITY STATUS OF RICE (*Oryza sativa*) UNDER RECLAIMED SODIC SOIL IN EASTERN U. P.

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An experiment was carried out in reclaimed sodic soil at Student Instructional Farm of Narendra Deva University of Agriculture & Technology Kumarganj, Faizabad (U.P.) to assess the possibility of improving productivity of rice under two levels of fertilizer N and P application i.e. 75% recommended NP (112.5 kg N + 45 kg P ha^{-1}) and 100% recommended NP (150 kg N + 60 kg P ha^{-1}) with and without organic manure i.e. 10 t ha^{-1} farmyard manure, 10 t ha^{-1} sulphitation pressmud, *in situ* green manuring as *Sesbania aculeata* and 2.5 t ha^{-1} wheat residue. Application of N, P and organic sources significantly increased the plant height, number of tillers, test weight and yield of rice than control. The highest yield of rice was recorded in 100% NP + GM (58.20 q ha^{-1}) over 100% NP (50.10 q ha^{-1}) and 100% NP + wheat residue (54.20 q ha^{-1}) treatments. The use of organic manure decreased soil pH and its combined use with fertilizers were significantly reflected in the buildup of available N, P, K, O.C and DTPA-extractable Fe and Mn content of the soil.

Keywords: Reclaimed sodic soil, rice, FYM, green manure, sulphitation pressmud, wheat residue, soil fertility.

CHARACTERIZATION OF CHITOSAN-CELLULOSE HYDROGEL BEADS AS ADSORBENT FOR DYES

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The application of biopolymers like chitin and cellulose in the form of small beads is one of the emerging adsorption techniques for the removal of dye, heavy metals ions and other pollutants even at low concentrations. Chitosan, a natural poly-amino saccharide, obtained from deacetylation of chitin, a polysaccharide containing unbranched chain of –β (1→4) -2 acetoamido-2 deoxy –β glucose. Pure chitosan beads have poor mechanical strength which was improved to some extent by using crosslinking agent like glutaraldehyde. On the other hand, mechanically strong hydrogel beads can be obtained by grafting in which side chain grafts are covalently attached to the chain of a polymer back bone resulting the formation of branched chain co-polymer. These are some reports showing stabilization of cellulose immobilization on chitosan to from chitosan-cellulose composite beads. These beads are known to adsorb a number of metals and some of other pollutants. Chitosan-cellulose beads crosslinked with glutaraldehyde have been prepared by us and their removal efficiency for dyes was studied. The formulated beads have been characterized by SEM, FTIR, XRD and DSC analytical methods. Their swelling behavior has also been studied at different pH (3.0, 7.4 and 10.0) which proves that swelling is more in acidic medium than in basic. Present color removal efficiency for dye effluents has been estimated and found to be dependent of initial dye concentration, temperature and pH. The results calculated that chitosan-cellulose beads can be used to remove color in dye contaminated effluents to improve water quality discharge from industries.

CLIMATE CHANGE: IT`S IMPACT ON SOIL EROSION & INEFFICIENT WATER MANAGEMENT

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Due to drastic change in climate it's also affect our soil and vegetation related issues. Where soil erosion is directly linked to deterioration of soil health.Which in turn affects crop productivity and sustainability. Erosion of soil also take away with it every year 14 million tones of such major nutrients as nitrogen, phosphorus and potassium from the country`s soils. Red and lateritic soils are particularly prone to this problem. Intensive cropping has further hastened the process of nutrient removal. The eastern part of the country is the worst affected with respect to loss of soil organic matter beside parts of western India land. Soil organic matter is one of the key resources supporting crop productivity. However it is dynamic resource responding to the changing land uses and

input ratios. It has a significant bearing on soil properties related to productivity as also erosivity. Under intensive cropping and imbalanced fertilizer application systems. Government of India has not estimated the economic losses due to impacts of all the factors and processes of land degradation. According to the Tata Energy Research Institude (TERI) New Delhi,the economic losses caused by lower crop yields and reduced reservoir capacity has been estimated to be in the range of 89-232 billion rupees, as a result of loss of 11-26% of agricultural output. Inefficient water management is also observed at all levels. City province and village leadings to drought like situations. In place of acute water scarcity, long hours are spent. In collection of water, which affects the quality of life in a direct loss of country economy. The availability of renewable freshwater resources per capita India has fallen from 6000 cubic meters in 1947 to about 2300 cubic meter in 1997 (TERI Report).According to world bank study ,India losses 1.2-6.0 million tons of food grain production every year due to water logging.

Keywords:Soil erosion, Sustainability, Deterioration, Intensive, Cropping.

INTEGRATED NUTRIENT MANAGEMENT QUALITY PARAMETERS IN BRINGAL (*Solanum melengena* L.) CV. PUSA ANMOL

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A field trail were conducted to study of integrated nutrient management on quality parameters in brinjal .The study revealed the combined application of farm yard manure @ 20 t/ha.along with 80:40:40 kg of recommended NPK dose /ha.and Biofertilizer (*Azospirillum* and *Phosphobacteria*) @ 3 kg /ha. Was the best in increasing the quality of fruit, size of fruit and colour of fruit also.

Keywords: *Solanum melongena* L., FYM, Biofertilizer.

PRESENT STATUS AND FUTURE PROSPECTS OF ORGANIC FARMING IN SIKKIM

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India is bestowed with lot of potential to produce all varieties of organic products due to its various agro climatic regions. An inherited tradition of organic farming in several states of the country is an added advantage. In North Eastern state of Sikkim, over the years around 75000 hectares of land has been converted into certified organic farms following the guidelines as prescribed by National Programme for Organic Production. The total geographical area of the state is 7,29,900 hectares out of which farming is done in about 10.20 % area (74,303 hectares) only where all the farming activities take place and rest of the area constitutes of forest cover, permanent pastures, culturable waste, barren and uncultivable, land put to non-agricultural use, land under miscellaneous trees and groves etc.It falls between latitudes 270 5'N to 280 9'N and longitudes 870 59'E to 880 56'E and constitutes 0.22 per cent of the total geographical area and 0.05 per cent population of the country.The main crops are maize, rice, buckwheat among cereals, urd& rice bean among pulses, soybean and mustard among oilseeds. The main horticultural crops are orange & pears among fruits, ginger, cardamom, turmeric and cherry pepper among spice crops, cole crops, peas & bean, tomato, potato among vegetable crops. Besides, production of potato & pea seeds at high altitude and off season vegetables cultivation is done extensively. Of late, cultivation of flowers like cymbidium, rose, gerbera, anthurium is generating good income to farmers and a large number of farmers have adopted floriculture as a commercial venture.Rich biodiversity provides ample scope for on farm production of organic manure which is the main item in the menu of organic farming. Soil is rich in organic matter content which ranges from 2-7 % organic carbon. More than 15,000 ha area is under cardamom with forest cover where fertilizer and pesticides have never been applied. Agricultural operations are carried out only in 10.20 % of the total geographical area and 89.80% of the area has not been touched and affected by chemicals.The results revealed that the average productivity of rice and maize was recorded 14.75 q/ha and 10.7 q/ha of organic cultivators. However, the average productivity of these crops together organic was below to the national average productivity of 21.8 q/ha for rice and 14.49 q/ha of maize reported during 2012.The average number of goat, poultry and cow per household were recorded as 1.05,5.82and 1.05 respectively. These farm animals' figures underline the bright scope of organic farming in Sikkim.The farming system in the state is rain-fed farming system with low input consumption and low productivity which encourages farmers to go for high value low volume crops which has better prospect in organic market.This showed a good scope of organic farming system in the state.

Keywords: Organic Farming, Sikkim, Farming System, Sustainability, Environment, Ecology

SOCIO-ECONOMIC FACTORS AFFECTING ON THE DAIRY ENTERPRISES IN BLOCK MARDAH DISTRICT GHAZIPUR

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The present study was undertaken to identify the find out the socio economic factor of dairy farmers which to the effect of cast and the annual income of different categories of farmers including large, marginal and small on the size and nature of herd mentioned by them milk production and its utilization (Consumption of milk in the family and its disposal to the market) a survey of 16 villages one village from each Nyaypanchayat was selected randomly of Mardah Block in District Ghazipur. The results of the study so for as consumption of milk in the family and its disposal to the market (liter/household/day) was concerned it was found significantly higher at the homes at backward cast group as compared to forward and scheduled caste groups at 5% label of significant. There was no significant effect of annual income on all the parameters viz size of herd on the whole no of cows and buffalos, household. Total milk production, its consumption in the family and disposal to the market (liters/household/day) however higher income group (over rupees 135 thousand annual income) maintained largest herd size (on the hole) number of cows and buffalos per household and the production of milk and its consumption (liters/household/day) in family was also apparently higher as compare to all other income groups.
Keywords: - Milk Production, Dairy farmer, Cattle and Buffalo socio economic character

SOCIO-ECONOMIC FACTOR AFFECTING QUALITY OF RAW MILK IN DAIRY VALUE CHAIN

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In India fastest deterioration in milk quality has been observed in dairy value chain, which needs to be taken into accepted by introducing the concept of clean milk production the present study was conducted in the area of Uttar Pradesh co-operative dairy federation (UPCDF) to marking the socio-economic factor of dairy farmers, which affects the quality from pail to dock level. A total of 150 farmers were selected on the basis of random sampling from six district milk unions of (UPCDF) .The milk samples collected from five different level viz. pail (producer) dairy co-operative society (DCS) And dock (processing plant) were analyzed using methylene blue reduction test (MBRT) to estimate milk quality. The raw milk quality in UPCD dairy value chain was excellent pail, very good at DCS good at dock and accepted at five levels. Data on different of socio economic factor of the respondents were analyzed using different statically methods. The overall result revealed family education status experience in dairying Socio participation land holding capacity and herd size of annual income and milk production and milk sale had positive and significant correlation with the milk quality however, land holding capacity had negative significantly correlation. Social participation and annual income were able to explain 46.22% Variability in the milk quality at pail level at the DCS level social participation land holding and milk sale were able to explain 59.08% variability in milk quality .family size average milk consumption and sale were able to explain 32.18% variability in milk quality at dock level.
Keywords: Pail, Socioeconomic, Dock, Milk quality.

FEEDING PATTERN OF COW IN CHIRAIGAON BLOCK OF VARANASI DISTRICT

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India had approximately 512.07 million No. of Livestock and about 135 million cows found in India. In current senario total milk production of India 132.75 million ton and 278gm milk consumption per/day per/person. About 17.85 percent milk contributed of U.P. in total milk production of India.Feeding pattern is a most important role for cow obtaining of the maximum milk production, about 70% expenditure through feeding of total milk production and other by product of cow and livestock. Chiraigaon Block of Varanasi district had total Number of cows 18180. But feeding policy are not good, some farmer are large, marginal and small, holding capacity of land 4 to 0.5 hectare, not proper pasture land available. Only depend on stall feeding such as conventional feed and unconventional feed. Feed providing by farmer to cause such as Roughages and Concentrate, Both feed are given cows on the basis of milk production and the basis of body weight of animals, feed receive of farmer from scrapping of land, growing of grass or green fodder and purchasing to market. The farmer obtain feeds direct or women and children. Timing of feeding morning, noon and evening are also best, but grazing should be compulsory 2-3 hours in a days. High milk producing cows 3 litres milk production on provide one kg concentrate and 8-10 kg roughages on the 100 kg body weight for better pattern of feeding for cows .

TRANSPOSABLE ELEMENTSAND ITS IMPORTANCEIN DIFFERENTCROP SPECIES

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Transposable elements are the most abundant components of all characterized genomes of higher eukaryotes. It has been documented that these elements not only contribute to the shaping and reshaping of their host genomes, but also play significant roles in regulating gene expression, altering gene function, and creating new genes. Thus, complete identification of transposable elements in sequenced genomes and construction of comprehensive transposable element databases are essential for accurate annotation of genes and other genomic components, for investigation of potential, functional interaction between transposable elements and genes, and for study of genome evolution. The recent availability of the soybean genome sequence has provided an unprecedented opportunity for discovery, and structural and functional characterization of transposable elements in this economically important legume crop. Transposable elements mainly divided in to two parts – Autonomous and non- autonomous. Different examples of transposable elements which help in the evolution of different crop species are such as Ac and Ds in maize, Soy TE in soybean and Ty in yeas**t**. A transposable element also helps in evolution of crops by site directing mutagenesis. TE are nature's tool for genetic engineering as they have ability to copy transpose etc. They can spread simply and independent on normal replication machinery.All the organism present in huge fraction of total DNA sequences. Transposable elements are the major cause of mutations and genome rearrangements. They are used in genetic studies.

BIOTECHNOLOGICAL APPROACHES FOR GRAIN QUALITY IMPROVEMENT IN WHEAT

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Wheat is an important cereal crop which is cultivated worldwide and was one of the first crops to be domesticated some 10000 years ago. Unlike rice and maize, which prefer tropical environment, wheat is extensively grown in temperate regions occupying 17% of all crop acreage worldwide. It is the staple food for 40% of the world's population Other than reporter genes, perhaps the most targetted trait for genetic engineering in wheat is quality. Seed storage proteins (SSP) are contained in the seed of higher plants. These proteins have been classified as albumins, globulins and glutenins on the basis of their solubility in solvents. The high molecular weight glutenin subunits (HMW-GS) genes in wheat are located on the long arm of the homeologous chromosomes 1A, 1B and 1D. Bread-making properties are particularly associated with variation at the *Glu-D1* and *Glu-A1* loci. The level of amylose (low amylose or amylose free) in starch is affected by the lack of *GBSS1* activity (due to mutation at waxy locus) in the developing wheat endosperm Grain hardness in wheat is the most important quality characteristic which affects milling, baking and end-use quality. Various biotechnological approaches like in vitro tissue culture, gene transfer and use of DNA markers have emerged as powerful tools to complement conventional methods of breeding by generating genetic variability necessary for desirable traits and reducing the time taken to produce cultivars with improved characteristics. Among various methods of wheat transformation, particle bombardment has been used widely to develop highly efficient transformation systems for wheat (Vasil et al., 1993; Altpeter et al., 1996). Gene dosage studies have indicated that bread-making quality of wheat could be improved by integration and expression of specific HMW-GS genes (Flavell et al., 1989; Shewry et al., 1995).

Keywords:Reporter Gene,Integration, Expression, Transformation, Bombardment.

SKILL DEVELOPMENT AMONG RURAL WOMEN THROUGH JUTE PRODUCT MAKINGUSING KASUTI EMBROIDERY AND IMPACT ON AGRIBUSINESS

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Jute is natural fiber obtained as an extract from the bark of jute plant. It is a bast fiber used to produce burlape and other industrial fabric. It is known as a golden fiber.Kasutiis traditional regional hand embroidery practiced by women in northern part of

Karnataka state of India. It has been a main occupation and source of income for many rural women from that region.To achieve objectives of the study it was carried out in three stages first stage was design development, second stage was product development and third stage wasskill development among rural women throughtraining program.The study was carried out in Sisarmavillage of Udaipur district. For the design development, the basic motifs of Kasuti embroidery were collected and modified, 30 designs were developed for the development of seven value added articles. These articles included purse, shopping bag, magazine holder, floor mat,toran,wall hanging,pot holder. The designs of Kasuti embroiderywas developed bywoolen thread.Selected designs were evaluated by panel of experts on the basis of suitability.In second stage the seven articles were developed by researcher using modified designs of Kasuti. In the third stage training was conducted to 30 rural women to impart the skill about the Jute product development.All the respondents took interest in training and participated willingly. Allthe respondent highly appreciatedthis effort madeby researcher.It can be conclude that this research will be helpful in women empowerment and promoting the use of jute fabric. As increase the consumption of jute it will give a positive impact to jute agriculture and jute industry. Indirectly it will promote agribusiness.

ROLE OF MOLECULAR MARKERS FOR THE DEVELOPMENT OF VARIETY

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Molecular markers could serve to identify traits that are difficult to identify phenotypically. Durum drought tolerance had shown that some RFLP markers are associated with grain yield and its component traits(grain yield KSUG48, CDO1090, CDO395, BCD1661 Awns length -BCD348, Peduncle length BCD782, BCD292, Early growth vigor BCD758, Productive tillering under stress BCD292, Spike fertility under stress BCD348, Kernel weight BCD342, Leaf rolling indexBCD348, BCD1355f, Canopy temperature CDO669, BCD305, Fluorescence inhibition (Q%) BCD292, BCD758, Leaf water potential (MPa) BCD21, BCD758, Proline content (Dmg/g) BCD758, Carbon isotope discrimination CDO1090, CDO1312, KSUG48)in dryland and with morpho-physiological traits for drought tolerance. The progress in molecular markers mapping will allow the use of molecular markers to be integrated in studying drought tolerance; however, more fundamental studies need to be generated to devise the use of QTL analysis. Molecular markers as new tools in crop improvement have demonstrated usefulness, especially with genes controlling qualitative traits. these new tools will have a better opportunity for demonstrating their true values for crop improvement, when the techniques used by molecular genetics reach a higher degree of automation; then it will be possible to use molecular markers leading to a new "green revolution" in the world of agriculture. Since several QTL studies are available for the same trait using different populations, an important exercise of meta-QTL analysis was also undertaken for PHST. We also plan to undertake joint linkage and association studies to obtain more robust markers associated with genuine QTL. Another desirable area of research at the international level would be genome-wide selection (GWS) or genomic selection (GS), which is yet to be tried at a large scale to become effective for wheat breeding.

Keywords: Molecular Marker, RFLP Markers, Carbon Isotope Discrimination

EFFECTS OF WATER STRESS ON THE DEVELOPMENT AND GROWTH OF CROP PLANTS

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Abiotic stresses, such as drought, extreme temperature, cold, heavy metals, or high salinity, severely disturb to plant growth and productivity worldwide. Drought, is the most important abiotic stress, severely impairs plant growth and development, limits plant production and the performance of crop plants, more than any other abiotic stress. Plant experiences drought stress either when the water supply to roots becomes difficult or when the transpiration rate becomes very high. Available water resources for successful crop production have been decreasing in recent years. Ultimately growth and developments is the result of daughter-cell production by meristematic cell divisions and subsequent massive expansion of the young cells. Under severe water deficiency, cell elongation of higher plants can be inhibited by interruption of water flow from the xylem to the surrounding elongating cells. Drought caused impaired mitosis; cell elongation and expansion resulted in reduced growth and yield traits. Water deficits reduce the number of leaves per plant and individual leaf size, leaf longevity by decreasing the soil's water potential. Leaf area expansion depends on leaf turgor, temperature, and assimilating supply for growth. Drought reduces plant growth and development, leading to hampered flower production and grain filling and thus smaller and fewer grains. A reduction in grain filling occurs due to a reduction in the

assimilate partitioning and activities of sucrose and starch synthesis enzymes. The physiological and biochemical responses such as root signaling under drought stress, photosynthesis, chlorophyll contents, osmolyte accumulation, water relations, reactive oxygen species (ROS), and antioxidant enzymes also play an important role to hampering the life cycle of crop plants. The morpho-physiological traits offer the potential to select germplasm based on key-traits linked with grain yield in dryland for drought tolerance. Morpho-physiological traits can be used as indirect selection criteria for grain yield in dryland, however, their effectiveness depends on their correlations with grain yield under drought and the degree to which each trait is genetically controlled. Therefore it is of interest to know the efficiency with which water is used by a crop in the dry area (mol CO2 fixed per mol H2O transpired). The Carbon Isotopic Discrimination (CID) was found as a useful tool to screen for variation in Water Use Efficiency (WUE). CID was reported to be associated with WUE.

Keywords: Drought stress, Relative water content, Proline, Soluble carbohydrates, Chlorophyll

PLANT QUARANTINE: AN EFFECTIVE APPROACH FOR PLANT DISEASE MANAGEMENT

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The challenge for all disciplines of agriculture is to increases production and to improve quality of produce applicable to plant protection. The responsibility of plant protection also includes addressing Phytosanitary issues concerning agricultural trade. In the past, many diseases have been responsible for food scarcities including famines. In view of increases in quantum of import and export of plant commodities, there is a distinct possibility of moving insect pests and pathogen from their original native habitation to new location. The method of exclusion of the pathogen is enforced through certain legal measures, commonly known as Quarantine. The term Quarantine is derived from Latin word *quarantum*meaning forty. Late blight ofpotato, Coffee rust, Downey mildew of grapes, fire blight of pear, bacterial blight of paddy, bunchy top virus in banana and golden nematode of potato etc., are some classical examples where exotic diseases have been introduced into our country and caused extensive damage. Plant Quarantine related regulatory measures are taken at the national level (Domestic Quarantine) as well as international level (Foreign Quarantine). Effective implementation of quarantine is highly emphasized for management of diseases, which in turn helps in maintaining the productivity of crops.

PRODUCTION OF FRUIT AND VEGETABLE CROPS THROUGH SUSTAINABLE HORTICULTURE

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Sustainable agriculture seeks to at least use nature as the model for designing agriculturalsystems. Since nature integrates her plants and animals into diverse landscape, a major tenet of sustainable agriculture is efficiency and lack of waste products in nature. When domestication of crops replaced hunting and gathering of food, landscape changed accordingly. By producing a limited selection of crop plants and animals, human kind has substantially reduced the level of biological diversity over much of the earth. There is more cooperation in nature than competition. Cooperation is exemplified by mutually beneficial relationships that occur between species within communities. If left undistributed and unplanted an abandoned crop field will first be colonized by just a few species of organisms but after several years a complex community made up of many wild species develops. Stability is reached by a community when it has reached a high level of diversity. Diverse communities have fewer fluctuations in numbers of a given species and are stable. The practices which promote diversity and stability on the farm are enterprise diversification, crop rotation, use of wind breaks, and provision of more habitats for microorganisms, intercropping and integration of crop farming with livestock production. Intercropping is the cultivation of two or more crops at the same time in the same field. Its advantages are risk minimization, increased income and food security, reduction of soil erosion and pest and disease control. This paper discusses the practice of intercropping in horticultural crop production to promote sustainability.

Keywords:Sustainable agriculture, crop rotation, intercropping, and pest and disease control.

DEVELOPMENT OF BIO-PESTICIDES AND THEIR EVALUATION ALONG WITH BOTANICALS AGAINST SHOOT AND FRUIT BORER*(Leucinodes orbonalis* G.)ON BRINJAL *(Solanum melongena* L.)

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The present investigations were carried out during 2015-16 to development of bio-pesticides and their evaluation along with botanicals against shoot and fruit borer *(Leucinodes orbonalis* G.) on brinjal *(Solanum melongena* L.**)** microplot *Trichoderma viride, Beauveria bassiana, Metarrhizum anisopliae* were developed and produced in lab, one botanical based Neem seed oil and another marketed insecticide Quinalphos 25% EC. Out of all above management components, antagonistic fungal biocontrol agents, *Trichoderma viride, Beauveria bassiana, Metarrhizum anisopliae* were procured from Indian Type Culture Collection (ITCC), Division of Plant Pathology, Indian Agricultural Research Institute, New Delhi while rest two management components viz. Neem oil seed cake and Quinalphos 25% ECwere procured from authentic outlet from market. Prior to initiation of *in-vivo* microplot experiment; a systematic *in-vitro* experiment has been conducted to mass culturing, development and production of bioformulation of *Trichoderma viride, Beauveria bassiana, Metarrhizum anisopliae*for determining of shelf life. For mass culturing of above both bio-control agents, potato dextrose broth as liquid and sorghum as solid medium has been used. For harvesting of maximum spores of both antagonistic, sorghum grains were utilized as solid medium and powdered. Powered spores and mycelium of *Trichoderma viride Beauveria bassiana, Metarrhizum anisopliae* were added in pre-sterilized filler/career like clay soil + 5% CMC, boric acid + 5% CMC, bentonite fine powder + 5% CMC respectively as its requisite dose after determining the cfu in per gram by haemocytometer. All 3 prepared bio-formulations were kept at ambient temperature at safe and undisturbed place for determining shelf life in gram bio-formulation at monthly constant interval upto 180 days. During 180 days of storage of both bio-formulations were depicted more than 90% survivals of cfu. Meantime, 18 pre-surface sterilized cement pots were arranged in 3 replication and 6 treatments including control at experimental site. At flowering, all the above components were applied as foliage spray in its individual requisite dose at constant interval of 7, 14 and 21 days. At harvest, all the treatments, given in micro-plot as accordance of plan has been illustrated paramount effect on population of shoot and fruit borer *(Leucinodes orbonalis* G.), growth and yield over the control.

PHYSIO-BIOCHEMICAL CHARACTERISTICS OF SOHIONG (*Prunusnepalensis ser*): AN UNDERUTILIZED FRUIT OF MEGHALAYA

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Sohiong (*Prunusnepalensis*Ser) is an important indigenous and underexploited wildfruit crop of Khasi and Jaintia Hills in Meghalaya, and these fruits are used by the local people as fresh and for processed products like jam, jelly, squash, RTS and wine. Fruits were collected from Shillong and a study was attempted to assess its morphological knowledge of the fruit and itsimportance for nutritional security. The experiment was conducted in the Department of Horticulture, NEHU, Tura campus. The physical characteristics of fruits were analysed for average weight(7.38g), size(22.524 mm), shape(oval to round), colour of mesocarp(brown red) and pericarp(dark purple), seed size (16.11 mm), seed weight(2.30 g), number of fruits per bunch(4.66), and pulp weight(4.98g), respectively.The biochemical value of fruits were analysedand revealed that the TSS(14.2 °Brix), total sugar (6.06%), reducing (3.17%) and non-reducing sugar (2.83%), acidity (0.77%), ascorbic acid (8.25 mg/100g), β-carotene (780 µg/100g)and anthocyanin (37.08mg/100g) respectively. The resulted values from different analysis proved that the fruit contain good quantity of biochemical compositionwhich are useful for the people. Therefore, there are vast scope for nutritional security diet among the tribal populace of the region.

Keywords:Sohiong, Physico-chemical, underutilized fruit.

ROLE OF KVK'S SUBJECT MATTER SPECIALISTS IN TRANSFER OF TECHNOLOGY

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Improvement of farming community mainly depends on development of farm technology and its dissemination. There is more agricultural technology available, but maximum utilization of it is not satisfactory in some parts of the country. The work of transfer of technology is mainly covered by the State Department of Agriculture, State Agricultural Universities and KVKs. The subject matter specialists of KVK play a vital role in this regard. The SMSs on the one hand,are engaged in generating the

knowledge,testing the technology, developing innovations and on the other hand, in communicating knowledge, technology and innovations directly or indirectly to the farmers and extension worker. The SMSs seeks to reach the end users through different extension method by giving proper treatment to technological massage.The present studywas carried out in the Bundelkhand region of Uttar Pradesh comprising 07 KVKs. According to the study, it was observed that 65% 0f the SMSs had medium role level in respect of actual participation. The majority of the SMSs were involved in farm publications, farmer'sfair and exhibitions, training program and meetings, demonstrations for transfer of technology. It was observed that in respect of farm publication, SMSs always participated in implementation (90%) and planning (63.5%) while in case of newspaper, most of them were involved planning (88.50%) and implementation (68%) stage. Regarding radio programs 69 % SMSs had participated in preparation process and in case of television programs, 45% participants participated in planning, preparation and implementation process. In respect of exhibition 53.8% were involved in follow up process stage and in field day activities, 61.7 % respondents participated in preparation stage for transfer of technology. In case of demonstrations, 61% SMSs participated in preparation and implementation process while in meetings, they had participated in implementation (66%) process. In case of training programs 72% SMSs had participated in planning for transfer of technology.

Keywords: SMS, Planning, Implementation

LEGISLATIVE CONTROL OF INSECT PESTS IN INDIA

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Plant quarantine is the legal restriction of movement of plant materials between countries and between states within the country to prevent and spread of pests and diseases in areas where they do not exist.The Destructive Insects and Pests Act, 1914 passed by the Central Government provided for measures against entry of pests and diseases from other countries into India.The authority to implement the quarantine rules and regulation formed under DIP Act rest basically with the Directorate of Plant Protection, Quarantine and Storage, under the ministry of Agriculture (Anonymous, 1980).Presently there are total 26 different quarantine stations located at 10 airports. There are very important inspection procedures followed in quarantine station as visual inspection, x-ray test, sedimentation test and electron microscopy (Gupta and Khetarpal, 2004). There are several points of plant quarantine inspection as inspection of point of destination, inspection at the point of origin, embargoes, and controlled introduction (Laxmi *et al.*, 2014). Pest Risk Analysis (PRA) in plant quarantine - In view of manifold increase in the quantum of import and export of the plant commodities during the current years, the existing plant quarantine process seem to be far from being satisfactorily equipped. The Commission for Controlling the Desert Locust in South-West Asia (SWAC) was the first of these commissions to be established, consisting of four member countries: Afghanistan, India, Iran and Pakistan. It was inaugurated on 15 December 1964. Plant quarantine system in India is with a view to provide the farmers the best planting materials available in the world for maximizing productivity per unit area and to encourage the private seed industry in India not only to meet the internal requirements but also to develop export potential for high quality planting materials.

STUDY OF ADOPTION DRIP IRRIGATION SYSTEM ON CHILI CROP IN MORADABAD DISTRICT OF U.P. INDIA

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Drip irrigation system of saving 50-60 % water as compared to surface irrigationmethod i.e. flood, sprinkler, furrow, as the drip method reduces labor cost and protects the plantsfrom diseases by minimizing humidity in atmosphere. Based on soluble fertilizers can also beapplied with irrigation water. Thus, drip irrigation has become a means of hi-tech Agriculture.The efficiency of water is enhanced by 90 -95 percent under drip irrigation system. The adoptionit is found to be low due to its higher cost with respect to study was conducted to analyses thatthe adoption behaviour of drip irrigation system in Moradabad district with sample of

farmers.The study found that higher number (71.34 per cent) of the respondents had medium adoptionlevel of drip irrigation system in study area followed by medium (16.33 per cent) and low (12.33per cent) adoption. It was observed that, percentage of respondents expressed the benefit likecultivation of chili by using DIS.

WATER POLLUTION AND ITS IMPACT ON THE HUMAN HEALTH: PROBLEMS AND CONTROL

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It is a well-known fact that clean water is absolutely essential for healthy living. Adequate supply of fresh and clean drinking water is a basic need for all human beings on the earth, yet it has been observed that millions of people worldwide are deprived of this.Freshwater resources all over the world are threatened not only by over exploitation and poor management but also by ecological degradation. The main source of freshwater pollution can be attributed to discharge of untreated waste, dumping of industrial effluent, and run-off from agricultural fields. Industrial growth, urbanization and the increasing use of synthetic organic substances have serious and adverse impacts on freshwater bodies. It is a generally accepted fact that the developed countries suffer from problems of chemical discharge into the water sources mainly groundwater, while developing countries face problems of agricultural run-off in water sources. Polluted water like chemicals in drinking water causes problem to health and leads to water-borne diseases which can be prevented by taking measures can be taken even at the household level.Many areas of groundwater and surface water are now contaminated with heavy metals, POPs (persistent organic pollutants), and nutrients that have an adverse affect on health. Water-borne diseases and water-caused health problems are mostly due to inadequate and incompetent management of water resources. Safe water for all can only be assured when access, sustainability, and equity can be guaranteed. Access can be defined as the number of people who are guaranteed safe drinking water and sufficient quantities of it. There has to be an effort to sustain it, and there has to be a fair and equal distribution of water to all segments of the society. Urban areas generally have a higher coverage of safe water than the rural areas. Even within an area there is variation: areas that can pay for the services have access to safe water whereas areas that cannot pay for the services have to make do with water from hand pumps and other sources.In the urban areas water gets contaminated in many different ways, some of the most common reasons being leaky water pipe joints in areas where the water pipe and sewage line pass close together. Sometimes the water gets polluted at source due to various reasons and mainly due to inflow of sewage into the source. Hepatitis, cholera, dysentery, and typhoid are the more common water-borne diseases that affect large populations in the tropical regions.Water-borne epidemics and health hazards in the aquatic environment are mainly due to improper management of water resources. Proper management of water resources has become the need of the hour as this would ultimately lead to a cleaner and healthier environment.In order to prevent the spread of water-borne infectious diseases, people should take adequate precautions. The city water supply should be properly checked and necessary steps taken to disinfect it. Water pipes should be regularly checked for leaks and cracks. At home, the water should be boiled, filtered, or other methods and necessary steps taken to ensure that it is free from infection.

FLORAL AND PHYSIO-CHEMICAL BEHAVIOR OF SANTA ROSA PLUM AS AFFECTED BY NITROGEN AND BORON UNDER RAINFED CONDITIONS

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To examine the effect of nitrogenous fertilizers and boron on flowering, maturity, yield and quality of Santa Rosa plum a trial was conducted for two consecutive years (2012 and 2013) in a seven year old private plum orchard near SKUAST-Kashmir, Shalimar Campus, Srinagar. The experimental design consists of four sources of fertilizers and three timing of application viz. urea @ 500 g (N_1), $CaNO_3$ @ 1450 g (N_2), N_1 + 50 g boron (N_3) and N_2 + 50 g boron (N_4) were applied at T_1 = Full dose in spring, T_2 = Full dose after harvest and T_3 = $^3/_4$ dose in spring and $^1/_4$ dose after harvest. Significant results were recorded for all the physical and chemical characters except acidity. Early flowering and harvesting was observed when full dose of urea @ 500 g was applied in spring under the treatment N_1T_1 as compared to other treatments. Maximum fruit weight (40.63 g), fruit diameter (41.01 mm), pulp weight (39.29 g) was recorded in N_1T_1 treatment whereas, maximum fruit length (39.16 mm) was registered in the N_1T_3 treatment followed by N_1T_1. N_4T_1 treatment recorded maximum total soluble solids (16.12 %), total sugars (7.18 %) with minimum values for acidity (1.07 %). It is clear from the present study that full dose of urea (500 g) when applied in spring was observed effective for improving fruit weight and size of Santa Rosa plum however, $CaNO_3$ + 50 g boron was found effective for fruit quality.

ESTIMATION OF CHEMICAL RESIDUES WITH SPECIAL REFERENCE TO FUNGICIDES IN BASMATI RICE

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Rice is an important staple food grain crop in India. Basmati rice is having the characteristics of extra-long slender grains that elongate at least twice of their original size, which is responsible for soft and fluffy texture upon cooking, delicious taste, superior aroma and distinct flavour. The total area of Basmati rice in India is about 2.10 million hectares and production is 8.70 million tonnes (Anonymous 2014-2015). There are several biotic and a biotic factors behind the less productivity as compared to other major rice growing countries, plant pathogenic diseases such as fungal, bacterial, viral, nematodes and Phytoplasmal attacks on Basmati rice. To control the blast farmers are using various fungicides, which left residue in Basmati rice grain. The European Union has a maximum residue limit (MRL) of 1 ppm; Japan has allowed MRL of 3 ppm for the fungicide. The U.S. has a pesticide norm of 0.01 ppm and Chainahas a MRL of 2 parts per million. The presence of tricyclazole in aromatic grain is within safety levels of 0.02-0.04 ppm set by the Indian government and also in tune with the WTO standards. Earlier consignments of Basmati rice were rejected because they had trace of tricyclazole content. The main problem in Basmati rice is chemical residues which adversely affect the export of Indian Basmati rice.

UTILIZATION OF LEAF LITTER COMPOST FOR THE PRODUCTION OF SPINACH

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Aim of the current study was to evaluate the competence of leaf litter composts prepared by aerobic (NADEP) and anaerobic (Bangalore) pit methods on yield of the spinach (*Spinacia oleracea* L.). The experiment was conducted in earthen pots with five treatments and four replications. The composts were used either independently or in combination (1:1) in comparison with inorganic fertilizers and control. The analysis of the crop was done at 68 DAS. Among the leaf composts NADEP compost (AC) produced the highest yield and nutrient contents of spinach in comparison with other treatments. The present study indicates that leaf litter composts have positive effect on plant growth and NADEP is a method to improve composting effectiveness and excellence.

Keywords:Leaf litter, composts, NADEP, Bangalore, spinach, analysis

SOME ADDITIONAL RECORD OF CICINDELIDS (*Cicindelidae* : *Coleoptera*) FROM MIZORAM, NORTH EAST INDIA

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Cicindelidae is a family of Beetles, commonly known as Tiger Beetles, one of the important bio-resources of the country. Tiger beetles are so named, due to their predatory habits and colourful elytra. These are worldwide in distribution and are found along riverine habitat, agricultural habitat, forests habitat, barren lands, road sides etc. They have comparatively large sized mandibles and eleven segmented filiform antenna. Prothorax is smaller then head. The beetles are having beautifully and variously coloured elytra, which are also an aid to their identification, up to some extent. The tiger beetles are predatory in habits and feed on small and soft bodied insects including some insect's pests of various crops, and hence contribute in insect pest control. They move in zig zag burst manner and are not long fliers. Occurrence Tiger beetles in Mizoram have not been mentioned in Fauna of Mizoram, 2007, of Zoological Survey of India. There are some reports of Tiger Beetles from the state of Mizoram, which falls in one of the biodiversity hot spot of the world / India. This paper presents unpublished report of additional tiger beetles observed from Champhai district of Mizoram state, North East India, on Indo-Myanmar border.

NATURAL PLANTS GROWTH STARTER

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Natural plant starter is a plant growth regulator hormonens (PGRs). Plant growth regulator (PGRs) are organic compound, other than nutrients, that modify plant physiological processes. PGRs called biostimulants or bioinhibitor, act inside plant cells to stimulate or inhibit specific enzymes or enzyme systems and help regulate plant metabolism. They are normally are active at very low concentration in plants. Today, specific natural plant starter are used to modifdy crop growth rate and growth pattern during the various stage of development. Natural plant starter that have positive influences on major agronomic crops can be of value. It must be increase crop quality and production. Of the many current uses of the natural plantstarter, effects on yield are often indirect. These are following classes: Starter solution: 20 kg of cow dung, 20 litres of cow urine, 3-4 kg of Jaggery are to be mixed in 200 litres of water. Amara Leaf Extract: kg of leaf is to be mixed with 5 litres of buttermilk and is kept for 7 days. 1 litre of this solution is mixed with 10 litres of water and can be applied to the crops as foliar spray. Fermented Buttermilk & Coconut milk Solution: 5 litres of fermented buttermilk and 5 litres of coconut milk are mixed and kept in a mud pot or plastic drums for 1 week during which period it has to be stirred often. Then the solution is mixed with water @ 1 litre solution in 10 litres of water. Panchakavya: Cow dung 5 kg, Cow urine 5 litres, Curd 2 litres (fermented for 15 days), Ghee 0.5-1 litre, Jaggery 1 kg or Sugarcane juice 2 – 3 litres, Tender Coconut water 2 – 3 litres, Well ripened Banana (Poovan variety) 12, Yeast 50-100 gm or toddy 2 litres.Biofertilizer: Azospirillum, Phosphobacterium, Rhizobium. Vermicompost: It contains growth promoter enzyme, hormones and vitamins.Apple Cider Vinegar, willow tea**,** Honey and etc.

EFFECT OF NITROGEN, PHOSPHORUS AND CUTTING MANAGEMENT ON SEED YIELD OF FENUGREEK (*Trigonella foenum-greacum* L.) CV. PUSA EARLY BUNCHING

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Fenugreek (*Trigonella foenum-greacum* L.) is commonly known as *methi* and grown throughout the India for seed and greens (green leaves). It is considered as dual purpose crop for providing leaves as vegetable and seed as seed spices. It is used as flavour/aroma agent and spices. It plays an important role in *Aurveda* and cures various diseases like diabetes, indigestion etc. It is also provides vitamins, proteins, minerals, carbohydrates and dietary fibre etc. Keeping above facts that an experiment was conducted during 2013-14 at HRC, SVPUAT, Meerut in Randomized Block Designs with three replication. Total nine treatments were tried with various doses nitrogen, phosphorus and cutting time. Out of these, a dose of 40 kg N, 60 kg P2O5 and one cutting after 20 days after sowing was found superior in terms of growth, flowering and yield and yield attributing parameter as compared to control and other treatments.

COMBINED EFFECT OF SALICYLIC ACID AND *Azospirillum* ON YIELD AND QUALITY CHARACTERS OF ONION(*Allium cepa* L.)CV.ALR

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The present investigation comprised of 18 treatment (1 Control) combinations of Salicylic acid (SA) and *Azospirillum in* onion*cv.* Agrifound Light Redto estimate the best responsive treatments, this workwas carried out during *Rabi* season of 2013-2014 and laid out in a Randomized Block Design (RBD) with three replications at Vegetable Research Farm, Department of Horticulture, Jawaharlal Nehru Krishi Vishwa Vidyalaya, Jabalpur (M.P.). This study resulted that all the growth parameters under study noted that (T_{17}) Salicylic acid (250 mg/lit.) at 30 DAS, 30,45,60 and *Azospirillum* (5 kg/ha) at 60 DAT was performed superior over control such as highest plant height at 30, 60, 90,120 DAT(35.18 cm), (38.74 cm), (48.44 cm) and (49.97 cm) respectively, length of leaves at 30, 60, 90,120 DAT(32.16 cm), (38.74 cm), (43.16 cm) and (45.37 cm) respectively, number of leaf plant^{-1} at 30, 60, 90,120 DAT(8.29), (12.44), (17.67), (19.77) respectively, Neck thickness at 30, 60, 90,120 DAT(12.05 mm), (15.88 mm), (14.20 mm) and (12.91 mm) respectively, dry weight of leaf at 30, 60, 90,120 DAT(1.80g), (2.50 g), (3.43 g) and (4.05 g) respectively. The growth yield and quality traits also reported best under (T_{17}) as chlorophyll content index at 30, 60, 90 DAT (30.19), (43.36) and (45.36) respectively, TSS (14.08%), average weight of bulb (80.53g), equatorial diameter (64.04mm), polar dimeter (61.40mm), double bulb(0.33%)lowest, A,B and C grade bulb (on weight basis) (38.49%),(66.37%) and (13.29%) respectively, bulb yield polt^{-1}(14.90 kg), marketable bulb yield (28.53 t/ha.), total bulb yield (29.66 t/ha) higher in $T_{11.}$

SUSTAINABLE AGRICULTURAL APPROACHES AND NATURAL RESOURCES

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In the simplest word the sustainable agriculture can be defined as the production of food, fiber, fuel or other plant or animal product using farming techniques that protect the environment, human health & community and animal welfare. This form of agriculture enables us to produce healthful food without comprising future generations ability to do the same. The sustainable agriculture provides higher yield without undermining the natural resources that productivity depends on. The farmers who initiate a sustainable approach work efficiently with natural process rather than ignoring or struggling against them and use the best of recent knowledge and tendency to avoid the unintended consequences of industrial, chemical based agriculture. One important result is that the farmers are able to minimize their use of pesticide, herbicide and fertilizers, that is they are saving money and protecting future productivity as well as environment. The some of the most common sustainable approaches employed by farmers to achieve the key goals of weed control, pest control, disaster control etc., crop rotation, cover crop, natural pest predators and Bio intensive Integral Pest Management.It is concluded that the sustainable agriculture approaches means the successful management of natural resources to satisfy human needs today without endangering the ability of future generations to satisfy their needs that attempts to provide long term sustainable yields through use of ecologically sound management technologies such as crop diversification, recirculation of plant nutrients and biological pest control.

ADAPTATION AND MITIGATION OF CLIMATE CHANGE THROUGH AGRICULTURAL BIOTECHNOLOGY

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With increase in variability of rainfall, atmospheric temperature and frequency of extreme climatic events (floods and droughts), the implications of climate change on monsoon-dependent Indian agriculture are clear, direct, threatening and significant. It can also affect food production and distribution indirectly through increasing insect pests, diseases and weed outbreaks at time of rising demand for food, feed, fiber and fuel. In this context, integration of conventional biotechnology with modern one must be carried out to improve crop yield, reduce damage due to pests and minimize food waste with use of less land, fertilizer and water as inputs. This paper reviews different approaches in agricultural biotechnology that can be employed to the upcoming ordeals of climate change so as to make food security far more achievable. These approaches include conventional techniques like organic farming, no-till agriculture, use of environment friendly fuels, biofertilizers, tissue culture while modern techniques include breeding crops and their varieties for more disease resistance, nutritional content and tolerance to droughts, extreme temperatures and high salinity environments. Sustainable intensification and safe application of these approaches with other current measures will greatly augment agricultural productivity and food security.

EFFECT OF DRIP IRRIGATION ON YIELD AND WATER USE EFFICIENCY ONBRINJAL (*Solanum melongena*) CV. PANT SAMRAT

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Drip irrigation is an irrigation method that saves water and fertilizer by allowing waterto drip slowly to the roots of plants, either onto the soil surface or directly onto the root zonethrough a network of valves, pipes, tubing and emitters. It is done through narrow tubes thatdeliver water directly to the base of the plant. Though, India has the largest irrigation network,the irrigation efficiency does not exceed 40%.The average rainfall in Uttar Pradesh is 650 mm asagainst the average rainfall of 1200 mm in the country. Due to water scarcity, the available waterresources should be very effectively utilized through water saving irrigation technologies.Diversification of cropping pattern particularly in favour of vegetable crops is becoming popularamong farmers because vegetables are most important component in a balanced diet. Butdiversification of area from field crops to olericulture to meet the demand is not desirable. Themaximum yield of crop 900 gm/plant and minimum of yield 600 gm/plant and total yield 52270gm (52.270 kg).The increase in water use efficiency for drip irrigation system. Among the dripirrigation levels, the highest field water use efficiency (6148.31kg ha-1 cm-1) was found at 65%irrigation level, indicating comparatively more efficient use of irrigation water with a possibilityof water saving of 35% water by adopting brinjal plot (1.58 litre plant-1day-1).

AGRICULTURAL SUSTAINABILITY AND ITS IMPACT

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Concerns about sustainability in agricultural systems centre on the need to develop technologies and practices that do not have adverse effects on environmental goods and services, are accessible to and effective for farmers, and lead to improvements in food productivity. Despite great progress in agricultural productivity in the past half-century, with crop and livestock productivity strongly driven by increased use of fertilizers, irrigation water, agricultural machinery, pesticides and land, it would be over-optimistic to assume that these relationships will remain linear in the future. New approaches are needed that will integrate biological and ecological processes into food production, minimize the use of those non-renewable inputs that cause harm to the environment or to the health of farmers and consumers, make productive use of the knowledge and skills of farmers, so substituting human capital for costly external inputs, and make productive use of people's collective capacities to work together to solve common agricultural and natural resource problems, such as for pest, watershed, irrigation, forest and credit management. These principles help to build important capital assets for agricultural systems: natural; social; human; physical; and financial capital. Improving natural capital is a central aim, and dividends can come from making the best use of the genotypes of crops and animals and the ecological conditions under which they are grown or raised. Agricultural sustainability suggests a focus on both genotype improvements through the full range of modern biological approaches and improved understanding of the benefits of ecological and agronomic management, manipulation and redesign. The ecological management of agroecosystems that addresses energy flows, nutrient cycling, population-regulating mechanisms and system resilience can lead to the redesign of agriculture at a landscape scale. Sustainable agriculture outcomes can be positive for food productivity, reduced pesticide use and carbon balances. Significant challenges, however, remain to develop national and international policies to support the wider emergence of more sustainable forms of agricultural production across both industrialized and developing countries.

CAUSES AND IMPACT OF CLIMATE TRANSFORMATION

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Climate change is now recognized as a global threat and actions of mankind are largely accountable for this. Factors responsible for climate change can be divided into two categories one is natural and other is due to human activities. The earth's climate is influenced and changed through natural causes like volcanic eruptions, ocean current, the earth's orbital changes and solar variations. Human activities are greatly responsible for climatic change by burning fossil fuels, cutting down rainforests and farming live stock. This adds great amount of green house gases to those naturally occurring in the atmosphere, increasing green house effect and global warming. Carbon di-oxide is the green house gas most commonly produced by human activities and it is responsible for 64% of man made global warming. Methane is responsible for 17% of man made global warming, nitrous Oxide for 6%. Climate change leads to several direct and indirect impacts on health of mankind. It is one of major environmental problems with impact on climate sensitive sector including crop productivity, food security, agriculture, water resource availability, energy, health, forestry and causes melting of ice/glaciers. Mankind is selfishly harming the environment for their own benefit like raising buildings on agricultural land, cutting down trees, automobile exhaust etc. This has resulted into hazards like global warming, depletion of ozone layer, floods, uneven rainfall, increased seasonal variations. Through this paper, attempt has been made to analysis the causes and effects of climate change.

Keywords: Volcanic eruption, ocean current, solar variations, fossil fuels, green house gases, global warming, automobile exhaust.

STUDY OF THE TRADITIONAL HERBAL MEDICINAL PLANTS OF DISTRICT SAHARANPUR

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The paper communicate a brief account of the traditional herbal medicinal plants of district Saharanpur. The study related about 60 plants species belonging to 8 families of angiospermic posses medicinal properties. Out of these the important species are Eclipta alba, Euphorbia hirta, Solanum nigrum, Ricinus communis, Cleome viscose, Bacopa monnieri. During study it was noted that these plant species is the source of medicine which are more in the demand of national and international drug market. These plants are used by many ayurvedic practioners in one form or other.

Key words:- Ayurvvedic plants

AN ANALYSIS OF MANAGEMENT'S OF GROUND WATER RESOURCE FOR SUSTAINABLE AGRICULTURE IN U.P.

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Amongst the renewable natural resources. Ground water commands a pre-eniment position. However, its excessive with drawl for irrigation raises the issue of sustainability of irrigation based agriculture. Being a common pool resource it is generally used by all the farmers' .In fact the ground water structure is quite cheap and its availability gives the farmers a sense of ownership. Uttar Pradesh in the mast popular state of the country and most of the geographical area is fertile alluvium plains, sustaining wells and tube wells. It has a maximum ground water potential of 18 million hectares out of 80 million hectares for the country as per revised assessment of central ground water board. In several areas of the state, there is tremendous decline in the water table because of over- exploitation and non- availability of recharge from cannels. The cost also increases in the case of bore wells/ tube wells pumps are to be further lowered because of decline in water table. Due to decrease in the availability of water the area under irrigation decreases leading to decline in agricultural production. The specific objectives of this study area: To examine the impact of ground water organization in the term of changes in ground water use structure level of water table, depletion and over – exploitation of ground water and normative demand for water by various crops over a period in the Uttar Pradesh.The following measures should be adopted. (1)To minimum the wastage of water, sprinkler / drip irrigation system should be use extensively. (2)All loses in conveyance of water from ground water structure to the fields should be reduced to minimum by way of pipeline distribution system.(3)Ground water resources should be used in conjunction with surface water so that over – exploitation of ground water resources is minimized .(4)Effective ground water legislation should be introduced to control the over – exploitation of common pool resources.(5)Besides , the agricultural price policy should be such that it induce suitable changes in the cropping pattern in the state so as to ensure the sustainability of water resources.

Keywords: Ground water, Agriculture sustainability, over-exploitation of water and Water table.

INNOVATIVEANALYTICAL TECHNIQUES FOR MONITORING AIR POLLUTANTS

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The quality of atmospheric air, connected essentially with the level of pollutants due to transmission and deposition phenomena and secondary pollutant formation as a result of primary pollutant conversion, can affect the state of other environmental areas, mainly surface waters and soil.Air quality monitoring such as sampling and measurement of air pollutants is an integral component of air pollution control programme. Through monitoring the current trends in air quality can be evaluated by comparing the data with the regulated standards. The information so obtained is helpful in implementing control measures for reducing pollutant concentrations to acceptable levels and in assessing the effect of air pollution control strategies.A great number of methods for sampling and Instrumental techniques for monitoring air pollutants are used to study atmosphere air.

Keywords: Analytical techniques, monitoring, Air pollution.

CHLOROPHYCEAE ALGAE FROM THE GODAVARI RIVER, NASHIK, MAHARASHTRA (INDIA)

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Algae play an important role in maintaining aquatic ecosystem and form base of food web. Godavari River shows variety of rich algal forms of various taxonomic groups in its abundant fresh water ecosystem, biodiversity studies of the chlorophyceae algal flora found at the onset of winter season at the Godavari River reveals abundance of member of class- Chlorophyceae. A preliminary survey of algae of the Godavari River was undertaken at four locations during the years 2015-2016. It was noted that several

planktonic algae were present in the river. A large number of taxa of fresh water algae have been recorded from different localities of Godavari River *Oocystis***,***Ankistrodesmus, Scenedesmus,Cosmarium, Closterium* and *Eustrum* are found to be dominant genus at certain locations of the river during winter.

Keyword:Chlorophyceae Algae Diversity, Godawari River, Nashik

ANTIBACTERIAL ACTIVITY OF KURCHI FLOWER (*Holarrhena pubescence)*EXTRACT AGAINST PATHOGENIC AND DRUG RESISTANCE BACTERIAL STRAINS

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Kruchi (*Holarrhena pubescen)* is an important flowering plant, which is also known as Kutaj and Kutaja. Kruchi belongs to the Apocynaceae family. The flower of Kruchihas so many important antipathogenic properties.In the present investigationantibacterial activity of kurchi flower extract were studied against some bacteria such as *Pseudomonas fluorescence* (disease cause in immune system), *Salmonella typhi* (cause typhoid fever), *Shigella flexneri* (disease cause nausea), *Klebsiella pneumonia* (cause pneumonia)and *Bacillus subtilis* (cause food poisoning). These all bacterial strains are gram negative and highly pathogenic. The extract of kurchi flower was prepared with methanol, ethanol and benzene. All extract showed the effectiveness against bacteria but maximum growth inhibition 76.34% was found in the kurchi flower benzene extract against *Shigella flexneri* bacteria at 100µl/ml concentration, while minimum inhibition was found at 3.12×10^{-5}µl/ml concentration for *Shigella flexneri*, which are pathogenic and cause an acute infection of the intestine and also cause diarrhea and dysentery. The *Shigella flexneri* was found resistance for some antibiotic as Cephaloridine, Lincomycin and Olendomycin. Thus the study depict that the extracts of kurchi flower showed good antibacterial activity against pathogenic and drug resistance bacterial strains.

APPLICATION OF MOLECULAR APPROACH IN RICE IMPROVEMENT

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Keywords:Marker-Assisted Selection, Linkage Disequilibrium, Chromosome Doubling.

Modern crop varieties have been developed from plant populations that exhibiting genetic variability.Conventional crop improvement has developed a large number of varieties, which have been generated following strategies based on the phenotypic values and in some cases by using the progeny tests. Genotypic and environmental effects produce phenotypic values over genotypes in plants and other living organisms. Strategies using best phenotypes to infer the best genotypes are commonly less efficient than the schemes performing progeny tests. **Marker-Assisted Selection (MAS)** In plantbreeding, MAS is a relatively new concept, nevertheless the original selection concept per se has not changed, that is, the purpose of the selection is to search and preserve the best genotypes, but using molecular markers. MAS can be used for manipulating both qualitative and quantitative traits. A highly saturated marker linkage map is necessary for effective marker based selection. Basically, MAS consists of identifying association between molecular markers and genes controlling agronomic traits, and using these to improve lines or populations (Dudley, 1993). Molecular markers as new tools in crop improvement have demonstrated usefulness, especially with genes controlling qualitative traits, whereas successful results are inconsistent with application to quantitative characteristics. The molecular techniques (MAS, QTL analysis and reverse genetic approach RNAi, Antisense RNA technology and TILLING) can be used to remove the drawback of conventional breeding. MAS are the efficient, effective and reliable than phenotypic selection. MAS can shorten the development time of varities. F2 population is considered best population for preliminary mapping. Chromosome doubling of anther culture derived haploid plants from F1 generation. With the help of bulk segregant analyses find a few markers that are closely linked to a specific trait. In QTL mapping, a suitable mapping population generated from phenotypically contrasting parent. Association analysis involves assessment of linkage disequilibrium based association. Molecular markers provide plant breeding with an important and valuable new source of information not only for qualitative but for quantitative traits too.

MONITORING OF MICROBIAL DIVERSITY AND PHYSICO- CHEMICAL CHARACTERISTICS OF ASAN WETLAND, INDIA

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Asan Wetland is situated at north- west portion of Doon Valley and north- eastern slopes of Shivaliks at an altitude of 389 m a.s.l. Initially, the Asan Wetland was constructed for power generation at Kulhal Power House, later it is converted into wetland by accumulation of silt and sediments which is carried out by Yamuna and Asan rivers. Human interference in terms of tourist influx, oil leakage, gas discharge from water boat activities had adverse impact on Asan Wetland. Discharge of domestic and households wastes located in the catchment area of Asan Wetland creating pollution problem in Asan Wetland. Excess phosphates and nitrates routinely enter into the water of Asan Wetland from agricultural fields and run- off from sub- urban areas and affect its water quality. The total coliforms and faecal coliforms bacterial density were found very high in Asan Wetland.

Keywords:Asan Wetland, Total coliforms, Faecal coliforms

IMPACT OF FOLIAR APPLICATION OF PLANT GROWTH REGULATORS ON DIFFERENT GROWTH PARAMETERS OF GARLIC (*Allium sativum* L.)

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Garlic (*Allium sativum L.*) is one of the most important bulb vegetable crop and it belongs to the family Amaryllidaceae.It has antibacterial**,** antifungal, antiviraland antiprotozoal properties. It is beneficial to cardiovascular and immune system and has antioxidant as well asanticancerous properties. Consideringits importance,the present investigation was carried out at Horticultural Research Center of SardarVallabhbhai Patel University of Agriculture & Technology, Meerut (U.P.) during rabi season of 2015-16.The experiment was laid out in Randomized Block Design (RBD) with three replications. Different growth attributes viz., plant height (cm), leaves per plant, diameter of stem (cm), length of longest leaf (cm), width of longest leaf (cm).The experiment consisted of seven treatments viz. T_1 (NAA 25 ppm), T_2 (NAA 50 ppm), T_3 (NAA 75 ppm), T_4 (GA_3 50 ppm), T_5 (GA_3 100 ppm), T_6 (GA_3 150 ppm) and T_7 (CONTROL)and they were applied at, 30 and 60 days after sowing.The result showed thatplant height, leaves per plant, diameter of stem, length of longest leaf, width of longest leaf was significantly affected by different doses GA_3 and NAA.The maximum plant height (35.87 cm) was recorded with the GA_3 100 ppm followed by NAA 75 ppm (34.19 cm), GA_3 50 ppm (32. 64 cm) and GA_3 150 ppm (33.87 cm) at 40 days after sowing, while the control plants were found to minimum plant height (28.78 cm) during the course of investigation. Maximum plant height (67.84 cm ,120 DAS after sowing),maximum number of leaves per plant (7.51),maximum diameter (1.33 cm),maximum leaf length and maximum leaf width (1.48 cm) was found for the treatment GA_3 100 ppm followed by NAA 75 ppm, GA_3 50 ppm and GA_3 150 ppm.

Keywords:Randomized block design,antibacterial, GA_3, NAA, antioxidant

EFFECT OF FOLIAR APPLICATION OF DIFFERENT DOSES OF BIO REGULATORS ON YIELD ATTRIBUTES OF GARLIC (*Allium sativum* L.)

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In the recent past the importance of garlic crop has increased considerably in the entire world.It is an important crop from economical point of view as well as it has several medicinal properties.It is useful in treating bacterial,fungal as well as viral disease.India is second largest producer of garlic.Considering its importance and relevance an investigation was carried at at Horticultural Research Centre of Sardar Vallabhbhai Patel University of Agriculture & Technology, Meerut (U.P.) during rabi

season of 2015-16. The experiment was laid out in Randomized Block Design (RBD) with three replications.Different yield attributes viz., (cm), length of bulb (cm), width of bulb (cm), number of cloves per bulb, weight of bulb (g), length of cloves (cm), diameter of cloves (cm), 100 cloves weight (g), bulb yield (q/ha), TSS (°Brix), Ascorbic Acid (mg). The experiment consisted of seven treatments viz. T1 (NAA 25 ppm), T2 (NAA 50 ppm), T3 (NAA 75 ppm), T4 (GA3 50 ppm), T5 (GA3 100 ppm), T6 (GA3 150 ppm) and T7 (CONTROL) and they were applied at, 30 and 60 days after sowing.The results revealed that significant improvement in bulb length (5.21 cm) was observed for GA3 100 ppm followed by GA3150 ppm (4.92 cm) NAA 75 ppm (4.91 cm) and NAA 50 ppm (4.88 cm).The maximum bulb width (4.12 cm maximum bulb weight (31.76 g) as well as length of cloves were highest for the treatment GA3100 ppm.Maximum bulb yield was recorded for GA3 100 ppm.Total soluble solids (TSS), the quality of solids dissolved in the liquid part of garlic, were observed to be increased after treatment with NAA and GA3. The best result was observed at 100 ppm concentration of GA3 which leads to the 37.110 Brix T.S.S. in compare to 30.360 Brix of control.

MITIGATING CLIMATE CHANGE THROUGH NATURAL RESOURCE MANAGEMENT

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Mitigating adverse effect of changing climate is one of the major concerns for whole world. This change, severally affects our environment in a variety of ways. Uncertain precipitation, altered variation in temperature, increasing extreme events, and variation in normal pattern of Indian monsoon are common occurrences now a day. Ultimately, the combined effect of these changes creates food shortage for increasing population. The balance of nature deteriorates day by day which is a major challenge. For overcoming this, various technologies have been developed so that problem of shortage of the food can be mitigated for both present and future generation. Conservation agriculture technologies such as zero tillage, direct seeding, residue management, and precise nutrient management etc are some prominent technique which conserve natural resources and hence mitigate the adverse effect of climate change. With minimum disturbance of soil through zero tillage can maximise microbial activity along with positive effect on nutrient dynamics in the soil. Precise application of nutrient in soil through site specific nutrient management (SSNM) approach reduces the loss of nutrients in environments and hence curtails down the pollution. These all technologies increase the efficiency of resource use and conserve it for future. These conservation techniques must be used in all sectors of agriculture so that food security can be achieved throughout the world.

Keywords: Climate change, food security, natural resources

COST OF MILK PRODUCTION OF BENEFICIARY FARMERS OF ORGANIZED DAIRY (COOPERATIVE AND PRIVATE) IN LUCKNOW REGION OF UTTAR PRADESH

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Indian dairy industry emerged as an important sector for income and employment generation, and is contributing as well in the country's economy besides improving the health standards. The output from dairy sector has increased at more than 4.0 % per annum since 2010-11. The changing economic scenario an entrepreneur has to be very alert and should always keep an eye on the cost and returns of the scarce resources of an entrepreneur in order to keep himself profitable. Dairying in our country dominated by the small holders, Now the producers are scaling up their capacity by incorporating newer technology. One hundred and sixty milk pourer farmers were selected randomly using probability proportional to size (PPS) from the list of producers who were supplying milk to organized dairy (cooperative or private) purely & exclusively from eight village level milk chilling units of Lucknow and Hardoi district purposively selected from Lucknow region. Average variable cost varies from 88.72 small, 88.95 medium, and 92.38 large farmers and rest 11.28, 11.05 and 7.62 were the fixed cost for small medium and large category farmers respectively. The cost of milk production was higher for Rs 18.02, Rs 16.30 and Rs 15.85 per liter for small medium and large farmers respectively. The average milk selling price was found to be almost at par for small Rs 27.77, Rs. 27.31 and Rs. 27.11 for small, medium and large category farmers. Whereas, the average income generated by investing one rupee was found lowest for small Rs. 1.56 followed by medium Rs. 1.71 and large Rs. 1.75 farmers respectively. However, the farmers have generated average annual income of Rs 70334.21, Rs. 128671.1 and Rs.230510.8 by small medium and large category farmers respectively.

WATER POLLUTION: SOURCES, CAUSES, EFFECTS AND CONTROL

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Water is one of the necessities for existence of mankind. It is also one of the most abundantly available resources. But indifference of mankind and its abuse of the plentiful resource made water scarcity a problem for many nations around the globe. Human activities including industrialization and agricultural practices contributed immensely in no small measure to the degradation and pollution of the environment which adversely has an effect on the water bodies, i.e. a necessity for life. Water pollution is one major problem that demands utmost attention to deal with emerging water crisis. This paper is an attempt to describe various sources, causes, effects and control for water pollution.

Keywords: Water Pollution, Resource, Control

THE CONTRIBUTION OF LIVESTOCK IN SUSTAINABLE AGRICULTURAL SYSTEMS

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Livestock have served and will continue to serve a valuable role in sustainable agricultural systems. They are particularly useful in converting vast renewable resources from rangeland, pasture, and crop residues or other by-products into food edible for humans. With livestock, land that is too poor or too erodable to cultivate becomes productive. Also, nutrients in by-products are utilized and do not become a waste-disposal problem. The need to maintain livestock to utilize these humanly inedible foodstuffs and convert them into high-quality foods for human consumption has been a characteristic of advanced societies for several thousand years. Further, ruminant livestock production is entirely consistent with proper agronomy practices in which forages are grown on 25% of arable land to minimize water and soil erosion. Improved efficiency of animal agriculture with its various commodities and service products is critical to achieving sustainable agricultural development, particularly in low income food deficit countries. A prerequisite for sustainable development of animal agriculture is the development, testing under local conditions, and promotion of appropriate technologies that use local and affordable resources. Policies, infrastructure and support services must be established to enable such technologies to succeed and reach small scale farmers. Integrating livestock and agriculture increases short term benefits to and long term sustainability of agriculture. The multipurpose and flexible livestock sector is able to react to changes in national economies. Mono-gastric species and ruminants are adapted to varying local conditions and use local resources to produce products and services. Pigs and poultry are likely to remain the main source of meat where rapid urbanization is occurring. Use should be made of transferable technologies to expand small scale production. Emphasis should be given to feeds that do not compete with human food.

Keywords:Livestock, Agriculture, Manure, Fertilizer, Nutrients

EFFECT OF DIFFERENCE WEED CONTROL METHODS TO YIELD OF LOWLAND TRANSPLANTED RICE IN THE JAUNPUR DISTRICT OF UTTAR PRADESH

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An experiment was conducted during kharif season of 2014 at crop cafeteria form of Krishi Vigyan Kendra, Jaunpur to assess the effect of different weed control methods to yield of low land rice (*Orgza sativa* L.). Weed competition will reduce rice yield. It has been conducted from 15 June 2014 until October 2014 with variety Pusa Sugandha-5 (It is non basmati variety but aromatic) nursery was done on 15 June and 23 days old seedling were transplanted. The experiment laid out using Randomized Block design with five treatments (A = unweed control (Weedy check), B = manual weeding (Two hand weeding), C = herbicide containing Penoxulam + Cyhalofop-butyl, D = Bispyribac sodium, and E = 2, 4 D + Methyl metsulfuron). The results showed that weed

control using herbicides containing Bispyribac sodium and 2.4 D + Methyl metsulfuron showed similar results as manual weed control on rice yield. The maximum weed index was observed in weedy check plots.

Keywords: herbicide, rice yield, aromatic, weed control

CONSERVATION OF PLANT RESOURCES

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India is a reservoir of genetic biodiversity. Each organism in this world whether it is a plant an animal or micro organism is unique in itself. This uniqueness of individuals forms the basis of the diversity among the living organism. Indian sub continent is one of the twelve mega biodiversity centre's and represents two of the eight Vavlovian centres of origin and diversity of crops plants and two hot spots of biological diversity also occur in India ,one of in the western Ghats and other in the north-eastern Himalayas. Conservation of plant biodiversity can be conserved in India. *ex-situ* conservation, conservation of germplasm away from its natural habitat *i.*e. whole plant such as field gene bank (on farm conservation), of landraces and indigenous cultivars, botanical/ herbal garden, arboreta and other method of conservation plants parts are conserve in gene bank / seed gene bank ,pollen bank ,tissue culture repository DNA library and other method of *in-situ* conservation in its natural habitat or in the area where it grows *i.*e. Identified biosphere reserves, national park, gene sanctuaries and wild life sanctuaries .Therefore can be used in future population improved program in the crop.

Keywords: Biodiversity, Conservation and resources

WIND ENERGY A SOURCE OF CLEAN ENERGY: FUTURE IN INDIA

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Wind energy is a form of solar energy. Wind energy describes the process by which wind is used to generate electricity.Wind turbines convert the kinetic energy in thewind into mechanical power. A generator can convert mechanical power into electricity.Wind power, as an alternative to burning fossil fuels, is plentiful, renewable, widely distributed, clean, produces no greenhouse gas emissions during operation, consumes no water, and uses little land. In this paper we focus on the future of this renewablepower.

GENETIC VARIABILITY, CORRELATION AND PATH ANALYSIS OF YIELD AND ITS COMPONENT TRAITS IN BARLEY

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Estimates of genetic parameters for ten genotypes of barley [H*ordeum vulgare* (L.)] revealed significant variability for all the traits under study, indicated wide spectrum of variability among the genotypes. The estimates of genotypic and phenotypic coefficient of variation were high for plant height, number of seeds per ear and seed yield per plant. High heritability coupled with high genetic advance was observed for plant height, number of seeds per ear and seed yield per plant. Improvement in yield can be made by selecting these yield contributed traits having high heritability coupled with high genetic advance. Genotypic correlations were of higher magnitude as compare to their corresponding phenotypic correlation in most of the character combination, indicating the existence of strong influenced of inherent association for the various characters. Seed yield per plant exhibited significant stable and positive correlation with number of tillers per plant and 100 weight at genotypic and phenotypic level. Thus, it can be inferred that selection based on any one of these characters either alone or in combination, will result in identifying high yielding strains. Path coefficient analysis of genotypic and phenotypic level exhibited high positive and direct effect of number of tillers per plant, number of ear per plant, number of spikelet per ear, length of ear and 100 seed weight on seed yield per plant. Thus any selection based on these characters will enhance performance and improvement seed yield in barley.

Keywords:*Hordeum vulgare*, Genetic variability, Character association, Path analysis

IMPACT OF NITROGEN FERTILIZERS ON METHANE EMISSIONS FROM FLOODED RICE

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Methane is second most potent greenhouse gas emitted under anaerobic condition in rice soils. Effects of different nitrogen fertilizer application on methane emissions in flooded paddy field were studied. The experiment was laid out in a randomized complete block design with three treatments and three replications. The treatments were control (0 kg N ha^{-1}), urea (120 kg N ha^{-1}) and ammonium sulfate (120 kg N ha^{-1}). In all treatments P (60 kg P_2O_5 ha^{-1}) along with K (40 kg K_2O ha^{-1}) were also applied as basal dose. The cumulative seasonal methane flux was highest in urea 36.3 (kg ha^{-1}) followed by control 35.2 (kg ha^{-1}) and ammonium sulfate 28.5 (kg ha^{-1}). Ammonium sulfate application reduced total seasonal emission by 19.5% as compared to control while it reduced CH_4 emissions by 21.6% as compared to urea application. On the basis of this study we can conclude that application of ammonium sulfate is an effective tool for mitigating methane emissions from rice soils.

Keywords: Rice, Methane, Urea, Ammonium sulfate

RESOURCE USE EFFICIENCY OF MENTHA OIL PRODUCTION IN SITAPUR DISTRICT OF UTTAR PRADESH

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Growing mentha (a bonus cash crop) does not disturb or replace the cultivation of any major winter and rainy season crop. Steam distillation of mentha herb is commonly done to extract peppermint oil. Sakran and Biswan block of Sitapur district were selected, of which total four villages (two villages from each block) were selected randomly. Twenty five mentha growers were selected from each village randomly making a total size of 100 farmers. The explanatory variable used in production function explained (86.39 percent) for small farmers followed by large farmers (70.09 percent) and marginal farmers (68.30 percent). However, the variability was explained by (82.26 percent) for all the farms across the group. Marginal farmers were not utilizing the manure and fertilizer adequately, small farmers were found using excessive expenditure on irrigation in per unit of area. Whereas, medium and large farmers were spending more on seed/ suckers for obtaining good produce. This implies the medium and large farmers were given priority to the better quality seed which justifies with the menthol oil production of these farmers.

Keywords: C D production function, resource use efficiency, mentha producers, distillation

IMPACT OF SUGARMILL EFFLUENTS ON SEED GERMINATION AND SEEDLING GROWTH OF*Glycine max*

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Sugar mill effluents are rich in acidic and alkaline compounds. These compounds are the by-products of sugar mill but sometimes are beneficial for certain crops. Present studies reveal the effect of these effluents on seed germination and seedling growth of *Glycine max.* Effluents of Simbhoali sugar mill, Simbhoali, Hapur are used in this experiment. Samples of effluents are collected from two different outlets. One untreated sample from the main drain before entering the effluent treatment plant and second from after treatment.25% concentration increases the radical length as well as shoot length,50% shows better results than 25% but 100% have moderate effect on length of the radical and shoot. On the other hand 25% concentration of effluents shows a slight promontory,50% concentration is best where as 100% concentration of effluents shows a mild effect on seedling growth. Thus 50% concentration of sugar mill effluent proved best for promoting both seed germination and seedling growth of *Glycine max.*

Keywords: Effulents, Germination, *Glycine max*, Seedling

EFFECT OF HUMIDITY AND ASCORBIC ACID ON OIL SEED UNDER DIFFERENT STORAGE REGIMES

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The seeds of most economically plant (crop) need to be stored under a proper storage condition. Hence the study was made to record the changes in seeds of oil crop during various storage condition with certain treatment. The oil seeds are poor in water content, yet they suffer fungal attack and also rancidity of their lipids with time and condition of storage. Various Treatments e.g. Airtight-room temperature-normal RH, Distilled water, to raise the moisture content, Ascorbic acid an antioxidant, to mitigate lipid deterioration and also to maintain a level which in protective during storage fat to prevent fungal attack on seeds. Ascorbic acid (10mM) treatment all storage regimes in general, improve percent germinability. Ascorbic acid at 30 degree celcious-100% RH causes adverse effect on germiability and physical characteristic of some oil seed *Raphanus satives* cv. Chaitki. The study points out that the oil seeds can be stored in two ways-one for retaining germinability and physical characteristics (Ascorbic acid+ Any storage regimes) and the other for accumulation of lipids untreated but stored at any storage regimes or treated with ascorbic acid distilled water.

Keywords: Seed storage, Ascorbic acid, distilled water, Moisture content, RH.

TO EXAMINE THE MAGNITUDE AND DIMENSIONS OF AGRICULTURAL DIVERSIFICATION IN WESTERN UTTER PARDESH

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The Present study was undertaken in baghpat and ghazibad district of western U.P. based on high and low productivity of major crops in the year 2006-07. Two block from each of these two district were selected randomly for the study in total 240 respondents from Ghaziabad and Baghpat district each were interviwed. It was observed during the survey that sugarcane and wheat are the predominant cropping system in these two district of western Uttar Pardesh. Marketing and cost factore are major soci-economic constrants for diversification of forming system towards vegatables, fisherish, piggery,poultry etc. Diversification of agriculture through high value enterprises implies shifting from low value food/non food crops and allied activities to high value food/non food crops and allied enterprises in the agriculture. It means switching over from local to high yielding varieties with integration of high paying enterprises such as horticulture, aquaculture,apiculture,sericulture live stock,poulty etc.

Keyword:Diversification Role of infrastructure.

SUSTAINABLE AGRICULTURE-BENEFITS AND CHALLENGES

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India is an agricultural country. Despite the recent spurt in manufacturing and services and declining share of agriculture in national income, majority of workforce is engaged in agriculture and allied activities. It has been the noblest profession in India since ancient times and has been carried out on sustainable basis. But recently, large scale forest areas, grazing lands and waste lands have been converted into croplands to support the rising population, which has caused ecological imbalance and atmospheric pollution. The green revolution is confined to a few crops like wheat, rice and maize and has been possible only in restricted areas, i.e., Punjab, Haryana and western Uttar Pradesh and certain districts of Andhra Pradesh, Maharashtra and Tamilnadu. The success of green revolution is limited and has been a mixed bag which has given rise to a new set of problems: overuse of water and fertilizers. Excessive use of water results in water logging and salinization whereas excessive use of fertilizers and pesticides cause pollution of water bodies and ground water. In such a situation a renewable and lasting alternative, sustainable agriculture, has to emerge for successful agricultural revolution. Sustainable agriculture may be defined as any set of agronomic practices that are economically viable, environmentally safe and socially acceptable. It has several advantages over traditional and conventional practices. It increases soil fertility, conserves water, increases diversity of crops, reduces use of hazardous chemicals and impacts on climate. It also poses less economic risks. But integrating the concept of sustainability into institutional strategy and educational programmes is proving difficult as sustainability requires dealing with interactions between technology society and environment and therefore multiple stakeholders. So an integrative analytical framework has been designed.

SHEATH ROT OF RICE: AN OVERVIEW

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Among the different diseases of rice, sheath rot caused by*Sarocladium oryzae*(Sawada) W. Gams & D. Hawksw (=*Acrocylindrium oryzae*, Sawada) is one of the most important diseases.The diseasehas been known almost for a century, but was restricted to South East Asia and the Indian Subcontinent. Occurrence of the disease became widespread in mid 1970s. Sheath rot for the first time was recorded in 1978 Kharif in Chhatisgadh (Narain, 1992). Although this disease was first noted at Hyderabad.The disease causes severe yield losses, which varies from negligible to 90% depending upon the degree of severity of disease and environmental conditions.Tikoo (1985) observed the reduced number of spikelets/panicle, number of grains/panicle and 1000 grain weight resulting in losses in crop yield due to sheath rot infection.

EFFECT OF HOLDING SIZE ON PRODUCTION AND QUALITY OF MILK OF CROSS-BRED COWS AND MURRAH BUFFALOES

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The milk production of cross-bred cows and murrah buffaloes in different holding size groups viz. landless, marginal, small, medium and large were investigated. The milk Production of cross-bred cows was significantly greater than that of murrah buffaloes in all above holding size groups. The milk production increase with advancing holding size but such increase was non-significant in both cows and buffaloes. Further, the milk of murrah buffaloes contained higher level of Fat, SNF and TS than that of corss-bred cows but remained unaffected by holding size.

Keyword: Cross-bred cow, murrah buffalo, holding size, lactation, chemical quality.

EFFICACY OF ANTAGONISTS ON MYCELIUM GROWTH AND CARPOGENIC GERMINATION OF SCLEROTIA OF*Sclerotinia sclerotiorum*ON INDIAN MUSTARD

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Sclerotinia sclerotiorum (Lib.) de Bary is a soilborne pathogen capable of infecting more than 400 host plants worldwide. It is a major pathogen that plays a crucial role in reducing the yield in economically important crops. The capability of sclerotia to survive for more than 4 years becomes very difficult to manage the crop from the infection of *Sclerotinia* rot fungus. Stem rot of indian mustard [*Brassica juncea* (L.) Czern & Cross] caused by *Sclerotinia sclerotiorum* is potentially a serious threat in many mustard growing areas in India.Treatments of seeds and foliar spray with of fungicides applied at regular intervals are effective in reducing infection, but uses of chemicals are hazardous, harmful for beneficial micro-organisms. Biological control of plant pathogens offers an exciting opportunity to manage plant diseases. In the present study, the efficacy of four bio-agents, *viz.*, *Coniothyrium minitans, Aspergilus nidulans, Trichoderma harzianum,* and *Pseudomonaschlororaphis*were evaluated for the control of stem rot of Indian mustard. Results on bio-efficacy of different bioagents, when evaluated under glass house condition, the *Coniothyrium minitans* was the most effective agent and caused highest reduction (64.7 %) in carpogenic germination of sclerotia followed by *Aspergilus nidulans* (52.5 %) and*Trichoderma harzianum* (48.8 %),over control while *Pseudomonaschlororaphis* (48.3 %) was at par with *T.harzianum*. All the bioagents showed significant reduction effective in controlling the disease. Similar results were achieved when bioagents tested on dual inoculated plates.

