

Sponsored by :



Organised by :



NAAC A++ Accredited

XLVII ALL INDIA BOTANICAL CONFERENCE of

THE INDIAN BOTANICAL SOCIETY
(Commemorating the Birth Centenary of Prof. Y. S. Murty)

and
International Symposium
on

"BIOTIC CURIOSITIES AND FUNCTIONAL
DIVERSITY ACROSS PLANT KINGDOM IN
CLIMATE CHANGE REGIME"

October 16-18, 2024

Souvenir & Compendium of Abstracts



Organized by :

Chaudhary Charan Singh University
Meerut-250004

(Formerly Meerut University, Meerut) NAAC A++



EXECUTIVE COUNCIL FOR 2023-2026

President (2024-25)	Prof. U. C. Lavania, Lucknow
Immediate Past President	Prof. N.K. Dubey, Varanasi
Vice President	Prof. Varsha Nathar
Secretary	Prof. Seshu Lavania
Treasurer	Dr. Alok Srivastava
Chief Editor	Prof. Y. Vimala
Associate Editors	Dr. Rajesh Sharma, Hapur Prof. Nalini Pandey, Lucknow

COUNCILLORS

- 1 Prof. R.K. Kohli, Mohali
- 2 Prof. Manoj Kumar Dhar, Jammu
- 3 Prof. Manoj Prasad, New Delhi
- 4 Prof. S.K. Garg, Bareilly
- 5 Dr. Manoj M Lekhak, Kolhapur
- 6 Prof. Varsha N Nathar, Amravati
- 7 Prof. Santhosh Nampy, Calicut
- 8 Prof. P. Giridhar, Mysore
- 9 Dr. Sandeep Kumar, Haridwar
- 10 Dr. Yogesh Joshi, Jaipur
- 11 Prof. H.K. Goswami, Bhopal
- 12 Prof. Prasenjit Mukherji, Ranchi
- 13 Prof. Shanti S Sharma, Sikkim
- 14 Dr. A.A. Mao, Kolkata
- 15 Prof. S.K. Barik, Shillong
- 16 Dr. Sarita Srivastava, Prayagraj



CONFERENCE COMMITTEE

PATRONS

Prof. Sangeeta Shukla
Vice Chancellor, Chaudhary
Charan Singh University, Meerut
Prof. K.K. Singh
Vice Chancellor, SVPUAT, Meerut

OFFICE BEARERS OF THE INDIAN BOTANICAL SOCIETY

Prof. U.C. Lavania, President
Prof. N.K. Dubey, Immediate Past President
Prof. Varsha N. Nathar, Vice President
Prof. Seshu Lavania, Secretary
Prof. Alok Srivastava, Treasurer
Prof. Y. Vimala, Chief Editor

ORGANIZERS

Prof. Jitender Singh, Organizing Secretary
Prof. Pankaj Kumar, Joint Organizing Secretary
Prof. Rahul Kumar, Joint Organizing Secretary
Dr. Anjali Malik, Treasurer

NATIONAL ADVISORY COMMITTEE

Prof. R.R. Rao, Bangalore
Dr. A.A. Mao, Kolkata
Prof. S. K. Sopory, New Delhi
Prof. Swapan K. Datta, Kolkata
Prof. Pramod Tandon, Lucknow, Padma Shree
Prof. H.K. Goswami, Bhopal
Prof. A. K. Pandey, Bhopal
Prof. C. Manoharachary, Hyderabad
Prof. S. M. Reddy, Warangal

Prof. Akhilesh K. Tyagi, Delhi
Prof. A.K. Koul, Jammu
Prof. R.K. Kohli, Mohali
Prof. S. K. Barik, Shillong
Prof. S.R. Yadav, Kolhapur
Prof. N.C. Gautam, Agra
Prof. M. Sabu, Calicut
Prof. Ashwani Kumar, Jaipur
Prof. P.C. Trivedi, Jaipur

Prof. V.P. Singh, Bareilly
Prof. D.K. Maheshwari, Haridwar
Prof. Amita Pal, Kolkata
Prof. Manoj Prasad, New Delhi
Dr. Rakesh Pandey, Lucknow
Prof. H. S. Gaur, Noida
Prof. Shanti S. Sharma, Gangtok
Prof. Manoj K. Dhar, Ghaziabad
Prof. Naveen K. Arora, Lucknow

LOCAL ADVISORY COMMITTEE

Prof. P.K. Gupta
Prof. H. S. Balyan
Prof. Govind Prakash
Prof. A. K. Srivastava
Prof. S.V.S. Rana
Prof. S. S. Lal

Prof. M.K. Gupta
Prof. Beerpal Singh
Prof. Bhupendra Rana
Prof. Dinesh Kumar
Prof. J.K. Dhaka
Prof. Jayanand

Prof. Hare Krishna
Prof. Shiv Raj Singh
Dr. N. P. Saxena
Prof. R.K. Soni
Dr. Yashvir Singh Tomar
Dr. Vidhu

Dr. A.M. Bendre
Prof. S. S. Gaurav
Prof. Sanjeev K. Sharma
Prof. Sanjay Bhardwaj
Dr. R.S. Saxena
Dr. R.K. Sharma

Prof. Jaimala
Prof. