

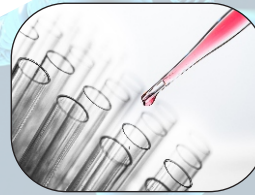
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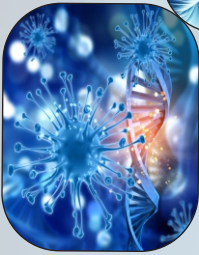
2nd National Conference Cum Workshop On

“Channeling as Tools & Techniques to Agriculture Biotechnology Microbiology & Molecular Biology in 21st Century”

November 24-25, 2019



ABSTRACTS & SOUVENIR



Edited By

Dr. Atul Tiwari
Mr. Yagyavalkya Sharma
Mr. Lakshya Chaudhary

Organised By

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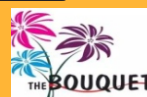
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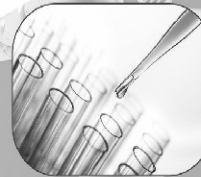
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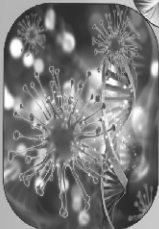
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ABSTRACTS & SOUVENIR



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VENUE

1st Day : Hotel Mukund Palace, Sonkh Adda, Mathura
2nd Day : KALP Laboratories, Mandi Chauraha, Mathura

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Late Shri Yogendra Yogiraj Sharma
Founder KALP Laboratories

पिता धर्म : पिता स्वर्ग : पिता हि परमं तपः ।
पितरि प्रीतिमापन्ने प्रीयन्ते सर्व देवताः ॥
पितरौ यस्य तृप्यन्ति सेवया च गुणेन च ।
तस्य भागीरथीस्नानमहन्यहनि वर्तते ॥
सर्वतीर्थमयी माता सर्वदेवमयः पिता ।
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मातरं पितरक्षेय यस्तु कुयति प्रदक्षिणम् ।
प्रदक्षिणीकृता तेन सप्तदीपा वसुन्हारा ॥

पदापुराण में कहा गया है कि पिता धर्म है पिता स्वर्ग है और पिता ही सबसे श्रेष्ठतप है। पिता के प्रसन्न हो जाने पर सम्पूर्ण देवता प्रसन्न हो जाते हैं। जबकि सेवा और सद्गुणों से पिता - माता सन्तुष्ट रहते हैं उस पुत्र को प्रतिदिन गंगा स्नान का पुण्य मिलता है। माता सर्वतीर्थमयी है पिता का पूजन करना चाहिए।
माता - पिता की परिक्रमा करने से पृथ्वी की परिक्रमा हो जाती है।

CTTABMMB-2019

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Message

СТТАВММБ
2019





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ICAR - Indian Agricultural Research Institute
(An ISO 9001:2015 Certified Institute)



Dr. V K Baranwal

Prof. & Principal Scientist
Division of Plant Pathology
ICAR - IARI, PUSA, New Delhi



I am very happy to note that Kalp Laboratories is organizing a training programme cum workshop on different aspects of molecular biology for the benefit of students. The contents of training include good laboratory practices, various techniques of molecular biology and tissue culture. I am sure students taking part in this programme will benefit immensely. I wish good success to the training programme.

Dr. V K Baranwal



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माइकोबैक्टीरियल रोग संस्थान**

Dr. V.K.Sharma

Deputy Director / Scientist-E

Head, Electron Microscope Department

**National JALMA Institute for Leprosy & Other Mycobacterial, Diseases, Agra
(Indian Council of Medical Research)**

Deptt. Of Health Research, Ministry of Health & Family Welfare, Govt, of INDIA



I am delighted to know that KALP Laboratories Mathura (U.P.) is organizing a two days National Conference cum Workshop on CTTABMMB-2019, during 24th-25th November, 2019 at Mathura, which will bring students, academicians, scientists and corporate together to share, discuss and to create value for students in biotechnology field. The theme of the National Conference and workshop is quite appropriate for the students and researcher to understand the well equipped laboratory training on various aspects. I hope the laboratory training will lead the students towards the excellence in Life science, biotechnology, by providing Hands-On training and technological advancements in these fields. My greetings and best wishes to all the participants and Organizers of this National Conference cum Workshop for their success in noble mission for promoting value-based education.

Dr. V.K.Sharma



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MATHURA
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Accredited with **A** Grade by **NAAC**

Dr. A.K. Bhatia

Professor Emeritus, Biotechnology

Retd. Professor and Head Biotechnology, GLA Univ. Mathura

Retd Prof. and Head Microbiology and Immunology, Univ. of Veterinary
Science, Mathura



It is a matter of immense pleasure that young enthusiastic alumni of GLA Univ. Mathura have started the biotech. Centre "Kalp Laboratories" in Mathura. His mission is to train the students of Mathura and its adjoining regions enabling them to compete with those of metro cities. His "Never Die Spirit" is laudable for the cause of bioscience specially biotechnology, microbiology and molecular biology. His attempt to organize two day 2nd conference on CTTABMMB from 24th Nov. 2019 has delighted us and I am confident that these kinds of Endeavour will definitely prompt students and scientists to go for innovations and start up in the field of biotechnology. Conference will provide opportunity for the participants to address their confidence in the subject. I wish the conference a great success.

Dr. A.K. Bhatia

Convener

CTTABMMB-2019



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UNIVERSITY
MATHURA
Recognized by UGC Under Section 2(f)

Accredited with **A** Grade by **NAAC**

Dr. Anjana Goel

Associate Professor
GLA University, Mathura



It gives me immense pleasure to learn that Department of Biotechnology & Microbiology, KALP Laboratories, Mathura is organizing a National Conference on “Channeling as Tool & Techniques to Agriculture Biotechnology, Microbiology and Molecular Biology in 21st Century” during 24th -25th November, 2019. Kalp Biotech is the first private laboratory in Mathura having excellent research facilities and training modules and is now showing its caliber in organizing a wide spectrum National Conference in Mathura. Students from this region can utilize the opportunity of project and summer training from this Laboratory. I am confident that during the conference there will be good amount of interaction amongst the experts and participants, Biotechnologists and Microbiologists in specific as well as in diverse fields all associated with integrative Biology. With these words I wish all success to the conference and organizers.

Dr. Anjana Goel
Organizing Chair Person
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Dr. Narotam Sharma

Ex Scientist and Incharge
Central Molecular Research Laboratory
Shri Guru Ram Rai University, Dehradun
Senior Scientist & Managing Director
DNA Labs -A Centre For Applied Sciences, Dehradun
Scientific Advisor, KALP Laboratories, Mathura
+91-9557650069
sharmanarotam5@gmail.com



I am pleased to introduce this Souvenir being published as a resource material during **National Conference cum Workshop** on 24-25, November, 2019, entitled, CTTABMMB-2019 by Kalp Laboratories, Mathura, Uttar Pradesh.

With the persistent innovations in the field of Agro industries, Medical Microbiology, Dairies, Veterinary sciences, Biotechnology and Cellular and Molecular medicine, Kalp Laboratories is a hub for imparting quality education for the young Researches & is boon to the next generation. Cellular and Molecular Biology is providing a backbone for the doctors/Clinicians to diagnose the disease/disorder at an earliest. Best wishes and congratulations to the young delegates, learners and the young generation coming here to learn the modern tools & techniques in the field of cellular & Molecular Biology during this National meet. My sincere congratulations and best wishes for the success of this academic meet. Kalp Laboratories achieve its missions through the team effort of its faculty, and staff members. Its research programs encompass diverse areas of investigation in the molecular genetics. This conference will provide a wonderful forum for you to refresh your knowledge base and explore the innovations in proteomics and genomics. The conference will strive to offer plenty of networking opportunities providing you with the opportunity to meet and interact with the eminent researches We hope you will join us for symphony of outstanding science and take a little extra time to enjoy the spectacular and unique beauty of this region.

Dr. Narotam Sharma
Organizing Chair Person
CTTABMMB-2019

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koshambifoundation@gmail.com
info.koshambifoundation@gmail.com

www.koshambifoundation.org

Dr. Atul Tiwari

Vice President

(Director Administration)

+91 - 99270 85120

dratultiwari@koshambifoundation.org

dratult@gmail.com



It is a matter of great pleasure that KALP Laboratories, Mathura is organizing 2nd National Conference cum workshop 2019 on "National conference Cum Workshop on Channeling as Tools & Techniques to Agriculture Biotechnology, Microbiology & Molecular Biology in 21st Century" on November 24 & 25, 2019 at Hotel Mukund Palace, Sonkh Adda, Mathura & KALP Laboratories, Mandi Chauraha, Mathura. The Conference Cum Workshop is a great opportunity to meet researchers, Professors, Biotechnologists, Scientists, Physicians, Doctors, Delegates, Students, Graduates, Young Researchers and all other professionals. At the Conference Cum Workshop you will have the opportunity to not only expand your network; but also, to be privy to presentations that incorporate a wide variety of topic ranging from the newest researchers in Agriculture & Biotechnology conduct, ethics, quality and regulation of its practical applied in different contexts. It is also very important to remain in touch with the latest advances and innovation and exchange ideas by the National Eminent Speakers and Researchers.

I am sure that the deliberations at the Conference Cum Workshop are expected to contribute towards chalking out a definite roadmap for restructuring process for Sustainable Agriculture & Biotechnology.

Dear valuables & respected Delegates we strongly encourage you to take full advantage of opportunity to attend the conference.

Dr. Atul Tiwari

Joint Organizing Secretary
CTTABMMB-2019

Head Office - Koshambi Complex , Plot No -11,175 Ft. Road, Shastrapuram Ind. Area, Nh 2-Nh11 Bypass, Sikandra, Agra-282007

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Main Branch - 13 B North Arjun Nagar, Tiraha Near Indraprasth Hotel Agra – 282001

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Dr. Touseef Hussain

M.Sc.(Biotech.), Ph.D Life Science (UTU, DDN/ICAR-CPRI, Shimla)

DST/SERB-National Post-Doctoral Fellow, AMU, Aligarh

+91-9990648647

Hussaintouseef@yahoo.co.in



The focus of this conference is to seek convergence of the thoughts, experience, and knowledge of science and technology so that the twain meets for the well of human masses worldwide. I am sure that the conference will bring together leading researchers, emerging scientist, academicians in the field of Biotechnology from around the corner of India. It will be a great opportunity for them to present technological advances and research results in their field with focus on emerging trends. I am sure that the outcome of the **2nd National Conference cum Workshop-CTTABMMB-2019** at Mathura will be beneficial to students, Research scholars, scientists, academician's as well industrial professionals and society as a whole. I congratulate the Organisers for the conceptualizing and planning the event in a focused and meaning full manner. I am sure this unique opportunity provided by this conference will be gainfully utilized by all the participants, which in long run will strengthen in the field of Biotechnology in India. I sincerely thank to all those who have supported this great event. I wish the National Conference-Workshop a great success and hope that it will disseminate the necessary message to all those who participate in it.

Dr. Touseef Hussain
Joint Organizing Commity
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Mr. Yagyavalkya Sharma

Head & Training Coordinator Department of Biotechnology & Microbiology

Kalp Laboratories Mathura, Uttar Pradesh, India (281001)

+919953329363 ,+917906463149

KalpbioLab2018@gmail.com

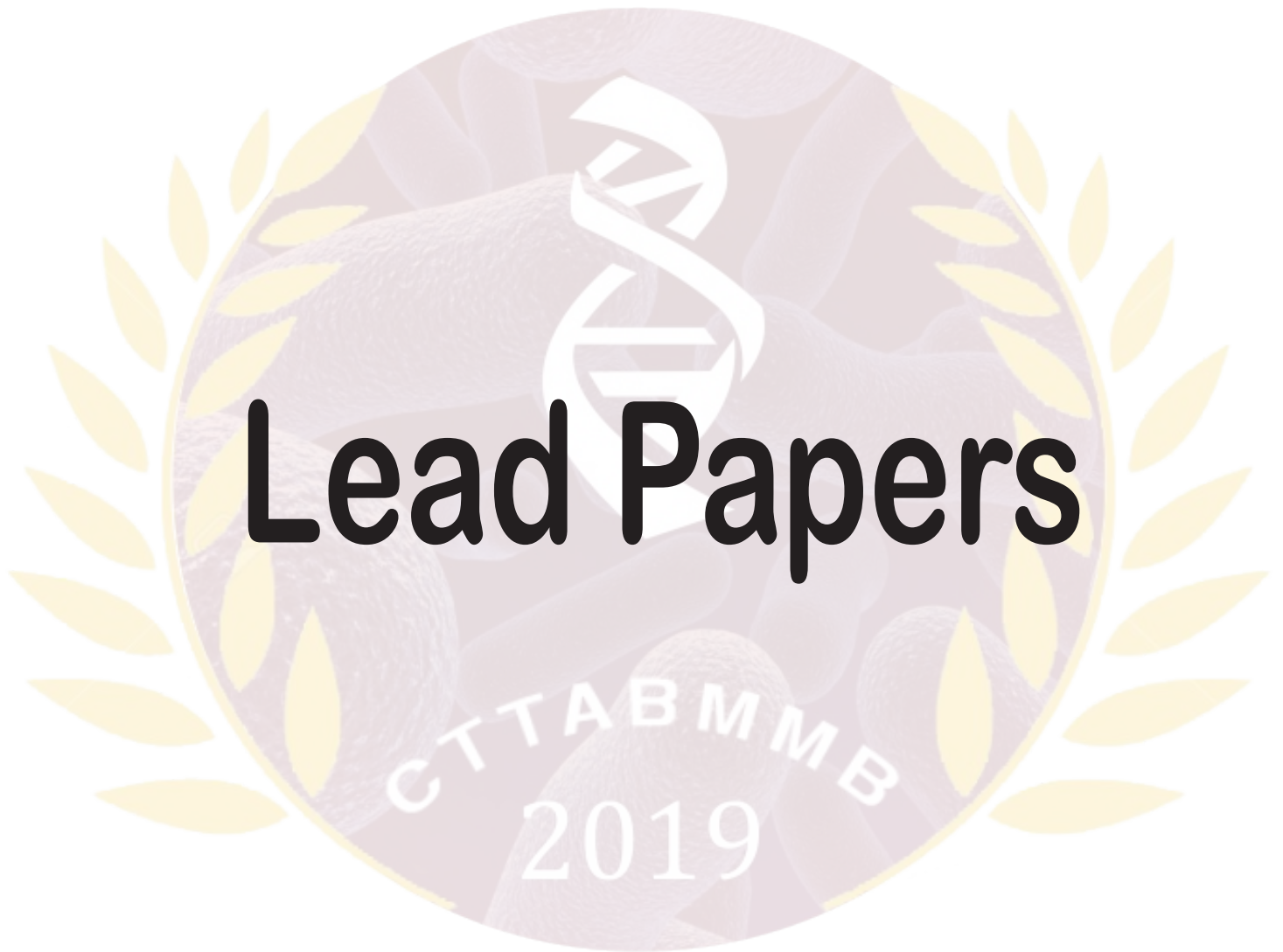


On behalf of Kalp laboratory, please let me extend my congratulations and best wishes to all those attending the **2nd National Conference cum Workshop-CTTABMMB- 2019**. I am, delighted to provide message for the souvenir of the national conference on. It is aimed towards a balanced and holistic approach towards educating the young budding researches from the various streams of Biotechnology. This conference is both timely an important demonstrating the forward thinking approach of India's Biotechnology community. It is important to mention that interdisciplinary nature of the conference justifies the word *Sangam* which brings three major branches of Biotechnology *i.e.* Agriculture, Environment and Health. I extend my gratitude to my colleagues for their support and enthusiasm. All the talks are delivered by distinguish scientists; Oral presentations with their vast experience will certainly enhance the knowledge of the young researchers. I look forward in collaborating with partners in India to further scientific knowledge and applications in these areas. I wish all the participants good luck

Mr. Yagyavalkya Sharma

Organizing Secretary

CTTABMMB-2019



Lead Papers



Characterization of Morphological Variability in Bougainvillea for DUS testing

Ranjana^{*1}, R. Singh² and R.K. Roy³

1. Department of Agriculture, Mangalayatan University, Aligarh.
email: ranjana.tewari@mangalayatan.edu.in
2. Department of Agriculture and Management, Sanskriti University, Mathura.
email: dr.ranasingh@gmail.com
3. Former Head & Sr. Principal Scientist, Botanic Garden, Floriculture &
Landscaping Division, CSIR-NBRI, Lucknow; email:
editorgreensgardens@gmail.com

ABSTRACT

The present investigation was undertaken during 2011-12 and 2012-13 to characterize the morphological variability of 306 Bougainvillea varieties at Botanic Garden, CSIR-National Botanical Research Institute, Lucknow. The research was done to collect the information about distinct features of bougainvilleas varieties. 43 highly heritable morphological traits *viz.*, Plant growth habit, Young shoot color, Plant length of internodes, Stem thorns presence, Thorn length, Thorn curvature, Leaf blade length, Leaf blade width, Leaf blade shape, Leaf blade shape of apex, Leaf blade shape of base, Leaf blade main color, Leaf blade secondary color, Leaf blade distribution of secondary color, Leaf blade tertiary color, Leaf blade undulation of margin, Texture, Number of leaflets/ Primary branch, Leaf blade Persistence, Petiole length, Petiole Attitude, Inflorescence length, Inflorescence Peduncle length, Inflorescence arrangement of bract clusters, Inflorescence number of bract clusters, Inflorescence density of bract clusters, Inflorescence presence of flowers, Inflorescence type of bract, Bract length, Bract width, Bract shape, Bract Reflection, Bract shape of Tip, Bract shape of base, varieties with inflorescence type of bract single Calyx lobes color of upper side, Small young bract main color of outer side, Young bract main color of inner side (calyx lobe not open), Young bract main color of inner side, varieties with inflorescence type of bract double Young outer bract main color of inner side, Only varieties with inflorescence type of bract double Young inner bract main color of inner side, Young bract secondary color of inner side (calyx lobe open), Young bract tertiary color of inner side (calyx lobe open) and Bract main color of inner side (calyx lobe wilted) were identified for characterization among all the varieties as the morphological characterization results are useful for varietal selection in ornamental gardening, establishing true identity of new or existing variety for the purpose of registration as per PPV

& FR Act, 2001 and deriving commercial benefits. The results showed the existence of considerable amount of variability in morphological characters that can be used for DUS testing, breeding of Bougainvillea varieties for particular traits or development of new varieties, as a reference variety for protection of other new varieties under PPV&FR Act, 2001.

Keyword: Characterization, DUS test, Bougainvillea

Introduction

Bougainvillea, 'Glory of the Tropics' has four species namely *B. glabra*, *B. buttiana*, *B. spectabilis* and *B. peruviana*, originated in Brazil are most popular ornamental plant used for coloured bracts in landscaping all over India and the world. They can be grown at a height of 1500-2000 meter above the sea level. Bougainvillea is a hardy shrubby plant which has an alternate arrangement of leaves. Flowers are inconspicuous, tubular structure and attached to the showy heart-shaped bracts. Many varieties of Bougainvillea were bred in India and many were imported also. Though, same variety with different names also exists, creating the confusion many a times in varietal wealth. Thus leading to the requirement of varietal identification either on morphological or on molecular basis. Morphological basis is easy, quick, and cheap and does not destroy the plant. It can be done by scoring for the characters using characterization.

Characterization is studying, recording or documentation of highly heritable characters of plants based on morphological, agronomic, biochemical and molecular markers features that provide the description of germplasms e.g., Roots, rhizomes, stems, Bulbs, Corms, Flowers etc. the characterization is needed for documenting proper description of characters, defining phenotypic expressions, helps grouping of accessions, development of core collections, provide information of collections and its genetic diversity, helps detect somaclonal variation, identification of varieties, identification of gaps and retrieves germplasm for breeding programmes, naming of new varieties, checking bio-piracy and assuring maximum utilization of germplasm collection. It can be done at any stage of conservation process provided sufficient amount of plant material is sampled. Despite being distinct as variety description does not define an identifiable unique entity. The assessment involves visual estimates also. In India no such guidelines was present for the characterization of bougainvillea. Thus keeping in view the above objectives the characterization of bougainvillea was undertaken.