Keywords: Bio – management, antagonists, stem – rot, yield, rhizospheric population, carpogenic, sclerotia, *Sclerotinia*

CHALLENGES OF CLIMATE CHANGE IN AGRICULTURAL SUSTAINABILITY & FOOD SECURITY

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The aim of this paper is to explain the Challenges of climate change and its impact on agricultural sustainability and food security. Climate is directly to have impacts on agricultural sustainability and crop productivity. Sustainability of agricultural production is the key to ensure food and livelihood security. The changing climatic conditions affect agricultural system at three levels: the crop (or livestock) level, the farm (or cropping system) level and at the food system level. Negative impact includes more frequent droughts and floods, heat stress, increased outbreaks of diseases and pests, shortening of crop growing periods and in coastal region

increasing flooding and Salinization due to sea level rise and impeded drainage. The adverse impact of climatic variability on agriculture production at farm level gets aggregated to the level of the food system in terms of food shortages and rising prices which can affect food security.

INFOCHEMICALS: AN EFFECTIVE AND ENVIRONMENT FRIENDLY MANAGEMENT OF INSECT PESTS FOR SUSTAINABLE AGRICULTURE

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Chemical signals and cues have been collectively called semiochemicals or infochemicals referring to "a chemical substance, which in a natural context, is implicated in the transfer of information from one individual to other that results certain behavioral and physiological changes in response in one or both. Infochemicals that mediate interactions between members of the same species are collectively referred to as pheromones, and can be classified as sex pheromone, aggregation pheromone, alarm pheromone, trail marking pheromone on the basis of their functions etc. Allelochemicals are also infochemicals which cause an insect to respond interspecifically. They include a more number of chemicals than pheromones, and can be grouped into: allomones, kairomones, apneumones and synomones. The idea of infochemicals using for management of insect pests in agricultural, horticultural, forestry and storage has been a driving ambition through few decades of pheromone research.Several chemicals have been identified from insects that can be used in monitoring of native and invasive pest and also to protect the plants against herbivores. They can also be used as mass trapping, annihilation, and behavior manipulation of insect in host finding. Since these compounds are species specific, highly biodegradable and require in minute quantity, they could be exploited as green alternative to insecticides for ecofriendly management of insect pest for sustaining agriculture growth.

Keywords: Infochemicals, semiochemicals, pheromones, allelochemicals and IPM

IN VITRO EVALUATION OF FUNGICIDE AND BIOAGENTS AGAINST *Pythium aphanidermatum*

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The sponge gourd (*Luffa cylindrica* Roem) is one of the most popular vegetable. There are a number of diseases like Powdery mildew, Downey mildew, Anthracnose, Fusarium root rot, Cercospora leaf spot, Soft rot and cottony fruit rot,they cause considerable loss to sponge gourd in term of quality and quantity both. During the survey in the year 2015-16, it was found that among all the diseases cottony fruit rot caused by *Pythium aphanidermatum* was a very destructive disease of this important crop. To manage the loss of yield due to this disease twelve fungicide and eight bioagents were evaluate against the pathogen (*in-vitro*) in biocontrol lab, Deptt. of plant pathology during 2015-16. Among all the tried fungicide, Master, Propioconazole and Tubuconazole were most effective for inhibition of radial growth of *Pythium aphanidermatum* and it was recorded no growth. In case of bioagents *Trichoderma koningii and Trichoderma harzianum* wear most effective for inhibition of test pathogen and it was 15.33mm and 16.66mm respectively.

Keywords:*Pythium aphanidermatum, Trichoderma harzianum,T. koningii,* bioagents, fungicids.

POPULARIZATION OF MAIZE PRODUCTION TECHNOLOGY THROUGH FRONT LINE DEMONSTRATION IN JAUNPUR DISTRICT (U.P.)

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The study was carried out during 2012-14 at farmer's fields of five adapted villages of District Jaunpur of Uttar Pradesh. Front Line Demonstration on maize crop was conducted on an area of 20 ha with active participation of 50 farmers with improved technologies composed of Pro-316 variety and integrated crop management (deep ploughing + seed treated with thiram 75% WP @

3g/kg seed). The results revealed that maximum mean grain yield 30.5 q/ha with an increase in 39 per cent over local check (22.0 q/ha). Improved technologies of maize recorded progressively increased average grain yield during two years of study.The extension gap can be bridged by popularizing package of practices of maize including improved variety (Pro-316), use of optimum seed rate, balanced nutrition and recommended plant protection measures. Improved technologies gave higher net return of Rs. 30,367/-ha with benefit cost ratio 2.65 as compared to local check (Rs. 18,065/-ha, benefit cost ratio 2.05).

Keywords: Maize, Yield, Improved technology, Benefit cost ratio.

A STUDY OF FUNGAL SPORE POPULATIONS IN THE ATMOSPHERE AT HAPUR

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The aim of the study was to determine seasonal variation in concentration of selected fungal spora. The fungal air spore of Hapur was investigated using petri-dish trapping technique. During the period from 1 January 2009 to 31 December 2009.The maximum number of fungi were observed in winter season .During summer *Alternaria aternata,Alternaria longipes* had maximum 51-75% frequencies. During rainy season one *Curvularia Lunnata* had maximum 51-75% Frequencies. While during winter *Aspergillus niger* and *Cladosporium cladosporioides* had maximum 76-100% Frequencies. The monthly total number of fungi showed marked seasonal periodicity with the greatest number of 26 genera occurring in winter season 19 genera in summer and 18 genera in rainy. Only 52 species of fungi were reported from incubation at 45 Degree calcious.

Keywords: Air-spora, Petri-dish ,*Alternaria alternata*, *Aspergillus niger*, Periodicity

CHEMICAL COMPOSITION OF FEED RESOURCES IN RURALAREAS OF KUSHINAGAR DIISTRICT (U.P.)

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Feeding system of livestock depends on the availability of crop residues and by-products and pasture and grasses on common property resources. The present work was; therefore taken up to assess the proximate compositions of commonly available feed stuffs in rural areas of Kushinagar District (U.P) Feed samples were collected from 40 households ot 4 villages(Block) of East and 40 household of 4 villages(Block) of West Kushinagar. The average DM content of cereal crop as well as the leguminous crop residues varied between 89 and 93%. The chemical compositions of cereal crop residues revealed that the CP content was very low varied between 2.9 and 3.4% while fibre content was very high and varied between 32 and 37%. The CP content in grain and pulses/used for feeding of livestock varied from 8 to 18% with highest value in gram flour. The wheat and rice bran and pulses chunies constitute the larger part of the dairy ration. The chemical composition of pulses chunies and bran depicts that they contained 14 to 15 and l0 to l4% CP respectively. Horticulture waste contains 5 to 19% CP and 2 to 4% EE. Three types of oil cakes are used for feeding livestock. All over the District. Mustard cake is used as primary source of protein. Linseed cake is only used for feeding dairy cow and buffalo. The chemical compositions revealed that the oil cakes contained 31 to 33% protein and 3 to 8% EE. The present study revealed that available fodder resources had good nutritional values However, energy values and mineral contents of feed resources have to be worked out for better understanding of nutrients intake.

Keywords: Chemical composition, Crop by-products, Grain, Oil-cake, Straw, Tree leaves

THE EFFECT OF GLOBAL CLIMATE CHANGE ON AGRICULTURE

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Climate is the primary important factor for agricultural productivity. The fundamental role of agriculture in human welfare, concern has been expressed by many organizations and others regarding the potential effects of climate change on agricultural productivity. Interest of this matter has motivated a substantial body of research on climate change and agriculture over the past decade. Climate change is caused by the release of 'green house' gases into the atmosphere. These gases accumulate in the atmosphere, which results 'global warming'. Agriculture is one of the sector, which is important to consider in terms of climate change. The

agriculture sector both contributes to climate change as well as will be affected by the changing climate. Theresearch topics concentrate possible physical effects of climate change on agriculture, such as changes in crop and livestock yields as well as the economic consequences of these potential yield changes. The regional increases and decreases associated with climate change are not expected to result in large changes in food production over the next century on aglobal scale. Therefore, impacts on regional and local food supplies in some low attitude regions could amount to large percentage changesin current production. Climate change may impose significant cost for these areas. In addition, warming beyond that reflected in current studies may impose greater costs in terms of total food supply. Projections from most economic studies show substantial economic losses as temperature increases beyond the equivalent of a CO_2 doubling. This reinforces the need to determine the magnitude of warming which may accompany the CO_2 build up currently under way in the atmosphere.

Keywords: Climate change, Agriculture, Regional effects, Adaptations

EFFECT OF *Trichoderma sp.*ON WATER MANAGEMENT OF RAINFED RICE (*Oryza sativa*L.)

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Rice (*Oryza sativa* L.) is one of the most important and staple food crops for more than half (nearly 60%) of the world population, especially for south-eastern Asia, which accounts for 90% of the world's production and consumption. Due to variability of the monsoons the production of rice is affected every year. Water availability is one of the most important inputs which contribute to the growth and productivity of rice crop. Rice faces serious challenges in cultivation with the decreasing water availability. Uncertain and uneven precipitation is a major constraint in rice production especially when it occurs at an unexpected time and moreover, problems become aggravated if dry conditions prevail for a longer period. Trichoderma is a genus of aerobic fungi that is prevalent in most soils. They are known for their ability to act as biocontrol agents against plant pathogens.The principal mechanisms for control have been assumed to be those primarily acting upon the pathogens and included mycoparasitism, antibiosis, and competition for resources and space. These fungi colonize the root epidermis and outer cortical layers. *Trichoderma spp. as* a cosmopolitan fungal organism has been utilized not only in biocontrol of plant pathogens but also in enhancing plant growth even under suboptimal plant-growth conditions. Several studies have revealed that these fungi promote plant growth right from the germination phase. The fungi enhances tolerance to drought by improving root growth, increasing water-holding capacity and/or enhancing nutrient uptake. *Trichoderma* spp. produce various enzymes which help in combating soil pathogens. Studies clearly reveal that the use of *Trichoderma spp*. under drought stress can effectively augment plant growth (Chepsergon *et al*., 2014). Thus apart from protecting the plant from biotic stresses, providing nutrients, full potential of the fungus may be achieved by harnessing more water in their fungal mass and providing at the time of scarcity in rainfed areas.

INTEGRATED WEED MANAGEMENT WITH HERBICIDE TOLERANT CROPS

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Integrated weed management (IWM) is the control of weeds through a long-term management approach, using as physical, chemical, biological and cultural weed management techniques. Weed control mechanisms include preventative measures, monitoring, crop rotations, tillage, crop competition, herbicide rotation, herbicide mixtures, biological control, nutrition, irrigation, burning, etc. Herbicides have revolutionised weed control in farm cropping systems since the 1940s by increasing the farmer's ability to control unwanted plants that might compete with crops for light, nutrients and water. Herbicide tolerant crops are a relatively new weed management practice used to enhance integrated weed management programmes.. These crop varieties are able to tolerate exposure to specific herbicides that would normally kill them. Since the introduction of triazine-tolerant oilseed rape (Brassica napus L.) in 1981, various conventionally-bred herbicide tolerant (CHT) crops (i.e. traditional plant breeding or bred through spontaneous mutations and mutagenesis) have been grown commercially worldwide. The rapid adoption of genetically modified herbicide tolerant (GMHT) crops is generally attributed to low cost, simplified, more flexible and selective weed management options through the use of broad-spectrum, intrinsically non-selective herbicides (primarily glyphosate), a lower risk for crop injury, and their compatibility with no-till or reduced-tillage systems. The approach is driven by the need to maximize crop yields and profits while simultaneously protecting natural resources and minimizing environmental effects. The adoption of herbicide-tolerant crops and their related agronomic practices can help in effective weed management, overcome growing problems with herbicide resistance in weeds, and help prevent environmental issues connected with the intensification of agriculture. However wide spread use and over reliance on herbicide- tolerant crops, without the benefit of an integrated weed management can

result in the development of herbicide- tolerant weeds, a shift to weed species or biotypes that are more tolerant to herbicide and species that emerge after post-emergence herbicide has been applied. So, it should be believed as one component of an IWM approach that helps secure the longterm benefits of a profitable and environmentally sound weed management programme.

EFFECT OF DIFFERENT SOWING DATES ON GROWTH,YIELD AND QUALITY OF VARIOUS INDIAN MUSTARD(*Brassica juncea* L.) VARIETIES

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A field experiment was conducted during *rabi*season of 2015-16 at Agronomy research farm of N. D. University of Agriculture and Technology, Kumarganj, Faizabad (U.P.) to assess the effect of different dates of sowing on the growth yield and quality of various Indian mustard (*Brassica juncea* L.) varieties. The experiment was conducted with split plot design replicated four times. Treatments consisted of four dates of sowing viz. 15th October, 30th October,14th November and 29th Novemberwas kept as main plot and three varieties viz. Varuna, Narendra Rai-1 and Kranti was kept as sub plot. The growth characters like plant height, leaf area index, dry matter accumulation, seed and stover yield was influenced significantly due to different sowing dates and varieties. Highest plant height (164.6 cm), leaf area index (4.5), dry matter accumulation (41.0 g plant^{-1}), seed yield (1873.5 kg ha^{-1}), stover yield (6472.3 kg ha^{-1}) and oil yield (838.2 kg ha^{-1}) was recorded when the crop was sown on 14th November. Among the various varieties taken under investigation, Varuna proves better with respect to growth and yield which gave highest plant height (170.22 cm), leaf area index (4.7), dry matter accumulation (42.7 g plant^{-1}), seed yield (1877.0 kg ha^{-1}), stover yield (6533.8 kg ha^{-1}) and oil yield (841.1 kg ha^{-1}). Whereas quality parameters like oil, nitrogen and protein content were not influenced significantly due to different dates of sowing as well as varieties.

Keywords: Mustard, sowing dates, LAI, oil yield, quality, protein.

SOIL MANAGEMENT FOR SUSTAINABLE AGRICULTURE

Amit Kumar and Arti

Thesoil sustains most living organisms, being the ultimate source of their mineral nutrients.Good management of soils ensures that mineral elements do not become deficient or toxic to plants, and that appropriate mineral elements enter the food chain. Soil management is important, both directly and indirectly, to crop productivity, environmental sustainability, and human health. Because of the projected increase in world population and the consequent necessity for the intensification of food production, the management of soils will become increasingly important in the coming years. To achieve future food security, the management of soils in a sustainable manner will be the challenge, through proper nutrient management and appropriate soil conservation practices. Research will be required to avoid further degradation of soils, through erosion or contamination, and to produce sufficient safe and nutritious food for healthy diets.In many areas of the world, the loss of topsoil, either through mineral imbalance or erosion, is the single largest threat to agricultural productivity. Soil erosions by wind and water are the main processes by which topsoil is lost. R. García-Moreno et al. report that soils with high soil surface roughness (SSR), such as those produced with conservation tillage, are less susceptible to erosion, and that there is an inverse relationship between SSR and soil porosity. They suggest that these soil properties might be used to predict the susceptibility of a soil to erosion by wind or water. Organic amendments often improve the productivity of soils and the nutritional value of crops grown thereon. In particular, crop residues can be used to increase the phytoavailability of essential mineral nutrients, reduce the phytoavailability of toxic mineral elements, improve soil physical properties, and promote a beneficial soil biota.

STUDIES ON THE EFFECT OF NITROGEN AND PHOSPHORUS ON GROWTH, FLOWERING, FRUITING AND YIELD OF OKRA (*Abelmoschus esculentus* (L.) Moench)

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The present investigation was conducted during summer season at vegetable research farm of the Department of Horticulture, faculty of Agriculture, Udai Pratap College (An Autonomous institution), Varanasi, India in the year 2013-14. The field trial involving three levels each of nitrogen, *i.e.* 0, 60 and 120 kg per hectare , phosphorus, *i.e* 0, 30 and 60 kg per hectare and their interaction making 9 treatment combination , was laid out in randomized block design (factorial) with three replication. The observation on height of plant, diameter of stem, number of branches per plants, number of fruits per plant, yields of fruits per

hectare , length of fruit, diameter of fruit. Fresh weight of per fruit and dry weight of fruit per plant were recorded. The statistical analysis clearly showed that nitrogen and phosphorus and their interactions responded significantly effective on various growth characters of plants, flowering, fruiting and yields of okra fruits. Nitrogen application showed significant response at all the stages of growth. An increase in the level of nitrogen up to 120 kg per hectare reflected significant increase in various growth characters of plant, yield and physico- chemical composition of fruits. But number of days taken to flowering was reduced significantly with the increased level of nitrogen. The application of 60 kg phosphorus per hectare also recorded the same trend for the characters studies as it was found in case of nitrogen. Treatment combination also showed significant responses on various growth characters and were found useful when applied in certain combination. The maximum height of plant was recorded under N_2P_2 treatment combination wherever a combination of N_2P_2 produced greater number of stem, greater number of leaves and maximum thickness of stem. Earliest flowering and height number of fruits per plant were noted under N_2P_2 treatment combination where as highest yields per hectare was noted under N_2P_2 treatment combination, which was found significantly superior to other combination. Physico- chemical composition of fruits was also influenced by treatment combination. The length, diameter, fresh weight and dry weight of per fruit were maximum under a treatment combination of N_2P_2. The most important study of this experiment is the application of various nutrients under this experimental study it was found that during the year of experimental, 120 kg nitrogen, 60 kg phosphorus per hectare had given better results on almost all the characters. However, the N_2P_2 combination gave the highest yields per hectare.

BIOLOGICAL MEANS FOR THE MANAGEMENT OF WILT OF TOMATO AND BRINJAL INCITED BY *Fusarium* spp.

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Wilt of tomatoand brinjalincited by *Fusarium oxysporum* f. sp. *lycopersici* and *Fusarium solani* are serious soil-borne diseases. Studies were undertaken for the estblishment of pathoginicity and also for the management of these diseases by biological means. Among the three methods of inoculation, the soil inoculation was the best in causing wilt in these crops followed by spore suspension and disc method. The most aggressive pathogen was *F. oxy.* f. sp. *Lycopersici* that caused infection 66.67 % at pre-emergence, 33.33 % at post-emergence in tomato and 100% mortality in brinjal, respectivly. Scanning Electron Microscopy (SEM) and Energy Dispersive X-ray (EDX) analysis of the elements and cellular changes in different plant parts and isolates showed that their distributions are altered during disease development.*In vitro* efficacy of five medicinal plants *viz.,Moringa oleifera* (bark),*Tinospora cordifolia* (leaves), *Trachyspermum ammi* (seed), *Azadirachtaindica* (leaf), *Psidium guajava* (leaf), *Eucalyptus camaldulensis* (bark) and fungal antagonists *viz.*, four species of *Aspergillus* (*A. niger, A. flavus, A. sulphureus, A. luchuensis),* five species of *Trichoderma (T. viride, T. koningii, T. harzianum, T. atroviride, T. longibrachiatum*)and two species of *Penicillium* (*P. citrinum, P. italicum*)were tested at 25, 50 and 75% (v/v) by poisoned food technique against both the pathogens. Among the plant extracts tested, *M. oleifera*and *A.indica* were found significantly superior in suppressing the mycelia growth of *Fusarium oxysporum* f. sp. *lycopersici as* 100%inhibitionwere recorded as 50 and 75% concentration followed by *T. cordifolia, T. ammi , P. guajava, E. camaldulensis* at 7th day of inoculation. On the other hand, culture filtrates of *Aspergillus niger, A. luchuensis, A. flavus* and *A. sulphureus* showed 100% inhibitionagainst *F. oxy.* f. sp. *lycopersici* at all the concentrations. *However, A. sulphureus, A. niger*were most effective against *F. oxy.* f. sp. *lycopersici* as they completly inhibited the mycelial growth at 75% followed by *A. flavus, Penicillium citrinum, P. italicum*. The cultural filtrate of *T. longibrachiatum* was highly effective against both the test pathogens and there was 100% inhibition of mycelial growth at 50 and 75% concentrations, while *T. harzianum* and *T. atroviride* were 100% effective against *F. oxy.* f. sp. *lycopersici* at 75% concentrations followed by *T. koningii* and *T. viride* at 7th day of inoculation.Studies revealed that use of biological means (bioagents and plant extracts) appears to be the best option for the management of wilt of tomato and brinjal and sustainable production of these crops as they are non-pollutive, cost effective, non-hazardous in natureand also do not disturb ecological balance.

YELLOW LEAF DISEASE: AN EMERGING THREAT FOR SUSTAINED SUGARCANE PRODUCTION IN INDIA

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Yellow leaf disease (YLD) is one of the serious diseases of sugarcane in India. YLD is known as yellow leaf syndrome, because it is caused by single or mixed infections of two pathogens *i.e.Sugarcane yellow leaf virus* (SCYLV) and Sugarcane yellows phytoplasma (SCYP). SCYLV belonging to genus*Polerovirus*and Family: *Luteoviridae*. It is transmitted by Aphids (*Melanaphissacchari*) while, SCYP belonging to 16SrI-A group of phytoplasma and vectored by delphacidplanthopper (*Saccharosydnesaccharivora*). Yield loss due to YLD was estimated of about 15% in USA, up to 50% in Brazil, and 15-20% in India. In sub-tropical India there is meagre information was available on diagnosis and identification tolerant genotypesfor YLD hence, present study was conducted to diagnose the YLD and identify sources of field tolerant genotypes. To detect SCYLV and SCYP infection in YLD affected 14 sugarcane genotypes *viz.*, Khakai, Baragua, Co 0238, CoJ 64, Co Pant 97222, CoS 09232, CoLk 9709, BO 91, CoLk 94184, Co 1148, CoS 767, CoLk 8102, Co 05011 and CoLk 07201 subjected to DAC-ELISA and nested PCR assay. YLD affected sugarcane genotypes exhibited array of symptoms including, smaller leaves along with bunching in the crown, mild to severe yellowing of the mid-ribs, and leaf lamina and necrosis of leaves and dieback of whole plant. During the year 2015-16, up to 40% disease incidence was recorded in CoLk 94184, Co 0238 and CoS 767 sugarcane genotypes while up to 10% disease incidence was recorded on rest of the genotypes. None of the samples reacted positively with the SCYLV antiserum in DAC-ELISA. The value of absorbance was ranged from 0.042-0.119 (Healthy Control: 0.118). Nested PCR showed the amplification of phytoplasma of ~1.8 kb and ~1.2 kb from Co 0238 and CoLk 94184 in first round and second round PCR on 1.5% agarose gel electrophoresis. This confirms the association of phytoplasma with the YLD in sugarcane in sub-tropical region of the country. Earlier, the incidence of YLD in sub-tropics was recorded in the traces, since 2013-14 it is occurring in most of the sugarcane varieties cultivated in sub-tropical India including Co 0238, CoLk 94184, CoS 767. Moist hot air treatment (MHAT) is the only cheap and sustainable technology to check phytoplasmal infection and minimize yield loss caused by the disease. Genotypes *viz.*, Co 11026, CoLk 12202, CoPb 10181, CoPb 10182 and CoS 10231 have been identified as tolerant to this disease.

STATUS OF INDIAN FLYING FOX, *Pteropus giganteus* IN UTTAR PRADESH AND THEIR ECOLOGICAL ROLE

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Bats are the second largest group of mammals. India is relatively rich in bat fauna comprising approximately 119 species of bats out of which 14 species are fruit-eating or megachiropteran (Pteropodidae) belongs to 8 genus and the remaining are insect eating or microchiropteran bats. The Indian flying fox, *Pteropus giganteus* widely distributed throughout India the current study reveals the occurrence of high population of *P. giganteus* in Uttar Pradesh. The colonies of *P. giganteus* generally located nearer to the water body, close association with human beings and found in cities and villages. *Ficus* trees are the most favoured roosting trees, however they also known to roost on *Eucalyptus globulus*, *Mangifera indica* and *Tamarindus indica*. At dusk flying-foxes leave the roost to forage upon flower, nectar and fruit of trees in agro forest plantation as well as in primary and secondary forest. These bats are economically important to our society. They benefit us pollination and seed dispersal and play crucial role in the maintenance of forest ecosystems worldwide. Loss of their natural habitat by increased human population and human activities such as deforestation, use of pesticides, industrial activities are the major causes of their population. Hunting of *P. giganteus* was not completely stopped in the study area as there were rare observations on netting, shooting for bush meat. However, the habitat destruction by tree felling was a major threat to *P. giganteus*. To ensure the survival of this species, roost habitat must be protected. The protection of roost habitat alone is insufficient to ensure the survival of this species. Further investigations on seasonal distribution, maternity roost and feeding sites are essential for survival of the species. Thus, it is critically important to preserve the existing roosting habitats of *P. giganteus* in Uttar Pradesh, because bats play vital role in balancing the ecosystem, seed dispersal, regeneration of forests.

CHANGES IN FRESHWATER BACTERIAL COMMUNITY COMPOSITION DURING MEASUREMENTS OF MICROBIAL AND COMMUNITY RESPIRATION

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The respiration rates of a pelagic community and of its microbial fraction (< 1.2 µm) were measured at two depths in the oxic layer of a meromictic alpine lake (Cadagno, Switzerland) using the oxygen technique. The duration of the incubations were 12, 24 and 55 h. Bacterioplankton abundance (DAPI counts) and composition (whole cell hybridization using 11 group-specific rRNA-targeted oligonucleotide probes) were measured during the incubations. Respiration generally increased with time, especially in the

microbial fraction, or remained similar. This result was not always consistent with changes in bacterial abundance and cell volume. The composition of the community also changed during the incubations. The abundance of β-Proteobacteria increased during the course of all the experiments. These results extend the previous conclusions drawn in marine environments to fresh waters and demonstrate that, in addition to changes in bacterial abundance, cell volume and biomass, changes in the taxonomic composition of the bacterial community can occur during discrete incubations of freshwater planktonic communities.

Keyword: microbial,freshwater,plankton

LINE X TESTER ANALYSIS FOR YIELD AND ITS CONTRIBUTING COMPONENTS IN RICE (*Oryza sativa* L.)

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Rice (*Oryza sativa* L.) is a major staple food crop in Asia, where 90% of the world's rice is grown and consumed. In past twenty decades considerable number of high yielding varieties of rice for favourable ecosystem have been developed but it is meager in rice. The genetic classification of rice plant belong to genus *Oryza* of family Graminae (poaceae). In India, an annual production of about 103.04 million tonnes with an average productivity of 2207kg per hectare.To break the yield barriers and to attend yield plateau, proper utilization of effective doners for grain yield along with quality attributes is essential for sustainability. But performance of a F_1 hybrid depends on choice of parents. The parents with optimal to intermediate genetic diversity may be found to manifest markedly higher heterosis. Therefore, there is an urgent need to develop genotypes with high grain yield alongwith good grain quality traits. . Among the several statistical tools, line X tester analysis may be convenient. Hence, the present investigation have been planned to identify superior general and specific combiners for further utilization in breeding program for dual target grain yield alongwith grain quality traits. Present investigation has been planned to fulfill the following objectives for scented rice: To estimate the combining ability variances and their effects, to find out the gene action involved in controlling yield traits, to estimate heterosis over better-parent and standard varieties, and to sort out the heterotic combinations for commercial exploitation.

HETEROSIS IN RELATION TO COMBINING ABILITY FOR YIELD AND ITS CONTRIBUTING TRAITS IN SCENTED RICE (*Oryza sativa* L.)

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Rice (*Oryza sativa* L.) is a major staple food crop in Asia, where 90% of the world's rice is grown and consumed. In past twenty decades considerable number of high yielding varieties of rice for favourable ecosystem have been developed but it is meager in scented rice.Majority of the Indian farmers are marginal, with limited per capita income. Hence, in order to improve their economic status as well as to einhence the foreign exchange, more emphasis should be given to work on scented rice. Aroma of the scented rice is due to presence of analcoailed two acetyl one pyroline. The exploitation of heterosis for improving yield potential of crop plants has emerged as one of the most outstanding contributions of science of genetics to agriculture. The assessment of nature and magnitude of heterosis for different characters serves in the identification of potential hybrid combinations for exploitation as hybrid varieties or breeding materials for isolating transgressive segregants for developing high yielding pureline varieties. But performance of a F_1 hybrid depends on choice of parents. The parents with optimal to intermediate genetic diversity may be found to manifest markedly higher heterosis. Therefore, there is an urgent need to develop genotypes with high grain yield alongwith good grain quality traits. . Among the several statistical tools, line X tester analysis may be convenient. Hence, the present investigation have been planned to identify superior general and specific combiners for further utilization in breeding program for dual target grain yield alongwith grain quality traits. Present investigation has been planned to fulfill the following objectives for scented rice:To estimate the combining ability variances and their effects, to find out the gene action involved in controlling yield traits, to estimate heterosis over better-parent and standard varieties, and to sort out the heterotic combinations for commercial exploitation.

EFFECT OF UREA AND SPACING ON SNAPDRAGON (*Antirrhinum majus* L.) CV. AFRICAN MIX

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Present investigation was carried out to investigate the "Effect of urea and spacing on snapdragon (*Antirrhinum majus* L.) cv. African Mix" in 2014-15. The experiment was conducted at Main Experimental Station, Department of Horticulture, Narendra Deva University of Agriculture & Technology Kumarganj, Faizabad (U.P.).The experiment was laid out in Randomized Block Design (factorial) with 15 treatments combinations comprising of 5 levels of urea (0.0, 0.5, 1.0, 1.5 and 2 %) and 3 levels of spacing (30×10 cm, 30×20 cm and 30×30 cm) to studies the effect on snapdragon. It can be concluded from the overall experimental findings that spraying of urea @ 2 % at 30 DAT was proved to be most effective to increase plant height (33.37 cm), plant spread (28.27 cm), number of branches/plant (9.57), number of leaves/plant (325.16), first flower bud initiation (56.78 days), opening of first florets (80.11 days), duration of flowering (91.71 days), length of spike (59.48 cm), number of florets/spike (12.02), number of spike/plant (9.22), average weight of spike (17.27 g.), number of spike/ha (14.07 lakh), spike yield/ha (241.62 q.) and vase life (11.56 days) of snapdragon. Closer spacing enhanced plant height, number and yield of spike/ha. However, wider spacing resulted more spread, number of branches and leaves per plant. Flowering behaviour and quality of spike and vase life enhanced in wider spacing 30×30 cm planting distance. The interaction between urea and spacing were recorded significant in number of leaves per plant, number of spike ha^{-1}, yield of spike (q/ha) and vase life of flower. Maximum vase life (12 days) was observed in $U_4 \times S_3$ treatment.

REPRODUCTIVE BIOLOGY OF FAMILY ERICACEAE: *Agapetes serpens* (WIGHT) SLEUMER [*pentapterygium. s.* WIGHT] KLOTZSCH

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Ericaceae family commonly known as Health family is the largest among the families of the order Ericales comprising about 80 genera and over 1900 species. The important members of the family which have attracted our attention include *Agapetes serpens* and Rhododendron species. This paper describes the various aspects of reproductive biology of the genus *Agapetes serpens.* The paper deals with taxonomic description, phenological events, description of male reproductive organs, pollen viability, pollen germination *in vivo*, pollen morphology, female reproductive organs, trichomes on floral parts and the most important feature the floral vasculature.

Keywords: Ericaceae, *Agapetes serpens* (wight) Sleumer, Reproductive Biology

GOVERNMENT POLICIES FOR SUSTAINABLE AGRICULTURE

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Along with other inputs, credit is essential for establishingsustainable and profitable farming systems. Most of the farmers are small producersengaged in agricultural activities in areas of widelyvarying potential.The Government of India has initiated several policy measures to improve theaccessibility of farmers to the institutional sources of credit.Initiatives taken by the government for increasing flow of credit areFarm credit package,Interest subvention to farmers, Extension of interest subvention scheme to post harvest loans etc.The majorconcern of the Government is therefore, to bring all the farmer households within thebanking fold and promote complete financial inclusion.

ANTIBACTERIAL EFFICACY OF *Syzygium aromaticum*EXTRACT AGAINST NEONATAL SEPSIS CAUSING BACTERIA

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Perinatal mortality is alarmingly high in most of developing countries. This high mortality is mainly due to neonatal sepsis and antibacterial agents are greatly over prescribed for it. This resulted in up-rise of antibiotic resistant microbes. Due to this continuous spread of multidrug resistant pathogens has become a serious threat to public health. Thus present work aims to test the antibacterial efficacy of *Syzygium aromaticum* extract as a source of alternative antimicrobial chemotherapeutic agent.80 samples of neonatal septicemia were taken from NICU of Sardar Vallabh Bhai Patel Hospital, Meerut. Out of these 80 samples, *E.coli, Klebsiella, Staphylococcus* and *Psedudomonas* sp. were isolated. Among them antibiotic resistant strains were identified by using

different antibiotics like Meropenem, Imipenem, Polymixin B, Gentamycin and Amikacin etc. Phytochemical produced by *Syzygium aromaticum* extracted in Acetone, Benzene, Chloroform, Ethanol, Ethyl acetate and Methanol possess the antimicrobial properties against these sepsis causing bacteria in neonates. *S. aromaticum* extracted in methanol exhibited best result among all the solvent phases used as against *E.coli* MIC was 3.12 x 10^{-5},*Klebsiella* 0.78 x 10^{-7}, *Staphylococcus* 0.78 x $10^{-7}$and *Psedudomonas* sp. it was 1.56 x 10^{-6}.

ANTI-MICROBIAL ACTIVITY OF NAPHTHALECIN PRODUCED BY *Sporotalea colonica*

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Infections are very common and responsible for large number of diseases adversely affecting human health caused by various microbes as bacterial, fungal and helminths. The infection caused by these microbes can be prevented, managed and treated through a group of compounds known as antibiotics, that can be bacteriostatic or bactericidal. Naphthalecin is a low molecular weight antibiotic produced by an obligate anaerobe of the genus Sporotalea. In the present study *Sporotalea colonica* was isolated by garden soil of M.I.E.T campus, Meerut. This antibiotic obtained from *S. colonica* was tested against four bacterial strains as Staphlococcus, Streptococcus, Salmonella and Bacillus spp. and four fungal cultures as Penicillium, Cladosporium, Aspergillus and Alternaria. Among bacterial strain this antibiotic was maximum effective against Salmonella and least against Bacillus spp.. While in case of fungal cultures, maximum effect was seen against Penicillium and least against Cladosporium.

DEMONSTRATION OF DISC PLOUGH FOR DEEP PLOUGHING TO BREAK HARD PAN BELOW THE SUBSURFACE TO ENHANCE AND SUSTAIN THE PRODUCTIVITY OF SUGARCANE IN BAGHPAT

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Year round tillage operations carried out throughout the year in Baghpat district. There were a number of symptoms that indicate hardpan soil like water ponding in the field following rainfall, uneven crop growth, poor penetration of tillage equipment and/or high draft (horsepower) requirement; and plant roots growing sideways after they reach a certain depth in the soil. The hardpan soil was identified by on-site field inspections. The method involves pushing a narrow steel rod into the soil to a depth of 60 cm (2 feet). A hardpan layer made it difficult to push the rod into the soil. Repeated tillage operations are carried out by the farmers till sowing of the crop. Even after harvest of the crop, the field is repeatedly harrowed to avoid weed growth in the off season. Due to these practises a hard soil pan is formed below the subsurface. Compacted soils occur when the stress (weight) on the soil from farm equipment exceeds the ability of the soil to support that stress. The soil is "squeezed" into a smaller volume. Compacted or hard pan soils have a hard, dense layer at or near the plough layer or surface. It always creates difficulty for water to move through this layer and to grow the crop in it due to poor root penetration. Soils may also be compacted when tillage destroys the soil structure by breaking down the natural system of pores and channels. The soil can then be compacted more easily by heavy rainfall, animals' hooves, and wheels of tractors and carts. To encounter this issue of the Baghpat, no of demonstration of deep ploughing by disc plough were done in last five during summer season since 2011. It was observed that the percolation of water in the field was increased. The substantial increase in yield of sugarcane was found up to 7 to 10 % compare to unploughed field due to better nutrient uptake efficiency. The operating cost of plough was found to be Rs.1126 per hectare.

ENGINEERING MATERIALS FOR FOOD PROCESSING EQUIPMENTS

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Materials used for the construction of food processing equipments also play an important role in the sanitary design and maintenance of hygiene. Most of the food processing equipments are worked continuously throughout the year resulting in more wear and tear. The commonly used materials are: Iron, Steel, Stainless steel, Aluminium, Insulation materials, Plastics, Glass etc. Standards also provide the specifications regarding alloys and required coatings materials used in fabrication. These materials have peculiar kind of properties with regard to workability, compatibility, and sanitary design features. Depending upon the application, various metals as well as non metals (e.g., plastics, rubber) are used. The research article discussed the specifics interventions of

engineering materials in sanitary design of food processing equipments with internationally accepted Standards of various organisations.

VEGETATIVE GROWTH PERFORMANCE OF *Trigonella foenumgraecum*PLANTS UNDER SALT STRESS

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Salinity is one of the most brutal environmental factors limiting the productivity of crop plants because most of the crop plants are sensitive to salinity caused by high concentrations of salts in the soil, and the area of land affected by it is increasing day by day. Present study aims to study the effect of salt stress on vegetative growth performance of fenugreek plants. Seeds of *T. foenumgraecum* L. of local variety were procured from Meerut. These seeds were grown in pots containing control and various salt treated pots to see their salt tolerance. Seeds were treated with DW, 50, 100 and 200 mM NaCl. Various concentrations of salt had a significant effect upon the survival percentage, plant height, number of branches, fresh and dry weight of shoots as well as roots. Number of leaves also varied significantly. Higher salt treatment adversely affected the photosynthetic ability and thus the growth of plants. However leaf length and shoot moisture contents exhibited non significant difference. The findings suggest that test species is tolerant to moderate salinity (50 and 100 mM NaCl) and showed decline in all the growth parameters at higher salt treated (200mM NaCl) sets.

GDH1 GENE (NITROGEN USE EFFICIENCY GENE FROM *Arabidopsis thaliana*): *IN SILICO* IDENTIFICATION OF ITS ORTHOLOGS IN WHEAT GENOME

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Nitrogen use efficiency (NUE) in plants is for uptake, assimilation, remobilization and utilization of nitrogen. Gdh1 is a gene that codes for a hexameric enzyme Glutamate Dehydrogenase that perfoms the amination of α- keto glutarate into glutamine and deamination of glutamate into α keto glutarate. Glutamine derived from Glutamate synthesizes other amino acids. The present study was aimed on *in silico* identification of wheat orthologs of Gdh1 gene. The full length sequence of Gdh1 gene was retrieved from online data base i.e. TAIR (The Arabidopsis Information Resource). Sequence based similarity of query gene (Gdh1) was searched against wheat genomic database at NCBI using tBLASTx and CD search tool. Conserved domains of query gene showed similarity with CDs of corresponding wheat mRNA/ cDNA. Sequences obtained from NCBI indicating the orthologous nature of wheat mRNA/cDNA sequences against the Gdh1 gene. Above mRNA/cDNA sequence of wheat was then used for locating the putative orthologs of query gene on homologous chromosomes of wheat using URGI BLASTn tool. Wheat contigs containing orthologs for the searched mRNA/cDNA sequences was downloaded.The gene structure and amino acid sequence of query gene and its putative wheat orthologs (obtained from URGI) was predicted using FGENESH programme. These were then used for determining 3D protein structure of both query gene and its putative wheat orthologs using various tools such as SWISS MODEL and ModWeb. The 3D structure of query genes and its putative wheat orthologs were further aligned using FATCAT server. The identity of more than 40% reflects good homology between the protein structures of the query gene and its putative wheat orthologs and hence the obtained putative wheat orthologs for the Gdh1 gene is true orthologs. Further validation was done by predicting the functions of both genes using ProFunc tool. A comparison of biological and biochemical function of query and orthologs reveals their conserved and orthologous nature.

REVIEW: MANAGEMENT OF PHYTOPHTHORA BLIGHT OF PIGEONPEA CAUSED BY *Phytophthora drechsleri* f. sp. *cajani*

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Pigeonpea is one of the major legumes and it is one of the most important among edible legumes of the world. Diseases are major constraints affecting both production and yield stability of pigeonpea (Kannaiyan and Nene, 1984). In IndiaFusarium wilt, Sterility mosaic, Phytophthora blight and Phoma stem canker are considered most important diseases of pigeonpea causing extensive damage to the crop. Pal and Grewal (1976) reported that the addition of potassium at 50 kg/ha in the form of potassium sulfate

decreased the incidence of Phytophthora blight of pigeonpea, regardless of the presence or absence of nitrogen or phosphorous in the soil. According to Chauhan and Singh (1991), the weed canopy reduced splash dispersal of *Phytophthora drechsleri* f. sp. *cajani*from soil to aerial plant parts, thus reducing disease intensity. One isolate each of *Pseudomonas fluorescens* and *Bacillus subtilis*, and two species of *Trichoderma* (*T. viride* and *T. hamatum*) were effective against *Phytophthora drechsleri* f. sp. *cajani*in in vitro tests. Mycelium of *Phytophthora drechsleri* f. sp. *cajani*lysed by *P. fluorescens* and *B. subtilis*, whereas *Trichoderma* species overgrew in dual culture (Singh, 1996). In addition to antagonistic potential, *P. fluorescens* was also compatible with metalaxyl, mancozeb + metalaxyl, captan, thiram and carbendazim. *T. viride* and *T. hamatum* were compatible at 0.6 and 0.3% of metalaxyl and 0.3% of mancozeb + metalaxyl, whereas, *B. subtilis* was compatible with metalaxyl only at 0.3%. Growth and sporulation of *Trichoderma sp.* and *T. viride* was not adversely affected at 1000 ppm of metalaxyl and 100 ppm of mancozeb + metalaxyl. However, *T. hamatum* was sensitive at higher levels of treatment. Singh *et al.* (1997) investigated 258 pigeonpea genotypes to locate field resistance against *Phytophthora drechsleri* f. sp. *cajani*. They placed 93.5% entries in the highly susceptible category compared with only 7 resistant genotypes (BDN 627, Sehore 197, Sehore 197-1, ICPL 187-1, ICPL 84052, ICPL 84023 and ICPL 88009).

EFFECT OF DIFFERENT SOWING DATES ON GROWTH,YIELD AND QUALITY OF VARIOUS INDIAN MUSTARD(*Brassica juncea* L.) VARIETIES

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A field experiment was conducted during *rabi*season of 2015-16 at Agronomy research farm of N. D. University of Agriculture and Technology, Kumarganj, Faizabad (U.P.) to assess the effect of different dates of sowing on the growth yield and quality of various Indian mustard (*Brassica juncea* L.) varieties. The experiment was conducted with split plot design replicated four times. Treatments consisted of four dates of sowing viz. 15th October, 30th October,14th November and 29th Novemberwas kept as main plot and three varieties viz. Varuna, Narendra Rai-1 and Kranti was kept as sub plot. The growth characters like plant height, leaf area index, dry matter accumulation, seed and stover yield was influenced significantly due to different sowing dates and varieties. Highest plant height (164.6 cm), leaf area index (4.5), dry matter accumulation (41.0 g plant^{-1}), seed yield (1873.5 kg ha^{-1}), stover yield (6472.3 kg ha^{-1}) and oil yield (838.2 kg ha^{-1}) was recorded when the crop was sown on 14th November. Among the various varieties taken under investigation, Varuna proves better with respect to growth and yield which gave highest plant height (170.22 cm), leaf area index (4.7), dry matter accumulation (42.7 g plant^{-1}), seed yield (1877.0 kg ha^{-1}), stover yield (6533.8 kg ha^{-1}) and oil yield (841.1 kg ha^{-1}). Whereas quality parameters like oil, nitrogen and protein content were not influenced significantly due to different dates of sowing as well as varieties.

Keywords: Mustard, sowing dates, LAI, oil yield, quality, protein.

USE OF *BT* CROPS AGAINST IMPORTANT INSECT-PEST AT GLOBAL LEVEL AND THEIR DEVELOPMENT

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Insect-pest resistance is a serious problem on global level. Over 600 pests are reported who developed resistance ageist chemical pesticides. Genetically modified (GM) plants are grown on more than 67 million hectares in 18 countries worldwide. Transgenic crops producing insecticidal proteins from the bacterium *Bacillus thuringiensis* have been cultivated commercially for over 15 years. Plant genetic transformation is primarily focusing on the use of *Bacillus thuringiensis*genes to impart pest resistance in several important crops. Most genetically modified plants are generated by the biolistic method or by *Agrobacterium tumefaciens* mediated transformation. Genetically modified crop are used in agriculture, the DNA of which has been modified using genetic engineering techniques. Worldwide, *Bt* crops have provided effective control of target pests with fewer applications of insecticide, have increased yield and profitability for farmers and have reduced risk to the environment and human health compared with non - *Bt* crops.

ROLE OF HONEY BEES IN HORTICULTURAL CROPS FOR POLLINATION

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In most horticulture crops, seed or fruit development depends on pollination and fertilization. In most cases, this involves the transfer of pollen from the male portion of the flower to the female portion. A single honey bee can carry up to five million pollen grains on its body, and a strong honey bee colony may bring in well over 50 pounds of pollen during a season. Bee pollination results in a higher number of fruits, berries or seeds, it may also give a better quality of produce, and the efficient pollination of flowers may also serve to protect the crops against pests. Honey bees alone account for 80 per cent of pollination service done by the insect. Honey bees enhance 11-79 per cent yield in different crops. The value of additional yield obtained due to bee pollination alone is 15-20 times more then the valus of all the hive products put together.

IMPORTANCE OF INTEGRATED PEST MANAGEMENT IN PADDY

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Rice is most important staple food of about 65% of Indian population; in Assam, it is more than 90%. It is grown in approximately 148 million ha of land globally. Nearly 90 per cent of this area falls in the Asian region. Paddy is grown under different agro-climatic conditions and the crop is damaged by more than 100 species of insect pests and infested by varied diseases. These insect pests cause enormous grain yield losses, which may vary from 20-50% if not managed in time, India losses 30% yield in rice every year. The IPM is a dynamic approach and process which varies from area to area, time to time, crop to crop and pest to pest and aims at minimizing crop losses with due consideration to human and animal health besides safety to environment. IPM also resulting in increase of natural enemies by three-fold reduced the insecticide and environmental pollution.

EFFECT OF PANCHAGAVYA ON GROWTH, PRODUCTION AND ANTIFUNGAL OF CORIANDER CROP

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A field experiment was conducted at Kumarganj, Faizabad (Uttar Pradesh), India. Coriander (*Coriandrumsativum* L.) is an important spices crop, grown in a wide range of weather conditions. Coriander suffers from various abiotic and biotic diseases. Among the biotic diseases, stem gall caused by *Protomycesmacrosporus* is a major disease, which causes yield loss up to 33-36%. The experiments were conducted during 2015-16. Panchagavya is an organic formulation, which is obtained from five products of cow milk, ghee, curd, dung and urine. It has potential to play the role for promoting growth and providing resistance to plant system. Panchagavya is used as a seed treatment, foliar spray as well as soil application alone or with irrigation. Because it is a mixed culture of naturally occurring beneficial microbe's mostly lactic acid bacteria, yeast, actinomycetes, photosynthetic bacteria and certain fungi. Which promote the growth of plants and provide resistance against pest and disease.Panchagavya which is capable of treating many diseases and has several medicinal properties. Thus it is the best remedy to cure fungal and bacterial diseases. It has an excellent germicidal power, antibiotic and antimicrobial activity.The experimental results indicated that panchagavya exhibited antifungal activity against fungal pathogens at all three concentrations i.e 10, 20 and 30%. Among these concentrations panchagavya at 30% concentration was most effective and exhibited 49.60% inhibition of *Protomycesmacrosporus*. Panchagavya are promising source for simple and naturally derived less expensive bacteriological media with antifungal effect with growth promotion.

Keywords:Panchagavya, growth promotion, antifungal effect.

BIOEFFICACY OF PLANT EXTRACTS AND BIO-AGENTS AGAINST *Alternaria solani*

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Potato (*Solanum tuberosum* L.) is one of the mostvaluable non-cereal food crops, grown in most of thetemperature and subtropical countries of world. Itcontribute highest amount of dry matter, protein and othernutrients per unit area and time.Three bioagents viz., *Trichoderma harzianum* Rifai, *Trichoderma viride* Pers. and *Trichoderma virens*(Miller et al) von Arx and five plant extracts viz., *Artimesia absinthium* L., *Datura stramonium* L., *Urticadioica* L., *Juglans regia* L. and *Mentha arvensis* L. were evaluated *in vitro* against *Alternaria solani* (Ellisand Martin) Jones and Grout causing early blight of potato through dual culture and poisoned foodtechnique, respectively. Among bioagents, significantly higher mycelia growth inhibition of *A. solani*was recorded in the case of *T. harzianum* (71.85%), which was followed by *T. viride* (65.93%) and *T.virens* (58.65%) proved least effective in inhibiting the mycelia growth of *A. solani*. The plant extracts were evaluated *in vitro* through poisoned foodtechnique (Carpenter, 1942; Nene and Thapiyal, 1993).Among plantextracts, *D. stramonium* proved superior to all other botanicals, exhibiting (61.12%) mycelia growthinhibition of *A. solani*. This was followed by *A. absinthium* (58.54%). *Urtica dioica* (37.34%) proved leasteffective in inhibiting the mycelia growth of the test fungus.

OPTIMIZATION OF NITROGEN SCHEDULING IN MAIZE (*Zeamays L.*) For Sustaining Its Productivity

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A field experiment was conducted in during *kharif* season of 2014 at Crop Research Centre (Chirauri) of Sardar Vallabhbhai Patel University of Agriculture and Technology, Meerut (U.P.) to optimize the nitrogen scheduling in maize. The soil of the experimental field was well drained, sandy loam in texture and slightly alkaline in reaction. It was medium in organic carbon, available phosphorus and available potassium but low in available nitrogen with an electrical conductivity (1:2, soil: water suspension) of 1.65 dS/m. Ten treatments comprised splitting of nitrogen as basal, at knee high and at tasseling stage in different proportions including absolute control were tested in a randomized block design with 3 replications. The results indicated that the growth parameters (plant height, horizontal spread and dry matter accumulation/ plant), yields (grain, stover and biological) per ha, shelling percentage and uptake of nitrogen by maize (grains, stover and total) were significantly superior with the application of nitrogen as 25% basal+50% at knee high+25% at tasseling stage as compared to rest of the treatments, except when the same amount was applied in three equal splits as 33% basal, 33% at knee high and 33% at tasseling stage. However, the application of nitrogen as 25% basal+50% at knee high+25% at tasseling stage gave 16.3 and 15.8 per cent more grains and stover yields/ha than the existing recommendation of nitrogen (50% basal+25% at knee high+25% at tasseling stage) treatment. Besides, this treatment also produces 22.8 and 8.7 q/ha more biological yield than the existing recommendation of nitrogen (50% basal+25% at knee high+25% at tasseling stage) and in three equal splits as 33% basal, 33% at knee high and 33% at tasseling stage treatments, respectively. However, crop growth rate (g/day/m^2) between 30 to 60 days in both the treatments was statistically *at par.* The maize also accumulated significantly higher nitrogen in grains, stover as well as total (115.44 kg/ha, 73.65 kg/ha and 189.1 kg/ha, respectively) in plots receiving nitrogen as 25% basal+50% at knee high+25% at tasseling stage as compared to all the treatments, except in three equal splits. Besides, partial factor productivity, agronomic and recovery efficiency also improved by 16.2, 24.2 and 33.0 per cent, respectively as compared to existing recommended N schedule. The split application of nitrogen as 25% basal+50% at knee high+25% at tasseling stage brought Rs 106840, Rs 78440/ha and 2.76 as gross, net returns and B:C ratio, respectively, being highest among all the treatments followed by application of nitrogen in three equal splits.

EFFECT OF DIFFERENT CONTAINERS ON PER CENT UN-GERMINATED SEEDS AT DIFFERENT STORAGE PERIOD IN RICE

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The present study was undertaken to study the effect of containers (polythene bags and cotton bags) on the un-germinated seeds of rice during storage period from January to May. It has been found that with an increase in storage period there has been increase in per cent un-germinated seeds in polythene and cotton bags. It has been observed that the polythene bags and cotton bags do not affect the percentage of un-germinated seeds at any period of storage (January to May).

NEED OF SKILL DEVELOPMENT TO YOUTH AND FARMERS IN AGRO PROCESSING SECTOR FOR INCOME GENERATION

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Agriculture sector is not only vital for food, nutritional security but also remains the principal source of livelihood for more than 58% of the Indian population where majority is vegetarian in its food habit. India's population has been growing at an annual rate of 1.8%, and is expected to touch the mark of 1.3 billion by the year 2020. The agro food processing industry is one of the largest in India, employs around 18% of the country's industrial work force and is ranked fifth in terms of production, consumption, export and expected growth. India also produces a variety of temperate to tropical fruits, vegetables and other food products. Processing of food products plays an important role in the conservation and effective utilization of fruits and vegetables. India's strong agricultural base, variety of climatic zones and accelerating economic growth holds significant potential for food processing industry that provides a strong link between agriculture and consumers. Major challenges faced by the Indian food processing industry include: educating consumers that processed foods can be more nutritious; dealing with low price elasticity for processed food products; need for distribution network; development of marketing channels; streamlining of food laws; improving food quality standards and strengthening food testing network; strengthening institutional framework to develop manpower for improving R&D capabilities to address global challenges. Government should give more support and should more formalize it. It has export potentials. Agro processing sector is indispensable for overall development of an economy as it provides a vital linkage and synergy between the agriculture and industry. It helps to diversify and commercialize farming; enhance income of farmers; create markets for export of agro foods as well as generate greater employment opportunities.
Cropping system: an approach for sustainable resource generation

CADMIUM POLLUTION: A MAJOR HUMAN HEALTH CONCERN

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Cadmium emissions have been increasing dramatically during the present century. Cadmium pollution is one such concern in present time. Its name is derived from the Latin word *cadmia* and the Greek word *kadmeia*which are ancient names for calamine or zinc oxide. In year 1912 the case of cadmium poisoning was first reported in Japan. The term "*itai-itai* disease"means (*itai-itai byō*- "it hurts-it hurts disease") was the name by locals for the severe pains victims felt in the spine and joints. With the rapid increase in industrialization this problem is getting exaggerated .Cadmium can travel long distances from the source of emission by atmospheric transport. It is readily accumulated in many organisms, notably molluscs and crustaceans. Lower concentrations are found in vegetables, cereals and starchy roots.In human beings Cadmium poisoning can also cause softening of the bones and failure of kidney accompanied by several diseases which are manifested in the form of Kidney and lung dysfunction and cancer .The major source of inhalative cadmium intoxication is cigarette smoke. The human lung resorbes 40–60% of the cadmium in tobacco smoke. Kidney damage has long since been described to be the main problem for patients chronically exposed to cadmium. Chronic exposures may cause loss of smell, occasional ulceration of nasal passages, cough, shortness of breath, sleeplessness, irritability and loss of appetite.

Keywords: cadmium, pollution

BIODIVERSITY FOR FOOD AND AGRICULTURE SECURITY

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Over the past decades, agriculture has achieved substantial increases in food production but these have been paralleled by serious overuse of non-renewable inputs and natural resources, loss of biodiversity and degradation of ecosystems, particularly with respect to their regulating and supporting services. While high-input industrial agriculture and long-distance transport have increased the availability and affordability of refined carbohydrates and edible oils, this has been accompanied by an overall simplification of diets and reliance on a limited number of energy-rich foods. Diets increasingly low in variation but high in calories contribute to

increasing problems of obesity and non-communicable disease (Popkin, 2002) which can now be found coexisting with malnutrition or undernourishment in the same family or community. Reliance on a lesser number of crops can also result in erosion of plant genetic resources and increased risk of wide-spread disease when a variety is susceptible to a new plant disease, which results in food insecurity. From an analysis of 104 country reports it appears that genetic erosion may be greatest in cereals, followed by vegetables, fruits and nuts and food legumes (FAO, 2010).Over the next 40 years some major changes will be needed in agricultural production systems if we are to achieve the desired objectives of improved productivity, environmental sustainability, equity and livelihood and health and nutrition. Systems will have to become increasingly flexible, multifunctional and option-rich, capable of providing multiple services and dealing with change and uncertainty. Resilience and adaptability will become increasingly important as the negative effects of climate change increase and the availability of non-renewable external inputs declines. Increases in production, which will have to be essentially increases in productivity, will need to be achieved with reduced water and chemical fertilizer use. To achieve this, production systems will need to have greater reliance on ecological processes that produce positive feedbacks on sustainability and production. Adaptation of agricultural systems will also be required to improve food security by ensuring reliable yields of nutritionally diverse foods in ways that contribute to improving human well-being and equity, particularly of poor rural communities.

BIOMASS: AS A NATURAL RENEWABLE ENERGY RESOURCES

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Nature blessed us with many gifts in the form of the natural resources i.e. land, water ,energy ,minerals and a large variety of living organisms (plants ,animals & microorganism).Bio-energy or Biomass energy is a renewable energy resources produced from photosynthesis .Biomass is organic matter available on a renewable basis including crops, trees wastes and residues, animal, municipal wastes and aquatic plants etc. Ministry of Non conventional energy sources estimates that India's energy potential from biomass at nearly 20,000MW,with 16,000MWfrom biomass and 3,500MWfrom plants using biogases from sugar mills Biomass is the most important energy sources which supplying 14 % of the world primary energy consumption.Today biomass energy are used to heat homes ,runs car, buses and producing electricity .Energy production technologies from biomass is being developed as viable alternatives to coal, oil and nuclear energy which are based on direct combustion of biomass , thermo chemical processing to upgrade the bio fuel through pyrolysis , gasification , liquefaction processes and biological processes through fermentation and anaerobic digestion.It helps to reduce greenhouse gas emission due to their immense potential to replace fossil fuels adds much less sulphur dioxide and nitric oxide to the atmosphere per unit of energy produced than burning of coal and reduce acid rain, water and air pollution.Nowadays it is necessary to produce clean energy services for sustainable development, poverty eradication, health, literacy and equity.

Keywords:Biomass, pyrolysis, fermentation and Sustainable development.

IMPACT OF GLOBAL WARMING ON MARINE LIFE

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Climate change is one of the greatest threats facing every living being present on the Earth today. Rising ocean temperature and acidification are radically altering aquatic ecosystems. Ocean plays an important role in maintaining the global carbon cycle and removes about 25% of CO_2 emitted by human activities, every year. The rising ocean acidity makes it more difficult for marine organisms to form shell. Many important animals forms the base of marine food chain and have Ca shells. Due to continuous disturbance in temperature of ocean, the distribution, productivity and species composition of global fish production is changing. Fisheries and aquaculture contribute significantly to food security and livelihood throughout the world. That is why we should need some practical measures that can be taken to adapt to the harmful effects of climate change. There is a critical need for well-informed public policy to address mitigation of GHG (Green House gases) emissions to limit and minimize impacts of climate change.

Keywords: Acidification, Marine, Emissions, Ecosystem, Fisheries, Temperature

SUSTAINABLE NATURAL RESOURCES MANAGEMENT FOR CONSERVING BIODIVERSITY

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In recent years, increases in agricultural productivity have come in part at the expense of deterioration in the natural resource base on which farming systems depend. It is urgent that this trend be reversed by encouraging farmers to adopt more sustainable methods of farming that will have long-term benefits in environmental conservation and development of sustainable livelihoods. Public sector investments are critical to reversing trends in degradation of natural resources. Specific objectives for sustainable natural resource management (NRM) include improving agro ecosystem productivity, conserving biodiversity, reducing land degradation, improving water management, ensuring the sustainability of forests, managing the sustainability of wildlife and fisheries, and mitigating the effects of global climate change.NRM refers to the processes and practices relating to the allocation and use of natural resources. Sustainable NRM optimizes the use of resources to meet current livelihood needs, while maintaining and improving the stock and quality of resources so that future generations will be able to meet their needs. NRM decisions are made at various levels— household, farm, community, national, and global. The NRM focuses on off-farm investments and activities at the local and community level that have direct implications for sustainable agricultural systems. Farm-level practices or technologies with a benign or positive effect on the natural environment.Agricultural production systems dependon natural resources land over 55 percent of Non forest land, water about 80 percent of total fresh water, biodiversity, forests, pastures, and wildlife. Farm activities can also have major impactson the quality and availability of these resources well beyond the boundaries of the production system for example, downstream pollution and soil erosion. Although natural resources are critical to agricultural production, farm households also frequently depend on them to meet other needs, such as fuel, construction materials, and supplemental foods. Thus rural livelihoods are intricately linked to the condition of natural resources, particularly for those 1.3 billion people living on fragile lands.Over the last 40 years as food production has doubled, agricultural production systems have expanded, with significant impacts on the natural resource base. The amount of agricultural land going out of production each year due to soil erosion is about 20 million hectares, and approximately 40 percent of the world's cropland is now degraded.Irrigated agriculture consumes about 70 percent of the total volume of fresh water used by humans, resulting in major environmental consequences: salinization, lowering of water tables, water logging, and degradation of water quality, with subsequent impacts on ecological systems affecting fisheries and wetlands.Agriculture currently contributes about 30 percent of the global emission of greenhouse, gases resulting from human activity. This has major implications for global climate change.The unplanned expansion of intensive production systems, which are typically monoculture and often developed at the expense of primary forests and savanna woodlands, can contribute to a significant loss in biodiversity. Deforestation rates have reached almost one percent per year in some regions. The major findings of the recently concluded Millennium Ecosystem Assessment warned that approximately 60 percent of the ecosystem services supporting life on Earth was being degraded or used unsustainably and that the consequences of degradation could grow significantly worse in the next half-century.

CONSTRAINTS FACED BY POTATO GROWERS IN ADOPTION OF POTATO PRODUCTION TECHNOLOGY INHAPUR DISTRICT OF UTTAR PRADESH

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It may be seen that altogether 16 constraints were faced by respondents in the technological gapof potato production technology in study area.It was observed that the lack of knowledge about plant protection measures gotI^{st} rank with 76.25 % responses in study area. Another constraints that less number of production technology information training centers II^{nd} rank with 75.00 % responses and unavailability of high yielding varieties 71.25 % and lack of knowledge about balance fertilizer application 63.75%, got rank III^{rd} and IV^{th} respectively. more than 61.25 % respondents were Government tube well are not available V^{th} rank order followed by high labour wage 55.00 % and high cost of new variety seed 51.25 % and got rank VI^{th} and VII^{th} respectively. 48.75 % of lack of about micro nutrients and got$VIII^{th}$rank and high cost of chemical was also reported to constraint by 46.25 % of the respondents and unviability of critical input in government sales center 45.00 % and got $IX^{th}$and X^{th}rank order and followed high cost of irrigation charges were also reported by 42.50 % of the respondents and got XIth rank order. Shortage of cold stores 41.25 % respondents and got XII^{th} rank order. Lack of knowledge about quality seed, chemicals and Small size of land holding 37.50 % and 33.75 % respondents reported got $XIII^{th}$andXIV^{th} rank order respectively. Another major problem of the potato growers reported that unavailability of organic manure 32.50 % and lack of knowledge about bio fertilizer respondents and got last XVth rank order andXVI^{th} rank order respectively.

COPING STRATEGIES FOR SUSTAINABLE AGRICULTURE THROUGH TECHNOLOGIES FOR CLIMATE CHANGE RESILIENCE ENHANCEMENT

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The impacts of Climate Change on Indian Agriculture faces an acute dilemma. Due to rise in temperature, higher evapotranspiration results in lowering ground water, whereas several weather extremes , floods will be associated with significant increase in runoff, resulting in soil erosion. Higher CO2 level will increase C : N ratio resulting in decreased decomposition rate of crop residues and nutrient supply whereas rise in soil temperature will increase the rate of N mineralization. N losses through volatilization and denitrification shall happen.Emphasis on technologies for enhancing resilience can only be the coping mechanism. START's initiative with South Asian Committee on Global Change have already carried out experiments on the serious effect of Global Warming through FACE (Free Air CO2 enrichment) projects. Some experiments have used open top chambers(OTCs) and FACE facilities. The elevated CO2 concentrations have resulted in a higher yield and biomass for rice varieties. With TGTs (Temperature Gradient Tunnels), the effect of temperature has been seen on crops. The oil content of sunflower and mustard seed was increased under elevated CO2 condition. In tomato, the presence of antioxidants was higher at elevated CO2 concentrations. Similarly under elevated CO2 conditions, at Arizona, oranges and at Italy tomatoes showed enhancement in production.Though by 2080-2100, atmospheric temperature increase may lead to 10-40% crop loss in India (IPCC 2007), but mitigation strategies may countereffect. We need climate tolerant crop varieties, the ideal plant type, where genetic engineering could play a vital role. For improving radiation tolerance, converting rice from C3 to C4 crop shall help. Laser aided leveling of fields, rain water harvesting, changing cropping systems such as maize-wheat, pulse-wheat, oil seed-wheat, with less demand for water and nutrient (with legumes). Among crops livestocks, fisheries can synergize farm productivity and income. Crop diversification, Integrated pest management, herbicides that reduce competition from weeds, Crop Insurance, and improved weather- based Agro-Advisory may be efforts for sustainable agriculture for maintaining food security.

ROLE OF MUTATION IN CROP IMPROVEMENT

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A mutation is a permanent change in the DNA sequence of a gene. Mutation in a genes DNA sequence can alter the amino acid sequence of the protein encode by the gene.Like word in a sequence,the DNA sequence of each gene determines the amino acid sequence for the protein it encodes. The DNA sequence is interpreted in groups of three nucleotide bases, called codons. Each codon specifies a single amino acid in a protein.Genetic variability is essential for any crop improvement programme, the creation genetic variability become central to crop breeding. Experimentally induced mutation provides an important source of variability. An advantage of creating such variability is that the starting point can be agronomically accepted cultivar rather than a genetic stock of no direct commercial value with many undesirable attributes. When mutant of the required type is obtained, we only reach the step of identification of a desired recombinant in a conventional breeding programme and all the succeeding step of evaluation of the mutant are in no way different from those in the conventional breeding produre**(Sharma and Chopra, 2003).**Mutation that occurs in nature iscalled the spontaneous and that are the induced are called the induced. Mutation is induced with the help of agents that are called the mutagens. They may be physical (Beta rays, Alpha rays, fast and thermal neutrons, X-rays, ultraviolet rays) or chemical (alkylating agents, acridine dyes, base analogues) **(B.D. Singh, 2011).**The improvement in crop is generally done by mutation mainly concentrated along the following as breeding for quality, breeding for yield, disease and pest resistance,stress tolerance etc. Through induced mutagenesis of gamma rays, mutants characterized by reduced plant height, square head,awnlessear, amber seed colour, bold seed and storage capacities were induced in bread wheat (Triticumaestivam L.) Kharchia 65.**(Singh and Balyan,2009)**A major contribution of mutagenesis to plant breeding progress, which cannot be overestimated, is its use for the advancement of genetics. It can be expected modern mutation breeding technologies in combination with refined selection methodsapplicable to large populations will continue to be of great potential for the improvement of both sexually and vegetative propagated crop plants.

LEGUME: A SUSTAINABLE SOURCE OF FOOD INDUCED THROUGH MUTATION BREEDING

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"Food for all" is the main challenge of our society. We need to decrease number of people suffering from hunger. Sustainability of agriculture is another challenge for next generation. Sustainable agriculture needs to fulfill the current and future needs in economy, social and environmental safety. Grain legumes play an important role in National agriculture contributing towards food and nutritional security, nitrogen economy, and sustainable farming systems. Pulses are good sources of proteins and commonly called the poor man's meat. The frequency of pulses consumption is much higher than any other source of protein.Historically, India is the largest producer, consumer and importer of pulses. Although it is the world's largest pulses producer, there is still a huge shortage of pulses and also, the prices are not affordable to a large section of consumers. An immediate need is the development and dissemination of low-cost technologies in pulses production, so that they can be affordable to the common man. In the entire scenario of crop production the legumes have experienced a near total neglect. It is unfortunate that the worldwide legume production has not increased at par with that of cereal production. There are several reasons, which have been suggested for this stagnation in production. Firstly, less amount of research has been conducted on legumes and secondly, less awareness in the farmers.Through integration of conventional breeding approaches with cutting edge technologies such as genomics, molecular-assisted breeding, mutation breeding, etc. are possible to develop such suitable varieties. Mutation breeding is one of the most important nuclear technologies for improving agriculture in terms of increase yield and gives sustainability. Mutagenic agents, such as radiation and certain chemicals then can be used to induce mutations and generate genetic variations from which desired mutations may be selected. It offers the possibility of inducing desired attributes that either cannot be found in nature or have been lost during evolution. When no gene, or genes, for resistance to a particular disease, or for tolerance to stress, can be found in the available gene pool, plant breeders have no obvious alternative but to attempt mutation induction.

Keywords:Legume, food, Mutation, Breeding

EFFECT OF NUTRIENT MANAGEMENT OPTIONS ON PERFORMANCE AND NUTRIENT USE EFFICIENCY OF WHEAT (*Triticum aestivum* L.) IN LIGHT TEXTURE SOIL

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The field experiment was conducted at CRC, Sardar Vallabhbhai Patel University of Agriculture and Technology, Meerut during *rabi*2013-14 and 2014-15. Influence of organic and inorganic sources on nutrient uptake and yield of wheat (*Triticum aestivum* L.) in Western Uttar Pradesh. Addition of 100% NPK (2% Urea spray at tillering and jointing stage) (RDF-recommended dose of fertilizer i.e 150: 75: 60 kg NPK ha^{-1} was recorded significantly higher value of nutrient uptake and grain yield (49.51 and 47.23 q ha^{-1}) was recorded yield which was at par with75% NPK + Vermicompost 2 t/ha (2% Urea spray at tillering and jointing stage) (48.93 and 46.83 q ha^{-1}) grain was recorded yield. Nitrogen, phosphorous and potash content and uptake as well as agronomic efficiency was also increased with the application of 100% NPK (2% Urea spray at tillering and jointing stage). Which was at par with the 75% NPK + vermicompost 2 t/ha (2% Urea spray at tillering and jointing stage). Highest organic carbon % in soil was recorded in 75% NPK + Vermicompost 2 t/ha (2% Urea spray at tillering and jointing stage).The integrating of 75% NPK + Vermicompost 2 t/ha (2% Urea spray at tillering and jointing stage) found more productive by maintain or improving the soil health.

Keywords:Nutrient Management, Vermicompost, Urea Spray, agronomic efficiency of NPK.

SOIL CONSERVATION: A NEED OF TIME

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Soil is a living and life giving natural resource. Soil provide the habitat for many organisms, medium for plant growth, carbon store and maintenance of atmospheric gases. It also controls pollution because of its absorption properties. Soil erosion is one form of soil degradation. Soil erosion is wearing away of top layer of soil by natural physical forces of water and wind. The process may be slow and it may continue unnoticed, or it may occur at fast rate causing serious loss of top soil. It is a natural process but human

activities have increased rate by 10-40 times. The effects of soil erosion can be felt on site, meaning at the site of soil disruption, or off site meaning the location where eroded soil deposits. Soil conservation is essential because soil provides food, filters water and air and it helps to decompose biological waste into nutrients for new plant life. Some of the ways to conserve soil are practice of contour ploughing, organic farming, terrace farming, planting a rain garden, reduce impervious surfaces, planting vegetation cover and forest restoration, proper waste disposal and management, restoration of wetlands, planting trees along river banks and refraining from practice of till farming. Restorative land use system and adoption resource management programmes are very important. Soil not only reflect natural processes but also record human activities both at present and in the past. They are part of our cultural heritage.

Key words: Soil degradation, contour ploughing, organic farming, terrace farming, till farming.

MICROPROPAGATION FOR HORTICULTURE AND FORESTRY

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Micropropagation or clonal propagation is the practice of rapidly multiplying stock plant material to produce a large number of progeny plants, using modern plant tissue culture methods. Clonal propagation refers to the process of asexual reproduction by multiplication of genetically identical copies of individual plants. The term clone is used to represent a plant population derived from a single individual by asexual reproduction. Asexual reproduction through multiplication of vegetative parts is the only method for the *in vivo* propagation of certain plants, as they do not produce viable seeds e.g. banana, grape, fig, and chrysanthemum. Clonal propagation has been successfully applied for the propagation of apple, potato, tuberous and several ornamental plants. Micropropagation of plants has certain advantages over vegetative propagation and sexual propagation *eg*. Faster multiplication, genetically identical plant production, useful in multiplying plants which produce seeds in uneconomical amounts, or when plants are sterile and do not produce viable seeds or when seed cannot be stored, micropropagation often produces more robust plants, Some plants with very small seeds, including most orchids, are most reliably grown from seed in sterile culture, it can be used to produce disease-free plants, sexually derived sterile hybrids can be propagated, seed raised plants pass through an undesirable juvenile phase is avoided in micropropagation, gene banks can be more easily established by clonally propagated plants, only viable method of regenerating genetically modified cells or cells after protoplast fusion.

Keywords: Plant Tissue Culture, Micropropagation, Clonal Propagation, Horticulture, Forestry

STUDIES ON HERITABILITY AND GENETIC ADVANCEON YIELD AND MALT TRAITS IN BARLEY *Hordeum vulgare* L.

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The present investigation entitled "Studies onheritabilityandgenetic advanceon yield and malt traits in barley (*Hordeum vulgare* L.)"was carried out with 4 sets of crosses (NDB-943 x NDB-1173, DL- 88 x K-890, DWR-57 x PL-762 and Azad x K-750) for eighteen (sixteen quantitative + two ancellary) traits during the *rabi* 2008-11 at Research Farm of Genetics and Plant Breeding, Narendra Deva University of Agriculture and Technology, Kumarganj, Faizabad (U.P.). Six genetic populations (P_1, P_2, F_1, F_2, B_1 and B_2) of above four crosses were evaluated in Compact Family Block Design with three replications in normal and saline sodic soils. The present investigation was undertaken (i) to test the adequacy of 'additive-dominance model' using simple scaling test and joint scaling test (ii) to work out nature and magnitude of gene effects for yield quality and its component traits (iii) to study heterosis and inbreeding depression for yield quality and its component traits. (iv) to work out heritability and genetic advance in per cent of mean. Observation were recorded on initial seed germination, plant height, number of effective tillers, peduncle length, spike length, chlorophyll content, number of grains/spike, grains weight/spike, days to maturity, harvest index, grain yield/plant, grain size, 1000-grain weight, protein content, grain hardness, amylose content, grain plumlness and seedling vigour were studied in both conditions. The data on sixteen metric traits from two environments were subjected to analysis of variance of Compact Family Block Design, separately, simple and joint scaling tests and six parameter models of generation mean were used to study the nature and magnitude of gene effects for sixteen traits of four crosses in normal and saline sodic soils. Heritability in broad sense, narrow sense and expected genetic advance in per cent of mean were computed to assess the efficiency of selection in improving the characters.The high magnitude of broad sense heritability (more than 75%) was estimated for most of the crosses for plant

height (cross II), number of effective tillers (cross I), peduncle length (cross I,III and IV), spike length (cross III), chlorophyll content (cross I and III), number of grains/spike (cross I, III and IV), grains weight/spike (cross I, II, III and IV), days to maturity (cross I, II, III and IV), harvest index (cross I, II, III and IV), grain yield/plant (cross II and III), grain size (cross I and III), 1000-grain weight (cross I, II, III and IV), protein content (cross II, III and IV), grain hardness (cross I, II, III and IV) and amylose content (cross I, II, III and IV) in both soil conditions. High heritability (h^2b) coupled with high genetic advance were recorded for number of grain/spike (cross III) under both soil conditions.

EFFECT OF SALINITY ON SEED GERMINATION AND EARLY SEEDLING GROWTH OF OAT *(Avena sativa L.)*

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Oat (*Avena sativa L.*) is grown as a comman forage crop, served as the principal source of fresh forage for draft animals and for dairy and beef cattle. It is considered as less sensitive to salinity. An experiment was conducted in petri dishes lined with whatman filter paper no.1 at room temperature. Salinity tolerance of five varities (NDO-2, UPO-94, UPO-212, Kent and OL-125) were investigated on the basis of seed germination and early seedling growth. The analyzed data showed that NDO-2 and UPO-212 were found to be highly salt tolerant and upo-94 and kent were sensitive to salinity in terms of germination %age, shoot/root and dry weight of shoot and root with respect different salinity levels i.e. 25, 50, 75 and 100 nm NaCl and distilled water was served as control level.

PRICE SPREAD: APPROACH FOR MARKETING ANALYSIS

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Agriculture is the back bone of the Indian economy and livestock sector is one of the important supplementary enterprises and confined to mainly rural economy. Live stock sector contributing about 26 percent in agricultural G.D.P and providing additional income and employment to the farmers family. India rank Ist in the milk production with an amount off 146 million tones (2014-15) and per capita availability is 302 gm/day, which is more than the recommended quantity of 225 gm per day (as per ICMR recommendations). There is wide variation in the availability of milk due to poor distribution system. Therefore present study is an attempt on price spread of milk. To conduct the present study multistage stratified random sampling technique was employed for the selection of districts, block, village & the respondents and required primary data were collected from the respondents through personal interview method on pre-tested schedule. In the study area four marketing channels were identified –Milk Producer households-consumers, Milk producer households-milk vender – consumers, Milk producer households - Milk purchase / collection centers of recognized dairies – milk processing plant – retailers - consumers, Milk producer households – sweetshops/ hotels – consumers. Among the above channels I was found to be most efficient. The net price received by the milk Producers household worked out to be Rs 1516.24/100 liters of milk in channel –I followed channel IV(1426), III (1365) & II (1344). The marketing cost incurred under channel II, III & IV came to Rs 469, Rs 834, & Rs 582/100 liters of milk respectively. The marketing efficiency was found to the highest 100 percent in channels-I followed by channel-IV, III & II accounted to be 71, 62 and 73 percent. The marketing efficiency was found highest in channel-I due to direct sale of milk by the producer to consumer.

ENVIRONMENT AND SUSTAINABLE DEVELOPMENT IN INDIA – ISSUES AND CHALLENGES

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Environment is a broad concept encompassing the whole range of diverse surroundings in which one perceives experience and react to events and changes. It includes the land, water, vegetation, air and the whole gamut of the social order. It is also includes the physical and ecological environment. It concern people's ability to adopt both physically and mentally to the continuing changes in environment. In its natural condition, the environment of any region is in a state of dynamic equilibrium. Rapid population growth in a country like India is threatening the environment through expansion and intensification of agriculture, uncontrolled

growth of urbanization and destruction of natural habitats. Poverty, unemployment, health hazards, deforestation, land degradation and environmental pollution are the result of uncontrolled growth of population and the misused of the natural resources. At present all world is suffering from the problem of environmental degradation. Climate transformation is the result of the urbanization and industrialization.

DROUGHT AND ITS POSSIBLE IMPACTS ON SUSTANABLE AGRICULTURE

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Sustainable agriculture is also known as eco-farming or organic farming or natural farming. Sustainable agriculture also involves agroforestry and multilevel cultivation and integrated animal husbandry. Crop production and animal husbandry have to be employed as an integral system for successes of sustainable agriculture and has assumed vary great significance the task of meeting the needs of the present generation without eroding the ecological assets of the future generation, is recording top priority of environmental planning. Drought is most wide spread disaster risk over agriculture in India with estimated 68% of recorded not sown area under direct impact of drought regions. Many other non- drought but water scarce regions developing due to altered rainfall patterns, degraded catchment and harvesting deficiency increased evaporation losses, unfit water, water – drinking industries and critically exploited ground water suffer sometimes more severe consequences. Present paper examines the possible impacts of drought risk identification, assessment and mitigation strategies in agriculture sector with a productive and peoples' centric approach. It is important to identify and promote indigenous capacities and self sufficient technological advances by improving knowledge base of the farmers and associated communities. Integration of the agriculture drought management with the holistic frame work of drought risk managed planning and implementation of frame work at village, Block and district level is much needed in order to facilitate & financial measures and administrative support. It is concluded that drought does not prevail all over the area but it occurs sporadically in different area due to variation in rainfall at micro level. Therefore, it is suggested that drought management plan should be developed at micro level.