Materials and Methods

Development of core collections is done to represent diversity within a collection. Identify clusters for selection of representative accessions for a core collection by

separating the accessions into meaningful groups using a wild from cultivated species, Using taxonomy, domestication, distribution, breeding history, cropping pattern and utilization knowledge.

Grouping varieties: Create groups of similar accessions from characterization data Using morphological characteristics or other characters. The final step in establishing core collection is choosing actual entries from each group. This is done randomly or systematically, based on some formal analytical procedure or on pragmatic considerations such as amount of material or information.

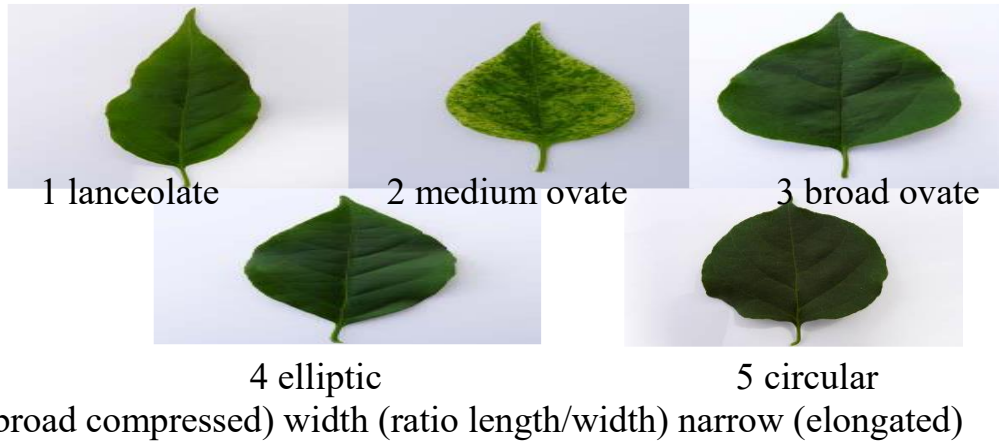
A total of 306 Bougainvillea varieties, viz., Abhimanyu, Aida Variegata, Aruna, Begum Sikander, Chitra, Dr. H.B. Singh, Dr. P.V. Sane, Dr. R.R. Pal, Gopal, Krumbiegel, Los Banos 'Variegata', Los Banos Variegata 'Silver Margin', Mahatma Gandhi, Manohar Chandra 'Variegata', Mary Palmer Special, Palekar, Pallavi, Partha, Parthasarthy, Shubhra, Shweta, Tetra Mrs. McClean, Vishakha, Wajid Ali Shah, Zakiriana 'Variegata', Aruna, Chitra etc., were evaluated at experiment site of Botanic Garden, CSIR-National Botanical Research Institute, Lucknow during 2011-12 and 2012-13. These varieties were tagged from the well grown specimen plants of the germplasm collection planted at a spacing of 3×5 m. The observations were recorded on three plants in each replication at specific growth time.

Characterization descriptors: enable easy and quick discrimination between phenotypes are used. They are highly heritable, can be easily seen by eye and are equally expressed in all environments e.g. flower color. The characterization descriptors include a. morphological descriptors: to describe the phenotype, these phenotypic characters are scored or measured and expressed in numeric values, the descriptive traits e.g., flower colour is expressed as numeric value by using a standard color chart (RHS). The two types of morphological characters are used for the morphological characterization:

1. Measured characters: that can be measured e.g. plant height, stem length
2. Derived characters: that are scored e.g. leaf size, leaf shape etc. the samples can be taken from live samples.

Method of observation: Visual and Measurement

MG: single measurement of a group of plants or parts of plants (*e.g. 100 seed weight*)



11. Leaf blade: shape of base

12. Leaf blade: main color

13. Leaf blade: secondary color



14. Leaf blade: distribution of secondary color

15. Leaf blade: tertiary color

16. Leaf blade: undulation of margin

17. Texture

18. Number of leaf/ Primary branch

19. Leaf blade: Persistence



20. Petiole: length

21. Petiole: Attitude



22. Inflorescence: length

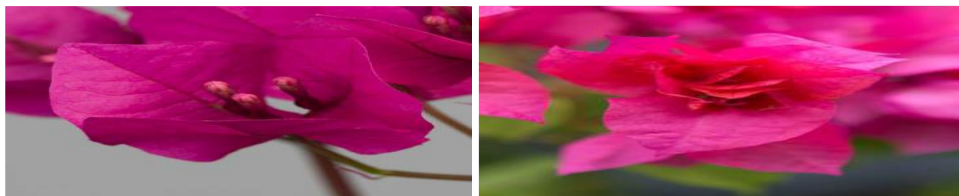
23. Inflorescence Peduncle: length

24. Inflorescence: arrangement of bract clusters

25. Inflorescence: number of bract clusters

26. Inflorescence: density of bract clusters

27. Inflorescence: presence of flowers



1. single

2. double

28. Inflorescence: type of bract

29. Bract: length

30. Bract: width

31. Bract: shape

32. Bract: Reflection

33. Bract: shape of Tip



1 narrow ovate
medium ovate



2



3 broad ovate



4 circular

34. Bract: shape of base



1 acute
3 cordate



2 obtuse

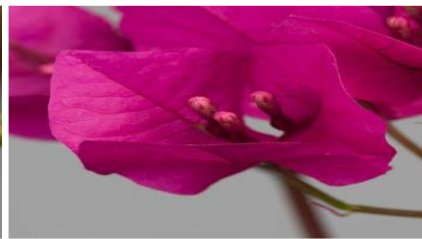


35. Only varieties with inflorescence type of bract: single: Calyx lobes: color of upper side

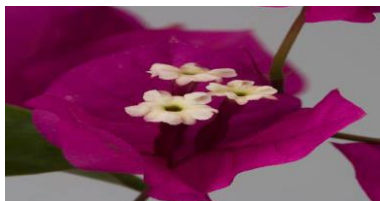
36. Small young bract: main color of outer side

37. Young bract: main color of inner side (calyx lobe not open)

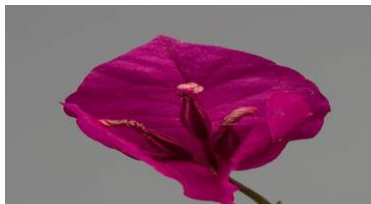
38. Young bract: main color of inner side



Small young bract
Young bract – calyx lobe not open



Young bract – calyx lobe open
calyx lobe wilted



Bract –

39. Only varieties with inflorescence type of bract: double: Young outer bract: main color of inner side
40. Only varieties with inflorescence type of bract: double: Young inner bract: main color of inner side
41. Young bract: secondary color of inner side (calyx lobe open)
42. Young bract: tertiary color of inner side (calyx lobe open)
43. Bract: main color of inner side (calyx lobe wilted)

A considerable variation was observed for all the 43 important traits under studies. Therefore, morphological characterization studies was undertaken to describe and formulate descriptor of Bougainvillea varieties. Characterization is a type of hortotaxonomical study for documenting vegetative and floral characters for correct identification and nomenclature of new cultivars that play a vital role in Parents selection for breeding programmes.

Conclusion

Morphological characterization is an important study for establishing true identify of any new or existing variety of ornamental plants for the purpose of registration and deriving commercial benefit out of that as per PPV & FR Act, 2001.

Acknowledgement

Authors are grateful to Director, CSIR-NBRI, Lucknow for providing necessary facilities and kind guidance for the study.

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Role of Tool and Techniques for Sustainable Ecosystem

Atul Tiwari

Department of Biotechnology, M.P.S. College, Agra

Communicating Author: dratult@gmail.com

Introduction the Convention on Biological Diversity (CBD) defined biotechnology as “any technology application that uses biological systems, living organisms, or derivatives thereof, to make or modify products or processes for specific use.”

In a broad sense, the definition covers many of the tools and techniques, which have been commonly used in agriculture and food production, processing, and utilization. In a narrow sense, however, it encompasses DNA techniques, molecular biology, and reproductive technological applications dealing primarily with gene splicing and recombination, and genomics.

In the present context, the narrow sense definition of biotechnology has been considered. Biotechnology is already underpinning the sustainable development of agriculture, forestry, and fisheries, as well as the food and other primary product-related industries. It has tremendous potential for impacting global food security, human and animal health, environmental health, and overall livelihood of mankind. However, as in the case of any complex technology impacting wide range of processes and developments, the gains from modern biotechnology are accompanied with certain negative effects and concerns.

The nature and extent of the positive and negative impacts will depend on the choice of the technique, place and mode of application of the technique, ultimate use of the product, concerned policies and regulatory measures, including risk assessment and management ability, and finally on the need, priority, aspiration and capacity of individual countries.

The science of biotechnology is no exception. Molecular biology researches have beautifully been disentangling the thread of life which are being carefully

rearranged to serve the humanity by thwarting diseases, poverty, and hunger. It is the application part of the science which, at times, generates contradictions, and not the science per se.

Modern biotechnology includes the following interdependent components: genomics, bioinformatics, transformation, molecular breeding, diagnostics, and vaccine technology. While there is general appreciation of the potential and impact of each of the components, controversies generally surround the transformation component resulting in Genetically Modified Organisms (GMOs), which may pose certain risks inherent to the technology. Other contradictions, socioeconomic in nature, are technology-transcending.

Therefore, it is not the science of biotechnology which is a subject of controversy, but it is the mode and nature of its application, through techniques and technologies, which could stir contradictions. Biotechnology, especially as it deals with living organisms, with its veritable manifestations, has been a subject of extensive public debate. As regards biotechnology in relation to biodiversity and sustainable agriculture, the three are complementary, synergistic and interdependent, and not contradictory to each other. Biodiversity is fundamental to both biotechnology and sustainable agriculture. Judicious, rational, and science- and need-based exploitation of genetic resources through biotechnological techniques should lead to sustainable agriculture.

The controversy arises only when non-scientific, hasty, profit-motivated, inhuman and unethical applications of biotechnology, and use of biodiversity are contemplated. Scares like ‘terminator gene’ and the ‘negative’ application of gene use restriction technologies (GURTs) are seen as moves toward monopolistic control of the thread of life by a few global companies. It has to be pointed out that the issues of food safety and biosafety could be matters of real contradiction. Horizontal gene transfer through genetic engineering is a possibility, posing threat to biodiversity and sustainability. However, with the scientific assessment of the

risk and adoption of preventive and corrective measures, the risks (contradictions) could be avoided or at least minimized.

With the overwhelming evidence of high synteny among genomes of highly diverse organisms, such as flies and mammals, the risk from horizontal gene transfer gets diluted. As new results and understandings build up, which is happening exponentially, the risks and contradictions must be assessed critically and continually on a case-to-case basis. This paper briefly describes

- 1) The status of the use of biotechnology for conservation and use of biodiversity and interaction among them.
- 2) The status of use of biotechnology for sustainable agriculture.
- 3) How real are the contradictions among biotechnology, biodiversity, and sustainable agriculture.
- 4) Issues and efforts in resolving the concerns and contradictions.
- 5) The way ahead.

The field of microbiology has traditionally been concerned with and focused on studies at the population level. Information on how cells respond to their environment, interact with each other, or undergo complex processes such as cellular differentiation or gene expression has been obtained mostly by inference from population-level data. Individual microorganisms, even those in supposedly “clonal” populations, may differ widely from each other in terms of their genetic composition, physiology, biochemistry, or behavior.

This genetic and phenotypic heterogeneity has important practical consequences for a number of human interests, including antibiotic or biocide resistance, the productivity and stability of industrial fermentations, the efficacy of food preservatives, and the potential of pathogens to cause disease.

New appreciation of the importance of cellular heterogeneity, coupled with recent advances in technology, has driven the development of new tools and techniques

for the study of individual microbial cells. Because observations made at the single-cell level are not subject to the “averaging” effects characteristic of bulk-phase, population-level methods, they offer the unique capacity to observe discrete microbiological phenomena unavailable using traditional approaches. As a result, scientists have been able to characterize microorganisms, their activities, and their interactions at unprecedented levels of detail.

With the advancement in the molecular biology techniques, researchers have learnt to isolate, characterize, and manipulate the molecular components of cells and organisms. These components include DNA, the repository of genetic information; RNA, a close relative of DNA that plays a central role in the pathway from DNA to proteins, known as "Central Dogma" of molecular biology; and proteins, the major structural and enzymatic component of cells.

Molecular biology techniques are common methods used in genetics, biochemistry, molecular biology, and biophysics to address issues such as:

- Identification of genes associated with a wide range of human diseases.
- Mechanisms involved in the control of gene expression.
- Structural-functional studies of proteins
- Identification of novel disease-specific markers for diagnosis.
- Gene therapy strategies for the treatment of human disease.
- Engineering cells, e.g. stem cells
- Engineering plants for crop improvements, pathogen resistance etc.
- Identify nature & treatment of viral, bacterial & fungal diseases

Microbial diversity is an important component of the overall global biological diversity. Recent technological advances in exploring microbial diversity have

revealed that a large proportion of microorganisms are still undiscovered, and their ecological roles are largely unknown.

Careful selection of microbes and intelligent design of test assays are the key steps in developing new technologies for effective utilization of microorganisms for sustainable agriculture, environmental protection, and human and animal health.

Several microbial applications are widely known in solving major agricultural (i.e., crop productivity, plant health protection, and soil health maintenance) and environmental issues (i.e., bioremediation of soil and water from organic and inorganic pollutants). Wastewater treatment and recycling of agricultural and industrial wastes are other important uses of microbial technology. It is expected that microbes in combination with developments in electronics, software, digital imaging, and nanotechnology will play a significant role in solving global problems of the twenty-first century, including climate change.

These advances are expected to enhance sustainability of agriculture and the environment. This chapter provides an overview of recent trends in microbial exploitation in plant growth promotion and sustainable environment mainly through bioremediation, biodegradation, and biosorption processes. Recent uses and application of microbes such as biosensors, synthesis of nanomaterials, and probiotics are also discussed.



Abstracts

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2019



Future Prospective of Saliva Proteomics Based Brain-Specific Disease Diagnostics

Krishan Gopal Pathak¹ and Dr. Arun P. Sikarwar²

Department of Zoology, Faculty of Science, Dayalbagh Educational
Institute (Deemed University), Agra.

Email: arunsikarwar@dei.ac.in

¹Ph.D. Scholar and²Ph.D. Supervisor

ABSTRACT

Human saliva may appear somewhat uninteresting, but it is actually a complex liquid composed of various enzymes, hormones, antibodies, antimicrobial constituents, and growth factors. Human saliva may contain more than 2000 proteins. Brain disorders, especially neurodegeneration is caused by a progressive loss of certain classes of neurons that affect motor skill, memory, and overall cognition. Several neurological disorders might be resultant of up-regulation or down-regulation of certain proteins and similarly the same might be reflected in salivary proteins. Thus checking the altered behaviour of such salivary proteins would reflect the diagnosis and prognosis of neurological diseases. This can highlight the urgent requirement for the development of easily accessible, non-invasive and cost-effective diagnostic tests that aim at early identification of neurological diseases. Indeed the salivary biomarkers, in their initial stages will not be able to solely detect neurological pathologies, but instead, these biomarkers shall serve towards in diagnosis, or simply replacing another invasive test. Brain derived neurotrophic factor (BDNF) acts on certain neurons of the CNS and PN, helping to support the survival of existing neurons, and encourage the growth and differentiation of new neurons and synapses and thus overall affect brain health. The scientific exploration towards non-invasively detecting BDNF through human saliva, mirror the brain health.

Key words- Saliva, brain disease and BDNF

EFFECT OF FUNGI ON SYNTHETIC DYE PRESENT IN INDUSTRIAL EFFLUENT USED FOR AGRICULTURAL CROP

*Kashif Hussain¹, Tulsi Bisht² and Popin Kumar¹

¹Gyani Inder Singh Institute of Professional Studies, Dehradun,
Uttarakhand.

²Dev Bhoomi Institute of Pharmacy and Research, Dehradun,
Uttarakhand.

*E.mail:2001kashif@gmail.com

ABSTRACT

Excessive use of synthetic dyes by food, leather, textile and paper industries and its discharge to the nearby water bodies is a major concern for all environmentalists specially for the agriculture, due to their low biodegradable nature and health problem like skin allergy, dermatitis, skin irritation and also has toxic, carcinogenic and mutagenic nature, it also lead to low water visibility. Conventional biological method for wastewater treatment is unable to treat dye containing effluents. Use of synthetic dyes results in specially skin allergy, dermatitis, irritation of skin and they are also reported to be toxic, carcinogenic and mutagenic in humans. To solve this problem two species of fungi I and II were isolated from pond water. These fungi individually inoculated in batch culture in shaking as well as stationery condition at different temperature and different concentration of fungi, for fifteen days using a suitable fungi grow culture media. Experiment was carried out in duplicate with control (without fungi) by adopting batch culture in 100 ml of wide bottle for 15 days at room temperature ($27^{\circ}\text{C} \pm 1^{\circ}\text{C}$) under shaking, stationery, different temperature and different fungi concentration condition. The bottles are filled with 50 ml of dye media and desired concentration (0.05%, 0.5% and 1.0%) and 50 mg of algal was inoculated in each bottle except the control. pH of the reaction mixture was adjusted to (7.0 ± 1) after the inoculation of fungi. Degradation of dye was observed at regular interval throughout the experimental period. Dye concentration was measured by filtering (Whatman No. 42) the sample and optical density (OD) was measured at the corresponding maximum wavelength using spectrophotometer. The studies reveal the potential effect in dye degradation by degrading the color of synthetic dyes up to 95%.

Key words: Natural colors, Dye, Fungi, Synthetic dye degradation.

Role of Rhamnolipids in Agriculture Plant Protection

Touseef Hussain

Dept. of Biotech. and Microbiology, Kalp Laboratory, Mathura, UP, India

Hussaintouseef@yahoo.co.in

Abstract

Biosurfactants are gaining importance in various industries like agriculture, food, textiles, and petrochemicals. The rhamnolipids have been pointed out as the most promising biosurfactants because emulsification, detergency and wetting, amongst others, are important properties ascribed to such molecules. The most studied microorganisms for the production of rhamnolipids are the bacteria of the genus *Pseudomonas spp.* The aim of this work was to produce rhamnolipid type biosurfactant by putative *Pseudomonas aeruginosa* isolated from oil-contaminated sites. The present review provides an overview of the effect of rhamnolipids in plant defence responses. Treatments have been shown to protect potato plants from *Phytophthora* blight, soil-borne pathogens and also prevent the development of infection on leaves. They have been also shown to induce resistance in plants, which is effective against a broad range of pathogens. It is demonstrated that Rha-C10-C10 and Rha-Rha-C10-C10 from *P. aeruginosa*. Rhamnolipids are new actors in plant defence and their low toxicity and biodegradability make them promising molecules to be used against pathogens. In this respect, there are some clues now available for the success of rhamnolipids applications in greenhouses to fight phytopathogens. Rhamnolipids have a dual mode of action: they are antimicrobial and also stimulate plant defence responses. This dual property is probably very important for the efficiency of new biopesticides.

Keywords: Plant pathogens, Agriculture, biopesticides, *Pseudomonas sp.*

Post-infection development and histopathological alterations induced by *Meloidogyne incognita* on roots of cowpea

Atirah Tauseef,* Hisamuddin, Mohd. Danish

Department of Botany, Aligarh Muslim University, Aligarh.

[e-mail- atirahtauseef92@gmail.com](mailto:atirahtauseef92@gmail.com)

Abstract

A pot experiment was conducted in the Department of Botany, Aligarh Muslim University, Aligarh to study the interactive effects of *Meloidogyne incognita* on cowpea. Excised cowpea roots were examined to elucidate the histopathological response of infected plants towards the root-knot nematode (*M. incognita*). The second stage juveniles entered the roots and moved intercellularly into the inner tissues by separating the cell walls. The first sign of infection was noticed 48 hours after inoculation as the cells in vicinity of juvenile head became hypertrophied. The study depicted that the nematode penetrated the cortex perpendicular to the stelar region and established a permanent feeding sites adjacent to the endodermis. The nematode feeding induced hypertrophy as well as hyperplasia in the affected region comprising endodermis, pericycle and parenchyma of vascular tissues. Feeding sites were characterized by the occurrence of giant cells containing dense and granular cytoplasm enclosing hypertrophied nuclei. The cytoplasm in these giant cells was found aggregated along the thickened cell walls. The head region of the nematode was in contact with the giant cells while remaining part of the body expanded and caused disruption in the vascular and cortical arrangement. Nematode - induced mature galls were large and usually contained one or more females associated with egg masses. The cortical tissues were also found disrupted due to extrusion of egg masses on the root surface.