Keywords**:** Sustainable agriculture, integrated drought management and Organic agriculture**.**

EFFECTOF DIFFERENT CROP ROTATION ON SOIL CARBON AND NITROGEN CONTENT IN VERTISOLS OF MADHYA PRADESH

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Objective of this study was to assess the effectof different crop rotation on soil fertility in Vertisols of Madhya Pradesh. Soil samplings (0-15 cm depth) were done for two years from two districts (Jabalpur and Chhindwara) of Madhya Pradesh belonging to soybean-wheat, soybean-chickpea, maize-chickpea, maize-wheat, and paddy-wheat croprotationsduring 2013-15. Sampling site for soybean-wheat rotation was AICRP on Long Term (since 1972) Fertilizer Experiment, where three selective treatments-absolute control, recommended dose of fertilizers (RDF) and RDF+FYM (farm yard manure) were considered. Soil organic carbon and available ($KMnO_4$ oxidizable-N) and total nitrogen were determined using standard procedures. Irrespective of crop rotations, maximum soil organic carbon was found at maximum vegetative growth stage in soybean-wheat rotation (5.7 g kg^{-1} soil) with application of RDF+FYM, while minimum (3.2 g kg^{-1} soil) with absolute control of soybean-wheat rotation. Available and total soil nitrogen was found more in Kharif season where soybean was included in the croprotations as compared to other rotations. After growing cereal crop during Rabi season the status was declined. So it can be inferred concluded that the inclusion of the leguminous crop in different croprotationsis beneficial towards increasing the soil fertility.

Keywords: Crop rotation, Soil carbon and Nitrogen and Vertisols

EFFECT OF INTEGRATED NUTRIENT MANAGEMENT ON THE VEGETATIVE PARAMETERS OF SUMMER TOMATO (*Lycopersicon esculentum* Mill.)

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Tomato *(Lycopersicon esculentum* Mill., 2n = 24) is one of the most popular fruit vegetables of the family Solanaceae. In India, tomato has wider coverage of the land area in comparison to other vegetables. Tomato is universally treated as a "protective food" and is also a very good source of income to small and marginal farmers. It is a rich source of minerals, vitamins and organic acid (healthy acid). High productive ability of tomato puts tremendous pressure on soil for removal of nutrient. As such liberal application of nutrients is needed to meet the nutritional requirements. However, in the wake of energy crisis, harmful effect on soil health and ever increasing prices of chemical-fertilizers, therefore, there is a dire need that have been felt to reduce the dependence on such a costly input, This can be accomplished through integrated nutrient management, which involve a combined use of chemical fertilizers and organic manure to sustain crop production and maintenance of soil health. The organic manuring has positive influence on soil texture and water holding capacity. In this connection to give more emphasis on organic vegetable, production, which minimizes cost of production, increase quality of product and maintain the soil fertility. Therefore, keeping the above facts an attempt was made to study the impact of integrated nutrient management on the vegetative parameters of tomato. An experiment was laid out randomized block design with three replications. The experiment consisted of eight treatments viz. T_1 (120kg N + 60kg P_2O_5 + 80kg K_2O/ha), T_2 (150kg N + 75kg P_2O_5 + 100kg K_2O/ha), T_3 (90kg N + 45kg P_2O_5 + 60kg K_2O + 2 tonnes V.C./ha), T_4 (60kg N + 30kg P_2O_5 + 40kg K_2O + 5 tonnes V.C./ha), T_5 (90kg N + 45kg P_2O_5 + 60kg K_2O + 15 tonnes FYM/ha), T_6 (60kg N + 30kg P_2O_5 + 40kg K_2O + 30 tonnes FYM/ha), T_7(10 tonnes FYM), T_8 (Control). Among all the applied treated plots maximum plant height (70.34cm), number of primary branches (8.60), days to first flowering (37.26), days to first fruit formation (44.60) and days taken to first harvesting (66.80) was recorded under a dose of organic and inorganic sources of fertilizer 60 kg N+30 kg P_2O_5+40 kg K_2O+30 tonnes FYM/ hectare. Thus, this combination of organic and inorganic fertilizer (60 kg N+30 kg P_2O_5+40 kg K_2O+30 tonnes FYM/ hectare) might be recommended for summer tomato cultivation under the Western Uttar Pradesh condition.

EFFECT OF SALT STRESS ON THE GERMINATION AND SEEDING GROWTH OF SOME BARLEY CV. (*Hordeumvulgare L.)*

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The present study deals with the effect of salinity on the germination and seedling growth of Barley cv.(Hordeumvulgare L.). Four cultivars of Barley were grown in different concentration of NaCl along with control eg. C (DW), 4, 8, 12 and 16 dSm^{-1}.Redicle and hypocotyl length as percentage over control was used as measure of growth. There is reduction in germination and seedling growth with increase in salinity level. Hypocotyl growth was more adversely affected than the radicle growth hence seems to be a better index for salt tolerance at early seedling growth.
Keywords: Hordem vulgare, NaCl

EFFECT OF SULPHUR ON SOIL HEALTH, NUTRIENT UPTAKE, YIELD AND QUALITY OF RICE (*Oryza sativa L.)*UNDER PARTIALLY RECLAIMED SODIC SOIL.

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The experiment was conducted at the instructional farm of N. D. University of Agriculture and Technology, Kumarganj, Faizabad (U.P.) to evaluate the effect of sulphur on soil health, nutrient uptake, yield and quality of rice (oryza sativa L.) under partially reclaimed sodic soil during *kharif 2015-16.* The experiment was comprises of treatments viz. 100% NPK (150:60:40) (as control) 100% NPK +75% sulphur through SSP, 100% NPK +100% sulphur through SSP, 100% NPK +125% sulphur through SSP, 100% NPK +75% sulphur through phospho gypsum, 100% NPK +100% sulphur through phospho gypsum, 100% NPK +125% sulphur through phospho gypsum, 100% NPK +75% sulphur through Bentonite, 100% NPK +100% sulphur through Bentonite, 100% NPK +100% sulphur through Bentonite kg ha^1 replicated in three randomized block design. Rice variety Sarjoo 52 was taken as test crop. The data revealed that growth parameters viz plant height, no of tiller running meter and leaf area index were found significantly superior over the treatment with the application of 100% NPK +125% sulphur through SSP. Recommended dose of NPK through 125% S through SSP produced significantly higher grain and straw yield as well as other yield attributes. The nutrition uptake of rice enhanced remarkably with the application of 100% NPK +125% sulphur through SSP, whereas benefit cost ratio was obtained economical in the plots treated with 100% NPK +120% sulphur through SSP and 100% NPK +125% sulphur through SSP respectively.

Keyword: Rice (*Oryza sativa L.),* Sulphur sources (SSP, Phospho Gypsum, Bentonite), Soil health, Nutrient uptake and yield.

ROLE OF E-LEARNING

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The term e-learning comprise a lot more than on line learning, virtual learning, distributed learning, networked or web- based learning. Simply e-learning is electronic learning, and typically this means using a computer to deliver part, of all of a course whether it is not in a school, part of your mandatory business training or a full distance learning course. As the latter "e" in e-learning stands for the word electronic. E-learning is commonly referred to the intentional use of the networked information and communication technology in teaching and learning's-learning is the use of technology to enable people to learn anytime and anywhere. E-learning can include training, the delivery of just- in- time information and guidance from experts. Types of modalities of e-learning activity like as individuals self paced e-learning online, Individuals self –paced e-learning off line. Groups – based e-learning synchronously and Group-based e-leaning unsynchronously. In India 46% population used internet as compared to rest world 44.5%population with 51.8% internet users are used internet. E-learning has proven to be very cost effective and has shown to provide a positive return on investments. The growth rate of countries by using of e-learning are having India 55%, China 52%, Malasysia 41%, Brazil 26%, etc. E-learning provides employs a self paced autonoms recitatives, cost effective and flexible method of training. On the other hand, an instructor based training encourage groups interaction identifies the training experts, and provide a learning structure. Although the scope of e-learning in India has expressed the of getting education to great extent from hi-tech school laboratories to virtual classroom the ways and means of education have been constantly evolving.

ENVIRONMENT POLLUTION CONTROL AND MANAGEMENT

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A living organism cannot live by itself. Organisms interact among themselves. Hence, all organisms, such as plants, animals and human beings, as well as the physical surroundings with whom we interact, form a part of our environment. All these constituents of the environment are dependent upon each other. Thus, they maintain a balance in nature. As we are the only organisms try to modify the environment to fulfill our needs; it is our responsibility to take necessary steps to control the environmental imbalances.The environmental imbalance gives rise to various environmental problems. Some of the environmental problems are pollution, soil erosion leading to floods, salt deserts and sea recedes, desertification, landslides, change of river directions, extinction of species, and vulnerable ecosystem in place of more complex and stable ecosystems, depletion of natural resources, waste accumulation, deforestation, thinning of ozone layer and global warming. The environmental problems are visualized in terms of pollution, growth in population, development, industrialization, unplanned urbanization etc. Rapid migration and increase in population in the urban areas has also lead to traffic congestion, water shortages, solid waste, and air, water and noise pollution are common noticeable problems in almost all the urban areas since last few years.Environmental pollution is defined as the undesirable change in physical, chemical and biological characteristics of our air, land and water. As a result of over-population, rapid industrializations, and other human activities like agriculture and deforestation etc., earth became loaded with diverse pollutants that were released as by-products. Deforestation increases soil erosion; thus valuable agricultural land is lost. Solid wastes from household and industries also pollute land and enhance land degradation. Solid wastes include things from household waste and of industrial wastes. They include ash, glass, peelings of fruit and vegetables, paper, clothes, plastics, rubber, leather, brick, sand, metal, waste from cattle shed, night soil and cow dung. Chemicals discharged into air, such as compounds of sulfur and lead, eventually come to soil and pollute it. The heaps of solid waste destroy the natural beauty and surroundings become dirty. Pigs, dogs, rats, flies, mosquitoes visit the dumped waste and foul smell comes from the waste. The waste may block the flow of water in the drain, which then becomes the breeding place for mosquitoes. Mosquitoes are carriers of parasites of malaria and dengue. Consumption of polluted water causes many diseases, such as cholera, diarrhea and dysentery.

ENVIRONMENTAL POLLUTION: ITS EFFECTS ON LIFE AND ITS REMEDIES

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Environment pollution is a wide-reaching problem and it is likely to influence the health of human populations is great. This paper provides the insight view about the affects of environment pollution in the perspective of air pollution, water and land/soil waste pollution on human by diseases and problems, animals and trees/plants. Study finds that these kinds of pollutions are not only seriously affecting the human by diseases and problems but also the animals and trees/plants. According to author, still time left in the hands of global institutions, governments and local bodies to use the advance resources to balance the environment for living and initiates the breathed intellectuals to live friendly with environment. As effective reply to contamination is largely base on human appraisal of the problem from every age group and contamination control program evolves as a nationwide fixed cost-sharing effort relying upon voluntary participation.

Keywords: Environment Pollution, Air Pollution, Water Pollution,

MEDICO-BOTANICAL ASSESSMENT OF A WEED PLANT: *Cassia obtusifolia*

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Cassia obtusifolia Linn.is commonly known as "Takla" or "Chakunda" in India, a common weed, also used as vegetable have a member of Family-Caesalpiniaceae. Macroscopic and microscopic examinations of the different organ, observations and differential microchemical test have been carried out for the authentication of the samples. Physiochemical values such as the Moisture contents, percentage of total ash, acid insoluble ash, acid soluble ash, water soluble ash, extractive values like petroleum ether-soluble extractives, ethanol-soluble extractives, methanol-soluble extractives and water-soluble extractives were calculated as well as colour reactions of powder and extract with different chemicals were performed to observe fluorescence analysis. The extracts were subjected to qualitative screening test for various constituents. This revealed the presence protein, glycosides, alkaloids, tannins and phenolic compound, steroid reducing sugars and saponin glycosides. These observations will help in the Pharmacognostical identification and standardization of the plant as a drug in the crude form and also to distinguish the material from its adulteration.

Keywords: Medico-Botany, *Cassia obtusifolia*, Pharmacognosy,Caesalpiniaceae.

APPLICATION OF GROWTH REGULATORS FOR POST HARVEST LIFE OF CUT GERBERA (*Gerbera jamesonii*BOLUS EX HOOKER) FLOWER CV. BLACK BIRD

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Keeping quality and length of vase life are important factors for evaluation of cut flowers quality for both domestic and export markets. Study was made on the effect of gibberelic acid and benzyl adenine applications on keeping quality and vase life of cut gerbera flowers during vase period. The cut flowers were harvested and kept into vase solutions containing gibberrelic acid and benzyl adenine with the combination of 11 treatments and along with distilled water as control. Sucrose at 4% was added to all treatments as a base solution. The changes in relative fresh weight, water uptake, water loss, acceptability, scape bending, vase life at 50% fading and biochemical changes were estimated during vase period. The results showed that the relative fresh weight, water uptake, water loss and vase life decreased significantly during experiment for all treatments. A significant difference between gibberelic acid, benzyl adenine and control treatments were observed. During vase period, the gibberrelic acid treatment (T_2-gibberrelic acid at 50 ppm) maintained significantly a more favourable for relative fresh weight, water uptake, water loss as compared to control treatment. The results showed that the using of gibberrelic acid was found that the vase life of cut gerbera flowers increased significantly over control. The result revealed that the quality attributes and vase life of cut gerbera flowers were improved by the use of gibberrelic acid at 50 ppm.

Keywords: Gerbera, Vase life, Gibberrelic Acid and Benzyl Adenine

FUNGICIDAL RESISTANCE AND ITS MANAGEMENT

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It is often observed that human pathogens and insects are developing resistance to antibiotics and certain insecticides as a result of continuous and injudicious use of these chemicals, several plant pathogens have also developed resistance. Fungicides affect several vital processes of the pathogen and many genes also get change or become dysfunctional which ultimately result into development of a resistant strain. Resistance to benzene fungicides began to appear in the 1960s when *Penicillium* strains resistant to Diphenyl, *Tilletia* strains resistant to Hexachlorobenzene were reported. Later, a strain of *Venturia inaequalis* appeared which was resistant to Dodine and these excellent chemical became ineffective against the fungus over a large area. The introduction and widespread use of the systemic fungicides especially Benomyl, Metalaxyl and the Strobilurins or QoI fungicides led to the appearance of strains resistant to one or more fungicides. To date, several of the important fungal pathogens, e.g., *Alternaria*, *Botrytis*, *Cercospora*, *Colletotrichum*, *Fusarium*, *Verticillium*, *Sphaerotheca*, *Mycosphaerella*, *Aspergillus*, *Penicillium*, *Phytophthora*, *Pythium*, and *Ustilago* are known to have produced strains resistant to one or more of the systemic fungicides. The likelihood and speed of resistance development largely depends upon whether the fungicide affects a single metabolic site (single-site) or multiple sites (multi-site) of the fungus. A single gene mutation is required for a fungus to overcome the toxic effects of a single-site fungicide. With single gene mutations governing resistance development, the population can shift from mostly sensitive to mostly resistant individuals with just one or two applications of the fungicide. For this reason, single-site fungicides are often considered at-risk or high-risk fungicides. Good systemic or nonsystemic fungicides that become ineffective because of the appearance of new resistant strains can continue to be used to a practical level through changes in the methods of deployment of the fungicide. This can be achieved by using mixtures of specific systemic and wide-spectrum protectant fungicides, such as benomyl or a strobilurin and either Captan or Iprodione for the control of *Botrytis* or *Sclerotinia*, or Metalaxyl and Mancozeb for the control of downy mildews, by alternating sprays with systemic and protectant fungicides or by spraying during half the season with systemic and the other half with protectant fungicides. The protectant or nonspecific chemical reduces the possibility of survival of any strains of the pathogen that may develop resistanceto the systemic or specific-action chemical.

STUDY ON PRODUCTION AND PRODUCTIVITY OF WHEAT-BASED INTERCROPPING WITH RABI CROPS.

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An experiment was conducted during Rabi season of 2014-15 at Students Instructional Farm of Chandra Shekhar Azad University of Agriculture and Technology, Kanpur. The world's population is increasing rapidly, and in order to feed it, one of the most attractive strategies is to increase productivity per unit area of available land or to increase the land area under production, which seems shrinking day by day. Therefore, to maximize land use and production, the ultimate goal of agriculture, namely yield, intercropping is an advanced agronomic technique that allows two or more crops to yield from the same area of land. Better utilization of resources and reduced weed competition minimize the risk of food shortages by enhancing yield stability. Several factors can affect intercropping: plant density, sowing time, the maturity of a crop, the selection of crop that is compatible with another as well as farmer's and the region's socioeconomic conditions. In intercropping, the land equivalent ratio (LER) is used to measure the productivity of land. Since wheat is the most important cereal around the world and is most suitable for intercropping, this review focuses on wheat-based intercropping.

Keywords: Intercropping, Wheat, land equivalent ratio, leaf area index, weeds, pests, resource utilization

GENE ACTION STUDIES FOR YIELD AND ITS CONTRIBUTING CHARACTERS IN OKRA (*Abelmoschusesculentus*(L.)MOENCH)

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There are several types of gene action. The types of gene action and alleles present for a given gene affect the phenotypes. In additive gene action, the progeny,s phenotypic value is at the midpoint between both parents. In complete dominance, the phenotypes of the heterozygous progeny equals the phenotypes of the homozygous dominant parents. Epistasis is another non additive genetic pattern , involving the interaction of different loci to produce a particular trait in a non additive way .Gene effects for various trait in okra were studied by involving 45 cross combinations obtained from crossing 10 diverse genotypes of okra in

half-diallel fashion. Forty five f_1s along with their 10 parents were evaluated in a randomized block design with three replications.The ratio of gca variance to sca variance was lower than unity for majority of the traits under study except days of first flowering and length of fruit. The magnitude of sca variance greater than that of gca variance suggests the predominance of the non-additive gene action for majority of the traits. These traits could be improved by resorting to simple selection procedures. However days of first flowering and length of fruit greater magnitude of gca variance than that of sca variance suggests the preponderance of the additive gene action .these traits could be improved by delaying the selection to later segregation generations and resorting to Intermating of represents followed by recurrent selection. Heterosis breeding would be a main breeding methods in improvement of these traits.

Kewwords: okra, gene action and heterosis

GENETIC BASIS OF WILT RESISTANCE IN CHICKPEA

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Wilt (Fusarium oxysporum) is one of the most serious fungal diseases of chickpea (cicer arietinum L.) causing 10-15% losses in yield depending on the severity and the stage of crop growth infected by this pathogen. Development of disease resistant varieties is the most effective and cheapest method of control of this disease. In this endeavour the knowledge of inheritance of resistance is of immense importance. Keeping this in view the present investigation was made to find out the mode of wilt resistance. Resistant desi type parents (WR 315 and BG 212) and moderate resistant desi type parent(K850) were crossed with two susceptible parents Viz. BG 362 and BG 363. Various generations Viz. P_1, P_2, F_1, and F_2, were screened for resistance in wilt sick plot. The F_1 plants of all crosses were susceptible to F. oxysporum which indicate that the inheritance of wilt is controlled by recessive gene/genes. the F_2 generation of crosses resistant and susceptible segregated into the ratio 15 susceptible and 1 resistant which indicate that two recessive complementary genes were involved in the control of wilt resistance. In the cross of moderate resistant and susceptible parents, the F_2 generation showed the ratio of 3 susceptible and 1 resistant. This indicate that only one gene is controlling the resistance to wilt in K 850. It is concluded that WR 315 and BG 212 resistant parents have two major recessive genes and K 850 has only one major recessive gene, responsible for the genetic control of wilt resistance.

GM TECHNOLOGY: FUTURE TOOL FOR AGRICULTURE DEVELOPMENT

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People have always been concerned with the food supply in view of ever increasing population. The world population is predicted to be between 9.6 billion and 11 billion in 2050 necessitating a 70% increase in food production. This amounts to an increase of 3 billion tonnes (t) of cereals mainly wheat, rice, and maize. Economic and environment-friendly approaches are needed to meet the above food demand. Thus, the development of crop cultivars demanding less water and fertilizers must be a priority for plant breeding.The application of conventional plant breeding tools has resulted in greatly increased yields per unit land area for many of our important crops, but it has changed the low input agriculture into high input agriculture in terms of more irrigation and increasing chemical use and it is not desirable as far as sustainable agriculture is concerned. Now it is imperative to shift from a high-input agriculture to a sustainable agriculture to minimize the impact of agriculture on the environment.India heavily relies on imports to meet the requirements of protein and fat spending US$ 4.5 billion on imported pulses and another US$ 10.5 billion on imported edible oil. It is expected that with urbanization, better employment opportunities coupled with more disposable income, the demand for nutritious food especially pulses, oils, vegetables, milk, meat, poultry food etc. will grow many folds. The situation currently is so grim that our Honorable Prime Minister Mr. NarendraModi drew attention of scientists and farmers to the large import bill toward the pulses and vegetable oils. In addition to the above challenges, climate change is also forcing us to develop climate resilient cultivars. Now, it seems very much essential to expedite the varietal development process by integrating biotechnological tools as it provides an option for breeders to overcome the problems associated with conventional breeding. If we combined plant biotechnology with traditional agricultural practices, it may make agricultural systems more sustainable.The basic principle involved in the production of GMO involves the addition of new genetic material or modification of organism's genetic material in order to improve its characteristic and properties. Genetic engineering or recombinant DNA technology is being used for improving crop yields, resistance to biotic and abiotic stresses, and to enhance the nutritional content of foods. Bt-transgenic cotton for pest resistance, golden rice for Vit. A deficiency and transgenic banana as a source of edible vaccine are some of the promising achievements in transgenic technology.Are there only benefits, or are also risks with recombinant technology? GMOs

are increasingly becoming a topic of controversy. Biosafety measures should be used to avoid hazards, by taking necessary safeguards, associated with the recombinant DNA technology but it does not mean to avoid the use of technology.

EFFECT OF NUTRIENT MANAGEMENT OPTIONS ON PERFORMANCE AND NUTRIENT USE EFFICIENCY OF WHEAT (*Triticum aestivum* L.) IN LIGHT TEXTURE SOIL

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The field experiment was conducted at CRC, Sardar Vallabhbhai Patel University of Agriculture and Technology, Meerut during *rabi*2013-14 and 2014-15. Influence of organic and inorganic sources on nutrient uptake and yield of wheat (*Triticum aestivum* L.) in Western Uttar Pradesh. Addition of 100% NPK (2% Urea spray at tillering and jointing stage) (RDF-recommended dose of fertilizer i.e 150: 75: 60 kg NPK ha^{-1} was recorded significantly higher value of nutrient uptake and grain yield (49.51 and 47.23 q ha^{-1}) was recorded yield which was at par with75% NPK + Vermicompost 2 t/ha (2% Urea spray at tillering and jointing stage) (48.93 and 46.83 q ha^{-1}) grain was recorded yield. Nitrogen, phosphorous and potash content and uptake as well as agronomic efficiency was also increased with the application of 100% NPK (2% Urea spray at tillering and jointing stage). Which was at par with the 75% NPK + vermicompost 2 t/ha (2% Urea spray at tillering and jointing stage). Highest organic carbon % in soil was recorded in 75% NPK + Vermicompost 2 t/ha (2% Urea spray at tillering and jointing stage).The integrating of 75% NPK + Vermicompost 2 t/ha (2% Urea spray at tillering and jointing stage) found more productive by maintain or improving the soil health.

Keywords:Nutrient Management, Vermicompost, Urea Spray, agronomic efficiency of NPK.

GREEN CHEMISTRY FOR ADDRESSING ENVIRONMENTAL ISSUES

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Green chemistry, also called sustainable chemistry, is an area of chemistry and chemical engineering focused on design of products and processes that minimize the use and generation of hazardous chemical substances. It plays a critical role in harmonising ecology for sustaining life, as Chemicals are one of the most disastrous pollutants causing maximum damage to atmosphere and to mother earth. If we do not adopt the appropriate measures to check this, the day is not far ahead to see the total destruction.Thus by adopting principles of "Green Chemistry"we can certainly develop sustainable technologies to minimize the impact of chemicals and their adverse effect on to the environment. Furthermore, considering the limited natural resources, proper utilization of natural resources for progress of mankind without hampering the environment is crucial. Thus there is stressing need to develop greener and sustainable technologies.

BIOFULES: POSSIBILITIES IN INDIA

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In recent times, there has been a marked shift from use of conventional fossil fuels to new and renewable sources of energy that are cleaner, safer and in exhaustible. Against the backdrop of a widening gap between supply and demand, it becomes imperative to diversify energy sources and explore alternative ways to meet the country's energy need and sustain economic growth. Growing environmental concern also pose a serious challenge for energy companies, underlying the urgencies to usher in cleaner and

sustainable energy resources. In the country's pursuit of alternative sources of energy, Indian Oil is focussing on: 1. CNG 2. Auto gas (LPG) 3. Ethanol-blended petrol 4.Biodiesel 5.Hydrogen Energy.Biomass, a green fuel, which includes plant waste, wood and other organic material, is considered a model green fuel because of its low carbon properties. But what potential does it really hold in generating clean energy?In the norther Indian state of uttarakhand, environmentally-friendly fuel is literally strewn all over the roads in the form of pine neddles.The state has a mild climate, ideally suited for pine trees. The trees shed their leaves once a year, carpeting the ground with the perfect material for making briquettes of fuel. The use of biomass such as the pine needles in India is one way of generating green energy. The method reduces the use of fossil-based fuels such as coal and lowers greenhouse gas emissions.Valuable waste: Biomass includes food crops such as canola and corn, but also wood, plant waste, straw and other organic matter. They're used to generate electricity in waste incineration plants. Biomass is typically described as "carbon neutral". Proponents say it's a simple and proved renewable technology based on natural cycles. The scientific principle behind biomass is the carbon cycle. As they grow, plants absorb carbon-dioxide. The carbon builds tissues and feeds the plant while oxygen is released. When plant material is burnt carbon combines with oxygen. The resulting carbon-dioxide is released back in the atmosphere. The contribution of biomass to the greenhouse effect is therefore far less than for traditional fossil fuels.Thus whether the pine needles in uttarakhand decompose naturally or are burned-the carbon emissions are the same. That's not the case with oil and coal. These fossil based fuels and the carbon they contain are stored for millions of years under the ground. Burning such conventional fuels releases carbon emissions that interfere with the natural carbon cycle, damaging the climate. Another advantage of biomass is that it's a renewable source. It's available in regular intervals-during harvests-as an energy source.Biomass has a limited potentialBut several experts have pointed out that the potential of biomass to generate electricity is limited. Daniela Thraen, who heads the bio energy systems research area at the German Biomass research centre (DBFZ) in Leipzig, said that biomass can at the most meet 10 to 15 percent of the world's energy needs.According to Thraen, Who is also the spokeswoman for the bio energy department of the Helmholtz centre for Environmental Research in Leipzig, There's a high potential for biomass in Eastern Europe.South America and Australia, and to an extent in North America. That's because these places have enough land and relatively small populations, she said, adding that fuel crops for biomass production would not compete with food harvests for scarce farmland. Densely populated regions such as southwest Asia, on the other hand, aren't ideal for biomass production, according to Thraen. While Africa isn't as densely populated and has plenty of arable land suited for biomass fuel crops or crops grown specially for use as environmentally friendly fuels, the continent's agricultural production is too weak, the expert pointed out.She added that she didn't see any potential for biomass production in Africa that wouldn't compete with food crop production. And biomass energy production remains controversial because of concerns it would divert agricultural production away from food crops in poor countries. The 'fuel vs. food' debate escalated in Germany in 2007. At the time, the rising global demand for fuel crops sent prices for wheat, corn and rice sky rocketing and food became hugely expensive in poor nations. That fuelled a public controversy over whether it makes sense to convert edible grain which should be feeding humans into bio fuels in order to power cars.Readily available Green EnergyTharaen said that one particular advantage enjoyed by biomass is that it stores energy which-as opposed to sun and wind-is always available when it's needed."The potential for bio energy thus probably lies in complementing wind and solar energy," Thraen said. "If wind isn't blowing you can offset it with bio energy." Thraen added that in future biomass could take the place of fossil-based fuels such as kerosene that can't be replaced by other renewable energies.Clean and green wasteBernd Bilitewski, head of the institute for Waste management at the Technical University Dresden said that biomass holds huge potential in other areas too. He pointed that in Germany for instance, 12 million tons of unused organic waste is partially disposed off even though it's ideal for generating bio energy. "The waste products must be used before we begin to work on other competitive products."He added that there was plenty of agricultural land that couldn't be used for food and animal feed production but was perfectly suited for the cultivation of fuel crops. That includes land previously used mining as well as for areas polluted by industries, he said. Bilitewski said that Germany today hardly had a waste incineration plant that didn't use the energy generated through waste. But he added that bio energy sources could still be used in a much more efficient way.

THE STUDIES ON NUTRIENTS MANAGEMENT ON SOIL HEALTH ,UPTAKE NUTRIENTS AND PRODUCTION OF CAULIFLOWER (*Brassica oleracea* var. botrytis) IN BUNDELKHAND REGION

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The cauliflower is next to potato in respect of economic importance, wide adaptability, high economic and medicinal importance . The bio manures are known to improve soil tilth ,aeration ,water holding capacity and the activities of soil micro-organisms while continuous use of fertilizer exhibit adverse effect on soil health. The spacing between the plants is another important factor which affect plant population ,yield and quality to a great extent.In view of above, a field trial was conducted at Brahmanand

Mahavidyalay Rath, Hamirpur (U.P.) during 2009-10 and 2010-11. The treatments involved three doses of nitrogen which were 100,75 and 50 percent of recommended dose (120kg/ hectare).Thus 120,90 kg and 50 kg per hectare of nitrogen were applied through urea The remaining dose of nitrogen i.e 30 and 60 kg per hectare were supplied through bio manure namely FYM,NADAP and Vermicompost. The plant spacing was 30 cm,45 cm and 60 cm with rows 45cm apart. The nitrogen plus bio manure was in main plot while plant spacing in sub-plot. These were replicated thrice in randomize block design.The observations viz. plant height, number of leaves per plant and diameter of stem at base during growth period while the number of fully open green leaves , size of leaves, fresh weight of whole plant less root , fresh and dry weight of curd diameter of curd and dry matter content in leaves were recorded at harvest.The gross and net income, removal of NPK by the crop and organic matter content of soil were also was determined.The application of nitrogen through urea plus bio manure , spacing and their interaction influenced all the growth parameters , yield and quality of curd and gross as well net income significantly These were superior than the application 100% recommended dose of nitrogen supplied through urea alone. The favourable effect of application through urea plus bio manure on soil health was also observed. The application of 75% N through urea (90kg N) plus 25% N through vermicompost (30 kg N) and 45cm x45cm spacing proved superior most among all the treatments and hence recommended for Bundelkhand region especially for Hamirpur district of Utter Pradesh.

EFFECT OF NITROGEN AND POTASH ON GROWTH, YIELD AND QUALITY OF GARLIC (*Allium sativam* L.) UNDER BUNDELKHAND REGION

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Garlic is an important bulb crop which belong to family Alliaceae .It a famous spice crop grown through out the country. The soil of the experimental area was poor in organic matter 1.01% , cal 0.70% ,lime 0.65% potash 0.24% , phosphorus 0.09% and nitrogen 0.08%. Nitrogen and potash are the major nutrients needed in large quantities. The sulphur requirement of garlic is high. The present investigation involved four levels of nitrogen i.e. 0.50 ,100 and 150 kg per hectare and two levels of potash viz. 50 and 100 kg per hectare the eight treatments were replicated thrice in CRBD.The entire amount of 20 ton per hectare of cow dung manure was applied as basal dose at final land preparation while nitrogen and potash were incorporated in individual plot in three equal instalment at 25,45,65 days after planting of cloves. The maximum height, number of leaves per plants, diameter of bulb and neck height and diameters of bulb , number of cloves per bulb , weight of bulb per plot were recoded under N_3K_2 where 150kg Nitrogen per hectare plus 100 kg Potash per hectare were applied. The minimum values sfor the above characters were found under 50 kg potash without nitrogen fertilization N.K. Hence, the application 150 kg nitrogen plus 100 kg potash per hectare in three equal doses at 20,25 and 65 days after planting along with 20 ton per hectare cow dung manure as basal doses is recommended .

HUMAN RESOURCE PLANNING: A STUDY IN EXTENSION EDUCATION

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This competitive study we found that Human resource planning forecasts the future personnel needs of extension organizations. With the rapid changes in technology, needs of farmers, market situation, and competitive environment, planning for human resources has become an important, challenging task for extension. Human resource planning involves plans for future needs of personnel, their required skills, recruitment of employees, and development of personnel. Human resource forecasting and human resource audit are the two most important components of this type of planning. Human resource forecasting refers to predicting an organization's future demand for number, type, and quality of various categories of employees. The assessment of future needs has to be based on analysis of present and future policies and growth trends. The techniques of forecasting include the formal expert survey, Delphi technique, statistical analysis, budget and planning analysis, and computer models. The human resource audit gives an account of the skills, abilities, and performance of all the employees of an organization.

INTEGRATED DISEASE MANAGEMENT THROUGH ORGANIC FARMING INVEGETABLE CROPS IN INDIA: A SUSTAINABLE TOOL

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Integrated Disease Management (IDM) is a holistic approach which first assesses the disease situation, evaluates the merits of disease management options and then implements a system of complementary management actions within a defined area**.** Integrated disease management in organic farming combines the use of various measures. The usefulness of certain measures depends on the specific crop pathogen combination. In many crops, preventative measures can control diseases without the need of plant protection products. However, for certain disease problems, preventative measures are not sufficient. For example, blight in Potato, Chili leaf curl in Chili, Leaf curl Virus in Tomato, Viral disease in Cole crops and Cucurbits. Organic farming is a production system which accelerates and enhances agro-ecosystem health, including biodiversity, biological cycles and soil biological activity. Organic farming support stopping the use of chemical fertilizer, chemical pesticides and all other inorganic inputs in farming. Organic farming assist in creating an ecological balance and a microenvironment suitable for health and growth of soil micro-flora, plants, animals, farm workers and finally the vast population of consumers. Integrated Disease Management (IDM) as applied to diseases of vegetables means using all the strategy available to the grower (cultural, biological, host-plant resistance, and chemical) that provides acceptable yield and quality at the least cost and is compatible with the tenets of environmental stewardship. India has tremendous potential to grow crops organically and emerge as a major supplier of organic products in the world's organic market. In our country, the vegetable crops like Potato, Tomato, Brinjal, Chili, Cole crops, Onion, Garlic, Pea and Pumpkin are growing through organically on commercial scale. Organic Farming seems to be more appropriate as it considered the important aspects of sustainable agriculture tool. It is a production system, which favors maximum use of organic materials like crop residues, FYM, compost, green manure, oil cakes, bio-fertilizers, bio-gas slurry etc. to improve soil health from the different experiment, microbial fertilizers like Rhizomic, Azotobacter, Blue green algae, Azolla etc. have increased the yield and also played important role for minimizing the harmful effect of pesticides and herbicides.

Keyword:Integrated Disease Management, Vegetable Crops, Organic Farming, Sustainable Tool and biodiversity

INTEGRATED WEED MANAGEMENT IN CONSERVATION AGRICULTURE

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Adequate food production for ever-increasing global population can only be achieved through the implementation of sustainable growing practices that minimize environmental degradation and preserve resources while maintaining high-yielding profitable systems. Conservation agriculture practices are designed to achieve agricultural sustainability by implementation of sustainable management practices that minimize environmental degradation and conserve resources while maintaining high-yielding profitable systems and also improve the biological functions of the agro-ecosystem with limited mechanical practices and judicious use of external inputs. It is characterized by three linked principles, viz. (i) continuous minimum mechanical soil disturbance, (ii) permanent organic soil cover, and (iii) diversification of crop species grown in sequences and/or associations. A host of benefits can be achieved through employing components of conservation agriculture or conservation tillage, including reduced soil erosion and water runoff, increased productivity through improved soil quality, increased water availability, increased biotic diversity and reduced labour demands.Considering the diversity of weed problems, no single method of weed control, viz. cultural, mechanical or chemical, could provide the desired level of weed control efficiency under CA. Therefore, a combination of different weed management strategies should be evaluated for widening the weed control spectrum and efficacy for sustainable crop production. Integrated weed management system is basically an integration of effective, dependable and workable weed management practices that can be used economically by the producers as a part of sound farm management system. This approach takes into account the need to increase agricultural production, reduce economic losses, risk to human health and potential damage to flora and fauna, besides improving the safety and quality of the environment. Integrated weed management system is no meant for replacing selective, safe and efficient herbicides but is a sound strategy to encourage judicious use of herbicides along with other safe, effective, economical and eco-friendly control measures. The use of clean crop seeds and seeders and field sanitation (weed-free irrigation canals and bunds) should be integrated for effective weed management. Combining good agronomic practices, timeliness of operations, fertilizer and water management and retaining crop residues on the soil surface improve the weed control efficiency of applied herbicides and competitiveness against weeds. Approaches such as stale seedbed practice, uniform and dense crop establishment, use of cover crops and crop residues as mulch, crop rotations, and practices for enhanced crop competitiveness with a combination of pre-and post-emergence herbicides could be integrated to develop sustainable and effective weed management strategies under CA systems.

STUDIES OF PLANT GROWTH REGULATOR ON MICRO PLANT IN NET HOUSE OF VARIOUS CULTIVARS OF POTATO

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The investigation was conducted at Central Potato Research Institute Campus Modipuram, Meerut (at 28.580 N latitude and 77.20 E longitude) during 2009-2010 and 2010-2011 respectively. To determine the effect of plant growth regulator in vitro culture plant under net house condition for three variety (K. Bahar K. Surya and K. Chipsona-3) and four combination of plant growth regulator with one control. The recommended package and practices were followed in all cultivars under net house for successful rising of crops. Marketable as well as total tuber numbers were significantly higher in cultivar K.Surya (9.82 lakh/ha) as compared to rest of other two cultivars. Highest marketable grade (<25g)tuber yield noticed in cultivar K.Surya (232.45) with combination to 0.1ppm Ga3, 0.01ppm NAA and 2.5 ppm cytokinine, while in case of cultivar K.Bahar (208.06) and K.Chipsona-3 (211.52) in control treatment .

IMPACT OF PHYSICALLY AND CHEMICALLY TREATEDANAEROBICALLY DIGESTED DISTILLERY EFFLUENT ONNUTRIENT ANDOIL QUALITY OF SUNFLOWER

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A pot experiment was conducted in CRD during cropping season 2007 and 2008 at G.M.V.Rampur Maniharan,Saharanpur . The distillery effluent for study was collected from Sir Sadi Lal Distillary Muzaffarnagar. Variety Jwalamukhi of Sunflower was used as test crop. Nitrogen, phosphorus and potassium content in grain determined and observed that the highest N.P.K. percentage (2.87 and 2.84%), (0.48 and0.48%) and (2.44 and 2.55%) was observed in T_0 in both years 2007 and 2008. The minimum N.P.K.% were recorded in T_1 in both the years. To judge quality of oil, acid value, oil percent and refractive index were determined and observed that maximum acid value was recorded in T_1 treatment and minimum in T_0, while the maximum oil percent was recorded in T_0 (control) in both the years. The values of refractive index reported to have very little difference in both years

ANALYSIS OF AUTOMOBILE POLLUTION OF DIFFERENT ROADSIDE SOILS IN MEERUT CITY, U.P. INDIA

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Pollution is known to be the introduction into the environment (air, water or land) of contaminants, the quantities, characteristics and duration of which are likely to be injurious to human, animal or plant life. Automobile emission has been found to be a major role in soil pollution. it showed the adverse effect on plant life, animals and human also. Influence of vehicular emissions on the accumulation of organic contents and lead content. The main objective of this research was to determine impact of soil pH, soil humidity percentage and lead content at different selected roadside of Meerut city. Four locations were selected on the basis of high concentration of vehicular traffic as compared to low traffic concentration act as control site. Samples were taken in a month of dry season. Soil pH, measure by digital electronic pH meter and Concentration of lead content was measured by atomic absorption spectrometer. Lead content was found to be higher at all study sites than in control. Present study showed that soil pH value was found to be slightly acidic due to gaseous exhaust pollution. Reduction in soil moisture percentage was found lower at low polluted site and high at much polluted sites. Therefore it indicates that higher the green belt sites higher the soil moisture percentage.

Keywords: Automobile pollution, Lead content, Moisture percentage, Atomic Absorption Spectrometer, Soil pH.

CLIMATE CHANGES AND GLOBAL WARMING - ITS IMPACT ON HUMAN LIFE

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The climate is changing. Global warming and climate change refer to an increase in average global temperatures. Natural events and human activities are believed to be contributing to an increase in average global temperatures. This is caused primarily by increases in "greenhouse" gases such as Carbon Dioxide (CO_2).The earth is warming up, and there is now overwhelming scientific consensus that it is happening, and human-induced. With global warming on the increase and species and their habitats on the decrease, chances for ecosystems to adapt naturally are diminishing. Global warming is causing climate patterns tochange. Throughout Earth's history the climate has varied, sometimes considerably. Past warming does not automatically mean that today's warming is therefore also natural. Recent warming has been shown to be due to human industrialization processes. The increased volumes of carbon dioxide and other greenhouse gases released by the burning of fossil fuels, land clearing, agriculture, and other human activities, are believed to be the primary sources of the global warming that has occurred over the past 50 years.
The greenhouse effect is the process by which absorption and emission of infrared radiation by gases in a planet's atmosphere warm its lower atmosphere and surface.Greenhouse gases include carbon-based gases such as carbon dioxide and methane. They're vital in the Earth's atmosphere in certain quantities because they help trap and retain some of the sun's heat (the 'greenhouse effect'). This makes life as we know it possible on Earth – without it the world would be mostly frozen. But too much is dangerous, too.Carbon dioxide is a natural gas. It's essential for all life on Earth. It's absorbed by plants as they grow, and emitted by all life forms when they respire and when they die (or when they're burned as fuel). Other than water vapour, it's the most common greenhouse gas. The carbon cycle is the natural process by which carbon gases are emitted and absorbed across the globe. This determines the overall levels of carbon gases in the atmosphere. Without action climatic changes threatens to damage our world byhigher temperature, changing land scape and wild life habitat, rising seas, increase risk of storm, drought and flood. But by supporting people around the world to be a part of the solution, together we have the power to limit the damage. A solution can be use of forest conservation, land for animal conservation, restoration of coastal habitat and restore natural system could be the measurements for limiting the global warming. As we move into an era in which climate change impacts are all around us, adapting to these changes quickly will be key for all sectors of the global economy. Innovate and science based solution would be very helpful so we can adapt faster in climatic changes.If we don't restraint in heat-trapping emissions from burning fossil fuels and deforestation now, these impacts will only intensify. We can help by supporting measures to make polluters reduce climate emissions.

IN VITRO EVALUATION OF DIFFERENT PLANT EXTRACT ON MYCELIAL GROWTH INHIBITION OF *Alternaria solani*

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Tomato (*Lycopersicon esculentum* Mill) belongs to the family Solanaceae and is one of the most remunerable and widely grown vegetables in the world. Among vegetable crop, tomato ranks second important vegetable in the world next to potato and first among the processing crops, attacked by a number of diseases which cause huge crop losses. Early blight of tomato caused by *Alternaria solani*(Ell. And Martin) is one of the major diseases of tomato. The antifungal activities of various plant extracts like *Melilotus albus, Solanum nigrum, Physallis minima, Salix sp., Datura fastusa, Convolvulus arvensis, Achyranthus aspera and Parthenium hysterophorus* were evaluated against early blight of tomato and their effect on physiological and biochemical activities in Early blight tomato were also observed. The results revealed that there was 76.75 to 80.68% reduction in mycelial growth of *A. solani*.The antifungal activity of different plant extract was determined *in vitro* following Poison Food Technique. The results shows that maximum inhibition was obtained by *Datura fastura* extract (81.36%) followed by *Achyranthus* (76.48%), *Parthenium* (69.66%), *Salix sp.* (65.14%*) and physallis minima* (49.53%) other treatment also significantly controlled the mycelium growth of *Alternaria solani.*

EFFECT OF INORGANIC NUTRIENTS AND BIO-INOCULANTS ON BLACK GRAM (*Vigna mungo* L.)

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A pot experiment on black gram crop was conducted at pot house of the Department Soil Science and Agriculture Chemistry C. S. Azad University of Agriculture and Technology Kanpur during kharif -2013 with variety shekhar-2. The dose of experiment were 50% SR , 50% SR + Rh , 50% SR+PSB, 50%SR+Rh+PSB , 100% SR , 100 % SR + Rh , 100% SR+PSB, 100%SR+Rh+PSB , .

The result showed that number of branches /plant varied from 1.5 to 4.5 and 2.5 to 5.5 at 30 and 60 DAS, respectively. The number of nodules ranged from 8.75 to 23.0 and 16.0 t0 30.50 at 30 and 60 DAS, respectively .The grain yield varied from 8.50 to 15.20 q/ha and Stover yield varied from 12.60 to 23.80 q/ha. The N content in grain ranged from 3.16 to 4.24 % and P from 0.60 to 0.69 % .The N content in Stover varied from 1.03 to 1.09 % and P from 0.24 to 0.29 %. The total nitrogen uptake ranged from 39.83 to 90.60 kg/ha and P uptake from 8.35 to 16.6 kg/ha. The protein content in black gram grain showing the range of variation from 19.75 to 26.62 % The treatment T_9 (100%SR+Rh+PSB) gave the best results in terms of branches , number of nodules, grain and Stover yield , nutrient content , uptake values and protein content.

EFFECT OF GROWTH REGULATORS AND GROWING MEDIA ON PROPAGATION OF KIWIFRUIT THROUGH HARDWOOD CUTTINGS

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To find out effective growth regulators and growing media for propagating kiwifruit through hardwood cuttings, an experiment was laid out under intermittent misting at Division of Fruit Science, SKUAST-Kashmir, Shalimar Campus, Srinagar (Jammu and Kashmir). The experiment comprised of two growth regulators with different concentrations of IBA (2000 ppm, 3000 ppm and 4000 ppm) and NAA (2000 ppm, 3000 ppm and 4000 ppm) and four growing media saw dust, coco peat, soil and sand. The experiment was laid out in Randomized Block Design with three replications per treatment. The hardwood cuttings were dipped in the solution and placed in the media. The results obtained from investigations revealed that the saw dust + NAA @ 3000 ppm recorded 81.98 per cent sprouting percentage of cuttings and survival percentage was observed maximum with saw dust + IBA @ 2000 ppm. Maximum shoot length, shoot diameter, number of leaves and leaf area were recorded with coco peat + NAA @ 4000 ppm closely followed by saw dust + NAA @ 4000 ppm. Higher fresh and dry weight of shoots and roots were recorded in coco peat + IBA @ 2000 ppm closely followed by coco peat + IBA @ 3000 ppm. Overall NAA @ 3000 ppm + saw dust and IBA @ 2000 ppm + coco peat were much effective for propagating kiwifruit through hardwood cuttings.

PLANKTON AS BIOTIC FACTORS IN NATURAL WATER

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Plankton is composed of algae and microscopic animals in variousstages of development. They comprise a large portion of the livingmatter in natural waters and have important function in biogeochemicalcycles. There are two main biotic factors i.e phytoplankton andzooplankton. Much effect on the quality of water is reflected in thecommunity structure and diversity of zooplankton and phytoplankton.Phytoplankton and zooplankton are good biotic factors for changes innutrient pollution over time because they respond quickly to changesin nutrient. Zooplankton comprises a very dynamic portion of the totalplankton. Phytoplankton contributes significantly to the productivityof aquatic ecosystem. The quantitative and qualitative abundance ofthe phytoplankton and zooplankton were studied from Feb 2010 to Jan2011 in a fresh water canal of western U.P. and were correlated to thewater quality conditions. The diversity of plankton and itsrelationship to physico-chemical properties of water and theirimportance as indicator of health of a water body is well establishedfact. In the present study a total of twenty species of phytoplanktonwere recorded from the two stations under study. The Chlorophyceae wasfound to be the most significant group followed by Bacillariophyceaeand Cyanophyceae. The zooplankton also comprised of three groups i.ecopepods, rotifers and cladocera. Copepodes were the most dominantgroup then others. Phytoplankton and zooplankton analysis were carriedout using numerical counts with compound light microscope andidentification. In this study the population of plankton was found tobelow.

MARKER-ASSISTED RECURRENT BACKCROSSING IN CULTIVAR DEVELOPMENT

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In Marker-Assisted Recurrent Backcrossing (MARB), marker are used during recurrent backcrossing to select for the presence of the target gene (foreground selection), to select against the donor genome contribution (background selection) to reduced the

introgressed segment's size and thus potential linkage drag. MARB reduces the number of the backcrossing needed to recover most of the recurrent parent genome in 3-4 generation. Marker-Assisted Foreground Selection (MAFS) was proposed by Tanksley (1983). The presence of target allele in a individual is diagnosed by monitoring the genotype with markers linked to the gene for alleles of the donor parent. This is a powerful tool for manipulation of oligogenic traits under numerous situations in plant breeding. Marker-Assisted Background Selection (MABS) was proposed by Young and Tanksley (1989) to accelerate recovery of the recurrent parent genome In MABS, individuals are selected which are homozygous for the alleles of the recurrent parent at as many marker loci. If major Quantitative trait loci (QTL) affecting the trait have been identified. Marker provides an effective option to control linkage drag. There are several successful applications of MARB in plant breeding such as Introgression of a single major gene, Introgression of two or more major genes for disease/insect resistance, Introgression of QTL. Many factors affect the success of a QTL introgression program. The most important factors are QTL-by-environment interaction (QUI) and QTL-by-genetic background interaction (QGI). MARB, the combined use of MAS and recurrent backcrossing, genetic widen the applicability of recurrent backcrossing for cultivar improvement. It also serves as an important tool for the genetic study of complex traits. Breeding involving a much wider range of traits can be improved using MARB. This necessitates larger population sizes for foreground selection and reduces the possibility of background selection.

Keywords:Foreground Selection, Background Selection, Recurrent Parent, Introgression, Homozygous

IMPACT OF MAHATMA GANDHI NATIONAL RURAL EMPLOYMENT GUARANTEE ACT (MGNREGA) REGARDING RURAL DEVELOPMENT PROGRAMME.

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The World Bank defines rural developments as a strategy designed to improve the economics and social life of a specific group of people – the rural poor. It involves extending the benefits of development to the poorest among those who week a livelihood in the poor areas. The group includes small scale farmers, tenants and the landless. The MGNREGA stands for Mahatma Gandhi National Rural Employment Guarantee Act further an act to provide for the enhancements of livelihood security of the households in rural areas of the country by providing at least 100 days of guaranteed wage employments in every financial year to every household. This is the largest ever public employment programme inhuman history. This programme notified in February 2, 2006 as NREGA and later on renamed as MGNREGA on 2nd October 2009.This programme aims at providing at least to every adult of a household living in rural area is entitled to 100 days of employments for unskilled manual work and may submit his or her personal details such as name, age, and address, to the local Gram panchayats. The major activities of MGNREGA including water harvesting, water conservation and watershed management, afforestation and tree plantation; irrigation canals, counter bunds, dykes stop dams etc. In the current financial years 2014 MGNREGA has seen over 9.3 crore rural accounts being opened up in various banks and post office. The households were getting 3.81 crore employment in 2014. In MGNREGA it was found that maximum candidates i.e. 23% belong to SCs. While 16% STs Candidates were found. MGNREGA has come with the objective of providing hundred days of employments to the rural labourers. In this context it becomes important where the most deprived, scheduled caste, scheduled tribe, women and the disables included in the programme and got maximum benefit out of it. The state Governments which are responsible for the purpose of implementing this flagship programme needs to keep it mind. Although MGNREGA is demand driven programme and supply of work depends on the demands made by the labourers, but it is the duty of the governments to carry out awareness programmes so that the most deprived gets maximum benefit of the scheme.

STUDIES ON PREPARATION OF CASSAVA-MANGO BAR FOR LIVELIHOOD IN WEST GARO HILLS, MEGHALAYA

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In the present study, mango (*Mangifera indica*L.) bar of variety Lakhanbhog was prepared with the combination of cassava flour and sugar.The six treatments were experimented viz. T_1- M (mango pulp), T_2- M+S (mango pulp + sugar in proportion of90+10%), T_3- M+S (80+20%), T_4 - M+S (70+30%), T_5- M+S (60+40%), T_6- M+S (50+50%) and KMS @350ppm and cassava flour 20% were added in each treatment, and acid content was maintained @ 0.5% for each treatment. The processed bar was packed air tightly in polythene bag and stored at ambient condition. The physico-chemical characteristics like TSS, total sugar, reducing sugar,

non-reducing sugar, acidity, ascorbic acid, protein, carbohydrate, starch, β-carotene, moisture content and organoleptic quality with respect to colour, flavor/aroma, texture and overall acceptability were evaluated and standardized the recipe of mango bar.The treatment of T2 and T3 were standardized by the panelists with the help of 5 Point Hedonic Scale.
Keywords: Mango bar, cassava flour, KMS, physico-chemical.

ROLE OF ABIOTIC-FACTORS IN RELATION TO INCIDENCE OF BUDFLY (*Dasyneuralini*) AND GRAM POD BORER (*Helicoverpa armigera* Hub) ON LINSEED (*Linum usitatissimum* Linn.)

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The studies were conducted during *Rabi* season at the student's Instructional farm, of Narendra Deva University of Agriculture and Technology, Kumarganj, Faizabad during 2012-13. The site is located at 42 km away from the district head quarter, Faizabad on Faizabad-Raibareily road.The linseed genotype was sown in protected plot in Randomized Block Design with 3 replications.The plot size was 10x10 sqm.The sowing was done on the last November. In addition to this all normal recommended agronomical practices were followed. The meterological data was collected from the Department of Agrometerology, N.D.U.A. & T., Kumarganj, Faizabad (U.P.). Linseed, *Linum usitatissimum* (Linn.) is one of the oldest oilseed crop known as poor man's crop in India. It has got special importance amongst oilseed crop in *Rabi* season. The crop is cultivated commercially for flax in the world, while in the India, it is cultivated mainly for oil. In Uttar Pradesh, the area under linseed is about 0.65 lakh ha and production was about 0.294 lakh tones with the highest productivity level of 453 kg/ ha. The study was carried out on the effects of various weather parameters like temperature (minimum and maximum), Relative humidity (%), Rainfall (mm) and Sunshine (hr) on incidence of budfly (*Dasyneuralini*) and gram pod borer (*Helicoverpaarmigera*) on variety Neelum of linseed. The incidence of budfly (*Dasyneuralini*) was positively correlated with minimum and maximum temperature (0.110) and (0.490), while it was negatively correlated with relative humidity (-0.590), rainfall (-0.319) and sunshine hours (-0.363) with regard to incidence of gram pod borer (*Helicoverpaarmigera*). All weather parameters were found different. He waspositively correlated with maximum temperature (0.177), while it was negatively correlated withminimum temperature (-0.063), relative humidity(-0.447), rainfall (-0.396) and sunshine hours (-0.423) during *Rabi* 2012-13.

STUDIES ON POPULATION DYNAMICS OF LEAF MINOR (*Chromatomyiahorticola*) IN LINSEED (*Linum usitatissimum* Linn.)

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The field experiment was carried out at the student instructional farm of Narendra Deva University of Agriculture & Technology, Narendra Nagar (Kumarganj), Faizabad. The site is located at 42 km away from the district head quarter, Faizabad on Faizabad-Raibareily road. The incidence of leaf minor (*Chromatomyiahorticola*) were recorded on variety Neelum on weekly interval from germination to harvest of the crop.Weekly observations ofleaf minorwere recorded on 20 randomly selected plants in the plot of 10×10 Sqm.First appearance of leaf miner was recorded in the second week of December on the variety of Neelum during *Rabi* 2012-13. Initially, the damage was 0.49 %, which peaked to its maximum 12.30 % .The maximum damage was recorded during second week of March on the variety Neelum during *Rabi* 2012-13.Simple correlation between weather parameters viz., minimum and maximum temperature, relative humidity, rainfall and sunshine hours with population of leaf minorwas worked out. The population of leaf miner was positively correlated with minimum temperature (0.218), relative humidity (0.858), rainfall (0.616) and sunshine hours (0.650) and it was negatively correlated with maximum temperature (-0.135) during *Rabi* 2012-13

TO STUDY THE POPULATION DYNAMICS OF BIHAR HAIRY CATERPILLAR (*Spilarctia obliqua*)On Linseed, *Linumusitatissimum* (Linn.)AND THEIR RELATIONSHIP WITH ABIOTIC FACTORS

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The experimental trial was carried out at the student instructional farm of Narendra Deva University of Agriculture & Technology, Narendra Nagar (Kumarganj), Faizabad. The site is located at 42 km away from the district head quarter, Faizabad on Faizabad-

Raibareily road. The linseed genotype was sown in protected plot in Randomized Block Design with 3 replications.The plot size was 10x10 sqm.The sowing was done on the last November. In addition to this all normal recommended agronomical practices were followed. The meterological data was collected from the Department of Agrometerology, N.D.U.A. & T., Kumarganj, Faizabad (U.P.)The study was carried out on the effects of various weather parameters like temperature (minimum and maximum), Relative humidity (%), Rainfall (mm) and Sunshine (hr) on incidence ofBihar hairy caterpillar (*Spilarctiaobliqua*)on variety Neelum of linseed.The incidence of Bihar hairy caterpillar was positively correlated with minimum and maximum temperature (0.335 and 0.586), relative humidity (0.086), rainfall (0.233) and sunshine hours (0.046), during *Rabi* 2012-13.The larvae of this voracious foliage feeder were recorded in the late vegetative stage of the crop during the last week of January and first week of March in Neelum. The peak in population 4.91 per plant was recorded in first week of March in variety Neelum during 2012-13.

MANAGEMENT OF BUDFLY, *Dasyneuralini*BARNES IN LINSEED

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The experiment was carried out at the Student's Instructional Farm of Narendra Deva University of Agriculture and Technology, Narendra Nagar (Kumarganj), Faizabad (U.P.) during *Rabi* 2012-13, to effectiveness of three insecticides against *Dasyneuralini* Barnes on linseed. The population was homogeneous in the experimental plots at the time of application of insecticides on the crop three days after the spraying, all the treatments were found significantly superior over control. Imidacloprid 17.8 SL @ 0.005% performed better among the treatments, which was at par with Nimbicidine @ 0.25 followed by NSKE @5%. Application of Imidacloprid 17.8 SL @ 0.005% gave higher grain yield of linseed i.e. 16.22 q/ha over rest of the treatments. The highest per cent increase in grain yield due to Imidacloprid 17.8 SL @ 0.005% application over control was 33.60% followed by Nimbicidine @ 0.25 was recorded 17.71%. The maximum cost benefit ratio (1:15.83) was obtained from Imidacloprid 17.8 SL @ 0.05%, Followed by Nimbicidine with benefit cost ratio (1:14.09), NSKE with benefit: cost ratio (1:6.94). From the results, it is clear that application of Imidacloprid 17.8 SL @ 0.05% was found to be most effective and economical to control budfly during *Rabi* 2012-13

STUDY ON KNOWLEDGE AND ADOPTION OF ORGANIC FERTILIZER MANAGEMENT IN SUGARCANE CROPIN DISTRICT LAKHIMPUR KHERI (U.P.)

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The study was conducted in Gola block of district Lakhimpur kheri (U.P.) selected purposively. Out of 121 villages in Gola block, 5 villages were selected purposively for this study. A complete list of all the villages was prepared and 5 villages were selected and respondents selected randomly then sample size of 100 respondents. The structured schedule was developed keeping in view the objectives & variables under study. The respondents were contacted personally for data collection. The percentage, mean, standard deviation, correlation were used for calculation and drawing the inferences. The majority of the respondents 60% were found in medium categories (37-60) of age group, like this 78 % literate, 37% General cast, 77% Hindu religion,58% joint family, 69% medium family size (3-7 members), 38% small land holding size (1-2 ha.),68% pucca houses, 70% agriculture main occupation, 63% annual income (88711-285109), 100% participate in Gram Panchayat, 61% overall material possession (38-66 equipment), gram pradhan I ranked formal sources, family member I ranked informal sources, mobiles I ranked mass media, 65% medium (23-25) economic motivation, 60% medium (21-22) risk orientation, 100% knowledge of field preparation & I ranked, 90% ratooning in adoption of respondents & I ranked, 82% scientific knowledge about given by sugar industry for motivation sugarcane cultivation & I ranked, respectively majority of respondents. Variables like education were highly significant & positively correlated with knowledge extent of sugarcane crop. In adoption, supporting of sugar industry was highly significant and positively correlated. Variable like supporting of sugar industry motivate farmers for sugarcane cultivation in adoption was highly significant and positively correlated.Major constraints in adoption of sugarcane cultivation, "Lack of scientific knowledge about organic fertilizer. Most of the suggestive measures, The Scientist and Extension personals approach and interact rarely with the farmers on utility preparation & use of FYM, respectively.

Keywords:Knowledge, Adoption, suggestion

ENVIRONMENTAL POLLUTION EFFECTS ON TREES AND PLANTS

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The hazardous pollutants (HAPs) are defined as chemicals in atmosphere in sufficient concentration have adverse effect on trees, plants and humans and cause damage to ecological and social systems such as forests and agricultural crops .Acid rain can kill trees, destroy the leaves of plants. Ozone holes in the upper atmosphere can allow excessive ultraviolet radiation from the sun to enter the earth causing damage to trees and plants. Ozone in the lower atmosphere can prevent plant respiration by blocking stomata and negatively affecting plants photosynthesis rates which will stunt plant growth. Ozone can also decay plant cells directly by entering stomata. Industries make a major contribution towards causing airpollution. Formation of pollutants can be prevented and their emission can be minimised at the source itself. Some effective methods to control air pollution are Source correction methods, Pollution control equipments, Diffusion of pollutants in air , Vegetation, Zoning. Plants contribute towards controlling air-pollution by utilizing CO2 and releasing O2 in the process of photosynthesis. Gaseous pollutants like carbon monoxide are fixed by some plants .Plenty of trees should be planted especially around those areas which are declared as a high risk areas of pollution.

Keywords: HAPs, Ozone, Acidrain, Photosynthesis.

ORGANOPHOSPHORUS PESTICIDES STRESS DERANGED KINETIC VALUES OF A FEW MIDGUT CARBOHYDRASES OF NAIAD OF *Trithemis aurora* (BURM.) (ODONATA : LIBELLULIDAE)

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The 40 Hrs. treatment of last instar naiad of *Trithemis aurora (Burm.)* in Chlorphyriphos and Quinalphos pesticides concentrations (LC_{50} = 5.12 $\times 10^{-7}$ ppm and 7.6 $\times$ 10^{-8} ppm) has shown significant variations in the enzyme kinetic parameters and arrested the enzymatic activity in the midgut tissue of last instar naiad of *T. aurora* causing deleterious effect on various carbohydrases at standard temp. and pH value. The midgut amylase ($\alpha$and β amylase) showed the change in the velocity of enzymatic reaction under LC_{50} conc. of chlorpyriphos. The data of initial velocity and substrate concentration were processed to achieve their reciprocal values. These values were plotted and a characteristic Lineweaver – Burke straight line was observed from the graph and values of maximum reaction velocity (V_{max}) and Michaelis–Menten constants (Km) were assessed. The present organophosphorus pesticide showed an inhibitory impact on midgut amylase reaction velocity. The double reciprocal plot of initial velocity and substrate concentration after exposing the enzyme under LC_{50} conc. of chlorphyriphos resulted in varied V_{max} and Km. values. These carbohydrase on treatment with LC_{50} conc. of chlorphyriphos showed an inhibitory change in the reaction velocity.The 1/V and 1/S values were plotted to achieve a characteristic Lineweaver – Burke pattern of V_{max} and Km values obtained as 5.0 $\times$ 10^{-2} and 2.0 under LC_{50} chlorphyriphos stress for α amlyase. The Km and V_{max} values were obtained from 0.625 $\times$ 10^{-3} to 1.25 $\times$ 10^{-2} for various other midgut carbohydrases with V_{max} value obtained from 0.28 to 5.0 under chlorpyriphos stress. The Quinalphos inhibited the enzymatic efficiencies of various carbohydrases severely and changed Km and V_{max} values were found under the pesticidal stress and found as potent uncompetitive inhibitor for enzymes as values compared to the controlled enzymatic reactions by deranging the kinetic values. The Km values determined as on 1/V and 1/S basis found deranged from 1.66 $\times$ 10^{-3} to 10 $\times$ 10^{-2}. The V_{max} values were found in a range of 0.41 to 3.3 under LC_{50} Quinalphos stress for midgut hydrolases. The analysis of enzymec kinetic values revealed the great inhibitory and deranged activities of various carbohydrases under both the pesticide constrain. The present toxicants were found to change the enzymatic velocity negatively. The LC_{50} concentrations of these toxicants were sufficient to inhibit the activity of present hydrolases as αandβ amylase, α glucosidase, α galactosidase, β galactosidase, βfructosidase and $\alpha\alpha$ trehalase after obtaining a meaningful Lineweaver – Burke line of plotted reciprocals of data of reaction velocity and substrate concentration.

Keywords: organophsphorus stress, Trithemis aurora, LC_{50}.

SOIL MANAGEMENT FOR SUSTAINABLE AGRICULTURE

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Thesoil sustains most living organisms, being the ultimate source of their mineral nutrients.Good management of soils ensures that mineral elements do not become deficient or toxic to plants, and that appropriate mineral elements enter the food chain. Soil

management is important, both directly and indirectly, to crop productivity, environmental sustainability, and human health. Because of the projected increase in world population and the consequent necessity for the intensification of food production, the management of soils will become increasingly important in the coming years. To achieve future food security, the management of soils in a sustainable manner will be the challenge, through proper nutrient management and appropriate soil conservation practices. Research will be required to avoid further degradation of soils, through erosion or contamination, and to produce sufficient safe and nutritious food for healthy diets.In many areas of the world, the loss of topsoil, either through mineral imbalance or erosion, is the single largest threat to agricultural productivity. Soil erosions by wind and water are the main processes by which topsoil is lost. R. García-Moreno et al. report that soils with high soil surface roughness (SSR), such as those produced with conservation tillage, are less susceptible to erosion, and that there is an inverse relationship between SSR and soil porosity. They suggest that these soil properties might be used to predict the susceptibility of a soil to erosion by wind or water.Organic amendments often improve the productivity of soils and the nutritional value of crops grown thereon. In particular, crop residues can be used to increase the phytoavailability of essential mineral nutrients, reduce the phytoavailability of toxic mineral elements, improve soil physical properties, and promote a beneficial soil biota.

EFFECT OF HUMIDITY AND ASCORBIC ACID ON OIL SEED UNDER DIFFERENT STORAGE REGIMES

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The seeds of most economically plant (crop) need to be stored under a proper storage condition. Hence the study for changes in seeds of oil crop during various storage condition with certain treatment. The oil seeds are poor in water content, yet they suffer fungal attack and also rancidity of their lipids with time and condition of storage. Various Treatments e.g. Airtight-room temperature-normal RH, Distilled water, to raise the moisture content, Ascorbic acid an antioxidant, to mitigate lipid deterioration and also to maintain a level which in protective during storage fat to prevent fungal attack on seed. Ascorbic acid (10mM) treatment all storage regimes in general, improve percent germinability. Ascorbic acid at 30 degree celcious-100% RH causes adverse effect on germiability and physical characteristic of some oil seed *Raphanus satives* cv. Chaitki. The study points out that the oil seeds can be stored in two ways-one for retaining germinability and physical characteristics (Ascorbic acid+ Any storage regimes) and the other for accumulation of lipids untreated but stored at any storage regimes or treated with ascorbic acid distilled water.

Keywords: Seed storage, Ascorbic acid, Distilled water, Moisture content, RH.

OKRA (*Abelmoschus esculentus*(L.) MOENCH) AS A MEDICINAL PLANT- A REVIEW

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Okra, also known as “lady’s fingers” and “bhindi” is an herbaceous annual vegetable plant. Okra has been called “a perfect villager’s vegetable” because of its robust nature. Okra is rich in carbohydrate (7.45%), protein (1.9%), fibre (1.2%), calcium (82 mg/100g), iron (0.61mg/100g), potassium (299mg/100g) and vitamin A (36 µg/100g), C (23 mg/100g) and K (31.3 µg/100g) which plays a vital role in human diet and health-conscious. Foods with higher fiber content and antioxidant qualities are recommended for diabetes patient because fibers have property to reduce the cholesterol. Okra is rich in fiber, very helpful to the diabetic patient by slowing down sugar assimilation through the intestines. Roasted okra seeds which have long been used in Turkey to treat diabetes. The fiber Okra offers helps to cleanse the intestinal system and support colon health. Being a good source of antioxidants and fibers, okra is helpful in prevention of colorectal cancer. The mucilase of okra helps to reduced toxin level in liver and cholesterol level in blood. The frequent usage of okra might help avoid kidney disease. Seed oil of okra has a pleasant taste and odor with high in unsaturated fats such as oleic acid and linoleic acid. Okra’s polysaccharides are particularly effective in gastritis and gastric ulcers. It is neutralizes acid and forms a protective coat in digestive tract for healing ulcers. Okra pods is a rich source of vitamin A and other antioxidants, the green pods contain beta-carotene, lutein and xanthine, which together with vitamin A promote good eye vision and keep skin fresh and healthy. Since vitamin C is act as an anti-inflammatory, okra might be good for reducing the symptoms of asthma and help in instant repair of bodily tissue. Vitamin C can also stimulate the immune system by helping in more white blood cells formation. On the other hand Vitamin K plays an important role in blood clot formation. High iodine content of okra fruit is help in control goiter. Okra is used to promote a healthy of the pregnancy. Okra as contain good amount of folates (folic acid) are vital substance for the pre-conception, early gestation and prevent birth defects. Okra is full of both foliate and vitamin C which essential for growth of fetus brain and baby development. Okra is a good vegetable for the patients who suffer

from weakness, depression, lung inflammation, sore throat as well as irritable bowel. In Ayurveda it is used as an herbal remedy for boots sexual functions and erecting dysfunction. Bhindi is also considered as a good vegetable for spermatorrhoea in man and leucorrhoea in woman.

STUDY ON THE IMPACT OF FOLIAR APPLICATION OF BIOREGULATORS AND NUTRIENTS ON THE ECONOMICS OF OKRA (*Abelmoschus esculentus* (L.) Moench) CULTIVATION UNDER WESTERN UTTAR PRADESH CONDITIONS

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Okra (*Abelmoschous esculentus* (L.) Moench), also called as Lady's finger belongs to a family Malvaceae. Okrais one of the economically important vegetable crops of India and cultivated for its immature fruits.Beside these, bhendi has a vast a potential as one of the foreign exchange earning crops which accounts for about 60 per cent of the export of fresh vegetables. Among all the cultivars of okra the cultivar 'Parbhani Kranti' has high export potential.A two years (2011 and 2012) field experiment was carried out at Horticulture Research Center of Sardar Vallabhbhai Patel University of Agriculture and Technology, Meerut to find out the response of foliar application of plant growth regulators and nutrients in economics of okra cv. Parbhani Kranti cultivation.The experimental field was laid out in randomized block design (RBD) with three replications and comprise of two growth regulators and four nutrients in different concentrations. The different treatment concentration namely, NAA (25, 50 and 75ppm), GA_3 (25, 50 and 75ppm), $MnSO_4$ (2000 and 4000 ppm), $FeSO_4$ (2000 and 4000 ppm), $MgSO_4$ (2500 and 5000 ppm), $CuSO_4$ (1000 and 2000 ppm) and Control (Water spray) were used as foliar spray at 30 and 50 days after sowing of okra seeds. Results obtain from the two year research revealed that maximum average gross income i.e. 223580.00 and 232000.00 Rs./ha and net return i.e. 178865.00 and 186652.00 Rs./ha were registered with foliar application of 75 ppm GA_3 followed by 50 ppm GA_3 during 2011 and 2012, respectively. While, maximum cost: benefit ratio i.e. 4.57 and 4.81 was found to be with 75 ppm NAA during the year 2011 and 2012, respectively. However among the nutrient foliar application, $FeSO_4$ @4000 ppm was found more economical with maximum average gross income i.e. 175980.00 and 184640.00 Rs./ha, net return i.e. 139629.00 and 147657.00 Rs./ha and cost: benefit ratio i.e. 3.84 and 3.99 over all other nutrient treatments. While minimum cost of cultivation was estimated under control treatment.

APPROACHES AND POSSIBILITIES OF ORGANIC FARMING FOR SUSTAINABLE AGRICULTURE IN INDIA

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Green revolution in India has undoubtedly changed the scenario of food grain production. The food grain production in India has been doubled during post Green Revolution era with virtually no increase in the net cultivated area. This marvelous achievement in agriculture production was mainly due to the increased use of inputs like fertilizers, insecticides, pesticides and farm machinery. As time went, extensive dependence on chemical farming has shown its darker side. The soil is losing its fertility and is demanding larger quantities of input materials. Pests are becoming resistant due to frequent sprays and resulting residues much which are above the safety levels and this brought to the attention of modern agriculture and paved the way for organic farming in India. Present paper discusses the need for organic farming in India in the light of the experiences of other countries and analyses the factors and constraints in introduction of organic farming in India.Present study is based on secondary data sources. Information from literature on the historical evolution of the organic farming and the progress it has made both in India and abroad collected from the published sources like from the websites. International Federation of Organic Farming Movements (IFOAM), FIBL/FOAM survey, books and periodicals and newspaper reports is liberally used for the preparation of the article.

PRELIMINAR PHYTOCHEMICAL INVESTIGATION OF OCIMUM *KILIMANDSCHARICUM* GUERKE (Lamiaceae)

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Kapurtulsi is the local name *of Ocimumkilimandscharicum* belongs to family lamiaceaeis an important aromatic medicinal plant. It is used in indigestion, as anti-inflammatory &as analgesic (cure ears pain). In Indian system of medicine (Ayurveda) *Ocimumkilimandscharicum*(Kapurtulsi) have been used as an anti inflammatory, indigestion, insecticidal, mosquito repellent. Whole plant is used as spasmolytic & antibacterial purpose. The preliminary Phytochemical studiest shows presence of secondary

metabolites compounds like alkaloids, saponins, phenols & tannins in addition to this dermatological features & leaf- architectural features were studied which imparts medicinal value to the plant

Keywords*:* Secondary metabolites, *Ocimum* and *Lamiaceae*.

ENHANCED YIELD PARAMETER AND PLANT GROWTH IN MUNG BEAN (*Vigna radiata* L.WILCZEK)" TREATED WITH PLANT GROWTH REGULATING CHEMICALS

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A field trial was conducted during *Zaid* 2011 at the Students Instructional Farm (SIF), Narendra Deva University of Agriculture and Technology, Kumarganj, Faizabad (U.P.). The experimental design was laid out in factorial randomized block design which consists of two varieties, NDM-1 and Sammrat with seven treatments ofplant growth regulating chemicals in three replication. The results revealed that the application of KNap (1500 ppm) recorded highest plant height (63.70 cm), and cycocel (1000 ppm) crop growth rate (0.200 mg cm^{-2} day^{-1}), relative growth rate (0.059 mg g^{-1} day^{-1}). There was a decrease in plant height (43.74) with cycocel 1500 ppm. Narendra Mung-1 recorded highest yield components *i.e.*, number of pods cluster $plant^{-1}$ (9.63), number of pod $plant^{-1}$ (54), number of pod $cluster^{-1}$ (6.1), number of seed $plant^{-1}$ (413.47), seed yield $plant^{-1}$ (8.68 g), with the application of cycocel (1000 ppm) and number of seed pod^{-1} (12.80) and highest pod length (7.82 cm) recorded with the application of Knap (1500 ppm) over Sammrat.

Keywords:Mungbean, cycocel, potassium naphthenate (KNap), growth and yield parameter.

STUDIES ON SYNTHETIC, MAGNETIC, SPECTRAL AND ANTIMICROBIAL ACTIVITY OF BIOLOGICALLY POTENT MANGANESE (II) COMPLEXES

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The synthesis,spectroscopic characterization and antimicrobial activities of some unsymmetrical manganese(II) complexes of thioazomethines including benzothiazolines having NS donor set have been decribed. The 1:1:1 reactions of hydrated manganese chloride with monobasic bidentateazomethines resulted in the formation of coloured solids which have been characterized by elemental analysis, molecular weight determination, conductance and magnetic measures. The infrared, electronic and elctron spin resonance spectral studies indicated tetrahedral geometry for the resulting complexes. These thio ligands along with their complexes have been screened in vitro against a number of pathogenic fungi and bacteri to assess their growth inhibiting potential.

Keywords: Synthesis, Spectral properties, Antimicrobial activities,Manganese (II) complexes

IDENTIFICATION OF MEDIA FOR ENHANCING THE VASE LIFE OF CUT ANTHURIUM (*Anthurium andreanum*LINDEN)

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Anthurium is an appreciated species used for cut flower with their brilliant glossy spathe and slander spadix and they are classical tropical flowers. The investigation made on the effect of coconut water along with Listerine (antiseptic mouthwash) on vase life of Anthurium flower (cv. Tropical) were used in the study. Freshly cut flowers of Anthurium were collected and used in the experiment with the 11 treatments for vase life in the Laboratory. The flowers were treated with 10%,20%,30%,40%,50%,60%,70%,80%,90% and 100% coconut water and 5% sucrose with pH 3.5 by adding citric acid in each treatment and 100% distilled water as control respectively. All the treatments contained 0.2% Listerine as an antiseptic agent. The

slantcut flowers were dipped into each treatment with three replications and cover the mouth of conical flask with cotton plug.The vase life of flowers were assessed in two days interval. The flowers treated with 60% coconut water and 0.2% Listerine was observed longest vase life up to 22 days. Therefore, the treatment-7was found more suitable medium for vase life as compared to other treatments.

Keywords:Anthurium, coconut, sucrose and Listerine.

PERFORMANCE OF VARIOUS FUNGICIDES AGAINST *Rhizoctoniasolani*CAUSING SHEATH BLIGHT IN BASMATI RICE

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Rice (*Oryzasativa*L.) one of the staple food crops of 60% of world's population, suffers from different kinds of diseases caused by fungi.Sheath blight of rice is potentially a serious fungal disease caused by *Rhizoctoniasolani*Kuhn. The potential losses due to sheath blight alone in India has been up to 51.3%.Efficacy of some new fungicides namely trifloxystrobin + tebuconazole (Nativo 75 WG), tebuconazole (Folicur 25 EC), propiconazole (Tilt 25 EC), pencycuron (Monceren 250SC) and thifluzamide (Spencer 24SC) were evaluated against sheath blight (*Rhizoctoniasolani*) field conditions. Trifloxystrobin + tebuconazole @ 0.04% was found to be the most effective fungicide and next best fungicide observed was tebuconazole (Folicur 25 EC) @ 0.1%, effective against sheath blight. It was followed by propiconazole (Tilt 25 EC) @ 0.1%. Fungicide pencycuron (Monceren 250SC) was equally effective against sheath blight. Fungicides viz. trifloxystrobin + tebuconazole, tebuconazole, and propiconazole showed higher level against *R. solani*

POPULATION FLUCTUATION OF MUSTARD APHID *Lipaphis erysimi*(KALT.) IN WESTERN U.P.