Keywords-*Meloidogyne incognita*, Histopathology, cowpea, Hypertrophy, Giant cell.

Using the midgut microflora to assess the impact of vector control on malaria parasite transmission.

Ankita kumari 1 and Arti Prasad 2

¹Research Scholar, Laboratory of Public Health Entomology,
Department of Zoology, UCOS, Rajasthan, India

²Professor and Head Department of Zoology, UCOS, Mohanlal Sukhadia
University, Udaipur, Rajasthan, India

Correspondence to:

Ankita kumari, Research Scholar, Laboratory of Public Health
Entomology,

Department of Zoology, UCOS, Mohanlal Sukhadia
University, Udaipur, Rajasthan, India

E-mail Id: ankitabochldaji@gmail.com

Abstract

Prior studies have shown that annual entomological inoculation rates (EIRs) must be reduced to less than one to substantially reduce the prevalence of malaria infection. In this study, EIR values were used to quantify the impact of insecticide-treated bed nets (ITNs), indoor residual spraying (IRS), and source reduction (SR) on malaria transmission. The analysis of EIR was extended through determining whether available vector control tools can ultimately eradicate malaria.

Malaria is a serious public health problem in many parts of world including India. About 95% population of the country resides in malaria endemic areas. Malaria is caused by a protozoan parasite belonging to the genus Plasmodium. Many control strategies for malaria has been developed over the years which has been proved total for human kind.

The genera of mosquito actually responsible for transmission of malaria in humans are Anopheles. *Anopheles stephensi* (L.) is the main vector in urban India, where 70% of world-wide malaria related cases occur. Although, only few species of it act as vector whereas the species which donot transmit the disease are termed as non-vectors. Majorly, Anopheles species keeps on changing their ecological niche and behaviour by adopting new ecological, and climatic changes induced by humans (Muriu *et al.*, 2008).

The population and density of malaria vectors and non-vectors are generally not static (Duffy, 1977) and hence they keep on extending their

range beyond their normal area of distribution when temporary suitable conditions occur in neighbouring areas (WHO, 2010).

Current efforts have proven inadequate to stop the transmission of plasmodium parasites, and hence the spread of malaria, by *Anopheles* mosquitoes. During the development and maturation of parasite in vector the midgut of the female *Anopheles* is a major site of interaction. Interruption of parasite development in mosquitoes remains the enticing strategy for the control of mosquito-borne diseases. The malaria parasite development involves critical steps within the mosquito midgut, an environment it shares with gut-residing bacteria. The occurrence of apparent 'symbiotic' association between *Anopheles* mosquitoes and bacterial species has not been much evaluated. Therefore, a novel arsenal of strategies for inhibiting plasmodium infection of mosquitoes is urgently needed (Rani *et al.*, 2009).

There is current interest in the use of microorganisms as biological control agents of vector-borne diseases. Microorganisms associated with vectors could exert a direct pathogenic effect on the host by interfering with its reproduction or reduce vector competence.

A better understanding of the roles of microbiota in the exploiting host immunity in defending against pathogens could potentially lead to the development of new malaria control strategies (Dong *et al.*, 2009).

Effect of different fly ash levels with nitrogen fertilizer on *plant growth*, yield and photosynthetic pigments performance of radish (*Raphanus sativus*)

Moh Sajid Ansari* Gufran Ahmad and Abrar Ahmad Khan

Section of Environmental Botany Lab, Department of Botany, Aligarh
Muslim University, Aligarh-202002, U.P., India

Corresponding author: sajidamu12@gmail.com

Abstract

Fly ash is glass like fine powder waste material of thermal power plants generated by the burning of lignite coal for the production of electricity. Fly ash contains several macro and micro nutrients including S, B, Ca, Mg, Fe, Cu, Zn, Mn, and P except N, which are beneficial for plant growth and yield. Radish is consumed as a root vegetable, a leafy vegetable, and is used as forage crop. In human diets, radish provides a rich source of vitamin A, vitamin C, minerals and carbohydrates. The present study was an attempt to evaluate the effect of different levels of fly ash (10%, 20%, 30%, 40% and 50%) combined with nitrogen fertilizer (0.5g, 1.0g) on the plant growth, yield and photosynthesis pigments markers in radish. All the plant growth, yield and chlorophyll content markers were significantly ($P \leq 0.05$) increased upto 30% fly ash with nitrogen fertilizer (0.5g and 1.0g) as compared to control. In the finding the maximum enhancement in growth of radish crop was observed at 1.0g nitrogen fertilizer with 30% fly ash level as compared to 0.5g nitrogen fertilizer with 30% fly ash level. However, higher levels (40% and 50%) of fly ash were harmful for plant growth and yield of radish with both nitrogen fertilizer doses. Present study showed that 30% fly ash combined with 1.0g nitrogen fertilizer is the best level for radish crop.

Keywords: Chlorophyll, fertilizer, fly ash, growth, radish

Assessment of genetic variation in selected members of Apocynaceae family using SDS-PAGE

¹Rajdeep Kudesia and ²Mahendra Pal Singh*

Department of Botany, Faculty of Science,
Bundelkhand University, Jhansi, UP, India

E_mail: chauhanmp1986@gmail.com, kudesiard@rediffmail.com

Abstract

Genetic variation of any plant species is very interesting in reducing genetic vulnerability as well as stabilizing production. In this regard, a study was undertaken to analyze the genetic variation among selected members of family Apocynaceae by using sodium dodecyl sulphate polyacrylamide gel electrophoresis (SDS-PAGE). In this study, a total of 53 bands were analyzed, out of them all bands were polymorphic with a total of 100% polymorphism. The protein size base polymorphism revealed the range of protein bands based on their molecular weights which revealed from 151kD to 11 kD. The binary data generated from the polymorphic bands over the selected species were used to compute Jaccard's Similarity Coefficient, ranged from 0.04 to 0.200. A dendrogram was constructed based on UPGMA (unweighted pair group method using arithmetic averages) clustering method revealed three clusters. Cluster I contain three species in grouped namely *Thevetia peruviana*, *Catharanthus roseus* and *Nerium indicum*, in which *Thevetia peruviana* and *Catharanthus roseus* were more closed than *Nerium indicum*, while cluster II included only one species namely *Rauvolfia serpentina*. *Carissa carandus* emerged as the most primitive species forming an out group (cluster III). Thus, this study revealed that the SDS-PAGE method plays a key role in the study of protein based variation among selected plant species.

Key words: SDS-PAGE, Genetic variation, Apocynaceae, UPGMA.

Molecular Characterization and Divergence Analysis of Chickpea Genotypes Using Morphological Characters and Microsatellite Markers

¹RAHUL ANAND* AND ¹MITHILESH KUMAR

Department of Agricultural Biotechnology and Molecular Biology

Dr. Rajendra Prasad Central Agricultural University, Pusa, Bihar

Email Id: rahulanandbhu@gmail.com

Mobile No. + 91 8709417780

Abstract

Both morphological and molecular work was carried out at Dr. RPCAU, Pusa. Twenty four genotypes were chosen for morphological and eighteen genotypes for molecular characterization of chickpea. The highest inter-cluster distance was observed between cluster I and V on the basis of their genetic distances. Cluster II showed maximum cluster mean values for yield per plot (538) and attributing characters like plant height (40.20); number of primary branches (3.05) and pods per plant (15.13) by cluster I, number of seeds per pod (1.59) by cluster III and 100 seed weight by cluster V. Molecular markers generated a total of 77 shared and 50 unique allelic variants in the form of amplified products. The polymorphism information content values revealing allele diversity and frequency among the chickpea genotypes varied from 0.549 in H2A02 to 0.994 in H2E13. Eight SSR primers namely, H1A06, H1I24, H2A11, H2I10, H2J10, H2J11, H2J19, and H3A07 appeared to be highly polymorphic and informative. The polymorphism percent to be the maximum in the case of H2I01 (71.42%). By drawing the twenty-six phenon similarity units, the entries were basically divided into six groups. There was 16.66% similarity between pattern based on morphological and molecular characterization.

Keywords- Allelic variants, Morphological, Molecular and Polymorphic

Future Prospective of Saliva Proteomics Based Brain-Specific Disease Diagnostics

Krishan Gopal Pathak¹ and Dr. Arun P. Sikarwar²

Department of Zoology, Faculty of Science, Dayalbagh Educational
Institute (Deemed University), Agra.

Email: arunsikarwar@dei.ac.in

¹Ph.D. Scholar and²Ph.D. Supervisor

Abstract

Human saliva may appear somewhat uninteresting, but it is actually a complex liquid composed of various enzymes, hormones, antibodies, antimicrobial constituents, and growth factors. Human saliva may contain more than 2000 proteins. Brain disorders, especially neurodegeneration is caused by a progressive loss of certain classes of neurons that affect motor skill, memory, and overall cognition. Several neurological disorders might be resultant of up-regulation or down-regulation of certain proteins and similarly the same might be reflected in salivary proteins. Thus checking the altered behaviour of such salivary proteins would reflect the diagnosis and prognosis of neurological diseases. This can highlight the urgent requirement for the development of easily accessible, non-invasive and cost-effective diagnostic tests that aim at early identification of neurological diseases. Indeed the salivary biomarkers, in their initial stages will not be able to solely detect neurological pathologies, but instead, these biomarkers shall serve towards in diagnosis, or simply replacing another invasive test. Brain derived neurotrophic factor (BDNF) acts on certain neurons of the CNS and PN, helping to support the survival of existing neurons, and encourage the growth and differentiation of new neurons and synapses and thus overall affect brain health. The scientific exploration towards non-invasively detecting BDNF through human saliva, mirror the brain health.

Key words- Saliva, brain disease and BDNF.

EFFECT OF FUNGI ON SYNTHETIC DYE PRESENT IN INDUSTRIAL EFFLUENT USED FOR AGRICULTURAL CROP

*Kashif Hussain¹, Tulsi Bisht² and Popin Kumar¹

¹Gyani Inder Singh Institute of Professional Studies, Dehradun,
Uttarakhand.

²Dev Bhoomi Institute of Pharmacy and Research, Dehradun,
Uttarakhand.

*E.mail:2001kashif@gmail.com

ABSTRACT

Excessive use of synthetic dyes by food, leather, textile and paper industries and its discharge to the nearby water bodies is a major concern for all environmentalists specially for the agriculture, due to their low biodegradable nature and health problem like skin allergy, dermatitis, skin irritation and also has toxic, carcinogenic and mutagenic nature, it also lead to low water visibility. Convectional biological method for wastewater treatment is unable to treat dye containing effluents. Use of synthetic dyes results in specially skin allergy, dermatitis, irritation of skin and they are also reported to be toxic, carcinogenic and mutagenic in humans. To solve this problem two species of fungi I and II were isolated from pond water. These fungi individually inoculated in batch culture in shaking as well as stationery condition at different temperature and different concentration of fungi, for fifteen days using a suitable fungi grow culture media. Experiment was carried out in duplicate with control (without fungi) by adopting batch culture in 100 ml of wide bottle for 15 days at room temperature ($27^{\circ}\text{C} \pm 1^{\circ}\text{C}$) under shaking, stationery, different temperature and different fungi concentration condition. The bottles are filled with 50 ml of dye media and desired concentration (0.05%, 0.5% and 1.0%) and 50 mg of algal was inoculated in each bottle except the control. pH of the reaction mixture was adjusted to (7.0 ± 1) after the inoculation of fungi. Degradation of dye was observed at regular interval throughout the experimental period. Dye concentration was measured by filtering (Whatman No. 42) the sample and optical density (OD) was measured at the corresponding maximum wavelength using spectrophotometer. The studies reveal the potential effect in dye degradation by degrading the color of synthetic dyes up to 95%.

Key words: Natural colors, dye, fungi, synthetic dye degradation, potency.

Role of Rhamnolipids in Agriculture Plant Protection

Touseef Hussain

Dept. of Biotech.and Microbiology, Kalp Laboratory, Mathura, UP, India
Hussaintouseef@yahoo.co.in

Abstract

Biosurfactants are gaining importance in various industries like agriculture, food, textiles, and petrochemicals. The rhamnolipids have been pointed out as the most promising biosurfactants because emulsification, detergency and wetting, amongst others, are important properties ascribed to such molecules. The most studied microorganisms for the production of rhamnolipids are the bacteria of the genus *Pseudomonas spp.* The aim of this work was to produce rhamnolipid type biosurfactant by putative *Pseudomonas aeruginosa* isolated from oil-contaminated sites. The present review provides an overview of the effect of rhamnolipids in plant defence responses. Treatments have been shown to protect potato plants from *Phytophthora* blight, soil-borne pathogens and also prevent the development of infection on leaves. They have been also shown to induce resistance in plants, which is effective against a broad range of pathogens. It is demonstrated that Rha-C10-C10 and Rha-Rha-C10-C10 from *P. aeruginosa*. Rhamnolipids are new actors in plant defence and their low toxicity and biodegradability make them promising molecules to be used against pathogens. In this respect, there are some clues now available for the success of rhamnolipids applications in greenhouses to fight phytopathogens. Rhamnolipids have a dual mode of action: they are antimicrobial and also stimulate plant defence responses. This dual property is probably very important for the efficiency of new biopesticides.

Keywords: Plant pathogens, Agriculture, biopesticides, *Pseudomonas sp.*

Post-infection development and histopathological alterations induced by *Meloidogyne incognita* on roots of cowpea

Atirah Tauseef,* Hisamuddin, Mohd. Danish

Department of Botany, Aligarh Muslim University, Aligarh.

e-mail- atirahtauseef92@gmail.com

Abstract

A pot experiment was conducted in the Department of Botany, Aligarh Muslim University, Aligarh to study the interactive effects of *Meloidogyne incognita* on cowpea. Excised cowpea roots were examined to elucidate the histopathological response of infected plants towards the root-knot nematode (*M. incognita*). The second stage juveniles entered the roots and moved intercellularly into the inner tissues by separating the cell walls. The first sign of infection was noticed 48 hours after inoculation as the cells in vicinity of juvenile head became hypertrophied. The study depicted that the nematode penetrated the cortex perpendicular to the stelar region and established a permanent feeding sites adjacent to the endodermis. The nematode feeding induced hypertrophy as well as hyperplasia in the affected region comprising endodermis, pericycle and parenchyma of vascular tissues. Feeding sites were characterized by the occurrence of giant cells containing dense and granular cytoplasm enclosing hypertrophied nuclei. The cytoplasm in these giant cells was found aggregated along the thickened cell walls. The head region of the nematode was in contact with the giant cells while remaining part of the body expanded and caused disruption in the vascular and cortical arrangement. Nematode - induced mature galls were large and usually contained one or more females associated with egg masses. The cortical tissues were also found disrupted due to extrusion of egg masses on the root surface.

Keywords-*Meloidogyne incognita*, Histopathology, cowpea, Hypertrophy, Giant cell.

Using the midgut microflora to assess the impact of vector control on malaria parasite transmission.

Ankita kumari 1 and Arti Prasad 2

¹Research Scholar, Laboratory of Public Health Entomology, Department of Zoology, UCOS, Rajasthan, India

²Professor and Head Department of Zoology, UCOS, Mohanlal Sukhadia University, Udaipur, Rajasthan, India

Correspondence to:

Ankita kumari, Research Scholar, Laboratory of Public Health Entomology, Department of Zoology, UCOS, Mohanlal Sukhadia University, Udaipur, Rajasthan, India
E-mail Id: ankitabochohldaji@gmail.com

Abstract

Prior studies have shown that annual entomological inoculation rates (EIRs) must be reduced to less than one to substantially reduce the prevalence of malaria infection. In this study, EIR values were used to quantify the impact of insecticide-treated bed nets (ITNs), indoor residual spraying (IRS), and source reduction (SR) on malaria transmission. The analysis of EIR was extended through determining whether available vector control tools can ultimately eradicate malaria.

Malaria is a serious public health problem in many parts of world including India. About 95% population of the country resides in malaria endemic areas. Malaria is caused by a protozoan parasite belonging to the genus Plasmodium. Many control strategies for malaria has been developed over the years which has been proved total for human kind.

The genera of mosquito actually responsible for transmission of malaria in humans are Anopheles. *Anopheles stephensi* (L.) is the main vector in urban India, where 70% of world-wide malaria related cases occur. Although, only few species of it act as vector whereas the species which do not transmit the disease are termed as non-vectors. Majorly, Anopheles species keeps on changing their ecological niche and behaviour by adopting new ecological, and climatic changes induced by humans (Muriu *et al.*, 2008).

The population and density of malaria vectors and non-vectors are generally not static (Duffy, 1977) and hence they keep on extending their range beyond their normal area of distribution when temporary suitable conditions occur in neighbouring areas (WHO, 2010).

Current efforts have proven inadequate to stop the transmission of plasmodium parasites, and hence the spread of malaria, by *Anopheles* mosquitoes. During the development and maturation of parasite in vector the midgut of the female *Anopheles* is a major site of interaction. Interruption of parasite development in mosquitoes remains the enticing strategy for the control of mosquito-borne diseases. The malaria parasite development involves critical steps within the mosquito midgut, an environment it shares with gut-residing bacteria. The occurrence of apparent 'symbiotic' association between *Anopheles* mosquitoes and bacterial species has not been much evaluated. Therefore, a novel arsenal of strategies for inhibiting plasmodium infection of mosquitoes is urgently needed (Rani *et al.*, 2009).

There is current interest in the use of microorganisms as biological control agents of vector-borne diseases. Microorganisms associated with vectors could exert a direct pathogenic effect on the host by interfering with its reproduction or reduce vector competence.

A better understanding of the roles of microbiota in the exploiting host immunity in defending against pathogens could potentially lead to the development of new malaria control strategies (Dong *et al.*, 2009).

Effect of different fly ash levels with nitrogen fertilizer on *plant growth*, yield and photosynthetic pigments performance of radish (*Raphanus sativus*)

Moh Sajid Ansari* Gufran Ahmad and Abrar Ahmad Khan
Section of Environmental Botany Lab, Department of Botany, Aligarh
Muslim University, Aligarh-202002, U.P., India
Corresponding author: sajidamu12@gmail.com

Abstract

Fly ash is glass like fine powder waste material of thermal power plants generated by the burning of lignite coal for the production of electricity. Fly ash contains several macro and micro nutrients including S, B, Ca, Mg, Fe, Cu, Zn, Mn, and P except N, which are beneficial for plant growth and yield. Radish is consumed as a root vegetable, a leafy vegetable, and is used as forage crop. In human diets, radish provides a rich source of vitamin A, vitamin C, minerals and carbohydrates. The present study was an attempt to evaluate the effect of different levels of fly ash (10%, 20%, 30%, 40% and 50%) combined with nitrogen fertilizer (0.5g, 1.0g) on the plant growth, yield and photosynthesis pigments markers in radish. All the plant growth, yield and chlorophyll content markers were significantly ($P \leq 0.05$) increased upto 30% fly ash with nitrogen fertilizer (0.5g and 1.0g) as compared to control. In the finding the maximum enhancement in growth of radish crop was observed at 1.0g nitrogen fertilizer with 30% fly ash level as compared to 0.5g nitrogen fertilizer with 30% fly ash level. However, higher levels (40% and 50%) of fly ash were harmful for plant growth and yield of radish with both nitrogen fertilizer doses. Present study showed that 30% fly ash combined with 1.0g nitrogen fertilizer is the best level for radish crop.

Keywords: Chlorophyll, fertilizer, fly ash, growth, radish

Seasonal Incidence of *Tonica ziziphi* on Citrus Crop

Amita Srivastava
Department of Zoology
D.G.P.G. College, Kanpur

ABSTRACT

A field experiment on the incidence of *Tonica ziziphi*, insect pest of citrus crop was conducted at C.S.A. Univ of Agriculture and Technology, Kanpur during 2017-18 (April - October)

Incidence on acid lime, kinnow orange and karna khatta by *Tonica ziziphi* was found that minimum temperature and relative humidity positively and significantly correlated with it. It has also been observed that on kinnow orange and karna khatta relative humidity showed non-significant correlation during the second year of investigation. In the partial regression coefficient negative value of maximum temperature reduced the incidence of insect pests with the increasing maximum temperature during 2017. Minimum temperature was found positive and significant only on karna khatta in 2017. During second year, all the independent variable revealed positive results. Multiple regression coefficients were highly significant during both the years of present investigation.

Keyword – Incidence, Regression coefficients

Tissue culture, Phytochemical screening and Evaluation of Antibacterial activity of *Glycyrrhiza glabra*

Anubhuti Raj¹, Vaishnavi Keshri²

¹Department of Microbiology, ²Department of Food Technology, Institute
of Bioscience and Biotechnology, C.S.J.M.U, Kanpur University, Kanpur
Email id:keshri.aarsi46@gmail.com

ABSTRACT

Glycyrrhiza glabra licorice is a traditional herb which grows in various parts of the world and has been used since earliest of times in treatment of various kinds of diseases like cough, asthma, arthritis, abdominal pain and infections etc. It has been also used in various formulation of Ayurveda as crude product. It is known as “sweet roots” which contains a compound glycyrrhizin that is roughly 50 times sweeter than sugar. The present study was undertaken to explore the phytochemicals present in *G. glabra*, antibacterial activity of the root and leaf extract of licorice and in-vitro micropropagation of *Glycyrrhiza glabra*. In phytochemical screening licorice showed the presence of metabolites like flavonoids, saponins, tannins, alkaloids, phenol and steroids. The study was conducted to determine the antibacterial activities of these metabolites on *E.coli* using the well diffusion method. The extracts showed significant antibacterial activities against organism. Results obtained from present study showed that *Glycyrrhiza glabra* is a rich source of metabolites and can be considered for isolation of potent antibacterial compounds having antibacterial activities. In-vitro micropropagation of stem segment with axillary buds of *Glycyrrhiza glabra* were done with different combination of plant hormones. Shoot initiation was observed within 2 weeks of incubation followed by alternate light and dark period of 16hr. each. Plant tissue culture can be utilized for higher cultivation of this medicinally important plant.

Keywords: *E.coli*, Antibacterial activity, Phytochemicals, Tissue culture.

Artificial Intelligence in Plant Pest and Disease Diagnosis

Duddukur Rajasekhar¹, M. Surya Prakash Reddy², P. Manjunath³

¹School of Crop Improvement, ³Department of Genetics and Plant
Breeding, CoA(Imphal)

¹College of Post Graduate Studies in Agricultural Sciences, Umiam,
Meghalaya.

^{1,3}Central Agricultural University, Imphal, Manipur.

²Departemnet of Plant Pathology, JNKVV, Jabalpur, Madhya Pradesh

*Email: drnaidu.agri@gmail.com

ABSTRACT

Artificial intelligence (AI) with deep learning models which help to identify plant diseases by the plant's appearance and visual symptoms that mimic human behavior should be considered. Pest and disease monitoring by using artificial intelligence (AI), advanced sensor technology and crowdsourcing capable of connecting the global agricultural community to help smallholder farmers. The present practice for plant disease detection is simply naked eye observation by specialists through which identification and detection of plant diseases is done. For doing so, specialists as well as continuous monitoring of plants is required, which costs very high. At the same time, in some countries, farmers do not have proper facilities or even idea that they can contact to specialists. Due to which consulting specialists even cost high as well as time consuming too. TensorFlow is a technique known for transfer learning to teach the AI to recognize crop diseases and pest damage in cassava crop. Penn State has also developed a mobile spectrophotometer through a start-up called CROPTIX. Early results suggest it can accurately diagnose different viral diseases in the field, even if the plant looks healthy. Another technique is using of image segmentation and soft computing technique to detect plant diseases. The deep convolutional neural networks (DCNN) was a robust and easily deployable strategy for digital banana disease and pest detection. Plantix is a free mobile application which offers farmers and gardeners the possibility to receive decision support directly on their smartphone. This app is able to identify the plant type, as well as the appearance of a possible disease, pest or nutrient deficiency.

Keywords: Artificial intelligence, Pests, Diseases, Diagnosis

Effectiveness of *Azolla pinnata* against *Ades aegypti* (Diptera: Culicidae) repellent in remote areas of Kanpur Dehat district

Nikhil Agnihotri
Dept. of Botany
S.K.J.D. Mahavidyalaya
Dilwal-Mangalpur, Kanpur Dehat
nikhil.azolla@gmail.com

ABSTRACT

Dengue is the most prevalent disease in present times. It is a vector borne disease with approximately 400 million infections per year. Now a days, over 120 countries around the world are effected from Dengue infections. India is also highly affected by this infectious disease. *Azolla* is a well known genous of aquatic pteridophyte which is widely found in tropical, semitropical and temperate regions of entire globe. It is widely used as green manure organic compost for increasing soil fertility as bioremediation agent, animal feed as well as mosquito repellent. The present study deals with utility of *Azolla* as mosquito controller in rural and remote areas of Kanpur dehat district. *Azolla* widely occurs in ponds and ditches and dies on its very birthplace. In the ponds where *Azolla* grows, it prevents the growth of the larva of the mosquitoes on the surface of water. This helps the locality fight dengue and other mosquito borne diseases very effectively. Local residents are not familiar with the utility of *Azolla* as organic compost or mosquito repellent. Hence, awareness programmes can be conducted to demonstrate the utility and explain the usefulness of *Azolla* as mosquito repellent to the local residents and farmers. Empty ponds were used for culture of *Azolla* which helped control the population of mosquitos. The present study deals with the usage of *Azolla* as ecofriendly and effective harmless mosquito repellent.

Key words-*Azolla*, dengue, *Ades aegypti*, mosquito repellent etc.

Gene Actions for Fruit Yield and its Component Traits in Tomato (*Solanumlycopersicum* L.)

BipashaDatta*, D. R. Mehta

Department of Genetics and Plant Breeding, COA, JAU, Junagadh Gujarat, India.

*bipasha2datta@gmail.com

ABSTRACT

Gene actions for fruit yield and its component traits of six basic generations (P₁, P₂, F₁, F₂, B₁ and B₂) of two crosses namely, JTL-15-02 x JT-3 (cross 1) and JTL-12-02 x AT-3 (cross 2) of tomato were estimated through generation mean analysis. The experiment was evaluated in Compact Family Block Design with three replications at Vegetable Research Station, Junagadh Agricultural University, Junagadh. The analysis of variance revealed the significant differences between the families as well as among the generations of each family for all the characters studied. Importance of both additive as well as non-additive gene actions was realized for most of the characters in both the crosses. However, non-additive gene actions were more profound than the additive gene action for all the characters in both the crosses except for fruit length in JTL-15-02 x JT-3. Duplicate type of epistasis was observed for fruit yield and its attributing traits suggesting selection would not be effective for such traits due to its non-fixable nature in earlier generation.

Key words: Tomato, gene action, generation mean analysis, epistasis

Oncogenic Effect on Tumor Targeting Cells

Abhilasha Singh*¹, Ashutosh Patel¹, Taniya Srivastava¹, Riya Rathor²,
Sandhya Yadav³, Manjusa Singh²

¹Department of Biotechnology, ²Biochemistry, Institute of Bioscience and
Biotechnology CSJMU,
Kanpur University, Kanpur

³Tahira Institute of Medical Sciences, Gida, Gorakhpur
Email Id: abhilashasingh2k15@gmail.com

Abstract

The dynamic nature of living system has always fascinated a wider range of people. Researcher has always been curious to know the logical explanations behind complex biological system. It is surprising to see how such system operate in compliance with the environment.

Normal cell undergoes division, differentiation and apoptosis. The cell which loses their usual control over their division, differentiation and apoptosis is call as tumour cells. The abnormal proliferation of cells without differentiation and apoptosis results in tumour cells.

One of the most dreadful diseases in the world is cancer which is caused due to accumulation of tumor cells at one place. The resercher ongoing efforts on several cancer studies which emphasis on gene responsible for uncontrolled cell growth- the hallmark of cancer –are being discovered and well-studied. These genes which increase the propensity towards developing cancer are called oncogenes. Any molecules that can nullify the action of oncogenes would ideally be effective in inhibiting the uncontrolled growth of cancer and thereby help in eliminating the tumor.

Keywords: Tumor, apoptosis, oncogenes.

Comparative Genomics in Crop Improvement

Duddukur Rajasekhar^{1*}, G. Sarath chandra², Ranjithkumar.G³ and P.
Manjunath⁴

¹School of Crop Improvement, ⁴Department of Genetics and Plant
Breeding, CoA(Imphal)

¹College of Post Graduate Studies in Agricultural Sciences, Umiam,
Meghalaya.

^{1,4}Central Agricultural University, Imphal, Manipur.

²Department of Genetics and Plant Breeding, Sam Higginbottom
University of Agriculture, Technology and Sciences, Prayagraj, Uttar
Pradesh.

³Departemnet of Genetics and Plant Breeding, JNKVV, Jabalpur, Madhya
Pradesh.

*Email:drnaidu.agri@gmail.com

ABSTRACT

For species with largely unexplored genomes, comparative genomics is a promising tool to gain information by utilizing the conservation between closely related plant species. In fact, plant genomes share extensive similarities even between distantly related species. The discovery of gene order conservation among the grasses provides the opportunity to further dissect the genetic control of traits in large genome species by investigating the underlying syntenic genes in small genome species. Among the plant kingdom, grasses have been the focus of comparative genomics analyses due to their high agronomic importance. The extent of genome conservation first became evident by comparative genome mapping studies, which suggested a colinear order of genes and markers shared by genomes of different species. It is noteworthy that plant genomes differ by several orders of magnitude in size; yet these differences generally correspond to intergenic regions. Recent advances in genome resequencing have led to increased interest in prediction of the functional consequences of genetic variants. Variants at phylogenetically conserved sites are of particular interest, because they are more likely than variants at phylogenetically variable sites to have deleterious effects on fitness and contribute to phenotypic variation. Nevertheless, in recent years, species-specific genomic resources are being generated and genomic resources from related cereal species are being transferred through comparative genomics studies. It is important to note that the comparative analysis of the

genome sequence data for Arabidopsis and rice is already providing important insights and understanding on the evolutionary relationships among various classes of gene families, including those representing components of hormone (especially auxin and cytokinin) signaling critical for plant development and growth. Furthermore, comparative genomics allows us to isolate QTLs of agronomic interest. Comparative genomics has provided important insights on genome evolution and how to best utilize marker/gene information from one species to the other.

Keywords: Comparative genomics, Genome, QTLs and Cereals

Effect of dates of sowing and genotypes on yield studies of Wheat (*Triticum aestivum*L.)

Uma and Manisha Dhakad

Deptt. Of Agronomy, R.B.S. College, Bichpuri, Agra, 283105(U.P)

Abstract

The field experiment on wheat was conducted at Raja Balwant Singh College, Agricultural Research Farm Bichpuri, Agra during Rabi season of 2014-15 with three dates of sowing 31st October, 15th November and 30th November and five levels of wheat genotypes as PDW-314, PDW-233, HD-4730, PDW-291 and WH-1105. The significant more bio-mass and grain yield were obtained of wheat crop sown on 31 October, as compared to November 15 and November 30, Genotypes WH-1105 proved significantly superiority over all other genotypes. Genotypes WH-1105 showed the significant PDW-314, PDW-233, HD-4730 and WH-291. Straw yield of 31st October sown wheat crop produced significant more straw yield than 15th November and 30th November sown crop and Genotype WH-1105 produced more straw yield than other genotypes PDW-314, PDW-233, HD-4730 and WH-291. The dates of sowing 31st October gave more harvest index than 15th November and 30 November and Genotype WH-1105 is statistically at par with PDW-233 and PDW-291.

Industrial applications of diatoms: an emerging sustainable tool

Raunak Dhanker^{1*}, Hans-Uwe Dahms^{2,3}, Archana Tiwari⁴, Jiang-Shiou
Hwang⁵

¹School of Basic and Applied Sciences, GD Goenka University, Gurugram,
India

²Department of Biomedical Science and Environmental Biology,
Kaohsiung Medical University, Kaohsiung City-807, Taiwan ROC

³Department of Marine Biotechnology and Resources, National Sun Yat-
Sen University, Kaohsiung City-804, Taiwan ROC

⁴Diatom Research Laboratory, Amity Institute of Biotechnology, Amity
University, Noida, India

⁵National Taiwan Ocean University, Institute of Marine Biology, Keelung
20224, Taiwan ROC

Presenting author*

Abstract

Microalgae are unicellular phototrophs wherein diatoms, represent outstanding class with wide range of diversity and enormous applications, in addition they also exhibit a major role in natural oceanic primary production globally. They are excellent sources of vitamins, pigments, carotenoids, polysaccharides, lipids, omega-3 fatty acids and other beneficial chemicals concomitant with the remediation of polluted waters and as bio-indicators of water quality. Their substantial trophic role, particularly of pelagic and microbenthic diatoms in providing food through their primary production for higher trophic level is well established. We explore the use of diatoms in various applications such as in value added product production, as a food for humans and animals, biofuel, and waste water bioremediation. Diatoms cells after degradation settled down in the form of silica which is known as diatomaceous earth. These death remains have tremendous applications for industrial and agriculture purposes and also responsible for their successful existence on the globe. Future perspectives of diatoms as bio-refinery will ensure the long-term sustainability of local biofuel production and waste water treatment are discussed. Due to the higher costs of biomass production and harvesting and the lack of appropriate technologies, we suggest an integrated usage of complete biomass of diatom and valorization of residual biomass production of diatoms for optimum utilization of potential of diatoms for human and animal welfare.

Key words: Microalgae, bio-refinery, biomass production, diatomaceous earth, remediation.

Ethno veterinary Practices of Plants in Kanpur

Rajesh Kumar and Seema Yadav*
Department of Zoology
D.A-V. College, Kanpur
Department of Zoology
Manohar Lal Degree College, Kanpur*
Rajeshkumar80y@gmail.com

ABSTRACT

Since the beginning of civilization, man has been dependent on plants for healthcare activities. Ancient Indians first discovered medicinal utility of plants. Many plants are also effective of both human and animal diseases. It can be assumed that the use of medicinal plants in the treatment of domestic animals started when the animals were used in agricultural practices. Many ancient Ayurvedic books describe plants utility of treatment of various domestic animals such as cows, horses, elephants etc. The present study is based on ethno veterinary practices of 25 plants Kanpur, U.P.

Plants under this study are used singly or in mixture in the treatment of animals. Scientific names, family, local name, habit and habitat and method of utilization are collected and documented. Most of the plants are useful more than one disease and useful more than one disease. Genda (*Tagetes erecta*) and Neem (*Azadirachta indica*) and *Nicotinum tubacum* is useful in skin, worms, wounds, tumours and ear diseases of cattle and dogs. Doob ghas (*Cynodon dactylon*) and Ghumchi (*Abrus precatorius*), Kalmegh (*Andrographis peniculata*) and Punarnava (*Bourhavia diffusa*) etc. are effective on intestinal and stomach diseases, while oil of Arand (*Ricinus communis*) with milk is useful in cattle, digestive and other problems created by oral consumption of polythene. Satavar (*Asparagus racemosus*) and Ashwagandh (*Withania somnifera*) are useful in reproductive problems.

Amaltas (*Cassia fistula*) and Doodhi (*Euphoria hitra*) are used in diarrhea. The traditional medicines are valuable not only as an indicator of plants to be methodological approach and strategies towards treatment and research so that the traditional or ethnobotanical knowledge can be preserved for the future generations of the country.

Key words- Ethnoveterinary practices, medicinal plants, traditional medicines etc.

Evaluation of Effects of EMS on selected varieties of *Glycine max*through SDS-PAGE of their Seed Proteins

Shikha¹, A.K.Singh¹ and Rajdeep Kudesia

1.Department of Botany, R.B.S. College, Agra 2. Department of Botany,
Bundelkhand University Campus, Jhansi (U.P.) India

ABSTRACT

Seeds of four varieties of *Glycine max* (i.e. PK-1029, PK-1042, PK-1092 AND PS1241) soaked in aqueous solutions having different concentrations of EMS for variable time periods after evaluating the LD50 for each variety. SDS-PAGE of the seeds proteins extracted from seeds of M1 plants showed the protein profiles of all experimental varieties and on comparing their protein profiles with control ones , maximum variations were detected in experimental var. PK-1042 treated with 0.5% EMS for four hours.

Key words: EMS, *Glycine max*, Protein profiles.

Intellectual property rights and Patent

Kirti,

Post graduate scholar , department of Botany ,Ch.Charan Singh P.G.
college, Heonra, Etawah

ABSTRACT

IPR covered patents, copyright, trademark, industrial designs ,geographical indications, IC designs. Different types of Intellectual property administred by Ministry of commerce and industry, Ministry of HRD ,Ministry of communication and information technology. Patent is an exclusive right granted by a country to the owner of an invention to make ,use ,manufacture and market the invention .A patent in the law is a property right and hence, can be gifted, inherited, assigned, sold or licensed. The patent right is territorial in nature and inventor will have to file separate patent applications in countries of their interest along with required fees , for obtaining patents in those countries. Novelty, Inventiveness and usefulness are the conditions satisfied to the patent. Invention means any new and useful Art, process, method or manufacture , machine, apparatus or other article .

Phytodiversity and Ethnobotanical Study of Medicinal Plants in Jalaun District, Bundelkhand Region, (U.P.), India

Ghan Shyam* and R.K. Gupta

Department of Botany, Dayanand Vedic College, Orai (Jalaun)

*Corresponding Author

Abstract

Phytodiversity of Jalaun district of Bundelkhand region, Uttar Pradesh has been analysed in the present study. The area has a unique phytogeographical position for floristic survey. The common vegetation of Jalaun district is mainly represented by tropical dry deciduous forest and thorn scrub forest. The floristic analysis shows 46 species belonging to 42 genera and 33 families of angiosperms. Dominant family is Fabaceae (6sp.) followed by Rhamnaceae (3sp.) and Rutaceae (3sp.). Most of the species are used by local people for their medicinal use. An ethnobotanical study was conducted from November 2017 to October 2019 for investigating the uses of medicinal plants by people of district Jalaun. The medicinal information of collected plants is based on personal interviews of villagers. These medicinal plants are used by the rural people for the treatments of various disease like jaundice, small pox, leprosy, antiseptic, cough, cold, bronchitis, skin disease, piles, diarrhea, diuretic, headache, asthma, toothache, fever, liver disorder, ulcer, urinary disorder, snake bites, scorpion bites, leucorrhoea and many other diseases. The present paper revealed medicinal uses of plants.

Keywords: Phytodiversity, dominant, medicinal, floristic survey.

Histopathological studies on Psoraleacorylifolia infected with Meloidogyne Incognita at different time intervals.

Yasar Nishat*, Mohammad Danish, Hisamuddin sheikh.

Abstract

A glasshouse experiment was conducted on *Psoraleacorylifolia* infected with *Meloidogyne incognita* in the department of Botany, Aligarh Muslim University, Aligarh, Uttar Pradesh. Histological studies of infected roots of the plants were carried out after 24 h, 48 h, 72 h, 5 days, 10 days, 15 days, 21 days, and 30 days after inoculation. The second-stage juveniles penetrated into the roots and moved intercellularly by separating the cell walls after 24 h. The first sign of infection observed after 48 h of inoculation was hypertrophy in the cells, around the head of the juvenile. The cytological changes in the parenchyma cells became more prominent after 72 h of inoculation and the cells transformed into discrete giant cells. The giant cell cytoplasm became dense and stained darkly, the size of the nuclei and the nucleoli increased after five days of inoculation. Ten days after inoculation, the width of vessel elements was also increased. The second-stage juveniles of *Meloidogyne incognita* moulted into the third stage. After 21 days of inoculation, hypertrophy and hyperplasia were observed in the tissue adjacent to the giant cells. At various occasions, the giant cell complexes appeared to be surrounded by abnormal xylem comprising of abnormal vessel elements, which were transformed from the hypertrophic and hyperplastic parenchymatous tissue. The head region of the nematode remained in contact with the giant cells while rest part of the body expanded and caused disruptions in the arrangement of vascular and cortical tissues, as was observed after 21 days of inoculation. After 30 days of nematode inoculation, egg masses were found associated with all the mature females. The root tissues got disrupted as the egg masses pushed out to the surface of the root. Several eggs enclosed first stage juveniles.