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Present investigation entitled " Efficacy of bio-pesticides and novel insecticides against mustard aphid, *Lipaphis erysimi* (Kalt.) and their effect on natural enemies in western U.P. " the field experiment was conducted in the year i.e. " *Rabi* 2015-16 " at crop research centre (CRC), Sardar Vallabhbhai Patel University of Agriculture and Technology, Meerut - 250110 (U.P.), India.Population of *L. erysimi* appeared in last week of December i.e. 51st standard week and continued till last week of March i.e. 13th standard week. The pest populations recorded as number of aphids per 10 cm main apical shoot. The aphid population was low during the 51th standard week of the December to 3st week of January which varied between 2.50 to 7.50 aphids. The pest population increased from third week of January and reached its peak during 7th standard week i.e. third week of February. During this period the weather parameters like mean temperature and relative humidity ranged from 12.10 ^{0}C to 16.20 ^{0}C and 80.2 to 71.70 per cent, respectively. The pest population declined thereafter and varied from 18.50 to 65.25 aphids/10cm main apical shoot. During this period mean temperature and relative humidity ranged from 12.10^{0}C to 16.20^{0}C and 81.20 to 71.70 per cent, respectively. The population of aphids suddenly decreased in the last week of March (12th standard week) and last week of March (13th standard week).

EFFICACY OF BIO-PESTICIDES AND NOVEL INSECTICIDES AGAINST MUSTARD APHID *Lipaphis erysimi*(KALT.) AND THEIR EFFECT ON NATURAL ENEMIES IN WESTERN U.P.

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Present investigation entitled " Efficacy of bio-pesticides and novel insecticides against mustard aphid, *Lipaphis erysimi* (Kalt.) and their effect on natural enemies in western U.P. " the field experiment was conducted in the year i.e. " *Rabi* 2015-16 " at crop research centre (CRC), Sardar Vallabhbhai Patel University of Agriculture and Technology, Meerut - 250110 (U.P.), India.Different insecticides against *L. erysimi* revealed that all the insecticides were significantly effective in reducing the population of aphids and thus increasing the yield than control, higher yield ranging between 15.55 to 18.15 q/ha and were proved significantly superior over control (14.17 q/ha). The highest seed yield of 18.15 q/ha was obtained from the

imidacloprid 17.8 %SL @ 20 ml a.i/ha treated plot and it was significantly superior over rest of the treatments. Cost benefit ratio from the table that imidacloprid 17.8 %SL @ 20 ml a.i/ha ranked first indicating the maximum return Rs 1: 9.55 per rupee invested followed by dimethoate 30 %EC @ 300 ml a.i/ha, Thiamethoxam 25 % WDG @ 25 g a. i ha. The effect of various insecticides on coccinellid population showed that imidacloprid 17.8% SL @ 150 ml/ha was found most safer followed by thiamethoxam 25% WDG @100 g/ha. From the present study it may be concluded that the seasonal incidence of *L. erysimi* was influenced by one or more abiotic factors and crop stage. For the control of *L. erysimi* newer insecticides were found more effective as compared to conventional insecticides and botanical insecticide. These newer insecticides not only effective in reducing the population of aphids but also proved safer to natural enemies (coccinellid) population and help to maintain the ecosystem.

PLANT GROWTH PROMOTING ENDOPHYTIC BACTERIA FROM *Zyzypus mauritiana*

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Plant growth-promoting bacteria are bacteria that can enhance plant growth and protect plants from disease and abiotic stresses through a wide variety of mechanisms; those that establish close associations with plants, such as the endophytes, could be more successful in plant growth promotion. Bacteria on roots and in the rhizosphere benefit from root exudates, but some bacteria and fungi are capable of entering the plant as endophytes that do not cause harm and could establish a mutualistic association. This study was conducted with a view to isolate bacteria associated with the roots and leaves of *Zyzypus muritiana* and to assess their functional potentialities in relation to plant growth promoting activities. Eighteen bacterial isolates were obtained from surface sterilized healthy roots and leaves of the plant. The isolates were tested for morphological and biochemical characteristics. The results of in vitro assays showed that all isolates can produce IAA, solubilize rock phosphate. These isolates having abilities for IAA production and phosphate solubilization were tested as bioinoculant to *Z. muritiana* roots.

Keywords:Endophytic bacteria, Bioinoculant, Rhizosphere, *Zyzypus muritiana*

POLYCYCLIC AROMATIC HYDROCARBON AND ITS IMPACT ON AGRICULTURAL SECTOR

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Polycyclic Aromatic Hydrocarbon orPolyarenesinirrigation water is originated from pyrolitic and petrogenic sources. It sticks to solid sediments and are ubiquitous including soil, water and air. PAHs are those compounds consisting of only carbon and hydrogen atoms. PAHs constitute extraordinary large and diverse class of organic molecules and are consist of fused conjugated aromatic rings. PAHs forms wide and varied group of compounds. It has complex structure, high melting and boiling points, highly lipophilic, light sensitive and heat resistant. Sources of PAHs are generally natural and anthopogenic. These compounds are one of the most widespread organic environmental pollutants. Agriculture is the single largest user of fresh water resource and is a major cause of degradation of surface and groundwater resource. In India, the Irrigation sector uses 85 percent of its available water resources. Sometimes recycled waste water is used for agricultural practices, which contains several pollutants, dangerous for food security such as Polycyclic Aromatic Hydrocarbon or PAHs. Recycled water used for irrigation shows that the concentration of PAHs was more in the upper layer of the soil profile as compared to the deeper layer. The aim of the present study is to observe the PAHs in the irrigation water and to suggest several remediation techniques, which are efficient and cost effective in removing PAHs from the agricultural water, because many PAHs have toxic, mutagenic and carcinogenic properties. The removal technology of PAHs from irrigation waters can be done through the methods of Gasification, Carbonization and Cogeneration. They serve as an alternative technology for power generation.

PPP IN AGRICULTURE IN INDIA: PRESENT STATUS AND CHALLENGES

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Over the past 60 years, Indian agriculture has recorded an average growth rate of 2.7% per year, making it the slowest growing sector. That we have not yet succeeded in consistently touching 4% growth as targeted in the recent Five-Year Plans indicates the

challenges we face in agriculture. Thus agriculture is a key sector for research, investment and development. In the present scenario, the challenge for the country is to make agriculture and allied sectors more profitable, and to ensure that rural population has a larger income to share. The emphasis should be on productivity, quality, diversification, sustainability, promotion of innovations and exports. So the need for new technologies with potential to provide holistic solutions, and the issues that relate to their dissemination and commercialization. Which cannot be done by government efforts only so the involvement of private organization also needed. There is a scope to leverage PPPs as a relevant vehicle in the agriculture sector. Enhanced yield and productivity is a crucial need, with India still battling food insecurity and poverty. Technology, better inputs and improved farming practices can make this possible. Thus agriculture is a key sector for research, investment and development. There is an urgent need to work together to bring innovations via partnerships between the private and public sector, farmers and government to meet India's agriculture needs through new technology and intervention models.There is a need to introduce appropriate technologies and create suitable institutions and infrastructure to promote a shift to high-value added crops. There are emerging opportunities for traditional and high value crops that offer potential to raise rural incomes. This review paper will be an in-depth analysis of present status of PPP projects in the field of agriculture, their achievements and also the challenges in front of PPP model to accelerate the growth of this sector.

CORRELATION AND PATH ANALYSIS FOR YIELD AND ITS COMPONENTS IN WHEAT

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Wheat (*Triticum aestivum* L.) is an important cereal crop of cool climates, and plays a key role in the food and nutritional security of India. In India, 86 per cent of the cultivated area under wheat represents hexaploid spring type belonging to *Triticum aestivum* more commonly called bread wheat. Wheat is widely grown the world-over and stands first among the cereals both in area and production. This study was aimed to characterize yield components and plant traits related to grain yield. Correlation and path analysis were carried out in wheat genotypes grown at the farm, of B.N.P.G. College, Rath (Hamirpur) UP, during *Rabi* season of 2012- 13. In the path coefficient analysis, grain yield represented the dependent. The phenotypic correlation coefficient was highly significant and positive for yield per plant with 100 seed weight and number of seed per ear, number of tiller per plant. The number of tiller per plant showed highly significant positive correlation with number of ear per plant (0.925). Path coefficient analysis revealed the maximum positive direct effect exhibited length of ear followed by 100 seed weight, number of seed per ear, no. of ears per plant, no. of tillers per plant had positive direct effect on yield whereas, days to flower, number of spikelet days to maturity had negative direct effect on yield. Thus, Path analysis suggest that 100 seed weight, length of ear, number of seed per ear, number of tiller per plant may serve as effective selection attributes during breeding program for yield improvement in wheat. Yield per plant had high positive and significant correlation with number of tillers per plant, number of seed per ear and test weight (g). Path coefficient analysis revealed maximum direct contribution towards yield per plant with length of ear followed by test weight (g). Hence, emphasis should be given to select these traits to increase the production and productivity of wheat.

Keyword: Correlation, path coefficient, yield characters, wheat (*Triticum aestivum* L.).

SUITABLE EXTESIONON STRATEGY FOR PROMOTION OF QUALITYPOTATO PRODUCTION IN HAPUR DISTRICT OF UTTAR PRADESH

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On the basis of the finding of the present study the following suggestions may be made to increase knowledge and adoption level of potato growers for production of quality potato in the study area. Keeping the observations and analysis of collected data in mind it becomes the necessary to develop some extension strategy for the promotion of quality potato production. In this direction an attempt was made by the investigator to systematically prepare a schedule of information which can be given to farmers through various extension agency teaching aids. Create knowledge and awareness about improved potato production technology to the potato growers through trainings, meetings, demonstrations and media exposure on different aspects of potato production in the

study area.Government should install government tube wells in every village and irrigation water should be provided at reasonable rates to the farmers.Crop insurance against all calamities, incidence of insect-pests and disease etc.Should be introduced at nominal premium.Plant protection chemicals and fertilizers should be made available within easy reach, convenient pack and at cheaper prices.Government zonel research stations, SAUs, KVKs, NGOs and timely training to the potato growers on the all aspects of potato production technology.Conducted trainings and demonstration programmes for the identification of harmful and beneficial insects-pests in study area for potato growers. Govt. should provide sufficient facilities and tools of technology for field study and e-choupal for quick transfer of improved potato production technology for potato growers.Local storage facilities should be created by the government so that the farmers can store their product at nominal charges.Increase numbers of information / training centres / potato research unit for sufficient quality potato production and quick transfer of potato production information technology in the study area.

BIO EFFICACY EVALUATION OF PYMETROZINE 50% WG AGAINST INSECT PESTS OF PADDY

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The present field experiment was conducted in randomized block design with three replications of seven treatments and crop season of the year i.e. " *Rabi* 2014-15 " at entomological research block of crop research centre, Sardar Vallabhbhai Patel University of Agriculture and Technology, Meerut - 250110 (U.P.), Paddy is one of the important *kharif* crops in western Uttar Pradesh, is transplanted during the months of June-July and harvested during the months of October/November. In the present study bio- efficacy of Pymetrozine 50% WG (a newly introduced insecticide) manufactured by M/s GSP Crop Science Pvt. Ltd., Ahmedabad, was evaluated for the control of Brown plant hopper (BPH), Green leaf hopper (GLH) and White backed plant hoper (WBPH) in paddy. The evaluation of the product for phytotoxicity to the crop, if any, and adverse effect on the natural enemies associated with the crop ecosystem was also carried out. The results of the experiment showed that Pymetrozine 50% WG (GSP sample) @ 300 and 400 g/ha and Pymetrozine 50% WG (Market sample) @ 300 g/ha effectively controlled BPH, GLH and WBPH pests followed by Imidacloprid 17.8% SL @ 125 ml/ha and Fipronil 5% SC @ 1500 ml/ha. No phytotoxicity symptoms on paddy crop and no adverse effect on natural enemies were recorded due to application of treatments. Since Pymetrozine 50% WG @ 300 g/ha was equally effective to 400 g/ha dose, it is suggested to use the product @ 300 g/ha control BPH, WBPH and GLH in paddy crop as there will be no advantage to use the product at higher dose.

ECO-FRIENDLY STRATEGIES FOR THE MANAGEMENT OF RICE LEAF FOLDER *Cnaphalocrosis medinalis*AND STEM BORER *Scirpophaga incertulus*

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The investigation on "Eco-friendly strategies for the management of rice leaf folder *Cnaphalocrosis medinalis* and stem borer *Scirpophaga incertulus*. " during 2014-15 at CRC, Chirori farm SVPUA&T., Meerut. All the treatments were significantly effective in reducing the infestation of rice yellow stem borer (YSB) and thus increasing the yield significantly as compared to the control. In treated plots all the bio pesticide, bio agent and novel insecticides formulations were effective to reducing in the rice crop, yellow stem borer and Leaf folder, significantly infestation in compared to control. The maximum yield and minimum infestation was noted in treatments. Significantly variation in consideration of the incidence of dead heart, white ear head and leaf folder in all treatments was noted minimum in T_6 Check (Catap hydrochloride 4 G 20 kg /ha)+ 1 spray of catap hydrochloride 50 SP 2g /lit + Profenophos 50 EC @ 1.0 lit/ha(2.3 DH, 2.6 EH & 1.5 LF) and the maximum was being noted in T_1 (6.3 DH,6.9 WH & 5.1 LF), against compared to control T_7 (18.5 DH, 12.56 EH & 9.2 LF). However T_5 *T.chilonis* 1.0-1.5 lakh /ha(4 released) +1 spray of NSKE.+ 1 spray of Imidacloprid 25 ml/ha +1 spray of *M. anisopliae.*(3.1 DH, 3.3 WH & 2.1 LF) Followed by T_5*T.chilonis* 1.0-1.5 lakh /ha(4 released) +1 spray of NSKE.+ 1 spray of Imidacloprid 25 ml/ha +1 spray of *M. anisopliae.* (44.56),T_4 *T.chilonis* 1.0-1.5 lakh /ha(4 released) +1 spray of NSKE.+ 1 spray of Indoxacarb+1 spray of *B. bassiana.* (4.2 DH, 4.5 DH & 3.2 EH), T_2 *T.chilonis* 1.0-1.5 lakh /ha (4 released) +*Metarrhizum anisopliae* @ 5.0 Kg/ha (4.6 DH, 5.0 DH & 3.6 EH),T_3 *T.chilonis* 1.0-1.5 lakh /ha (4 released) +*Beauveria bassiana* @ 5.0 kg. /ha (5.1 DH, 6.1 DH & 4.2 EH),T_1 *T.chilonis* 1.0-1.5 lakh /ha(4 released) (6.3 DH, 6.9 DH & 5.1 EH), varied in significantly in consideration of Dead heart white ear head and leaf folder incidence respectively.The significantly highest grain yield 44.56 q/ha was recorded in treatment of T_6, Check (Catap hydrochloride 4 G 20 kg /ha)+ 1 spray of catap hydrochloride 50 SP 2g /lit + Profenophos 50 EC @ 1.0 lit/ha followed by T_5*T.chilonis* 1.0-1.5 lakh /ha(4 released) +1 spray of NSKE.+ 1 spray of Imidacloprid 25 ml/ha +1 spray of *M. anisopliae.* (44.56), T_4 *T.chilonis* 1.0-1.5 lakh /ha(4 released) +1

spray of NSKE.+ 1 spray of Indoxacarb+1 spray of *B. bassiana.* (44.35 q/ha), T_2*T.chilonis* 1.0-1.5 lakh /ha (4 released) +*Metarrhizum anisopliae* @ 5.0 Kg/ha (38.76 q/ha),(42.85 q/ha) T_3 *T.chilonis* 1.0-1.5 lakh /ha (4 released) +*Beauveria bassiana* @ 5.0 kg. /ha (37.71), T_1 *T.chilonis* 1.0-1.5 lakh /ha(4 released) (36.45 and T_7 (28.75 q/ha), against compared to control

EFFICACY OF DIFFERENT NOVEL INSECTICIDES AND BIO-PESTICIDES AGAINST STEM BORER *Scirpophaga incertulus* (WALKER) ON RICE

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The investigation on "Efficacy of different novel insecticides and bio-pesticides against stem borer *Scirpophaga incertulus* (Walker) on rice" during 2014-15 at CRC, Chirori farm SVPUA&T., Meerut. All the treatments were significantly effective in reducing the infestation of rice yellow stem borer (YSB) and thus increasing the yield significantly as compared to the control. In treated plots, the yellow stem borer infestation recorded as dead hearts and white ears ranged from 1.7 to 5.5 as against 5.5 per cent in control, after 21 days of first application, and after that second application of 21 days, ranged from 1.99 to 7.50 per cent as against 11.83 per cent in control, respectively. fipronil 0.3 GR @ 25 kg/ha was found to be most effective treatment against yellow stem borer followed by cartap hydrochloride 50 SP @ 1kg/ha > imidacloprid 17.8 SL @ 200 ml/ha > Neemarin 1500 ppm @ 2.0 lit/ha > chlorpyriphos 20 EC @ 2.0 Lit/ha and *Trichogramm japonicum* 1.0 lakh/ha , 3, 7, 14 and 21 days after each application, respectively. Although, statistical analyses showed significant difference among various treatments but control had significantly high (11.83 %) dead heart / white ears than in treated plots, after 21 days of second spray. It gave clear message that chemical insecticides including bio-pesticides suppressed the population of yellow stem borer. **Economics of treatments:** All the treatments were recorded significantly higher yield than untreated control (31.75 q/ha). The results of paddy yield depicted in table 2, showed that the plots treated with fipronil 0.3 GR @ 25 kg/ha gave the highest yield (45.56 q/ha), followed by cartap hydrochloride 50 SP @ 1kg/ha (43.01 q/ha), and imidacloprid 17.8 SL @ 200 ml/ha (42.35) In terms of economics the higher net return was obtained with the treatment of fipronil 0.3 GR @ 25 kg/ha followed by cartap hydrochloride 50 SP (6.03) and imidacloprid 17.8 SL @ 250 ml/ha (5.48) The average increase in paddy yield over the control ranged from 5.01 to 11.26 q/ha under different treatments. The results revealed that the plots treated with fipronil 0.3 GR @ 25 kg/ha 5SC had the lowest dead hearts / white ears damage maximum paddy yield, and also gave maximum net return. Hence, the farmer of this zone could apply fipronil 0.3 GR @ 25 kg/ha along with alternate of cartap hydrochloride 50 SP @ 1kg/ha (45.56 q/ha), chlorpyriphos 20 EC and *Trichogramm japonicum* 1.0 lakh/ha for the effective management of YSB in rice crop.

RESPONSE OF WHEAT (*Triticumaestivum*L.) CULTIVARS TO DIFFERENT DATE OF SOWING

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India is the second largest wheat producing country in the world after China occupying an area of about 29.25 m ha and produces 94.9 mt grains with an average productivity of 29.89 q/ha . In India, U.P. having first place in production (30.29 mt) and area (9.73 m ha).Date of planting and varieties play an important role in productivity of wheat. Late sown wheat is exposed to both the extreme of temperature i.e low temperature during early growth period, which restrict the vegetative phase and high temperature during and post anthesis period, which reduce the duration of grain development consequently the grain yield. Drastic reduction in yield of wheat has been recorded with the delay of sowing beyond optimum time. It has been estimated that delay in sowing of wheat beyond 15 Dec, resulted in yield reduction of 50 kg grain/day/ha. The results from field experiments clearly indicated that 15 Nov sowing found better regarding yield.

EFFECT OF DIFFERENT ROW RATIO ON YIELD AND ECONOMICS IN INTERCROPPING WITH CITRONELLA (*Cymbopogon winterianus*)

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The present experiment entitled was conducted during *kharif* and *rabi* season, 2011-12 at students Instructional Farm (SIF), C.S. Azad University of Agriculture and Technology, Kanpur with an object to find out suitable and economical combination of *kharif*

and *Rabi* intercrops with Citronella (*Cymbopogon winterianus*).The experiment was laid out in Randomized Block Design with 13 cropping systems with different combination [Sole Citronella, Sole Pigeonpea, Sole Maize, Sole Mustard, Citronella + Pigeonpea (1:1), Citronella + Pigeonpea (2:1), Citronella + Pigeonpea (2:2), Citronella + Maize (1:1), Citronella + Maize (2:1), Citronella + Maize (2:2), Citronella + Mustard (1:2), Citronella + Mustard (2:2) and Citronella + Mustard (2:4)], each replicated thrice. The soil of experimental field was slightly alkaline with 8.12 pH and 0.21 EC. And low Organic Carbon, N and medium in P & k acceptable. The Citronella sole cropping system gave significantly the highest Citronella equivalent oil yield than other cropping systems. in the study of *Kharif* season crop all the row ratio 1:1, 2:1 and 2:2 of Citronella + Pigeonpea treatment proved significantly better over Citronella +Maize cropping systems. Among the Citronella + Pigeonpea row ratio combination 2:1row ratio found significantly better that the 1:1and 2:2 row ratio. Among the Citronella +Maize treatments, 2:1 row ratio proved significant better than 1:1 and 2:2 row ratio Citronella +Maize cropping systems. In Rabi season, 2:2 row ratios were significantly better over 1:2 and 2:4 row ratio Citronella + Mustard cropping systems. Citronella Sole brought about 49.29 (225.61%), 72.42 (42.77%), 75.36 (45.29%), 117.21 (94.12%), .18 (129.0%), 136.69 (130.11%), 160.66(198.14%) 1162.70 (205.84%), 166.16 (219.84%), 167.18 (224.22%), 180.57 (295.19%) and 194.32 (49.78%) kg/ha higher Citronella equivalent oil yield than Citronella + Pigeonpea (2:1), Citronella + Pigeonpea (1:1), Citronella + Pigeonpea (2:2), Citronella + Maize (2:1), Citronella + Maize (1:1), Citronella + Maize (2:2), Pigeonpea Sole, Citronella + Mustard (2:2), Citronella + Mustard (1:2), Citronella + Mustard (2:4), Mustard sole and Maize sole, respectively.

Keyword:Organic Carbon, Citronella, Pigeonpea, Maize, Mustard, Intercropping.

EFFECT OF NITROGEN SOURCES AND ZINC LEVELS ON DRY MATTER PRODUCTION AND NUTRIENT UPTAKE IN WHEAT (*Triticum aestivum* L.)

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Dry matter accumulation & relative uptake of Nitrogen and Zinc at successive growth stages of wheat variety PBW 502 were evaluated at three levels of zinc (0,20& 40kg $ZnSo_4$/ha) and three sources of nitrogen(ammonium sulphate, Urea and ammonium chloride)through pot experiments conducted at the Experimental farm of Krishi Vigyan Kendra, Chandauli, N.D.University of Agriculture & Technology,Kumarganj,Faizabad(U.P)224229 over a period of two years i.e. 2011-12 & 2012-13.
Dry matter accumulation & relative uptake of Nitrogen and Zinc increase with age of crop plant. Nitrogen results were absolute and independent of sources. Highest uptake of N & Zn were recorded with ammonium sulphate among the sources of nitrogen and 20kg $ZnSo_4$/ha in case of zinc levels. Interactions were not found significant.

Keywords:Wheat variety, Nitrogen, Zinc, Nutrient uptake

SCLEROTINIA STEM ROT OF LENTILS

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Sclerotinia sclerotiorum is a pathogen that causes White Mold disease in plants. It is cosmopolitan and one of the most devastating pathogen which attacks in almost all stages of plant. Plants susceptible to this pathogen encompass 64 families, 225 genera, and 361 species (Purdy, 1979). *S. sclerotiorum* on lentil causes stem rot because the rotted, watery area that develops on stem portion of lentil plant is usually whitish in color, most obvious and typical early symptom of disease is appearance of large, compact and white fluffy mycelium growth distinguished sclerotia on infected plant. The disease occurS in cool and moist areas, but now also reported in hot and dry areas. The fungus can survive on infected tissues, in the soil, and on living plants. White mold can spread quickly in the field from plant to plant. It can also spread in a storage facility throughout the harvested crop. During cool and humid soil condition sclerotium directly produces mycelia whereas under favorable condition ascospores are produced, for most diseases caused by *S. sclerotiorum*, ascospores produced through carpogenic germination are the primary source of inoculum (Huang *et al*., 2006). This is air borne disease and may also spread by irrigation. Mycelium from sclerotia causes infection within an area. So for management of the disease cultural practices such as crop density and population adjustment, irrigation etc can be the better options to manage the disease. *Coniothirum minitans* and *Trichoderma sp.* act as outstanding biological control agent some chemicals such as Thiophanate Methyl and Benomyl can also be used to reduce the infestation of this disease (Everts and Zhou, 2007).

A STUDY OF FUNGAL SPORE POPULATIONS IN THE ATMOSPHERE AT HAPUR

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The aim of the study was to determine seasonal variation in concentration of selected fungal spora. The fungal air spore of Hapur was investigated using petri-dish trapping technique. During the period from 1 January 2009 to 31 December 2009.The maximum number of fungi were observed in winter season .During summer *Alternaria aternata,Alternaria longipes* had maximum 51-75% frequencies. During rainy season one *Curvularia Lunnata* had maximum 51-75% Frequencies. While during winter *Aspergillus niger* and *Cladosporium cladosporioides* had maximum 76-100% Frequencies. The monthly total number of fungi showed marked seasonal periodicity with the greatest number of 26 genera occurring in winter season 19 genera in summer and 18 genera in rainy. Only 52 species of fungi were reported from incubation at 45 Degree calcious.

Keywords: Air-spora, Petri-dish ,*Alternaria alternata*, *Aspergillus niger*, Periodicity.

EFFECT OF HOST NUTRITION ON PLANT DISEASE DEVELOPMENT

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Nutrients are essential for the growth and development of plants and microorganisms, and are important factors of host-pathogen interaction. Each nutrient affects a plant's response to disease, whether positively or negatively, is unique to each plant-disease complex. Plant nutrients may affect disease susceptibility through plant metabolic changes, thereby creating a more favorable environment for disease development. When a pathogen infects a plant, it alters the plant's physiology, especially with regard to mineral nutrient uptake, assimilation, translocation, and utilization. Pathogens may immobilize nutrients in the soil or in infected tissues. They may also interfere with translocation or utilization of nutrients, inducing nutrient deficiencies or toxicity still other pathogens may themselves utilize nutrients, reducing their availability to the plant and thereby increasing the plant's susceptibility to infection. Soil borne pathogens commonly infect plant roots, reducing the plant's ability to absorb water and nutrients. The resulting deficiencies may lead to secondary infections by other pathogens. Plant diseases can also infect the plant's vascular system and impair nutrient or water translocation. Such infections can cause root starvation, wilting, and plant decline or death. In addition to carbon (C), hydrogen (H), and oxygen (O), which plants take up through the fixation of carbon dioxide (CO_2) through photosynthesis and water (H_2O) uptake through roots, there are 13 mineral nutrients that are essentialfor normal plant growth and development. Mineral nutrition also influences growth and yield by affecting plant resistance or susceptibility to pathogens and pests. In order to complement disease and pest control methods, it is helpful to know how mineral nutrients affect disease resistance in plants. Plants with an optimal nutritional status have the high level of resistance to pests and diseases. Susceptibility increases as nutrient concentrations deviate from this optimum level. The goal is to recognize the effect of host nutrition on plant disease development by mineral nutrition and fertilizer applications.

PHYTOL- CHEMICAL CONSTITUENT OF *LEONOTIS NEPETAEFOLIA* THROUGH TLC AND HPTLC

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The aim of this study was to evaluate phytochemical constituent of *Leonotis nepetaefolia*. The plant extract is obtained by soxhlet extraction method by using ethanol as solvent. Phytochemical analysis was performed on plant extract to detect the presence of phytoconstituents and comparison is done by using HPTLC. Phytochemical screening revealed the presence of phenolics, alkaloids, tannins, terpenoid in *Leonotis nepetaefolia*. HPTLC fingerprinting shows presence of quarcetin in *Leonotis nepetaefolia*. The HPTLC is also suitable for rapid and simple authentication.

Keywords:HPTLC, TLC, *Leonotis nepetaefolia*

EFFECT OF AGRICULTURAL BASED SUGARCANE INDUSTRY ON KNOWLEDGE AND ADOPTION EXTENT OF FARMERS IN DISTRICT SITAPUR (U.P.)

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The study was conducted in Maholi block of Sitapur district (U.P.) selected purposively. A total number of 100 respondents were selected through random sampling from 10 sample villages on the basis of majority of sugarcane grower. The structured schedule was developed keeping in view the objectives & variables under study. The respondents were contacted personally for data collection. The percentage, mean, standard deviation, correlation were used for calculation and drawing the inferences. The majority of the respondents 70% were found in medium categories (40-62) of age group, like this 80 % literate, 99% married, 58% other backward cast, 96% Hindu religion, 64% nuclear family, 65% medium family size (5-9 members), 42% small land holding size (1-2 ha.), 87% pucca houses, 87% agriculture main & 31% subsidiary occupation, 45% annual income (120001-180000), 98% sugarcane society participate, 62% overall material possession (37-67 equipment), gram pradhan I ranked formal sources, family member I ranked informal sources, mobiles I ranked mass media, 65% medium (23-25) economic motivation, 66% medium (21-23) risk orientation, 100% knowledge of field preparation & I ranked, 92% rationing in adoption of respondents & I ranked, 82% scientific knowledge about given by sugar industry for motivation sugarcane cultivation & I ranked, respectively majority of respondents. Variables like education were highly significant & positively correlated with knowledge extent of sugarcane crop. In adoption, supporting of sugar industry was highly significant and positively correlated. Variable like supporting of sugar industry motivate farmers for sugarcane cultivation in adoption was highly significant and positively correlated.Major constraints in adoption of sugarcane cultivation, "lack of scientific cultivation for the sugarcane crop.Most of the suggestive measures, scientific knowledge of sugarcane cultivation suggested by sugar industry of the respondents respectively.

Keywords: Knowledge, Adoption, suggestion

SOIL EROSION AND SUSTAINABLE AGRICULTURAL

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Data drawn from a global compilation of studies quantitatively confirm the long-articulated contention that erosion rates from conventionally plowed agricultural fields average 1–2 orders of magnitude greater than rates of soil production, erosion under native vegetation, and long-term geological erosion. The general equivalence of the latter indicates that, considered globally, hillslope soil production and erosion evolve to balance geologic and climate forcing, whereas conventional plow-based agriculture increases erosion rates enough to prove unsustainable. In contrast to how net soil erosion rates in conventionally plowed fields can erode through a typical hillslope soil profile over time scales comparable to the longevity of major civilizations, no-till agriculture produces erosion rates much closer to soil production rates and therefore could provide a foundation for sustainable agriculture.

IMPORTANCE OF LEMON GRASS (*Cymbopogon citratus*) IN HERBAL AND AYURVEDIC MEDICINE

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Lemon grass (*Cymbopogon citratus*) is an easy to grow herb that is belongs to the grass family of Poaceae. The genus *Cymbopogon* comprises of 55 species of grass. It is a perennial and tufted grass that is commercially cultivated in Southeast Asia countries such as- Thailand, Malaysia and China. It requires warm, humid condition, full sunlight and plenty of moisture for grown correctly free of pests. It is a store house of essential nutrients that is vitamin A, B_1, B_2, B_3, B_5, B_6, C, folate. It is also provide essential minerals such as – K, Ca, Mg, P, Mn, Co, Fe, Zn. Lemongrass used as herbal medicine for gastrointestinal problems stomachaches, diarrhea,

gas, bowel, spasms, vomiting, fever, flu, headache. Lemongrass used in India as Ayurvedic medicine to treat fever and infectious illness. Lemongrass oil is also used as an insect and snake repellant, skin infection, effective on ringworm, in cosmetic fragrances. Not only the leaves and stalk but also the root of lemon grass is also used in liniment preparation. Lemongrass has natural antimicrobial, antiseptic and antitumor properties. Lemongrass is also used in tea preparation. After scientific study, it is effective against Antihyperlipidemic and Antihypercholesterolemic properties and in treating type II diabetes. In the present review we compile some properties of lemongrass.

STRAW BURNING: A THREAT TO SUSTAINABLE AGRICULTURE

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Straw burning especially of rice is a common practice for residue management and weed controlling Northen India. Crop residues are natural resources with enormous value to farmers. The intelligent management and utilization of it is essential for the improvement of soil quality and crop productivity. In India vast majority of land is used for farming and a wide range of crops are cultivated in its different agro-ecological regions. It is estimated that approximately 500-550 Mt of crop residues are produced per year in the country. These crop residues are used for animal feeding, soil mulching, composting, thatching for rural homes and fuel for domestic and industrial use. About 25% of nitrogen, 25% of Phosphorus, 50% of sulphur and 75% of potassium uptake by cereal crop are retained in residues making them valuable sources of nutrients. According to an estimation One ton of rice straw on burning releases about 3 kg particulate matter, 60 kg CO, 1460 kg CO_2, 199 kg ash and 2 kg SO_2 besides other light hydrocarbons, volatile organic compounds (VOCs) including polycyclic aromatic hydrocarbons (PAHs) are also emitted. Straw burning declines soil quality by removal of organic matter, loss in water holding capacity and soil micro flora and fauna. To manage the residues in a productive and profitable manner, conservation agriculture (CA) offers a good promise. With the adoption of conservation agriculture-based technologies these residues can be used for improving soil health, increasing crop productivity, reducing pollution and enhancing sustainability and resilience of agriculture. The resource conserving technologies (RCTs) involving no or minimum tillage, direct seeding, bed planting and crop diversification with innovations in residues management are the possible alternatives to the conventional energy and input-intensive agriculture. On the other hand situation demands that an appropriate policy should be evolved to promote multiple uses of crop residues in the context of conservation agriculture and to prevent their on-farm burning.

Keywords: straw burning, crop residues, soil quality, resource conservation technologies etc

EFFECT OF VARIOUS MOISTURE REGIMES AND NIPPING EFFECT ON CHICKPEA (*Cicer arietinum*L.)UNDER (INM) FOR NORMAL SOWN CONDITION

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A study on Chickpea crop was conducted during *Rabi* season of 2012 at Student Instructional Farm of the Chandra Shekhar Azad University of Agriculture and Technology, Kanpur. Eighteen treatments were tested in three-replicated Split Plot Design. The test variety of Chickpea "KPG-59" was sown on Nov. 18, 2012 at, using seed rate 100 kg/ha. The crop was harvested on April 13, 2013. The important results summarized here are concluded that the application of nipping increase the growth of all yields attributes and yield of chickpea. It increased grain yield by 20.43q/ha under irrigation + *Rhizobium* culture + PSB + RDF + nipping higher (T_{18}) than control (T_1). All the yield contributing characters and yield of chickpea proved better by irrigation + *Rhizobium* culture + PSB + RDF + nipping higher than control, respectively over all tested plot. The combination of irrigation + *Rhizobium* culture + RDF + nipping proved to the best as it maximized the net profit (Rs.65719.00/ha). The combination irrigation + *Rhizobium* culture + PSB + RDF + nipping which was slightly reduced in comparison to irrigation + *Rhizobium* culture + RDF + nipping (Rs. 63603.00/ha). From the study, it is inferred that there was significant improvement in the yield with combined application of irrigation + *Rhizobium* culture + PSB + RDF + nipping compare to other treatments. It is found advantageous and remunerative in increasing yield attributing characters, yield and economics of chickpea.

INTRODUCTION AND MANAGEMENT OF SUGARCANE SCALE INSECT *Melanaspis glomerata*GREEN

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Sugarcane (*Saccharum officinarum* L.) is the main source of sugar in India and holds a prominent position as a cash crop. Insect species infesting sugarcane are numerous and diverse with characteristically limited geographical distribution. Damage caused to sugarcane crop in terms of loss in yield and quality runs to millions of rupees annually. Of the sucking pests, scale insect *Melanaspis glomerata* (Green) (Order: Hemiptera, Family: Diaspididae) is of economic importance and is distributed throughout India. Infested canes become shrivelled, internodes shortened, juice content and quality drastically reduced.Infestation may affect both cane weight and cane quality.
Adult scales are greyish black, irregularly oval and slightly convex and protected by the waxy covering. Males are winged, but rarely seen. Freshly hatched crawlers are light yellowish. Nymphs and females remain attached to the cane, look like an encrustation, keep sucking the sap, and devitalize the cane. It thrives best between 24 and 34°C and at high relative humidities.
The extensive literature indicates that this insect continues to be a major pest of sugarcane in India and therefore needs to be effectively controlled. It has been shown that Neem Seed Kernak Extracts can influence nearly 200 species of insects. It is significant that some of these pests are resistant to pesticides, or are inherently difficult to control with conventional pesticides. Most neem products belong to the category of medium to broad spectrum pesticides, i.e. they are effective over a wide range of pests. Neem products work by intervening at several stages of the life of an insect. They may not kill the pest instantaneously but incapacitate it in several other way.

Keywords:Sugarcane (*Saccharum officinarum* L.), *Melanaspis glomerata* (Green) and Neem Seed Kernak Extracts (N.S.K.E.).

ASSESSMENT OF BOTH SOLID AND LIQUID MEDIA FOR MASS MULTIPLICATION OF ENTOMOPATHOGENIC FUNGI

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Entomopathogenic fungi are used worldwide as safe and efficient biocontrol agents against different agricultural pests.Entomopathogenic fungi occur naturally in orchard soil, vegetable field and infected insects. The entomopathogenic fungus is of commercial importance as an alternative to chemical insecticides in an agro-ecosystem. The success of microbial control of insect pests depends not only on the isolation, characterization and pathogenicity, but also on the successful mass production of the microbial agents in the laboratory. Several naturally available substrates of both solid and liquid media were tested for mass multiplication of *Metarizium anisopliae*. Among the different substrates evaluated highest 18.39×10^6 spore/ml was observed on Sabouraud dextrose borth which was significantly superior all othertestedsubstrates. Subsequent higher spore (15.04×10^6spore/ml) was recorded on potato dextrose broth, and Sugarcane bagasse medium counted least spore (2.86×10^6spore/ml) among all the substrates.

Keywords:Entomopathogenic fungi, *Metarizium anisopliae* and *In vitro*.

CLIMATIC CHANGES IN AGRICULTURE

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In 1966 the World Meteorological Organization (WMO) proposed the term climatic changes to encompass all form of climatic variability on time scales longer than 10 years, whether the causes was natural. Changes was a given and climatic was used as an adjective to describe the kind of changes i.e political or economic changes. When it was realized that human activities had a

potential to drastically alter the climate, the term climate changes replaced climatic changes as the dominant term to reflect an anthropogenic causes. Climatic changes was incorporated in the title of the intergovernmental panel on climatic changes, used as a noun became an issue rather than the technical description of changing weather. Climatic changes is a change in the statistical distribution of weather when that changes lasts for an extended period of time i.e., decades to millions years. Climatic changes may refer to a changes in average weather conditions, or in the time variations of weather around longer time average conditions. Climatic changes is caused by the factors such as biotic processes, variations in solar radiation received by earth, plate tectonics and volcanic eruptions. Certain human activities have also been identified as significant causes of recent climate changes often referred to as global warming. Scientists actively work to understand past and future climate by using observations and theoretical models. A climate record extending deep into the earth's past has been assembled and continues to be built up based on geological evidence from borehole temperature profiles, cores removed from deep accumulations of ice, floral and faunal records, glacial and periglacial processes stable isotope and other analysis of sediment layers and records of past sea levels. General circulations models, are often used in theoretical approaches to match past climate data make future projections and link causes and effects in climatic changes. The term sometimes is used to refer specifically to climate changes caused by human activity as opposed to changes in climate that may have resulted as part of earth natural processes. In this sense especially in the context of environmental policy, the term climate changes has become synonymous with anthropogenic global warming.