Key words: *Psoraleacorylifolia*, Histopathology, *Meloidogyne incognita*.

Isolate and identify Micro-organisms in Meat samples (Buffalo-Animal): A review

Hariom Gupta*

AL-TABARAK FROZEN FOODS PVT.LTD, ALIGARH, U.P. INDIA

*Corresponding author E-mail: hariomgupta975@gmail.com

ABSTRACT

Microorganisms are ubiquitous in natural environment. Some of these microorganism have found in meat samples of animal which cause disease and is consumed by human. The present study was developed to find out the microorganisms from meat samples of animal.

We have been used different media for detection of different microorganisms (E.coli, S.aureus, Salmonellae spp., Yeast & Mold, Coliform & fecal coliform, Aerobic Plate Count). in samples for meat testing in laboratory. We have used some method as serial dilution technique, gram staining technique and other biochemical test method to identifying microorganisms in microbiology laboratory. Meat samples were collected from different parts of animal. Samples were cultured on different media in microbiology laboratory for meat testing. When we observed microorganisms growing on culture-media plate to identify it base on their shape and to count colony of bacterial in plate by colony counter. Gram stain is probably one of the most commonly used staining procedures used in the field of microbiology. These colony of bacteria were stained by staining technique to find out the gram positive and negative bacteria on the base of their cell wall of bacteria. Biochemical tests are the tests used for the identification of bacteria species based on the differences in the biochemical activities of different bacteria. Biochemical test has been performed to be confirm the microbes in laboratory. Some biochemical test has been used as **1.**Catalase test, **2.** Oxidase test, **3.** Carbohydrate fermentation test, **4.** IMViC test - Indole production test, Methyl-Red, Voges-Proskauer test, Citrate utilization test, **5.** Starch hydrolysis test, **6.** Urease test, **7.** Hydrogen sulphide production test, **8.** Nitrate production test.

In the present study, some microorganisms have been isolated from meat samples that confirmed such as E.coli, S.aureus, Yeast & Mold, Coliform & fecal coliform, Aerobic Plate Count (APC). But other organisms as Salmonellae spp. has been detected in meat sample.

Key Words: Meat samples; Biochemical Test Method, Serial Dilution technique, Media and Gram-Staining.

Isolation and functional characterization of cadmium and PGPR Activity

Taniya Srivastava*¹, Abhilasha Singh¹, Ashutosh Patel¹, Riya Rathor²,
Sandhya Yadav³

¹Department of Biotechnology, ²Department of Biochemistry, Institute of
Biosciences and Biotechnology, CSJMU, Kanpur University, Kanpur

³Tahira Institute of Medical Sciences, Gida, Gorakhpur

Email Id: taniya.srivastava.97.28@gmail.com

Abstract

Heavy metals pollution represent an important environmental problem- the discharge of heavy metals into the environment as a result of agricultural and industrial operations. The effects of pollution on ecosystem and human health have been a concern for some years. Cadmium is one of the most toxic pollutants of the surface soil layer released into the environment by mining and smelting activity. Resistance and tolerance are defined terms frequently interchangeable and after based on whether an isolate can grow in the presence of selected heavy metals concentration in laboratory media. Total bacterial strains were isolated and screened on the basis of heavy metals tolerance ability for cadmium and their PGPR (Plant growth promoting Rhizobacteria) activity. Rhizosphere contamination due to heavy metals in agriculture leads to decreased production of edible crops. High water solubility and permeability of these life threatening metals leads to increased translocation to the upper part of the plants and accumulation of these metals in food crops. Apart from conventional methods, PGPR influenced bioremediation is now an emerging, eco-friendly and inexpensive tool. The possible mechanism of heavy metals resistance by a PGPR strain might be due to bioaccumulation or biotransformation. It is also used directly as biofertilizers.

Keywords: *PGPR, Biotransformation, Biofertilizers.*

Molecular diagnosis and characterization of black spot of papaya (*Caricae papaya* L.) caused by *Asperisporium caricae* (Speg.) Maubl

S.Shreedevasena*, S.K.Manoranjitham and L.Rajendran
Department of plant pathology, TNAU, Coimbatore -641 003,
Tamil Nadu, India
*shreedevasena@gmail.com

ABSTRACT

The incidence of black spot of papaya caused by *Asperisporium caricae* was recorded in Tamil nadu in the variety of red lady, CO. 2 and CO. 8. The Per cent disease severity ranged from 16.67 to 31.67 on leaves. The disease was characterized by small, black coloured spots on the lower surface of the leaf while corresponding upper surface have white necrotic spots with pale yellow margin. The similar black spots were also observed on the outer rind of the fruit which reduce the marketed value. The black spot fungus *Asperisporium caricae* was isolated on papaya leaf extract medium and the pathogenicity test was proved by spraying the conidial suspension of 1×10^5 ml⁻¹ concentration on the matured leaf surface. The optimal temperature required for the mycelial growth was 25°C and alternate cycles of light and darkness has maximum sporulation. Molecular confirmation of *Asperisporium caricae* through 18S rRNA gene sequencing gave an amplicon size of 560 bp size. The pathogen were sequenced and submitted to NCBI database with the accession number MK879405. The studies on influence of weather parameters revealed that the disease severity increased progressively from August to November month and the disease was found to be less in summer months. The present study was aimed to characterize the pathogen responsible for black spot of papaya which is an emerging disease that affects the production and productivity of papaya and hence an efficient management practices needs to be evolved to manage the disease.

Key words: Epidemiology, Molecular characterization, Papaya black spot, *Asperisporium caricae*,

PCR Based Methods for Plant Pathogens Detection

Mallikarjun P K, Balaji S and Deepika D*

School of Crop Improvement, College of Post Graduate Studies,
Central Agricultural University, Umiam, Meghalaya - 793103.

*email: mallihonna@gmail.com

Abstract

Globally nearly forty per cent crop and yield loss may happens due to crop infections incited from pathogens viz., bacteria, viruses and fungi and are persistent issues in agriculture for centuries. To ensure agricultural sustainability, to minimize the disease, an advanced disease detection and prevention in crops are imperative. In nature all organisms are having nucleic acid (DNA/RNA) as their genetic constitution. Basedon the fidelity of DNA hybridization and replication, Polymerase Chain Reaction (PCR)is one such direct and advanced pathogen detection method.PCR results in the exponential amplification of a target DNA/RNAstrand of pathogen. In comparison with traditional diagnostic methods, it offers several advantages which includes non-culturable pathogen detection. Itis rapid andversatile possesses exquisite sensitivity, with the theoretical potential to detect a single targetmolecule in a complex mixture without using radioactive probes. Amplified products are separated by agarose gel electrophoresis and specific bands obtained are used to detect the pathogen and study the polymorphisms. Many derivative methods in PCR for pathogen detection such as real time PCR, multiplex PCR, RT-PCR, nested PCR etc., facilitates the detection of a single pathogen or many members of a group of related pathogens. However, specific primers are required to amplify DNA for detecting different pathogens. Because of its cost effective nature to analyze pathogens at a faster rate PCR based methods are getting popular in the recent scenario. Pathogens like *Ralstonia solanacearum*, *Alternaria tenuissima*, *Citrus mosaic badnavirus*, *Cucumber mosaic virus*, *HLB*, *Candidatus Phytoplasma oryzae*, *Citrus Tristeza Virus* and many more were recently detecting using PCR methods.

Bioethanol Production from Sugarcane waste by Fermentation of Yeast

Ashutosh Patel*¹, Abhilasha Singh¹, Taniya Srivastava¹, Riya Rathor²,
Sandhya Yadav³

¹Department of Biotechnology, ²Department of Biochemistry, Institute of
Biosciences and Biotechnology CSJMU, Kanpur University, Kanpur

³Tahira Institute of Medical Sciences, Gida, Gorakhpur

Email Id-ashutoshpatel7839@gmail.com

Abstract

The aim of this study is to produce Bioethanol from sugarcane waste by Yeast (*S.cerevisiae*) fermentation. In Bioethanol production the most two factor is effecting the production of bioethanol is, its pH and temperature. Two enzymes participated in the bioethanol production as alpha amylase and glucaamylse. These enzymes are used to break down of cellulose present in Sugarcane baggess. The *saccharomyces cerevisiae* is used in the experiment of fermentation. The preparation of sample was done at the 37°C Temperature and pH 4.5. The purification of bioethanol is checked through running the sample in HPLC. The highest peak 5.643mAu was obtained at 29.563 min. It showed that at highest ethanol concentration was obtained at pH 4.5 and temperature 35°C - 37°C. This Parameter is gives us a maximum Bioethanol Production.

Keywords: S.cerevisiae, Bioethnol, glucaamylase, alpha amylase.

Assessment of Native microflora, Fungicides and Genotypes against Fusarium root rot disease in Coriander (*Coriandrum sativum* L.)

*M.S.V. Satyanarayana**¹, *K. Gopal*¹, *Ch. Ruth*¹, *M. Kavitha*¹ and *D. Ramesh*²

1. Department of Plant Pathology, College of Horticulture, Dr. YSR
Horticultural University, Anantharajupeta, YSR Kadapa, Andhra
Pradesh - 516105.

2. Department of Statistics, Agricultural College, Bapatla,
ANGRAU, Andhra Pradesh.

* Present address of the corresponding author:

School of Crop Protection, CPGSAS, CAU (Imphal), Umiam Meghalaya.

Email: shivamaaragaani7@gmail.com

ABSTRACT

Coriander is an important spice both in leaf and seed form as well in traditional cuisine. This crop is severely affected by soil borne diseases, root rot in particular. A survey was conducted in Andhra Pradesh to investigate the status of soil borne diseases in this crop, where highest disease incidence of root rot (38.71%), Wilt (10.35%) was observed in Kurnool district. The pathogen from infected plants responsible for the root rot disease was identified as *Fusarium solani*. Further, an experiment was carried out with one hundred and twenty germplasm to screen the resistance response against this disease. Amid the genotypes tested, least disease incidence (2.73%) and AUDPC (40.91) was recorded in LCC-22. *In vitro* experiment was conducted with four bioagents and six chemical fungicides for their inhibitory effect against the incitant. Among them, *Trichoderma harzianum* with 69.05% and Carbendazim + Mancozeb with 100% inhibition of *Fusarium solani* was found best in dual culture and poisoned food techniques respectively. Proceeding with that, an experiment on integrated disease management was conducted to manage the disease in field conditions with organic amendments along with best observed treatments *in vitro*, of which Neem cake + *T. harzianum* (T₄) was found significantly effective in managing disease incidence (9.8%, AUDPC value 610), plant height (37.7cm), number of branches/plant (4.7), umbels/plant (6.3), umbellets/umbel (5.0), root length (16.5 cm), seeds/umbel (6.7) and yield/plant (1.8 g) over control.

Key words: *Fusarium solani*, coriander, bioagents, fungicides

Studies on Combining Ability, Heterosis and Maternal effects for Yield and Contributing traits in Yellow Sarson (*Brassica rapa* L. var. *yellow sarson*)

Mayurakshee Mahanta* and Purna Kanta Barua

Email: mayuraksheemayur100@gmail.com

ABSTRACT

Rapeseed is the most important oilseed crop in Assam and major area under oilseeds is occupied by Toria (*Brassica rapa* L. var. *toria*). Yellow sarson (*Brassica rapa* L. var. *yellow sarson*), another ecotype of rapeseed has higher oil content due to thin seed coat. Development of varieties suitable for Assam conditions is an important breeding objective of this crop. The present investigation was conducted to analyse combining ability, heterosis and maternal effects for the yield traits in three Yellow sarson varieties (B9, YSH 401 and NRCYS 05-03) crossed in complete diallel design (Griffing, 1956). Significant differences were observed for all the thirteen characters from the analysis of variance. Combining ability analysis of variance revealed that variation due to GCA, SCA and reciprocals were significant for various characters. Both additive and non-additive gene effects were important in the inheritance of most of the characters. Analysis made on the Hayman's (1954) model exhibited maternal effects, which mainly accounted for the significant reciprocal effects for many characters. B9 was highly influenced by maternal effects as compared to the other two parents. YSH 401 was the best general combiner for early flowering, short plant height, seed yield per plant and harvest index and could be used for subsequent breeding programmes. YSH401 x B9 was the earliest and best cross showing good mean performance for various yield traits showing high heterosis. This could be good material for heterosis breeding, biparental mating and recurrent selection in this crop.

Keywords: yellow sarson, combining ability, heterosis, maternal effects

Clinical Evaluation of *Mycobacterium Tuberculosis* Culture and Multiplex PCR for the Characterization of Multiple Drug Resistance Tuberculosis in Dehradun, Uttarakhand, India.

Aditi Sharma^{1&2}, Narotam Sharma¹

¹Central Molecular Research Laboratory, Department of Biochemistry,
SGRR Institute of Medical & Health Sciences, Dehradun, India

²Gautam Buddha University, Greater Noida, Uttar Pradesh

Abstract

Multiple Drug resistance (MDR) tuberculosis timely diagnose is of utmost clinical relevance and needs to be diagnose at initial stages for the proper treatment. The current study was done to detect the multiple genes for MDR tuberculosis (TB) in clinical isolates by molecular tools. 186 clinical samples were considered out and subjected for AFB smear preparation, Nested PCR (*IS6110*) for *mycobacterium tuberculosis* complex detection and MDR TB PCR targeting *rpoB*, *kat G*, *mab A promoter*. 26 came positive for AFB smears, out of which 08 were pulmonary and 04 were extra pulmonary. Nested PCR targeting *IS6110* gene was amplified at 123 base pairs with 340 base pairs as IC (internal control) was seen in 43 cases which include 38 extra pulmonary. The Positive TB PCR specimens were subjected for MDR-TB PCR. Only 05 cases yielded, an amplicon of 315 bp confirming the *rpoB* gene resistance for resistance for rifampicin drug. In any of the 05 positives none of the other resistance gene other than *rpoB* was amplified. Targeting *IS6110* gene and *rpoB* genes at once, additional information can be gained from a single test run that otherwise would require several times the reagents and more time to perform. Current study signifies the usage of quick, cost effective, DNA sequences based method for Multiplex of MDR TB detection where disease can be diagnosed earlier and hence treatment would be started at an early stage. The ease to execute the standardized protocols and methodologies to study the slow grower clinically relevant pathogens like *Mycobacterium tuberculosis*. Such experimental studies will be useful to prepare strategies for the management of the disease and to formulate the plans in Revised National Tuberculosis Control Program (RNTCP) in India as well as it will help in managing the global Tuberculosis burden (as per the systemic protocols).

Keywords: Multiple drug resistance, amplicon, Polymerase chain reaction, Multiplex PCR, Nested PCR, *IS6110* gene and Rifampicin

Diversity of woody plant species in selected forests of Jalaun district, Uttar Pradesh

Ajay Kumar* & Dr. R.K.Verma
Department of Botany
Bundelkhand University, Jhansi (U. P.)
E-mail: calotropis11@gmail.com*

ABSTRACT

In the present study, a total number of 82 woody plant species under 63 genera belonging to 33 families were recorded. Among 33 families, Fabaceae, Moraceae, Rutaceae, Rubiaceae and Tiliaceae were found dominated with 23, 06 and 05 genera respectively. Among total number of woody plant species, some species like *Acacia catechu*, *Acacia leucophloea*, *Acacia nelotica*, *Azadiracta indica*, *Balanitis aegyptica*, *Capparis aphylla*, *Ficus glomerata*, *Prosopis juliflora*, *Pongamia pinnata* and *Ziziphus oenoplia* were common in each study sites. Based on phytosociological analysis, it is indicated that the study area comprises variety of woody species and it's important to understand the woody plant diversity within an area will be useful to observe the changes in forest ecosystem.

Keywords: Diversity, Woody Plants Species, Jalaun District Forests

PCR Based Methods for Plant Pathogens Detection

Mallikarjun P K*, Balaji S and Deepika D
School of Crop Improvement, College of Post Graduate Studies in
Agricultural Sciences,
Central Agricultural University (Imphal), Umiam, Meghalaya -
793103.

*email: mallihonna@gmail.com

Abstract

Globally nearly forty per cent crop and yield loss may happens due to crop infections incited from pathogens *viz.*, bacteria, viruses and fungi and are persistent issues in agriculture for centuries. To ensure agricultural sustainability, to minimize the disease, an advanced disease detection and prevention in crops are imperative. In nature all organisms are having nucleic acid (DNA/RNA) as their genetic constitution. Based on the fidelity of DNA hybridization and replication, Polymerase Chain Reaction (PCR) is one such direct and advanced pathogen detection method. PCR results in the exponential amplification of a target DNA/RNA strand of pathogen. In comparison with traditional diagnostic methods, it offers several advantages which includes non-culturable pathogen detection. It is rapid and versatile possesses exquisite sensitivity, with the theoretical potential to detect a single target molecule in a complex mixture without using radioactive probes. Amplified products are separated by agarose gel electrophoresis and specific bands obtained are used to detect the pathogen and study the polymorphisms. Many derivative methods in PCR for pathogen detection such as real time PCR, multiplex PCR, RT-PCR, nested PCR *etc.*, facilitates the detection of a single pathogen or many members of a group of related pathogens. However, specific primers are required to amplify DNA for detecting different pathogens. Because of its cost effective nature to analyze pathogens at a faster rate PCR based methods are getting popular in the recent scenario. Pathogens like *Ralstonia solanacearum*, *Alternaria tenuissima*, *Citrus mosaic badnavirus*, *Cucumber mosaic virus*, *HLB*, *Candidatus Phytoplasma oryzae*, *Citrus Tristeza Virus* and many more were recently detecting using PCR methods.

Key words: PCR, Detection, RT-PCR

Cancer control with the help of Biotechnology Techniques

Riya Rathor*¹, Sandhya Yadav⁴, Shashwat katiyar¹, Sagar Soni², Abhilasha Singh³, Ashutosh Patel³, Taniya Srivastava³, Manjusa Singh¹

¹Department of Biochemistry, ²Department of Microbiology, ³Department of Biotechnology, Institute of Bioscience and Biotechnology CSJMU, Kanpur University, Kanpur

⁴Tahira Institute of Medical Sciences, Gida, Gorakhpur

Email Id: nriya0325@gmail.com

ABSTRACT

Biotechnology with unique accuracy, higher efficiency power analysis ability at molecular level provided researchers with detailed information about causes, biomarkers, genes, factors, target and anticancer ligands for control of a many cancers. The side effects of conventional methods of cancer therapy such as chemotherapy and radiotherapy need to switch with more advance techniques and better drugs. Biotechnology has helped to understand cancer in various ways such as Gene profiling, Genome analysis, cell culture, culturing transgenic cell lines and help in identification of new biomarkers for detection of risk and progression of cancer. Cell culture is used to investigate the effects of the genes involved in the incidence of cancer on cultured cells. Biotechnology has immense role in cancer research such restrictions and contribute significant role in developing new drugs, therapy for cancer control and prevention. Gene profiling, Genome analysis and cell culture techniques will helpful for researcher to improve the technology for the advancement of cancer targeting therapies. With these ideas and development of applicable new techniques help in providing the major opportunities for researchers to expand it field for cancer patients with the help of biotechnology. It will definitely boom for millions of cancer patients.

Keywords: Gene profiling, Genome analysis, Cell Culture.

Stubble: Hidden opportunities

Shubham Goyal^{1*}, Nishant Pandey², Krishna Kumar², Raunak Dhanker³

¹Amity Institute of Biotechnology, Amity University, Noida

²School of chemical and life sciences, Department of Biotechnology,
Jamia Hamdard, New Delhi

³School of Basic and Applied Sciences, GD Goenka University, Gurugram,
Haryana

Presenting author*

ABSTRACT

Stubble is the leftover of the harvested crops such as wheat and rice which is one of the major concern nowadays, burning of these stubble results in release of the SO_x, NO_x, CO₂ and CO gases in the environment with release of particulate matters causing the air pollution furthermore. Burning of stubble also results in raising of the temperature of the soil resulting in destruction of the soil fertility by killing of bacterial and fungal colonies in soil responsible for the soil fertility along with loss of phosphates, nitrates, potassium and iron in large amount which has been accumulated during their development into crops.

Our study is based on the application of this stubble as a source for the production of the biofuels as they have a large amount of carbohydrate with other organic molecules which can be used in fermentation for the production of bio ethanol, furthermore after the fermentation the residues can be used for the cultivation of the algae, used in the production of the SCP and biofertilizers. This stubble can also be directly used for the production of the biogas under the digester by the process of decomposition which may be directly delivered to the village for household application and left over compost may be used as manure. With some little investment we may also encourage the villagers for making artefacts from these stubbles such as *Tokari*, flower and fruit pots, mats having economical values in market that can be used as replacement of plastic as well as provide economic support to villagers.

Keywords: Stubble, pollution, clean energy, biofuels, Economic support.

Assessment of Antibacterial Activity of Clove and Neem Plants against Diverse Bacterial Population

Lakshya Chaudhary*, Pooja Kumari¹, Atul Tiwari²,
Corresponding Email Id: clakshya94@gmail.com

ABSTRACT

For a long period of time, plants have been a valuable source of natural products for maintaining human health, especially in the last decade, with more intensive studies for natural therapies. Now days the use of photochemical for pharmaceutical purpose has gradually increased in many countries. According to World Health Organization (WHO) medicinal plants would be the best source to obtain a variety of drugs. About 80% of individuals from developed countries use traditional medicine, which has compounds derived from medicinal plants. Plants are known to be the source of many chemical compounds. Medicinal plants were used by people of ancient cultures without knowledge of their active ingredient. The common practice of taking crude extract orally is laden with hazards as the extracts may contain some toxic constituents. There is an ever increasing need to limit toxic clinical drugs. This study emphasizes antimicrobial properties of plant essential oils against human pathogenic bacteria. It has been observed that all the essential oils possess both bacterio-static and bactericidal activity much higher than that of synthetic antibiotics when tested in vitro. These essential oils may be effective on other Gram negative and Gram positive bacterias. More importantly, these can be included in the list of herbal medicines due to their high antimicrobial potential and lesser side effects. Hence, essential oils and their components can be recommended for therapeutic purposes and be used as an alternative. The sensitivity of two plants extracts of Clove and Neem were analyzed against different bacterial strains: *E. Coli*, *Pseudomonasaeruginosa*, *Staphylococcus aureus* and *Klebsiella* under in-vitro laboratory conditions.

Keyboard: Antibactical Activity, Clove, Neem plants.

A preliminary study of some ethnomedico plants around pagara reservoir, Jaura, Morena M.P.

*Dr. Sudhir Kumar Pathak & **Dr. Smt. V. Goyal

*Dept. of botany, Govt. College, Jaura Morena M.P.

**Principal Govt. College Jaura Morena M.P.

Abstract

The present paper deals with a preliminary survey of some ethnomedico plants are found around pagara reservoir used for traditionally in human health care of different ailments. In this work, ethnomedicinal information on 40 plants species was documented by the local people and traditional practitioners.

Thorny bushes or small trees commonly found in this area include *capparisdecidua*, *Capparis sepiaria*, *Balanites egyptiaca*, *Acacia nilotica*, *Prosopis juliflora*, *Calotropis procera*, *Xanthium indicum*, *Zyphus xylocarpa*, *Aeglemarmelos*, *zizyphus mauratiana* etc. Most of the plants are of great medicinal value, several ailments like dysentery, cough skin diseases, jaundice, diarrhoea, fever etc. are successfully cured by the use of plants.

Key words: ethnomedico, jaura, traditional practitioners

The Benefit of Molecular Diagnosis of Human Papillomavirus Testing in Predicting Cervical Cancer

Mr. Mayank Singhal

Abstract

Human papillomavirus (HPV) is the most common sexually transmitted virus. Human papillomavirus (HPV) is the cause of cervical cancer and is being used to detect the pre-cancerous stages of this disease. Human papillomaviruses (HPVs) comprise more than 100 genotypes. It can be divided into high-risk and low-risk (LR) types depending on the associated disease risk. HPV infection is mainly diagnosed by molecular methods, since reliable serological tools are not available and culture of the virus is not possible. Accurate molecular diagnostic techniques that can be used to inform patient management and follow-up after treatment are now available for detection and identification of HPV.

Pseudomonas putida: Bioremediation of oil spills

Suman Prajapati¹ Yagyavalkya Sharma²
Department of Biotechnology and Microbiology

KALP Laboratories

Mathura

Abstract

Over the past decade, Bioremediation often used to hasten the restoration of damaged ecosystems, using the metabolic capabilities of bacteria, fungi, yeast, algae, and microbial mats to degrade all contaminants. Bioremediation have been investigated as alternative tools for residues oil clean up. Microorganisms has been used to remove contamination from ground water, soils and to treat the oil tanker that remain in place (i.e., in situ) during the cleanup. The success of bioremediation technologies applied toHydrocarbon-polluted environments highly depends on the biodegrading capabilities ofnative microbial populations or exogenous microorganisms used as inoculants (*Venosaand Zhu, 2003*). Petroleum hydrocarbons and their derivatives are naturally occurring chemicals that humans have exploited for a wide range of purposes, from fueling engines to manufacturing chemicals. *Pseudomonas putida* (Pseudomonadales) is a [Gram-negative](#), rod-shaped, soil bacteria that utilized aerobic metabolism therefore is able to degrade organic solvents such as toluene and also to convert styrene oil to biodegradable plastic Polyhydroxyalkanoates (PHA).*P. putida* is preferable to biodegrade the oil spills (hydrocarbon) by breaking aliphatic and aromatic chain. Temperature decreasing is directly proportional to the rate of bio degradation decrease. Highest degradation rates generally occur in the range of 30 to 40° C in soil environments, 20 to 30°C in some freshwater environments, 15 to 20° C in marine environments respectively. Optimal pH is between 6 and 9 range. In a recent study, *P. putida* strains (KT2440) were compared to each other to determine the phylogenetic relationships. Because the *P. putida* strain KT2440 genome is fully sequenced it serves as a standard reference to compare with other *P. putida* strains (*Kowalski, H.*). Moreover it, many indigenous microorganisms in soil and water are capable of degrading hydrocarbon contaminant. *P. putida* has been used for degradation of compound for various other hazardous pollutants in future.

Key words: *P. putida*, oil spills, Hydrocarbon

Constituents of *Ocimum sanctum* alleviate β -amyloid peptide toxicity in *Caenorhabditis elegans*

Arpita Singh*, Krishna Rana¹ and Priyanka Gautam²

Bioinformatics lab, Dept. of Zoology, Dayalbagh Educational Institute
(Deemed University), Dayalbagh, Agra-282005, India.

E-mail: *arpitasikarwar2901@gmail.com, ¹krishnarana1992@gmail.com,
²drpriya18@gmail.com

ABSTRACT

Impaired functions of neuronal signaling due to accumulation of some particular proteins causes the structural and functional loss of neurons eventuating in neurodegeneration. Alzheimer's disease is the leading cause of dementia amongst aged population, marked by plaques of beta-amyloid ($A\beta$) and neurofibrillary tangles. With the accession of age oxidative stress also elevates making a person more prone to Alzheimer's disease. Thus, neuroprotective effects of anti-oxidants prompted us to find out the therapeutic potential of *Ocimum sanctum* (Holy Basil). The anti-stress, anti-oxidative, anti-pyretic, anti-inflammatory and anti-diabetic properties of *Ocimum sanctum* are evident from many scientific studies and experiments. *C. elegans* would be fed with some of the active phytopotential compounds of *Ocimum sanctum* like eugenol and isothymusin to examine their effect on life-span, levels of reactive oxygen species (ROS), $A\beta$ induced paralysis, etc. Transgenic strains of *Caenorhabditis elegans* expressing human $A\beta$ and Daf-16, gene responsible for activating oxidative stress responses, longevity, etc., would be used for this purpose. In conclusion, we would report the alleviation of $A\beta$ induced toxicity as an application of phytopotential compounds.

Keywords: Alzheimer's disease; oxidative stress; *C. elegans*; *Ocimum sanctum*.

To estimate HSP70 level in spermatozoa and fluid of different segments of buck epididymis

Akhilesh Kumar*, Rakesh Kaushik, Brijesh Yadav and M. K. Singh
Animal Genetics and Breeding Division, ICAR- CIRG Makhdoom,
Mathura- 281122 U.P.

Email: akhimaurya1992@gmail.com

ABSTRACT

The present study was carried out to estimate antioxidative status and HSP70 level in spermatozoa and fluid of different segments of buck epididymis. The experiment was carried out on the testes collected from sexually mature and healthy buck aged 2-3 years. Within one hour after the slaughter the testes were brought to the laboratory in pre-chilled phosphate buffer saline. The entire epididymis was separated from testes which was demarcated and cut into caput (head), corpus (body) and cauda (tail). After assessing the gross features of the spermatozoa, objective analysis was carried out using CASA and sperm viability was examined. The HSP70 concentration in fluids was significantly ($p < 0.01$) higher in corpus epididymis as compared to caput and cauda epididymis. The HSP70 concentration in sperm lysate was found to be significantly ($p < 0.01$) higher in caput epididymis as compared to corpus and cauda epididymis. Similarly, relative expression of HSP70 mRNA decreased significantly ($p < 0.01$) in the spermatozoa of corpus and cauda epididymis as compared to caput epididymis. Immunoblot confirmed the presence of HSP70 in the sperm of all the three segments of epididymis. HSP70 was found to be localized on the surface of the acrosomal cap region of the spermatozoa in cauda epididymis only. The results confirmed that HSP 70 concentration in spermatozoa vary in the fluid and spermatozoa of different segments of epididymis.

Key Words: HSP70, Epididymis, Goat.

Status of Plant diversity in safari Etawah (U.P)

Anant Prakash

Department of Botany, Ch.Charan Singh Degree college Heonra,Etawah (U.P)

Abstract

The present papers deals with study of plant diversity in safari ,Etawah.It is first safari of Uttar Pradesh situated near river Yamuna . It is developed by the idea of ex chief minister of U.P Shri.Mulayam Singh Yadav ji. It is developed in the Fisher Forest.It is man made forest established on the area of jamindar,by Mr.Fisher.The area closed to grazing and babul ,shisham and neem were sown to develop greenery in this area.The bark of babul was used in leather industry of Kanpur.Hence the forest plants were degraded. Karil,Ber,Hingot ,Chapat ,Pilu were raised by sowing in some of the compartments.Small patches of *Prosopis juliflora* was raised artificially.The common fodder grasses Anjana,bhanjura,dub and safed lappa are scanty present.

After the development of Safari *Prosopis juliflora* were removed by the forest department but some plant was not removed they are naturally flourish and maintain the forest diversty. They are *Semal,Shisham,Calotropis ,Munja ,Argemone* .Later on large scale of transplantation done by forest department for maintaining forest area which is suited for safari animal also.

Key words: Plant diversity, Fisher forest, Safari, Etawah.

Application of biotechnique in alcohol production

Anshul babu ,Post graduate scholar ,department of botany,
Ch. Charan Singh P.G college ,Heonra, Etawah.

ABSTRACT

Production of ethyl alcohol from sugars is one of the best known industrial fermentation, which originated over 5000 years ago and remain popular even today. Production of alcohol from sugars (grape juice or molasses) in the laboratory is carried out by using yeast at 25-30 0C.For industrial production molasses is the often used substrate contains 48 to 55% sugars ,usually sucrose. Sugar concentration of 10 to 18%is satisfactory but 12 % is frequently used for alcohol production as the higher concentration of sugar adversely affects yeast.

Application of cryopreservation in biotechnology

Namrata

Post graduate scholar, Department of Botany, Ch. Charan Singh. P.G.
College, Heonra, Etawah

ABSTRACT

Cryopreservation is the use of very low temperatures to preserve struturally intact living cells aand tissues.The biological effects of cooling are dominated by the freezing of water ,which results in the concentration of the solutes that are dissolved in they remaining liquid phase.Cryoprotectants,simply by increasing the total concentration of all solutes in the system,reduce the aount of ice formed at any given temperature,but to be biologically acceptable they must be able to penetrate into the cells and have low toxicity.Intra cellular freezing is dangerous, whereas extracellular ice is harmless.Extracellular ice is not always innocuous,densely packed cells are more likely to be damaged by mechanical stresses within the channels where they are sequestered and with complex multicellular systems it is imperative not only to secure cell survival but also to avoid damage to the extracellular structure.

Biodiversity profile of Rawasan stream: An important tributary of River Ganga in Central Himalaya, India

Koshal Kumar

Department of Zoology, H.N.B Garhwal University (A Central University)

BGR Campus, Pauri (Garhwal)-246001 Uttarakhand, India

Email id:koshalbagelu@gmail.com

ABSTRACT

The present study has been carried out in an important tributary of River Ganga in Pauri Garhwal District. Geographically, the Rawasan stream is bounded by 29°55'33.82"N and 78°26'42.41"E having an elevation of 2,664.04 feet and an eye altitude 13,320.21 feet. Aquatic biodiversity is the rich and wonderful variety of plants and animals from crayfish to catfish, from mussels to mayflies, from tadpoles to trout that live in watery habitats. During the present study five different sites was selected and observed a boast variety of aquatic flora and fauna. In Rawasan stream the benthic fauna comprised of 35 genera belonging to 8 orders (Ephemeroptera, Trichoptera, Diptera, Coleoptera, Odonata, Plecoptera, Hemiptera and Acariformes). During the investigation it was found that the periphytic algal community of Rawasan stream was represented by 21 taxa belonging to 3 major classes namely Bacillariophyceae, Chlorophyceae and Cyanophyceae. Overall 24 species of fish belongs to, 3 families, 5 sub-families, 2 orders and 9 genera have been recorded from Rawasan stream. The most abundant fish species in these tributaries were *Bariliussp.* followed by, *Noemacheilussp.*, *Schizothorax sp* and *Pseudecheneissp.* respectively. The water samples were collected to determine alkalinity, pH, dissolved oxygen, transparency, TDS, salinity, water temperature, air temperature. Such studies will generate valuable information on aquatic biodiversity of man-made wetlands, especially in the protected areas. In spite of this some crustaceans and annelids species has been also reported and keep for examination. From this study it has been concluded that Rawasan stream being biologically rich in diversity and hence the proper managerial planning is absolutely necessary for sustainable utilization of the resources.

Key words: Aquatic animals, Benthic fauna, Rawasan stream, Garhwal Himalaya

Comparative Study of Heavy Metals on Genetic Diversity of Vegetation in Yamuna Bank by Using Biochemical & Molecular Techniques

Monika Mittal*, Jyoti Mathur¹, Atul Tiwari²

*monika5050mittla@gmail.com research scholar Bansthali
Vidhya pith (Bioscience)

¹ Associate professor at Banasthali Vidyapith

² Lecturers at Dr. MPS Group of Institution, Agra

ABSTRACT

In general heavy metal toxicity can cause chronic degenerative diseases the symptoms being mental disorder, pain in muscle and joints, gastro intestinal disorder, vision problems, chronic fatigue, and susceptibility to fungal infections. Sometimes the symptoms are vague and difficult to diagnose at early stage. Genotoxicity and cancers can also occur. Industrial workers and populations living near the polluting industry are more susceptible and have to be monitored. Malnourished people and pregnant women are vulnerable.

The global industrialization is fulfilling the demands of modern population at the cost of environmental exposure to various contaminants including heavy metals. These heavy metals affect water and soil qualities. Moreover, these enter into the food chain and exhibit their lethal effects on the human health even when present at slightly higher concentration than required for normal metabolism. To the worst of their part, the heavy metals may become carcinogenic. Henceforth, the efficient removal of heavy metals is the demand of sustainable development. Remedy: Bioremediation is the 'green' imperative technique for the heavy metal removal without creating secondary metabolites in the ecosystem. The metabolic potential of several bacterial, algal, fungal as well as plant species has the efficiency to exterminate the heavy metals from the contaminated sites. Different strategies like Bioaccumulation, biosorption, biotransformation, rhizofiltration, bioextraction and volatilization are employed for removal of heavy metals by the biological species. Bioremediation approach is presenting a splendid alternate for conventional expensive and inefficient methods for the heavy metal removal. The patents granted on the bioremediation of toxic heavy metals are summarized in the present manuscript which supported the applicability of bioremediation technique at commercial

scale. However, the implementation of the present information and advanced research are mandatory to further explore the concealed potential of biological species to resume the originality of the environment.

Keyword: toxicity, chronic, fungal infections, genotoxicity, malnourished, vulnerable, Bioremediation, Metabolites, Bioaccumulation, biosorption, biotransformation, rhizofiltration, bioextraction

Strategies for Crop and yield Improvement Against water and salt stress: An Overview under Drought, Salinity

Anil Kumar and Rajani Chauhan

Department of Plant Breeding and Genetics, R.B. (P.G.) College,
Agriculture Campus, Mudi Crossing Agra, (U.P.), India

ABSTRACT

Agricultural production and quality are adversely affected by multiple abiotic stresses worldwide and this will be exacerbated by the deterioration of global climate. Therefore, it is urgently needed to develop tolerant cultivars to ensure yields under such adverse conditions. In this scenario, it is widely urged that strategies showed be adapted which may be used to get maximum crop stand and economic returns from abiotic stresses (drought and salinity). There are various strategies reported for abiotic stresses tolerance but two main strategies have been employed to this process. In this literature, we take five large families of TFs as examples and review the recent progress of TFs involved in plant various environmental stress responses and their potential utilization to improve multiple stress tolerance of crops in the field conditions and also explain some technological advances and different approaches of crop improvements that may help in developing cultivated stress tolerant plant.

KEY WORD: Drought, salinity, abiotic stress, biotic stress, salicylic acid

Genetic variability, heritability and genetic advance among Indian mustard (*Brassica juncea*) genotypes

ANIL KUMAR AND RAJANI CHAUHAN

*Department of Plant Breeding and Genetics, R.B. (P.G.) College, Agriculture
Campus, Mudi Crossing Agra, (U.P.), India*

ABSTRACT

Fifty five germplasm of Indian mustard were evaluated to estimate relationships among yield and some yield components using direct selection parameters like variability, heritability and genetic advance at school of Agricultural Sciences and Engineering IFTM University, Moradabad (U.P.) during 2017-18. Analysis of variance revealed highly significant differences for all the characters. The genotypes showed moderate to high level of genotypic coefficient of variance (GCV) and phenotypic coefficient of variance (PCV). In general, phenotypic coefficient of variance was found to be higher than their genotypic coefficient of variance but the extent was quite small, indicating very less environmental influence on the expression of the characters. Genotypic coefficient of variation was found to be higher for siliquae per plant (54.04), secondary branches per plant (36.02), seed yield per plant (28.84), siliquae on main shoot (27.51). Genetic advance and heritability are important selection parameters. High heritability estimates were observed for plant height, secondary branches per plant, main shoot length, test weight, siliquae per plant, siliquae on main shoot, seed yield per plant. The expected genetic advance as per cent of mean was higher for siliquae per plant, secondary branch per plant, primary branch per plant, seed yield per plant, siliquae on main shoot, main shoot length and test weight, indicating heritability is due to additive gene effects, so selection may be effective and it would be helpful in predicting the gain under selection.

Key Words: Indian mustard, heritability, genetic advance, genotypic variation, phenotypic variation, yield

Influence of Salicylic Acid on non-enzymatic antioxidative synthesis in Indian mustard (*Brassica juncea* L.) cultivars under stress conditions

RAJANI CHAUHANAND AND ANIL KUMAR

Department of Plant Breeding and Genetics, R.B. (P.G.) College,
Agriculture Campus, Mudi Crossing Agra, (U.P.), India

ABSTRACT

In the present work the possible roles of non-enzymatic antioxidants (TGS, TPC, GST and phenol) in SA-mediated protection against osmotic stresses were investigated. The research work was conducted in the Plant tissue culture laboratory, Department of Life Sciences, Jaipur National University, Jaipur (Rajasthan) in 2017. Drought situations were imposed under *in-vitro* conditions to observe two sets of 7-d-old seedling, Various concentrations of PEG 6000 like 5, 10 and 15 % PEG and for salinity three potential levels of NaCl (50, 100 and 150 mM and distilled water as control were used. On the other hand, second set of seedlings were also supplemented with same stress conditions along with the application of SA (8 μ m). Treatment with osmotic stress increased the PC levels in roots of *B. juncea*, but only slight changes were observed in the leaves. Long-term exposure to stresses decreased the phytochelatin synthase (PCS) activity in the roots and led to an increase in PCS and glutathione reductase (GR) activities in *B. juncea* leaves. The phenolic content decreased consistently with imposed stress in both cultivars. Treatment with osmotic stress increased the all non-enzymatic antioxidant levels in the leaves of *B. juncea* cv. in comparison to root. SA application protected antioxidant system to reduce oxidative damage. This protection was not directly connected with the altered regulation of PCs. Tolerant mustard variety showed less oxidative damage compared to susceptible variety under stress conditions.