Keywords:Climate change in Agriculture.

SUPERBUG: IT'S VITAL PRESENCE IN BIOREMEDIATION

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Bioremediation is the cleaning up of toxic contaminants in the environment using the activity of microbes. It removes the contaminants from the soil and water. It is a waste management technique. It is mainly concerned with the treatment of hazardous substances such as oil sludges in the soil and radioactive wastes in effluents. Microbes act as catalysts to reduce the level of hazardness of toxic chemicals. The reduced level of toxic chemicals in the soil and water does not affect the living beings. **Superbug** is genetically engineered micro- organism is used to clean up the environment. Superbug is a constructed bacterium. It is a strain of ***Pseudomonas putida*** that can degrade hydrocarbons found in petroleum waster. It is a multiplasmid strain developed by using genetic engineering techniques. It is used to treat oil spills as a measure to control oil pollution. Petroleum products contain cycloalkenes (octane), naphthenes, xylene, toluene and aromatic hydrocarbons. Since these compounds are not easily biodegradable, oil wastes become a major pollutant on the soil and water. A patent was given to **Chakrabarty** regarding the construction and use of superbug. The American Government, in 1990, allowed to used the superbug to clean up oil spills, in the water of Texas state. The mass culture of superbug is sprinkled over puddy straw and the straw is dried in shade. The bacteria inoculated straw can be stored for more than a year until we are in need.

LAND USE PLANNING IN RURAL AREA

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Land is basis of economic activities and the prime resource for man. Since the beginning of human existence man has directed his activities with reference to earth resources and he knows how to use for his own benefit. There is at the present time a pressing need for considerable re-planning of land use in rural area, a need created by the two factors in the first place there is entirely internal problem of population growth at a greater rate than the means of production are able to satisfy the increased demand. Secondly, for the planning of rural economy. The most important problem in the world today is to ensure that the people of the world will be fed. The planning of land use in rural area is must to achieve the sustainable development and conservation of the natural resources. Reducing ground water, deforestation, soil erosion and scarcity of grains etc. are the result of the unplanned land use. The available land resources of any country exercises a lasting effect on the economic life of man or nation.

TRADITIONAL SOURCES OF ANTIDOTES FROM BOTANICALS SOLD BY HERBAL VENDORS IN NORTH MAHARASHTRA, (INDIA)

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Traditional Knowledge has become an increasingly important from utilization point of view. The present authors investigated botanicals advised for various human afflictions in North Maharashtra. However, this paper communicates botanicals employed as antidotes for bites of snake, rabbit , dog and scorpion-sting. Totally 31 angiospermic species belonging to 29 genera and 24 families have been recorded so far, various plant parts such as leaves, stem-bark, roots, rhizome, tuber, fruits, seeds and entire plants are utilized for preparing medicinal recipes. The recipes are usually used in the form of extract, decoction, juice, latex, slurry, oil, powder, paste etc. about six species are under cultivation in India and the rest others heviled from wild. Three species are exotic and five species are added to supplement the recipes. It is desirable to verify such claims on scientific grounds.

Keywords: Antidotes, Herbal Vendors, North Maharashtra

IMPACT OF SULPHUR ON THE QUALITY AND YIELD PERFORMANCE OF MUSTARD *Brassica juncea*L

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A field experiment was conducted at Agronomy Research Farm of Narendra Deva University of Agriculture and Technology, Faizabad (Uttar Pradesh) during the *Rabi* season of 2011-12. Twelve treatment combinations comprised of four levels of sulphur (0, 20, 40, and 60 kg S ha^{-1}) and two varieties (kranti, and Basanti) were arranged in randomized block design with three replication. The soil of experimental field was silty loam in texture slight alkaline in reaction having low organic carbon and available nitrogen and medium in phosphorus and high in potash and medium in sulphur. The crop recorded normal recommended cultural practices and plant protection measures. Results revealed that all the yield attributes and quality increased significantly under 60 kg S ha^{-1}. Yield attributes like number of siliquae $plant^{-1}$, number of seed $siliqua^{-1}$, length of siliqua (cm) and seed and stover yields of mustard crop were significantly higher with Basanti. The highest net return (Rs. 39457.12 ha^{-1}) and B: C ratio (1.97) was computed under 60 kg S ha^{-1} with Basanti. Mustard variety Basanti at 60 kg S ha^{-1} proved most remunerative and economically feasible for cultivation under the agroclimatic condition of eastern Uttar Pradesh.

USE OF PLANT GENETIC RESOURCES IN CROP IMPROVEMENT

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The conservation of plant genetic resources has developed into an important technical, socio-economic and political concern over the past forty years or so. With the successes of the Green Revolution in the sixties and the concomitant losses of landraces of the major food crops, especially in developing countries, it became apparent that coordinated efforts to collect and conserve these threatened resources were needed. The use of plant genetic resources (PGR) in crop improvement, followed by adoption, cultivationand consumption or marketing of the improved cultivars by farmers, is one of the mostsustainable methods to conserve valuable genetic resources for the future, and simultaneouslyto increase agricultural production and food security. The objective of this research is to summarizeissues related to the use of PGR in crop improvement. Specific topics are: definitionof genetic resources for crop improvement; documentationand evaluation of PGR; access to PGR, equitable sharing of profits, and material transferagreements; impediments to the use of PGR in crop improvement; classical methods of usingPGR in crop improvement (introgression, incorporation, prebreeding and wide crosses); use oflandraces in breeding for specific adaptation to stress environments; utility of molecular markersand genomic research for using PGR in crop improvement (diversity assessment,

mappingof quantitative trait loci (QTL) and marker-assisted selection (MAS), advanced backcross QTLanalysis and introgression libraries, association studies and direct allele selection); and genetransfer.

Keywords:PGR,Green Revolution, Introgression, Incorporation, Prebreeding and wide Crosses.

ASSESSMENT OF EARLY MATURING SUGARCANE VARIETIES FOR BETTER YIELD AND YIELD GAP ANALYSIS IN DISTRICT SARANPUR

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Sugarcane an important agro-industrial crop in India plays a pivotal role in national economy by contributing 1.9 per cent to GDP. The crop is cultivated in 4.22 m ha producing 300 mt with a productivity of 70 t/ha. However, there have been fluctuations in area as well as productivity over the years on account of several factors. Plateauing yield level, declining factor productivity and increasing production cost in recent years. So A farmer participatory study was undertaken to asses the yield performance and yield gap evaluation of six Early maturing sugarcane varieties viz. Co. 0238, CoJ 64, CoSa 88230, CoSa95255, CoSa 96268 and CoSa 8436 under irrigated condition. The analysis of the data indicated that there was considerable yield increase ranging from 5.45 to 63.57 percent between varieties over farmers practice. Variety Co.0238 yielded 1240.60 qt per ha. With the net return of Rs. 83240.00 CB Ratio of 1:4.31.

Keywords: Late sown wheat varieties, net return, yield and yield gap analysis.

STUDY ON EFFECT OF SOWING METHODS AND WEED MANAGEMENT PRACTICES IN LATE SOWN WHEAT (*Triticum asitivum* L.)

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A field experiment was conducted Student's International Farm of CSAU&T, Kanpur during *Rabi* 2015-16. The soil was sandy loam in texture, low in organic C (0.32%), available N (160 kg/ha) and available P (19 kg/ha) and medium in available K (234 kg/ha) content. The experiment was land out in split-plot design with replicated three times. The main plots included three sowing methods, *viz.* line sowing, cross sowing, and broadcasting; and five weed management practices, *viz.* isoproturon 1.0 kg/ha + 2,4-D@ 500 g/ha, clodinafop@ 60 g/ha, Pinoxaden@ 35 g/ha,+ carfentrazone@ 20g/ha, sulfosulfuron@ 25 g/ha+ Pendamethaline@ 3.3litre/ha, weedy check and two hand weeding as subplot treatments. After the rice crop was harvested, field was prepared by cultivator and planking, and 125 kg/ha seeds of late sown variety *'K7903'(Halna),* was sown in 20December, 2015. Fertilizer (120 kg/ha N, 60 kg/ha P2O5,40 kg/ha K2O) was applied to the crop. A one-third dose of N and full dose of P and K was applied before sowing, and the remaining N was top dressed in two equal splits at the first node and booting stages. On the basis study it was concluded that the important weed flora infesting the crop field were *Phalaris minor*, *Chenopodium album*, *Anagallisarvensis*, *Melitotus indica* and other weeds like *Avenafatua*, *Cynodon dactylon*, *Fumaria parviflora*, *Coronopus didymus*, *Rumex dentatus* and *Cyprusrotundus*. Density and dry weight of weeds was significantly influenced by different sowing method during both the years. Differences in growth and yield attributes were observed due to sowing methods and weed management practices. The significantly higher plant height (95.5 cm), number of shoots/m2 (376), dry matter accumulation (882.5 g/m2), spike/m2 (425), spike length (10.3cm) and number of grains/spike (55) were recorded in cross sowing than broadcasting; however, these were was at par with line sowing. This might be due to optimum plant population and poor weed growth due to smothering effect. The significantly higher plant height (85.9 cm) was recorded in weed-free check than rest of the treatments. However, it was at par with isoproturon@ 1.0 kg/ha + 2,4-D@ 500 g/ha and Pinoxaden@ 35 g/ha,+ carfentrazone@ 20g/ha in respect of number of shoots/m2 and dry matter accumulation.. The more growth and yield attributes in weed-free check followed by isoproturon at 1.0 kg/ha + 2,4-D 500 g/ha was due to lower weed competition for water, sunlight and greater availability of nutrients, which resulted in profuse growth of plants and effective control of both grassy and broadleaved weeds.

Keywords:Economics,Sowing methods, Weeds, Weed Management, Wheat, Yield

INTEGRATED NUTRIENT MANAGEMENT IN RELATION TO VEGETATIVE PARAMETERS OF LEMON (*Citrus limon*Burm) CV. PANT LEMON-1 IN SANDY LOAM SOIL.

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Among all the fruits in India, citrus have second rank in are Citrus fruits are the third important fruit next to mango and banana. In western U.P., lemon has been found to be the most suitable citrus fruit due to its adaptability and availability of fruits throughout the year. Lemons are primarily used as a fresh fruit. The main uses of fresh lemon are; making of lemonade, shikanji and for a wide variety of culinary preparations like pies, cakes, dishes of vegetables, fish, meat and salads. It is extensively used for preparing lemon tea. Lemon is a good source of citric acid. INM play a vital role to enhance the quality production of fruits at low inputs by using organic, inorganic and bio-fertilizers. An investigation was carried out on vegetative characters of lemon cv. Pant Lemon-1 at Horticultural Research Centre of Sardar Vallabhbhai Patel University of Agriculture & Technology, Meerut during summer season of 2011-12 and 2012-13. The treatments involved in the study were 11 in numbers i.e. T_1 (RDF (420g N+ 280g P+ 420g K) +35 kg FYM), T_2 100% NPK (420gN+280g P +420g K) +15 kg VC, T_3 75% NPK (315g N+ 210gP+315g K) +20 kg VC, T_4 100% NPK (420g N+ 280g P+ 420g K) +5 kg NC, T_5 75% NPK (315g N+ 210gP+315g K) +10 kg NC , T_6 50% NPK (210g N+ 140g P+ 210g K) +15 kg VC+10kg NC ,T_7 100% NPK (420gN+280g P +420g K) +15 kg VC+200g PSB+200g Azoto. ,T_8 75% NPK (315g N+ 210gP+315g K) +25 kg VC+200g PSB+200g Azoto., T_9 100% NPK (420gN+280g P+420g K) +5 kg NC+200g PSB+200g Azoto., T_{10} 75% NPK (315g N+ 210gP+315g K) +10 kg NC+200g PSB+200g Azoto., T_{11} 100% NPK (420gN+280g P+420g K) +35 kg FYM+200g PSB+200g Azoto,. The experiment was laid out in Randomized Block Design with three replications. The maximum per cent increase in tree height (14.44 and 15.34), maximum per cent increase in trunk diameter (11.21 and 13.55) and maximum per cent increase in spread of the tree (16.20 and 17.68) were recorded in treatment under (T_{10}) dose of 75% NPK (315g N+ 210gP+315g K) +10 kg NC+200g PSB+200g azotobactor, followed treatment T_8 75% NPK (315g N+ 210gP+315g K) +25 kg VC+200g PSB+200g Azoto., while minimum percent increase in tree height were recorded under control during 2011-12 and 2012-13, respectively. The highest fruit Set (79.19 and 80.54%) and minimum fruit drop (51.89 and 50.61%) was recorded with the INM dose T_{10} (75% NPK (315g N+ 210gP+315g K) +10 kg NC+200g PSB+200g azotobactor) whereas, minimum fruit set per cent (60.51 and 61.16) and maximum fruit drop (64.34 and 63.35%) was noted under the treatment T_1 (RDF (420gN+280gP+420gK) + 35kgFYM) during 2011-12 and 2012-13, respectively. It is farther noticed that autumn flush had better fruit retention as compare to spring flush.

ECO-FRIENDLY MANAGEMENT OF POD BORER *Etiella zinckenella AND Helicoverpa armigera* IN VEGETABLE PEA

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The present investigation entitled "Studies on bio-ecology of major insect-pests and eco-friendly management of pod borer in vegetable pea" carried out during from Nov 12, 2014 to March 13, 2015 at (old campus) S. V. P. Uni. of Agri. and Tech. Modipuram, Meerut. The effect of various insecticides on *C. septumpunctata* population showed that bio-pesticides *B. thuringiensis* was found safer followed by Azadirachtin. The Indoxacarb was proved more toxic followed by Spinosad to *C. septumpunctata* population. Efficacy of different eco-friendly insecticides on the incidence of *E. zinckenella* Application ofIndoxacarb @ 0.5 ml/liter was the most effective treatment in the controlling of pod infestation resulting lowest pod damage (2.69 per cent) and less effective *Metarhizium* 2 gm/litre with 9.31 per cent of pod borer infestation. Efficacy of different Eco-friendly insecticides on the incidence of *H. armigera***,** Application ofIndoxacarb @ 0.5 ml/liter was the most effective treatment in the controlling of pod infestation resulting lowest pod damage (1.66 per cent) and minimum effective treatment was *Metarhizium* 2 gm/litre with 7.33 per cent of pod borer infestation. The maximum and mínimum yield obtanied from Indoxacarb @ 0.5 ml/liter and *Metarhizium*2 gm/liter with 84.45 and 65.031 q/ha respectively. The C: B ratio maximum and minimum was obtained from Indoxacarb @ 0.5 ml/liter and *Metarhizium*2 gm/liter with1:10.74 and 1:1.93, respectively.

STUDIES ON BIO-ECOLOGY OF MAJOR INSECT-PESTS, POD BORER *Etiella zinckenella* And *H. armigera*IN VEGETABLE PEA

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The present investigation entitled "Studies on bio-ecology of major insect-pests and eco-friendly management of pod borer in vegetable pea" carried out during from Nov 12, 2014 to March 13, 2015 at (old campus) S. V. P. Uni. of Agri. and Tech. Modipuram, Meerut. The result on *Etiella zinckenella* larval population reaches its peak (12.66 larvae/10 plants) in all control plots on 26th February (8th standard weeks) when the maximum and minimum temperature 22.07°C and 12.55°C, respectively, relative humidity 81.07 and 11.72 mm was recorded. The larval population of *E. zinckenella*showed negative correlation with maximum temperature (r= -0.007), and positive with minimum temperature (r= 0.378), relative humidity (r= 0.313) and rainfall also showed positive correlation (r= 0.393) with larval population. The result on *Helicoverpa armigera* larval population reaches its peak (10.33 larvae/10 plants) in all control plots on 26th February (8th standard weeks) when the maximum and minimum temperature 22.07°C and 12.55°C, respectively, relative humidity 81.07 and 11.72 mm was recorded. The larval population of *H. armigera* showed negative correlation with maximum temperature (r= -0.034) while positive correlation with minimum temperature (r= 0.364), relative humidity (r= 0.351) and rainfall (r= 0.384) with larval population during crop season *i.e. Rabi* 2014-15. The biology of pea pod borer *E. zinckenella* completed thier life cycle in completed in 24-45 days. .it was observed that the incubation, larval, pupal period female and male logevity average 4.4, 17.9, 10.6, 35.3 36.5 and 32.75days. The biology of pea pod borer *H.armigera* completed their life cycle completed in 36-65 days. it was observed that the incubation, larval, pupal period, female and male longevity average 3.3, 20.1,17.2, 52.3 and 47.2 days.

INDIAN AGRICULTURE & INDIAN YOUTH: PRESENT AND FUTURE

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Agriculture has been mainstay of Indian economy. The agriculture sector in India provides livelihood to about 56% of population of the country and contributes about 13.9% to the Gross Domestic Product. But there have been exclusion problems in the country. In other words, real development in terms of growth shared by all sections of the population has not taken place. We have problems of poverty, unemployment, inequalities in access to health and education and poor performance of agriculture sector. One of the excluded sector during the reform period was agriculture which showed low growth and experienced more farmers' suicides. There are serious concerns on the performance of agriculture sector in the country. Particular worry is agriculture sector which showed lower than 2% per annum in the decade of mid-1990s to mid-2000s. There are also concerns on food security and livelihoods. This paper examines the role of young formers and challenges of small holding agriculture in India. It covers trends in agricultural growth, cultivation patterns, participation of small holding agriculture, productivity performance of small holders, linking small holders with markets including value chains, role of small holders in enhancing food security and employment generation, differential policies and institutional support for small holders and, challenges and future options for small holding agriculture including information needs. It also provides a dream project of our young Prime minister, they shows, importance of youth in agriculture and some important steps for solving our problems and developed agriculture industry in India.

THE EFFECT OF SALINITY ON A-AMYLASE ACTIVITY OF *Cicer arietinum* L.

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The agricultural prosperity of a nation is largely connected with the balanced nutrition of human and cattle. The green revolution in our country has resulted in a remarkable step towards the quantitative and qualitative progress in food production, improvement in protein rich contents like milk and its various products. The human population growth has posed pressure on the existing land by way of meeting his basic demand like food, fodder, pulses and fuel. In order to attain the goal of self sufficiency one has to provide a sufficient amount of nutritious food and fodder crop to our live stock population through an improved production methods and the utilization of every inch of uncultivated land. Saline lands may also be reclaimed for this purpose and some varieties which can grow on these soils be tried. Soil salinity has posed a problem for all times to come. This can only be overcome by implementation of improved methods of agriculture. The utilization of such soil may be achieved by cultivating some salt tolerant crop particularly in arid and semiarid areas, where adequate irrigation facilities are available. The present study shows that α-amylase activity decreases significantly with increasing salinity level, while the reverse trend was observed with the seedling age. The interaction of varieties with the salinity levels clearly indicate that the enzyme activity decreases in both the varieties, however the degree of

enzyme inhibition differ. A remarkable decrease was observed in susceptible variety G-186 from minimum level of salinity to maximum (4 EC to 16 EC dsm^{-1})Where as variety pusa-1053 showed approximate effect only at 16 EC dsm^{-1}.

Keywords: Salinity and *Cicer arietinum* L.

PHOSPHORUS AND ITS DYNAMICS IN SOIL SYSTEM

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Phosphorus is an important nutrient in respect to plant nutrition, growth and development. The availability of P is often restricted although total soil P is found to be higher in soils. Therefore, the use of microbial agents especially phosphate solubilizing bacteria to enhance P mobilisation from native soil P-pool is an important aspect so as to reduce the drastic effect of synthetic fertilizers and make farming a cost effective and sustainable approach. The study of soil enzymes as an index of fertility status and activity of microorganisms would be an important area in order to demonstrate P transformation and dynamics in soil.

Keywords:Phosphorus, Soil Fertility, Dynamics, Soil System

CARBON CREDIT MARKET ITS FUTURE PROSPECTS AND IMPLICATION IN INDIAN CONTEXT

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The issue of climate change and global warming became the topic of international concern since from 1980 because of increase in the earth's temperature. Global warming due to excessive release of toxic gases, pollution of ecological endowments are glaring examples of reckless human behavior in pursuit of economic motives. It is call of the time for us to give back to mother nature what all we have robbed her off, and efforts are made world over to reduce the negative imprints as a priority call. To make stringent plan of action for environment protection the Kyoto Protocol was organised in 1997 where stakeholders from across the globe brainstormed a mechanism whereby it was decided to incorporate carbon (main green house gas) reduction endeavours with economic motives of enterprises to motivate sustainability efforts on their part. Carbon credits (often called a carbon offset) are certificates issued to countries that have successfully reduced emissions of GHG which causes global warming. Under this arrangement "carbon" a free gift of nature has been converted to an "economic commodity", which is actively traded in the form of carbon credits. The paper shall discuss basic concepts related to carbon credit as a tool to save environment as well as study business opportunities in emissions market in India's context.

Keyword:Climate change**,** Carbon credit, GHGs, Global warming, Market

INTEGRATED FERTILITY MANAGEMENT IN MUSTARD: AN ECO FRIENDLY APPROACH FOR WESTERN UTTAR PRADESH

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India is a major grower and producer of oilseeds as well as a major importer of vegetable oils, ranks fourth among the countries in oilseed economy, next to USA, China and Brazil. After achieving a very ambitious objective of TMO, the agro-technology of rapeseed-mustard could not be sustained and oilseed production has virtually stagnated or sometimes even showing declining trends. Keeping these points in view, an experiment was laid out in Randomized Block Design with three replications to see the response of 20 treatments of organic and inorganic fertilizers on mustard (*Brassica juncea* L.) at farmer's field of Muzaffarnagar district. Application of 100% RDF through inorganic source recorded significantly higher seed yield over control, 50% RDF, FYM @ 10 t/ha and vermicompost @ 5 t/ha alone, whereas application of additional supplementary nutrients along with RDF and 50% RDF resulted into higher seed yield and dry matter production as compared to control. The significantly maximum yield of mustard was recorded in RDF + 50% FYM + *Azotobacter* + Sulphur @ 40 kg/ha. The highest cost of cultivation was recorded in RDF + vermicompost @ 5 t/ha, whereas the highest net return was obtained in RDF + 50% FYM + *Azotobacter* + Sulphur @ 40 kg/ha, which was found profitable for the adoption of farmers of U.P.

CISGENICS - A SUSTAINABLE TOOL FOR CROP IMPROVEMENT

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The qualitative, safer and sufficient food productions are prime issues in the world wide. There is need of second green revolution to mitigate challenges existing in agriculture today like environmental stress, global warming, population growth and shrinking land resource. The advances in the Biotechnological tools in order to genetic enhancement cultivatable crop by introducing of novel genes isolated from non-crossable species, which possesses traits such as high yield, resistance to abiotic and biotic stress traits. Which stand testimony to the power of genetic engineering technology that ushered in green revolution and subsequently helped in the sustaining the production. However the testing, release and public acceptance of the genetically modified plants tightly regulated to monitoring the negative effect on the environments or human health. The implication of molecular biology in crop improvement is now more than three decades old. Not surprisingly, technology has moved on, and there are a number of new techniques that may or may not come under the genetically modified (GM) banner and, therefore, GM regulations. In cisgenic technology, cisgenes from crossable plants are used and it is a single procedure of gene introduction whereby the problem of linkage drag of other genes is overcome. The gene used in cisgenic approach is similar compared with classical breeding and cisgenic plant should be treated equally as classically bred plant and differently from transgenic plants. Therefore, it offers a sturdy reference to treat cisgenic plants similarly as classically bred plants, by exemption of cisgenesis from the current GMO legislations.

ECONOMICS OF CROSSBRED COW MILK AND DESI COW MILK PRODUCTION IN VARANASI DISTRICT OF UTTAR PRADESH

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The study was undertaken at Varanasi district of Eastern Uttar Pradesh. A total of 8 villages from 4 development blocks in two *tehsils* of Varanasi district were covered under the study. Ten households from each selected village were randomly taken for the purpose which consisted a total of 80 sample households representing landless, small, medium and large farmers. The overall net returns/day per milch animal was calculated Rs. 27.62 and Rs. 3.72 for crossbred cows and desi cows, respectively. It was also observed that net returns were found more in crossbred cows in comparison to desi cows. Net cost and net returns per litre of milk from crossbred cows were found to be Rs. 13.69 and Rs. 3.81 as compared to desi cows which were Rs. 18.91 and Rs. 1.11, respectively.

Keywords: Crossbred cows, milch animal, net returns per litre.

RESPONSE OF PLANT GROWTH REGULATORS AND COW URINE ON VEGETATIVE GROWTH, FLOWERING AND CORM PRODUCTION IN GLADIOLUS

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An experiment on the effect of growth regulators (NAA, GA3 and kinetin)
Cow urine and cow urine + growth regulators on flowering and corm production in gladiolus were conducted at research form floriculture, karloopp (Jammu) J&K from oct. 2007 to April 2008. 6 cm diameter corms of gladiolus cultivar Eighth wonder were soaked in solution growth regulators and cow urine for 24 hours before planting. Maximum plant height was noticed in GA3 150 PPM and minimum was reported in cow urine (20%) + kinetin 50 Ppm followed by cow urine 10% and 100% .Treatment of cow urine 10% ; 20%+GA3—100PPM ; GA3---150 PPM GA3 100 Ppm resulted in early spike emergence where as spike emergence delayed by NAA 100PPM and 200PPM in comparison to control . More spike length was reported by treating the corms with GA3 150 PPM and cow urine 10%. Corms treated with cow urine with 10% also resulted in max. No. of florets /spike, rachis length as compared to control. No effect of these treatments on no. of daughter corms / plant was reported. Diameter of daughter corm was

maximum with cow urine (10%) + Kinetin 50 ppm followed by cow urine (10%). Maximum Number of cormlets /plant was reported by treating the corms with cow urine (100%) compared to other treatments.

Keywords: Cow urine; corm; spike and plant growth regulator

GENETIC VARIABILITY STUDIES IN GLADIOLUS (*Gladiolus hybridus* HORT.)

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Genetic variability studies in gladiolus was carried out among 22 diverse genotypes of gladiolus for 20 characters at R.F. (Floriculture) Jammu for two years during 2010-2011 viz., American Beauty, Appache, Bonos Memory, Black Beauty, Congosong Canidman, Day Dream, Enchantress, Friendship, Great Britan, Her Majesty, Jester Gold, Lucky Number, Oscar, Pb. Morning, Red Beauty, Trader Horn, White Friendship, White Prosperity, Wine & Roses, Pacifica, Wind Song, Congo Song, Black Beauty.The PCV were higher than GCV for all the characters studies, indicating thereby high degree of environmental influence. Higher GCV and PCV estimates were found for number of cormels per plant and average weight of cormels per plant. Hertiablity estimates were high (>80%) for days to 50% heading, days to first floret opening, days to last floret opening. Whereas, Propagation Coefficient, number of cormels per plant showed moderate to high heritability along with genetic advance showing additive gene effects.

Keywords**:** Gladiolus, variability, heritability, genetic advance.

EFFECT OF UREA AND SPACING ON SNAPDRAGON (*Antirrhinum majus* L.) CV. AFRICAN MIX

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Present investigation was carried out to investigate the "Effect of urea and spacing on snapdragon (*Antirrhinum majus* L.) cv.African Mix"in 2014-15. The experiment was conducted at Main Experimental Station, Department of Horticulture, Narendra Deva University of Agriculture & Technology Kumarganj, Faizabad (U.P.) The experiment was laid out in Randomized Block Design (factorial) with 15 treatments combinations comprising of 5 levels of urea (0.0, 0.5, 1.0, 1.5 and 2 %) and 3 levels of spacing (30×10 cm, 30×20 cm and 30×30 cm) to studies the effect on snapdragon. It can be concluded from the overall experimental findings that spraying of urea @ 2 % at 30 DAT was proved to be most effective to increase plant height (33.37 cm), plant spread (28.27 cm), number of branches/plant (9.57), number of leaves/plant (325.16), first flower bud initiation (56.78 days), opening of first florets (80.11 days), duration of flowering (91.71 days), length of spike (59.48 cm), number of florets/spike (12.02), number of spike/plant (9.22), average weight of spike (17.27 g.), number of spike/ha (14.07 lakh), spike yield/ha (241.62 q.) and vase life (11.56 days) of snapdragon. Closer spacing enhanced plant height, number and yield of spike/ha. However, wider spacing resulted more spread, number of branches and leaves per plant. Flowering behaviour and quality of spike and vase life enhanced in wider spacing 30×30 cm planting distance. The interaction between urea and spacing were recorded significant in number of leaves per plant, number of spike ha^{-1}, yield of spike (q/ha) and vase life of flower. Maximum vase life (12 days) was observed in $U_4 \times S_3$ treatment.

STRATEGIC ITK USING BY LIVE STOCK OWNERS IN DISTRICT MEERUT

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In the indigenous technical knowledge live stock owner are using plant as medicine for the treatment of animal suffering from different problems. Herbal plant which has certain distinct advantages and does not have any side effects. Herbal plant are easy to administer and their dosages is not weight dependent.Indigenous technical knowledge has been found to be effective in almost all type of condition,be it acute or chronic.Imparting knowledge to live stock owner about indigenous technical treatment would help them manage dairy animal condition at least till the help from veterinary doctor becomes available.A PRA based field investigation were under taken by core team of scientist in the District Meerut through representative villages for obtaining indigenous technical knowledge using by live stock owner under guidance UPDASP Meerut. The following data were documented. Control of Foot and Mouth Disease-250 gm desi ghee +50 gm powder (Kali mirch) using 2-3 times in day with 80% success.Control of anestrus in

heifers- 250 gm of germinated seed of horse gram twice for 3-4 days with 60 % success.Control of prolapsed of uterus- collect the leaves of mimosa pudica (Chhui mui) and prepare paste in warm water and apply on the prolapsed portion and also feed 250 gms leaves with success 80%.Control of repeat breeding- feed 200 gms fresh or 50 gms dried powder for 10 days of murraya koenigii(Meethi neem/kurry patta) with 80% success,

AGRICULTURAL EXTENSION SYSTEM EMERGING CHALLENGES IN HUMAN DEVELOPMENT

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In real our farmers are mixed farmers adopting crop-livestock-fish integration. There fore the extension approach should also gear up to adopting farming system basis one of the major challenges fascine India agriculture is feeding of 1 billion 21 core population towards the and of the country. Animal husbandry sector also substantially contributes to growth in augmenting nutritional status and creating job opportunity.In view of a large number of dropouts in schools and the fact that a major segment of rural population is still unreached it is of paramount in importance that the extension system need to embark account the distance education and harnessing the tools of information technology viz, television, radio, video programmers, etc. Every farm is a production unit as every farmer is a voluntary adopter of new technology. Farmers in many states are familiars with mixed farming. The particular combination of enterprises is influenced by the agro-climatic conditions and socio- economic factors.The technology integrations in contrast to technology transfer refers to the process or a set of activities that must happen if new scientific agricultural information is put to use in any farm production system. The training and visit (T &V) system provides for interaction between research scientist and extension functionaries for transfer of technology.

Keywords: Emerging, Development, Human Technology

EFFECTS OF PESTICIDESS AND OTHER ORGANIC POLLUTANT IN THE AQUATIC ENVIRONMENT ON THE IMMUNITY OF FISH.

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In the present paper the effects of various pollutants from industry and sewage and agriculture on the fish immune system the major xenobiotics envolved as immunomodulators are pesticide (Pesticidess, herbicides and fungicids) and other organic pollutants such as poly nuclear aromatic hydro carbons and tn bertyle tine immune toxicology in mammals has became a very active discipline but their remains a scarcity of information concerning fish immune toxicology.

Keywords:Fish, Pollutant , Pesticidess, Immunity

ASSESSMENT OF EFFICACY OF NEW HERBICIDES FOR WEED MANAGEMENT IN PADDY

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Rice (*Oryza Sativa* L.) is a staple food for more than 60% of the world population. It is the most cereal crop and is extensively grown in tropical & subtropical regions of the world. There are several reasons for low productivity and the one due to weeds is the most important. Most of the improved crop management practices in rice cultivation failed due to poor and improper practices for containing weeds. Weeds compete with rice for moisture, nutrients, light, temperature and space. Uncontrolled weeds have caused yield reduction of 28-45% in transplanted rice. Shortage of laburs, increased wages and lock of suitable weed control implements have compelled farmers to think for alternative strategies of weed management. Herbicides have been the obvious choice to the farmers. Further, any delay in weeding will lead to increased weed biomass which has a negative correlation with yield.Butachlor, anilofos, oxadiargyl are herbicides presently used for weed control in transplanted rice. These herbicides presently used for weed control in Trans planted rice which provides effective control of annual grasses, but not annual sedges and broad leaved weeds. Keeping in this above point Krishi Vigyan Kendra Balrampur , U.P. conducted On Farm Trial to assess the efficacy of new

herbicides for weed management in paddy during Kharif Season 2014. The On Farm Trial consisting of 3 treatment *viz* one hand weeding at 25DAT, farmers practice (T_1), use of bispyre back sodium salt 10Ec @ 25gm ai/ha at 25 DAT (T_2) and use of chlorimuron + Metsulfuron methyl (Alimix) 20w.p. @ 4.0g ai/ha at 25DAT. (T_3), the plot size g each treatment is dept 0.13ha (1333m^2) and the total land of each farmers was 0.4 ha. The set of three treatments was conducted on five farmer's field at five selected Villages of Krishi Vigyan Kendra. The result indicated that treatment T_3 was given more yield (41.25g/ha), net return (Rs. 28887/ha) and B: C ratio (2.55) fallowed by treatment T_2. It is also observed that minimum weeds counts (16weeds/m^2) and weed dry weight (8.75g/m^2) was found in T_3 treatment. The minimum yield (36.25g/m^2), net return, B:C ratio and maximum No of weeds (28weeds/m^2) and weed dry weight (18.50g/m^2) was found in treatment T_1 (Farmers Practices). It is recommended that treatment T_3 is capable to controlling maximum number of annual grasses, sedges and broad leaded weeds resulted more yield.

STUDY ON THREAT STATUS OF MEDICINAL PLANTS IN MIRZAPUR AND SONBHADRA DISTRICTS OF UTTAR PRADESH

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Medicinal plants are one of the important components of plant biodiversity, which are economically important and essential for health security. It has been identified as one of the most important plant diversities for rural development. The forest areas in the state of Uttar Pradesh are very rich in variety of medicinal plant species particularly in the Vindhyan region where various medicinal plants grow naturally. In recent years, the global demand of herbs has increased up to 7% per annum, which leads to overexploitation of this important natural resource. Medicinal plant diversity of Vindhyan region is depleting gradually due to increasing industrialization, overgrazing, overexploitation and ignorance. Therefore, present study was done to know the threat status of medicinal plants in district Mirzapur and Sonbhadra under which a survey was conducted in selected blocks of Mirzapur and Sonbhadra districts by personnel contacts and interview with the local people. The information on availability of species during 30-35 year back and at present time was gathered from the respondents and matched to know the threat status of a species. .The present study has identified 120 species belonging to 42 families. Among these species herb, shrub, climber and trees were in the number of 40, 28, 32 and 20 respectively. Out of 120 species 14 were critically endangered which includes *Pueraria tuberosa, Chlorophytum tuberosum, Gloriosa superva, etc. Mucuna pruriens, Centela asiatica, Raulfia serpentine, Andrographis paniculata, Piper longum, Acorus calamus and* 20 other species were found endangered in the region. Highest numbers of species (42) were grouped under vulnerable category which includes *Tinospora cordifolia, Gymnema sylvestris, Euphorbia lingularia, Cissus quandrangularis, Withania somnifera, Asparagus racemosus* etc. 16 species were categorized under less threatened and rests of 22 species were identified in the category of sufficient. Therefore, there is urgent need to prioritize useful threatened medicinal plants and conserve them *in-situ* and *ex-situ* for sustainable utilization in health security, otherwise these species may get extinct from the region in near future.

STUDIES OF PLANT GROWTH REGULATOR ON MICRO PLANT IN NET HOUSE OF VARIOUS CULTIVARS OF POTATO

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The investigation was conducted at Central Potato Research Institute Campus Modipuram, Meerut (at 28.580 N latitude and 77.20 E longitude) during 2009-2010 and 2010-2011 respectively. To determine the effect of plant growth regulator in vitro culture plant under net house condition for three variety (K. Bahar K. Surya and K. Chipsona-3) and four combination of plant growth regulator with one control. The recommended package and practices were followed in all cultivars under net house for successful rising of crops. Marketable as well as total tuber numbers were significantly higher in cultivar K.Surya (9.82 lakh/ha) as compared to rest of other two cultivars. Highest marketable grade (<25g)tuber yield noticed in cultivar K.Surya (232.45) with combination to 0.1ppm Ga3, 0.01ppm NAA and 2.5 ppm cytokinine, while in case of cultivar K.Bahar (208.06) and K.Chipsona-3 (211.52) in control treatment .

IMPACT OF PHYSICALLY AND CHEMICALLY TREATEDANAEROBICALLY DIGESTED DISTILLERY EFFLUENT ONNUTRIENT AND,OIL QUALITY OF SUNFLOWER

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A pot experiment was conducted in CRD during cropping season 2007 and 2008 at G.M.V.Rampur Maniharan,Saharanpur . The distillery effluent for study was collected from Sir Sadi Lal Distillary Muzaffarnagar. Variety Jwalamukhi of Sunflower was used as test crop. Nitrogen, phosphorus and potassium content in grain determined and observed that the highest N.P.K. percentage (2.87 and 2.84%), (0.48 and0.48%) and (2.44 and 2.55%) was observed in T_0 in both years 2007 and 2008. The minimum N.P.K.% were recorded in T_1 in both the years. To judge quality of oil, acid value, oil percent and refractive index were determined and observed that maximum acid value was recorded in T_1 treatment and minimum in T_0, while the maximum oil percent was recorded in T_0 (control) in both the years. The values of refractive index reported to have very little difference in both years.

DEVELOPING ECO FRIENDLY PRODUCTS FOR SUSTAINABLE AGRICULTURAL DEVELOPMENT

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Agriculture is the most important enterprise in the world. Agriculture is the process of producing food, feed, fiber and other desired products by the cultivation of plants and the raising of domesticated animals. In recent times sustainability is a leading characteristic of textile fashion products. Textile fashion companies are focusing more on sustainable products these days, so that they can meet the environmental and social aspects. Two natural sustainable fibers are (organic cotton and Bamboo). Natural fibers are at the heart of an eco-fashion movement that seeks to create garments that are sustainable at every stage of their life cycle, from production to disposal. Cotton is a cellulosic fiber obtained from plants and wool is also fiber which obtained from animal hair. In this context, those eco-friendly methods are being considered as environmentally safe, selective, biodegradable, economical and renewable alternative for use in organic farming system. A diversified product refers to the produce the large variety of manufactured products from raw material such as waste cotton rags and wool fibers. Cotton and wool waste is worthless and also pollutes the environment. Waste cotton rags and wool fibers can use in developing diversified products. The diversified products made by waste cotton and wool are decorative and functional in nature. Decorative products include photo frame, greeting cards, flower pots, lamp lighting, flowers, mask, wall hanging, while functional articles includes book holder, guest book, tea coaster, pen holder etc. present study mainly focused on the pre consumer waste, post-consumer waste, waste clothes management, how to develop the different diversified products by using waste cotton and wool pieces, benefits of these products to consumers and environment. The present study is more relevant and beneficial because now a day's cotton industry discharges different types of waste across the state and country which can be manage by developing decorative and functional diversified products in eco friendly manner. Present study suggests an innovative way of waste clothes management which helps in converting the waste material into different useful and decorative products using waste cotton rags and wool fibers.

Keywords: Diversified products, pre consumer waste, wool fiber and Decorative articles.