Key words: Phytochelatin, salicylic acid, *B. juncea*, total glutathione, glutathione-s-transferase, phenol, drought, salinity

Effects of salicylic acid on growth and germination parameters in *in-vitro* raised Indian mustard (*Brassica juncea* L.) genotypes under water stress

ANIL KUMAR AND RAJANI CHAUHAN

Department of Plant Breeding and Genetics, R.B. (P.G.) College,
Agriculture Campus, Mudi Crossing Agra, (U.P.), India

ABSTRACT

Drought is one of the most challenging problems that adversely affects growth and development of plants. Salicylic acid (SA) has been involved in reducing the adverse effect of water scarcity. The research work was conducted in the Plant tissue culture laboratory, Department of Life Sciences, Jaipur National University, Jaipur (Rajasthan). To explore the individual effects of salicylic acid on the seedling growth parameters of *Brassica juncea* L. (cv. Pusa Agrani and CS-52) study was conducted under different concentrations of water stress conditions. Under in vitro conditions, two sets of 7-d-old seedling, were grown with three levels of drought induced by PEG 6000 concentrations (5, 10 , and 15 %), including stress free concentration (control) with three replicates, Another duplicate set of seedlings were supplemented with 8 μ M salicylic acid (SA) to study its ameliorative action. Application of SA was most effective in alleviating the harmful effects of water stress on germination percentage, plumule length, radicle length, seedling height, fresh and dry weight of seedling. These parameters were drastically reduced with increasing drought conditions. The drought stress tolerance also improved with the application of salicylic acid. It was minimum under 15% PEG concentration.

Keywords: Germination parameters; drought tolerance; *Brassica juncea*; salicylic acid

Crop Improvement: an essentiality for national food security

Author: Himadri Nautiyal, (B.Sc. (Hons.) Agriculture), FASC SGT,
University

Correspondence: Dr Mohinder Singh, Assistant Professor, Faculty of
Agricultural Sciences, SGT University, mohinder27481@gmail.com

Abstract

Crop improvement is the genetic manipulation of plant genes for the betterment of mankind. It has become the most essential or focusing tasks in current plant breeding as an increase in demand for ideal plant type. Many species have undergone transformation through genetic alternation processes that involves selection of hundreds of species from the thousands available and then the differential reproduction variants. This domestication process involves the identification of useful genes from wild species combined with selection process that results in changes in appearance, quality and productivity. Mass selection is a powerful technique for making rapid changes easily while maintaining genetic diversity in the population. As a result of this crop improvement programme many crops like maize have been so changed that there origin is uncertain with no extant close relatives.

Keywords: Ideal plant, domestication, quality

Salicylic Acid modulation of bio-molecules alteration in two varieties of *Brassica juncea* (L.) under stress conditions

ANIL KUMAR AND RAJANI CHAUHAN

Department of Plant Breeding and Genetics, R.B. (P.G.) College,
Agriculture Campus, Mudi Crossing Agra, (U.P.), India

ABSTRACT

The present study was carried out to examine drought, salinity and their combined stress induced modulation in growth and bio-chemical attributes in two cultivars of *Brassica juncea* varieties (PUSA-AGRANI and CS-52) under in-vitro conditions. Response of two different set of two Indian mustard varieties were also recorded with and without SA. Results were analyzed by the three way analysis of variation (ANOVA). Results elucidated that among all stresses drought stress imposed extremely negative effects on plant growth and productivity. Seedlings of both varieties were examined for total sugar, reducing sugar and free amino acid. In conclusion SA showed great potential in protecting the *B. juncea* seedlings from oxidative stress caused by all three types of stress. PUSA-AGRANI variety combats the deleterious effects stress in a great degree in comparison to CS-52.

Keywords: Brassica juncea, salicylic acid, drought, salinity, total sugar, reducing sugar, free amino acid

STUDY OF BIOCHEMICAL EVOLUTION AND ANTIMICROBIAL PROPERTIES OF MEDICINAL PLANTS IN WASTELAND NEARBY AGRA REGION

*Khushboo Gupta**, *Jyoti Mathur*¹, *Atul Tiwari*²

*khushboogupta9897@gmail.com research scholar Bansthali Vidhyapith (Bioscience)

¹ Associate professor at Banasthali Vidyapith

² Lecturers at Dr. MPS Group of Institution, Agra

ABSTRACT

Plants use as a root of medicinal complex in classical or aged time medicinal system. There is endless demand of the evolution of new effectual antimicrobial or antibacterial drugs because of the rise of new infective diseases and drug resistance and change other harmful compound in drugs. Much more newly plants got a grand awareness of scientists for development of alternate drugs to heal individual dangerous diseases. *C.gigantea* is almost generally base on the wasteland weed its also admitted as milkweed, surroundings of Asian countries in that as well as India, Indonesia, Srilanaka, Malaysia, , Thailand ,china, Philippines and other ethnic people were using this plant parts to correct the many more diseases and disorder, such as diarrhoea, toothache, earache, pain, sprain, anxiety and mental disorders. *C.gigantea* researcher or scientifically announced for its cytotoxic, anti-candida, antipyretic and damage healing all activities. Modern examine was center to explore the antimicrobial act as the crass leave, flower and stem essence of *Calotropis gigantea* against clinical isolated of bacteria. India is one of the significant biodiversity focal points of the earth and enriched closely 45,000 plant species. Away from these, almost 2500 species are define in Ayurveda including around 10,000 conception. The floristic influence of North- Eastern area of India is almost 43% of the nation's whole vegetation. All our medication systems similar Ayurveda, Unani, Homoeopathy and Tibetan systems, aside from the folk custom, apply the plants effectively.

C. gigantea is manner plants and released the stain after a tissues damage. Plants pigment is a compound of alkaloids, tannins, gum,

sweeten, snap, adhesives and protein. Leaves, roots, stems, flowers and pigment of *C.gigantea* are used in historic medicinal system to heal few diseases and medicinal potential of the *Calotropis gigantea* proved scientifically.

Keyword: *C. gigantea*, pigment, diseases, tissue damage, medicinal system, biodiversity, plant species, wasteland, potential .

Microbial Diversity Way to Deal Sustainability

Author: Deepika (B.Sc. (Hons.) Agriculture), FASC SGT, University
Correspondence: Dr Mohinder Singh, Assistant Professor, Faculty of
Agricultural
Sciences, SGT University, mohinder27481@gmail.com

The microbes have the companions in the agricultural production system to reduce the risks of environmental pollution and fight against the undesirable changes in soil physical, chemical and biological activities. The soil microbes are responsible for restoration of nutrient thereby enhancing the growth and health of plant. All the techniques dealt with the increase in agricultural output are directly or indirectly related to micro flora and fauna present in soil profile. Soil microbiology determines the fertility, organic matter and nutrient transformations. The whole procedure includes isolation, evaluation and multiplication of selected strains to be used as biofertilizers (*Azospirillum*, *Azotobacter*, *Rhizobium* etc.), as decomposers of organic matter (*Trichoderma*, *Lactobacillus* etc.), agents of biological control (e.g. *Veticillium*). Various researches have also found that resistance against plant nematodes of wheat plants obtained in vitro using bio-regulators of microbial origin, biological nitrogen fixation, microbial effect on vegetative growth and many more. This gives us opportunity to join hands with nature and work for human welfare.

Keywords: soil profile, evaluation, decomposers, nitrogen fixation

Herbivory induced protective signalling in Chick Pea (*Cicer arietinum*): A mini review

Madhu Shree¹, Vineet Kumar¹, Dr. Navin Kumar Ojha[#]

1- Department of Zoology, Lok Mahavidyalaya, Hafizpur, Baniapur,
Saran

2- Department of Zoology, Z.A. Islamia College, Siwan

#: Dr. Navin Kumar Ojha Lecturer, Dept. of Zoology Lok
Mahavidyalaya, Hafizpur, Baniapur,
Saran

Abstract

Plants and insects have living together for more than 350 million years. There is always tug of war between plants and herbivorous insects. In this clash, chemicals act as both weapons for defence and messengers for signal transduction. In evolutionary period, both have co evolved strategies to avoid each other defence system. This evolutionary arms race between plants and insects has resulted in development of an elegant defence system in plants that has the ability to recognise the non-self-molecules or signals from damaged cells much like animals and activates the plant immune response against the herbivores. To counter the herbivore attack chick pea plant produces specialized morphological structure or secondary metabolites and proteins that have toxic, repellent and anti-nutritional effect on the herbivore. Insect always look for a true and healthy host plant that can provide them proper food and could be suitable for mating, oviposition and also provide food for offspring. Both chick pea plants and insects have developed morphological and biochemical defensive characters to tackle each other's strategies. However, biochemical approaches are considered more important and effective than morphological ones because of their versatile nature. As there is an increasing demands on improving legume crop yield through safe and sustainable means by reducing the dependence on pesticides so it is highly valuable to understand the chick pea plant defensive traits against insect herbivory. Moreover, it is equally important to think about the adaptations used by insect pests to these defensive traits in order to develop and deploy management strategies to outsmart the insect pests. Here we discuss the plant defence characters against insect herbivory, their induction by elicitors and/or insect damage, and the counter-adaptation by insect pests.

Keywords: *Cicer aritinum*, herbivory, plant defence, biotic stress

Effect of summer and winter season on proximate composition of a common major carp *Cirrhinus mrigala*(Ham.)

Vivek Kumar Anand¹, Madhu Shree², Vineet Kumar^{2*}, Dr. Ashok Kumar^{1#}
1 &1#- Department of Zoology and Industrial Fish and Fisheries, Ganga Singh
College, Chapra
2- Department of Zoology, Lok Mahavidyalaya, Hafizpur, Baniapur, Saran
2*- Department of Zoology, Z.A. Islamia College, Siwan

Abstract

India is one of the top five nations in fish production & processing nations of the world. This nation has about 2500 marine fishing villages spread near the sea-shore from Bengal (through Tamilnadu, Kerala, Maharastra) to Gujrat states & about 1500 landing centres along the coasts. We observed the proximate composition of skin-less muscle of anterodorsal portion of the fish *Cirrhinus mrigala* (Av. Weight 416.38±19.42 gm during summer and 439.10±18.76 gm during winter) and have been recorded to be 77.28±0.27 & 76.76±0.32% moisture, 1.28±0.07 & 1.40±0.09% Ash, 1.09±0.04 & 1.20±0.07% glycogen, 18.38±0.10 & 18.95±0.12% total protein and 0.93±0.02 & 1.09±0.05% fat (total lipid) during summer & winter respectively.

Keywords: *Cirrhinus mrigala*, protein deficiency, chilled sea water (CSW), Proximate composition

Aquatic avifaunal diversity in Garhwal Himalaya, Uttarakhand.

Sunil Bhandari*, M.S. Bisht & Sudesh Kumar
Department of Zoology, H.N.B. Garhwal (A Central) University BGR Campus-
Pauri Garhwal Uttarakhand.
E mail-sunilbhandari83@yahoo.in

Abstract

Observations are presented on the aquatic avifaunal diversity on the Garhwal Himalaya region which geographically stretches from 29° 59'40" to 30° 29'37" north latitude to 78° 53'9" to 79° 56' 3" east longitude. This study was carried out from May 2013 to April 2014, with the objective relative abundance, Diversity index and distribution of aquatic avifaunal diversity in study area. Out of the total 41 birds' species belonging to 09 orders, 07 families recorded in study area. The order charadriformes and family charadriidae were dominant on other group of birds. Little egret, Yellow wattled lapwing, Pied kingfisher, were dominant species in the study area.

Studies on some aspects of Bioenergetics in a fresh water air breathing fish, *Channa gachua* (Ham.): Protein weight gain Vs Oxygen Consumption.

Vineet Kumar¹, Madhu Shree², Vivek Kumar Anand³ and Vijay Kumar[#]

1. Department of Zoology, Z.A. Islamia College, Siwan

2. Department of Zoology, Lok Mahavidyalaya, Hafizpur, Baniapur, Saran

3. Department of Zoology and Industrial Fish and Fisheries, Ganga Singh College, Chapra

Department of Zoology, Z.A. Islamia College, Siwan

Abstract

In the present work an attempt has been made to study the statistical relationship between Protein weight gain (g) Vs Oxygen consumption (KJ/Fish/day). The study shows that with increase in protein weight (g) the oxygen consumption (KJ/Fish/day) also increases in different weight group of *Channa gachua* (Ham.). The mean value of oxygen consumption (KJ/Fish/day) range from 1.10 to 10.68 (KJ/Fish/day) within the protein weight gain (g) range 3.2-18.41 g. The correlation coefficient has been calculated to be 0.9728, which indicates high degree of correlation between these two parameters.

Keywords-*Channa gachua*, Statistical relationship, Protein weight gain, Oxygen consumption, Correlation Coefficient.

Isolation and Screening of Actinomycetess from different river sediments

Sahil Abbas1*, Girendra Gautam1, Pawan Kumar Gautam2

1 Department of Pharmacy, Bhagwant University, ajmer, Raj., India

2 Department of Pharmacy, Sarojini naidu medical college, Agra, U.P., India

Abstract:

In modern era A number of antibiotics is produced by Actinomycetes among all microbes. Greater than 50% of the known natural antibiotics produced by Actinomycetes. Actinomycetes are a special group of heterotrophic prokaryotes forming hyphae at some stage of their growth hence refereed as filamentous prokaryotes. This group is a potential producer of different enzymes, enzyme inhibitors, growth promoter and antibiotics etc. Nowadays microbes is getting or developing resistance in infectious microorganisms (e.g., species of *Staphylococcus*, *Mycobacterium*, and *Streptococcus*) to existing compounds.

In our study screening of actinomycetes was performed by using different river sediments. Soil samples was collected from river Godaveri and Krishna and stored in the U.V. and alcohol sterilized Poly bags.

Soil samples was serially diluted upto 10^{-6} and 1 ml from each dilution was plated on different isolation media like starch Casein agar , Albumin media and YMA media, consisting of antifungal agent Nystatin 50 $\mu\text{g}/\text{ml}$, by pour plate technique. The plates were incubated at different temperature ranges 18 $^{\circ}\text{C}$ to 28 $^{\circ}\text{C}$ upto 7-14 days.

There were 3 actinomycetes were isolated and these were streak on solidified Bennet agar media at straight line and plates were kept for incubation in incubator at 37 $^{\circ}\text{C}$ for nearly about 3 days. Identification of actinomycetes was performed using Gram's staining.

Keywords: Actinomycetes, river sediments, Nutrient Media, Identification.

Selection of discriminatory variables between low and high oil content populations of Indian mustard

¹Poonam Godara*, ¹B.K. Hooda, and ²Ram Avtar

¹Department of Mathematics & Statistics, CCS, Haryana Agricultural University
Hisar-125004 (Haryana), India

²Department of Genetics and Plant breeding, CCS, Haryana Agricultural
University Hisar-125004
(Haryana), India

*Corresponding author email: poonamsinghsinghmar@gmail.com

ABSTRACT

In the past few years, in most of the applied disciplines, the researchers often deal with large numbers of variables or features recorded on each of the objects. Identification of redundant variable and selection of important variables is, thus an important area of research interest in multivariate analysis involving large number of variables. Variable Selection has thus become important problem in classification and discriminant analysis. The selection of important variables for the purpose of discrimination between populations is also important from the point of view of time and resources required for the experimentation. Keeping this in view, the present study has been designed to find important characters of Indian mustard which can discriminate between high and low oil content genotypes. Secondary data set on 310 genotypes of Indian mustard recorded for 12 characters was used for discrimination between populations of low and high oil content genotypes of Indian mustard. Three variable selection methods (Univariate t-test, Wilk's lambda Criterion and Random Forests Algorithm) for classification and discrimination were used and compared. Performance of the methods was assessed in terms of leave one out cross-validation error and out of bag error rate for classification. The important variables for discrimination which significantly affected the oil content were siliqua length, Secondary branches, primary branches and days to maturity with least error rate of 33.90 per cent.

Key words: Discriminant analysis, Error rates, Gini index, Random Forests, Wilk's Lambda Criterion

Crop Improvement: A Possible Way for Agricultural Sustainability

Mohinder Singh* and Chetna Kumari
Assistant Professor, SGT University, Gurugram-122505
Mohinder27481@gmail.com

Abstract

Crop physiology, selective breeding and site specific agronomic interventions proved to be major crop improvement tools in 21st century. The crop improvements have brought food security, lowering of malnutrition, lower prices freeing, greater food choices and safer foods to our countrymen. The collection and spread of improved germplasm around the world with improved package of practices constitute a major affect on production and sustainability of the system. Advances in agronomy have stemmed the selection of suitable varieties with precision management to lower down the competition from weeds, pest and diseases. The crop improvement techniques led to the developments of the sophisticated agrochemical industry and screening technologies. Crop improvement has the greatest potential to improve the yield of crops. The developments of combinatorial chemistry and the identification of new target sites from genomics research are likely to enhance the quality of agrochemicals at the farmer's disposal. Good agronomic Practices (GAP) will undoubtedly improve water use efficiency, fertilizers use and better crop protection measures to enhance the quality of agriculture system. To meet the challenges for food, feed and fiber needs screening of phenotypic advance crop plant with the full exploitation of natural resources.

Keywords: Germplasm, agrochemical, malnutrition

Content Analysis of crop husbandry information appeared in the Marathi newspaper Agrowon

S. L. Pulate, S.S. Kedar and D. N. Sawandkar

Department of Extension Education, College of Agriculture Latur -413512,(M.S.)
India.

Abstract

In Agrowon newspaper in agricultural and horticultural information was about 64.78 per cent and non agricultural information 24.04 per cent. In advertisement agricultural and horticultural advertisement was about 4.66 per cent and non agricultural advertisement 6.52 per cent. It was indicated that among the crop husbandry information cash crop information topped (37.97 per cent) in the total number of crop husbandry information in Agrowon newspaper.

Among the crop husbandry, cereals was the second highest type (20.86 per cent) and it was followed by general information (19.78 per cent). The information which was not covered cropwise under crop husbandry included under general type of information. The general information followed by oilseeds (10.96 per cent) and very less number of articles was observed on pulses (7.22 per cent) and forage crops (3.21 per cent).

It was concluded that majority of the articles were observed on cash crops (37.97 per cent). Because of these crops gives more income and regular money to the rural farmers. The cash crops were followed by cereal (20.86 per cent). The cereal crops is staple food crops so this was good sign of Agrowon to give large number of articles on cereals.

Less coverage was given to oilseeds, pulses and forage crops. There is scope to Agrowon to give more attention on these important crops.

Regarding package of practices crop production topped (66.58 per cent) in the total number of crop husbandry information followed by Marketing (18.18 per cent), post harvest technology (9.09 per cent) and farm mechanization (6.15 per cent).

This shows that the maximum number of articles appeared on the crop production i.e. from preparatory tillage operations to the harvesting. Second importance was given to marketing and then post harvest technology. The farm mechanization was neglected area so there is scope to give more articles on

farm mechanization and also on post harvest technologies for saving labour cost and value addition respectively.

Regarding crop groupwise package of practices, in cereals crop production articles topped (15.51 per cent) followed by marketing (2.94 per cent), post harvest technology (2.14 per cent) and very less number of articles were on farm mechanization (0.27 per cent). Among pulses highest articles on crop production (5.61 per cent) followed by marketing (1.07 per cent) and post harvesting technology(0.53 per cent). Not a single article was found on farm mechanization so there is scope to cover more articles on this area. Among the oilseeds crop production topped (8.29 per cent). Less number of articles were on farm mechanization (0.27 per cent), PHT (1.07 per cent) and marketing (1.34 per cent). In cash crops also crop production articles ranked first (21.92 per cent) followed by marketing (11.50 per cent), less number of articles were observed on PHT (2.41 per cent) and farm mechanization (2.14 per cent). Among the forage crops less number of articles was on crop production (2.67 per cent) and other practices were neglected. In general information the crop cultivation articles topped (12.57 per cent) followed by farm mechanization (3.48 per cent), PHT (2.41 per cent) and marketing (1.34 per cent).

This reported that there is a scope to give more attention on farm mechanization articles and post harvest technology articles. The findings were in line with Sindhu *et at.* (1983) and Waghmare (2001). The results are partially inline with Sawant and Shinde (1999), Jagatap (2001) and Nagane (2005).

Key words: Content Analysis, Crop Information, Vegetable, Agrowon Newspaper

Biodiversity: A tool for Environmental Conservation in Present and Future Scenario

Dolly Saini¹, Sandeep Arya² and Neha Sharma

Institute of Environment and Development Studies, Bundelkhand University,
Jhansi-284128 UP-India

¹ Presenting author,

² Mentor and Corresponding author: drsanarya@rediffmail.com

Abstract:

Biodiversity is a concise form of biological diversity that refers to variability among living organisms from all sources including terrestrial and aquatic (both fresh water and marine) ecosystem. Every organism of living world in unique of individuals is the basis of biodiversity the concept become popular that United Nations conference on environment and development held at RIO in 1992 convention on biological diversity (CBD) was held to protect and preserve the diversity on this earth. Total diversity on this earth more than 50 percent is concentrated in mega diversity countries vast majority of the species are found in developing countries. In tropical moist forest plant such as rice, mustard, mango, owe their origin of India. There are three hierarchical levels of diversity i.e. genetic diversity, species diversity and ecosystem diversity. Genetic diversity define variation of genes with in a species, species diversity tells about diversity within a population between different species of a community or an ecosystem whereas community or ecosystem diversity discussed the number of ecological niches, various ecological processes and a verity of tropic levels sustaining food chain, food web and recycling of nutrients, species diversity is spread over alfa, beta and gamma diversities based on mathematical indices. India is a seventh largest country in the world as regards its geographical area the country is endowed with rich biodiversity spread over 10 biogeographical zone due to varying physical condition , climates , soil and topography and species grouping of flora and fauna each biogeographical zone encompasses several habitats , biotic communities and ecosystems , endemism centers round mainly in eastern Himalayas western Ghats and Andaman and Nicobar Islands.

Key Words; Biodiversity; Ecosystem; Species; Environment

Estimation of Genetic variability, correlation and direct and indirect effects for seed yield characters in Greengram [*Vigna radiata* (L.)]

Department of Genetics and Plant Breeding,
Sam Higginbottom University of Agriculture, Technology and Sciences,
Prayagraj, U.P.

S. SANJU PRETHAM Dr. G. ROOPA LAVANYA
(Researcher) (Advisor)

ABSTRACT

In the present investigation, 25 genotypes of Greengram were evaluated to estimate the genetic parameters among the genotypes for yield and the extent of association between the yield and its component characters, including direct and indirect effects. The experiment was laid out in a Randomized Block Design with three replications during *Kharif* 2018. Analysis of Variance indicated the existence of significant genotypic differences among the genotypes for the yield and its component characters. The genotypes Pusa-871, IPM-9901-8, IPM 02-3, MSJ-118, and IPM 02-14 were observed as promising genotypes for important quantitative traits. High GCV and PCV values were observed for harvest index, number of primary branches per plant, number of seeds per pod and number of pods per plant. High heritability coupled with high genetic advance as per cent of mean was observed for harvest index, number of primary branches per plant, number of seeds per pod, number of pods per plant, number of clusters per plant, biological yield per plant, plant height and seed yield per plant, indicating the role of additive genes in the inheritance of these traits and hence these characters could be improved through simple phenotypic selection. Character association studies revealed significant positive association of seed yield per plant with Harvest index, biological yield per plant, plant height and number of pods per plant. The path coefficient analysis indicated that selection for plant height, number of pods per plant, biological yield and harvest index, would directly increase seed yield.

Keywords: Greengram, Genetic Variability, Correlation coefficient, Path analysis.

Studies on some aspects of Bioenergetics in a fresh water air breathing fish, *Channa gachua* (Ham.): Protein weight gain Vs Oxygen Consumption.

Vineet Kumar¹, Madhu Shree², Vivek Kumar Anand³ and Vijay Kumar[#]

1. Department of Zoology, Z.A. Islamia College, Siwan

2. Department of Zoology, Lok Mahavidyalaya, Hafizpur, Baniapur, Saran

3. Department of Zoology and Industrial Fish and Fisheries, Ganga Singh College, Chapra

Department of Zoology, Z.A. Islamia College, Siwan

Abstract

In the present work an attempt has been made to study the statistical relationship between Protein weight gain (g) Vs Oxygen consumption (KJ/Fish/day). The study shows that with increase in protein weight (g) the oxygen consumption (KJ/Fish/day) also increases in different weight group of *Channa gachua* (Ham.). The mean value of oxygen consumption (KJ/Fish/day) range from 1.10 to 10.68 (KJ/Fish/day) within the protein weight gain (g) range 3.2-18.41 g. The correlation coefficient has been calculated to be 0.9728, which indicates high degree of correlation between these two parameters.

Keywords-*Channa gachua*, Statistical relationship, Protein weight gain, Oxygen consumption, Correlation Coefficient.

Estimating Antioxidant and Antimicrobial Potential of Kumaun Himalayan *Cephalotaxus griffithii* Hook. f. needles

Urvashi Verma* Department of Botany, D. S. B. Campus, KU, Nainital
(Uttarakhand) India- 263002 Email-urvashi510@rediffmail.com

Abstract

Plants are the key source of scrutinizing the various phytoconstituents present in them which prevents against many microbial diseases and oxidative stress. In the present investigation the alcoholic (ethanol) and chloroform extracts of *Cephalotaxus griffithii* Hook. f. needles were prepared in order to evaluate their antimicrobial potential against nosocomial bacteria including some gram-positive and gram-negative bacteria and antioxidant potential of the plant. From the observed results it is clear that both extracts was found suitable to extract out the primary as well as secondary metabolites but chloroform was found better for secondary metabolites extraction and also showed good amount of total phenolic and total flavonoid content ranged from 263-106 mg/ gm dry extract weight of the plant with low IC₅₀ value for free radical scavenging activity. In antimicrobial screening five bacteria including three gram -ve (*Pseudomonas aeruginosa*, *Klebsiella pneumoniae* and *Proteus mirabilis*) and two gram +ve bacteria (*Staphylococcus aureus* and *Listeria monocytogenes*) were tested. The results revealed that the chloroform extracts was found effective against all bacteria except one gram -ve i.e., *P. aeruginosa* whereas ethanol extract was found effective against all the bacteria tested with zone of inhibition (ZOI) ranging from 14 mm to 17 mm at 1000 µg/ml concentration. These results reveal that the extracts of *C. griffithii* is a possible good source of phenolic and flavonoid content as well as good free radical scavenger along with having good antimicrobial potential and new antibiotics.

Keywords: *Cephalotaxus griffithii*, phytoconstituents, phenol, flavonoid, antioxidant, antimicrobial

Silicon-Dioxide-Nanoparticles influence Morphological characters of Mungbean (*Vigna radiata* L.) Varieties

Chandrashekara S Y¹, Pragati Misra² and Pradeep Kumar Shukla¹

¹Department of Biological Sciences, Faculty of Science
Sam Higginbottom University of Agriculture, Technology and Sciences, Prayagraj (Allahabad),
(U.P)-211007

²Department of Molecular and Cellular Engineering, Jacob Institute of Biotechnology and
Bioengineering
Sam Higginbottom University of Agriculture, Technology and Sciences, Prayagraj (Allahabad),
(U.P)-211007

E-mail: Pradeep.shukla@shiats.edu.in

Mungbean (*Vigna radiata* L. Wilkzek) is a short duration (70-90 days) summer pulse crop with high nutritive value. The seeds contain 22-28% protein, 60-65% carbohydrate, 1-1.5% fat, 3.5-4.5% fibers and 4.5-5.5% ash. India produced 14.76 million tons of pulses from an area of 23.63 million hectare, which is one of the largest pulses producing in the world. Nanotechnology opens a wide scope of novel applications in the fields of biotechnology and agricultural industries, because nanoparticles (NPs) have unique physiochemical properties, i.e., high surface area, high reactivity, tunable pore size, and particle morphology. Nanoparticles interact with plants causing many morphological and physiological changes, depending on the properties of NPs. Efficacy of NPs is determined by their chemical composition, size, surface covering, reactivity, and most importantly the dose at which they are effective. Si NPs increased seed germination plant growth, yield and plant resistance to abiotic stresses. Therefore, the present study highlights the key role of Si NPs in mungbean. The appropriate elucidation of physiological, biochemical and molecular mechanism of nanoparticles in plant lead to better growth and development. Seeds of mungbean variety KM1401 and K851 were soaked for 24 hrs with silicon dioxide nanoparticle (0, 100, 200, 300 and 400 ppm) and soaked seeds were sown in pots. The morphological and biochemical study showed significant in recent investigation concludes the concentration of silicon dioxide (300 ppm) performs positively and improved morphological and biochemical parameters studied.

Inter-Relationship between Physico-Chemical Parameters and Plankton Diversity in Potamon Section of Western Nayar, Uttarakhand, India

V.P Balodi and Koshal Kumar

Department of Zoology, H.N.B Garhwal University, Pauri Campus, Pauri
Garhwal, Uttarakhand, India

Email id: vpbalodi@gmail.com

Abstract

The present study was carried out in Western Nayar at Sankarsain spot in Pauri district of Uttarakhand. Diversity, abundance of plankton and physico-chemical parameters in the Potamon Section of river western Nayar has been studied during September 2017 and February 2018. In this study a total of 21 plankton genera, 13 belonging to Bacillariophyceae, 4 Chlorophyceae and 4 Myxophyceae were recorded. To know the monthly fluctuation in the distribution of different genera of plankton population in the Potamon Section and its correlation with physico-chemical parameters have been discussed.

Keywords: Planktonic diversity, Physico-chemical parameters, Potamon Section, Western Nayar

BIRD DIVERSITY OF NAGDEV RESERVE FOREST IN DISTRICT PAURI GARHWAL, UTTARAKHAND

SUDESH KUMAR, M.S. BISHT AND SUNIL BHANDARI

Department of Zoology, HNB Garhwal University BGR Campus Pauri- 246001

Email id: ksudesh75@gmail.com

Abstract

The present study deals with the Bird diversity in Nagdev reserve forest of district Pauri Garhwal lying between 29° 22'- 29° 75'N, 70° 10' - 78° 80'E along with the altitude of (above 1500m).

The field survey was conducted from April 2016 to March 2017 in mixed temperate forest

constituted by Quercus, Rhododendron, Myrica, Cedrus etc. Line transect method was used to

record the bird species diversity of the study area. During this study, a total of 70 species of birds

belonging to 06 orders and 27 families were recorded. The bird diversity was measured by

Shannon wiener diversity index which was ranged from ($H' = 2.96$ to $H' = 3.32$). Some of the

common birds of the study area are White throated laughing thrush, Kalij pheasant, Fire capped

tit, Black headed jay , Grey headed parakeet, Verditer flycatcher, Grey headed woodpecker, Blue

capped rock thrush, Spot breasted scimitar babbler, Himalayan woodpecker, Streaked laughing

thrush, HiScaly breasted munia, Chestnut bellied nuthatch, Great barbet, Himalayan bulbul,

Himalayan blue tail, Blue whistling thrush and Rufous sibia.

Key words: Bird diversity, Nagdev reserve forest, Pauri Garhwal.

Evaluation of the plant growth effectiveness of a new substrate made from fly ash amended soil

Adnan Shakeel* , Abrar Ahmad Khan, Mohammad Haris
Section of Environmental Botany, Faculty of Life Sciences,
Aligarh Muslim University, Aligarh 202002, India Author for correspondence:
adnanshakeel1717@gmail.com

Due to its generation in huge amounts, the disposal of fly ash from thermal power plants causes significant economic and environmental problems. Although it contains several essential minerals, its application in agricultural practices is uncommon in India. This work is an attempt to seek a safe, sustainable, and low-cost method for reuse of fly ash in agricultural soils. For that, a pot experiment was conducted to study the ameliorative role of different fly ash rates (0%, 5%, 10%, 15%, 20% and 25% w/w) amended to the soil on the growth markers, yield and the biochemical markers of the carrot (*Daucus carota* cv. Lali). The plant showed a significant improvement in growth markers, yield and biochemical markers at 15% fly ash as compared the control. With the improvement in nitrate reductase activity, the total protein and carbohydrate content also increased significantly at 15% fly ash. However, the plant showed a significant decline in all the above parameters when fly ash rate was increased beyond 15%. The results indicate that the new substrate containing 15% fly ash exhibits good physiochemical properties and is suitable for growing carrot.

Keywords: Environment; Agriculture; Fly ash; Soi

Silicon-Dioxide-Nanoparticles influence Morphological characters of Mungbean (*Vignaradiata* L.) Varieties

Chandrashekara S Y¹, Pragati Misra² and Pradeep Kumar Shukla¹

¹Department of Biological Sciences, Faculty of Science
Sam Higginbottom University of Agriculture, Technology and Sciences, Prayagraj
(Allahabad), (U.P)-211007

²Department of Molecular and Cellular Engineering, Jacob Institute of
Biotechnology and Bioengineering
Sam Higginbottom University of Agriculture, Technology and Sciences,
Prayagraj (Allahabad), (U.P)-211007

E-mail: Pradeep.shukla@shiats.edu.in

Mungbean (*Vigna radiata* L. Wilkzek) is a short duration (70-90 days) summer pulse crop with high nutritive value. The seeds contain 22-28% protein, 60-65% carbohydrate, 1-1.5% fat, 3.5-4.5% fibers and 4.5-5.5% ash. India produced 14.76 million tons of pulses from an area of 23.63 million hectare, which is one of the largest pulses producing in the world. Nanotechnology opens a wide scope of novel applications in the fields of biotechnology and agricultural industries, because nanoparticles (NPs) have unique physiochemical properties, i.e., high surface area, high reactivity, tunable pore size, and particle morphology. Nanoparticles interact with plants causing many morphological and physiological changes, depending on the properties of NPs. Efficacy of NPs is determined by their chemical composition, size, surface covering, reactivity, and most importantly the dose at which they are effective. Si NPs increased seed germination plant growth, yield and plant resistance to abiotic stresses. Therefore, the present study highlights the key role of Si NPs in mungbean. The appropriate elucidation of physiological, biochemical and molecular mechanism of nanoparticles in plant lead to better growth and development. Seeds of mungbean variety KM1401 and K851 were soaked for 24 hrs with silicon dioxide nanoparticle (0, 100, 200, 300 and 400 ppm) and soaked seeds were sown in pots. The morphological and biochemical study showed significant in recent investigation concludes the concentration of silicon dioxide (300 ppm) performs positively and improved morphological and biochemical parameters studied.

HOST PARASITE RELATIONSHIPS

Amita Sarkar and Shivam Chaturvedi
Department of Zoology
Agra College
Agra
amieeta@gmail.com

ABSTRACT

Parasites maintains their metabolic processes with the host metabolism. But, they supersede the host, to spread the disease ,infection and increase their population density inside the host body .In most cases, parasites tend to enter in the body of host, by several mechanisms of their own to spread infection. In case they have any resistance by host body, they use vector (i.e. vehicle of transmission).

During this interaction parasite takes two steps *viz.* moving itself or its progeny from one host to another (i.e. transmission) and in other phase it overcomes the defense system of host . The mode of transmission is of many types and different. Some parasites are transmitted from host parent to her offspring, *viz.* bacteria *Wolbachia* transmits insects eggs from her parents. This is vertical transmission. Many other parasites follow horizontal transmission in hosts by different methods. *Viz.* tapeworms, fleas and rhinovirus (common cold virus) , which spread by the contact between hosts and healthy individuals. Gonorrhea bacterium and other agents of venereal infections spread their infections through vectors like mosquitoes in malarial and Tse-Tse fly in sleeping sickness. The host parasite relationships were studied in lab and in present paper we discuss host parasite relationships.

KEY WORDS: host, parasite, relationship, transmission etc.

AIR POLLUTION PROBLEM IN INDIA: CAUSES AND SOLUTIONS

Nikhil Agnihotri, T.K. Sharma*, Sippy Dassani*, Vijay Kumar Yadav**

Botany Department, SKJD Degree College, Mangalpur, Kanpur

*Department of Botany, Vipin Bihari P.G. College, Jhansi, U.P.

**Department of Zoology, Vipin Bihari P.G. College, Jhansi, U.P.

nikhil.azolla@gmail.com

ABSTRACT

In the year 2018, 14 Indian cities were among the 15 most polluted cities of the world. According to WHO, about 1.2 million deaths every year are caused due to air pollution. This shows the dreadfulness of the level of air pollution in India. Since several years, air pollution has emerged one of the most deadly health and environmental problem in Northern India including Delhi, NCR, Punjab, Haryana and western and central regions of Uttar Pradesh. The air quality often reaches to the lowest levels and air pollution rises up to such high levels, which is considered as dangerous for health. Air pollution crosses all the standards and the atmospheric and weather conditions get very poor. Smog covers the entire north Indian states, the visibility reaches zero which causes flights cancelled. Breathing becomes difficult, esophagus feels shrinking and functions of several body parts such as heart, lungs, digestive organs is badly affected. Sometimes, conditions become so poor that one has to avoid morning walk due to air pollution and even schools and colleges are closed. As a general perception, in the beginning of the winter season in north India, bursting the crackers on the occasion of Diwali and burning the biological remains in the fields of Haryana and Punjab is considered one of the main reason for smog and air pollution in Delhi, NCR and entire north India, but more than 51% contribution to this pollution is made by the industries of Delhi, NCR and some cities of western Uttar Pradesh. 25% contribution is made by the combustion of fossil fuels in vehicles, 11% pollution is created from domestic wastes and 4% from other reasons. Burning of biological remains of crops in the fields of Haryana and Punjab only contributes about 8% to this air pollution, while bursting of fire crackers on Diwali contributes only 1% to this pollution. The present study deals with the causes of air pollution in North India along with providing a proper solution to this problem.

Key words- Air pollution, fire crackers, air conditions, air quality etc.

Effect of Polythene Hazard on Biodiversity and Ecology

S.V. Singh

Department of Chemistry

Dr. R.M.L. Degree College, Kalyanpur, Kanpur

ABSTRACT

Man has become highly obsessed by the use of plastic and polythene in modern times. According to a report, about 50% of total plastic produced till today is produced in the 19 years of the current century. Plastic or polythene poses a huge threat to our environment since the last two decades. Due to this, more than 127 countries have banned polythene bags and 6 countries have already banned single used plastic. Polythene bags have many redeeming ecological features; in fact, many of the techniques we utilize in our designs involve targeted use of plastic products. Though convenient, it is making us lazy these days as every second person uses a polythene bag everyday. A research concluded that about 11 kilogram of plastic or polythene is used by per person in India every year. Toxic chemicals released during manufacture are another significant source of the negative environmental impact of plastics. Polythene if not disposed properly may find its way into the drainage system resulting into choking of drains, creating unhygienic environment and causing water borne diseases. The major cause of recent floods in the Indian state of Bihar is supposed to be polythene or plastic bags. Recycled polythene may contain certain chemicals, which reaches to the ground and contaminates soil and water. Some of the plastic bags which contain leftover food or which get mixed up with other garbage are eaten by animals resulting in harmful effects. Because of the non-biodegradable and impervious nature of polythene, if disposed in the soil, it could arrest the recharging of ground water aquifers. If not disposed properly, polythene bags find their way into the drainage system resulting into choking of drains, creating unhygienic environment and causing water borne diseases. Polythene contains hazardous chemicals, which reach the ground and contaminate soil and sub-soil water. Because of the non-biodegradable and impervious nature of plastics, if disposed in the soil, they could arrest the

recharging of ground water aquifers. All the polythene consumed in the world will take 500 years to decompose totally. The current study deals with the ecological hazards of Polythene and necessary steps to control the danger of polythene in Kanpur city.

Key words: Polyethylene, Polythene, Plastic pollution, sewer choke, hazardous chemicals.

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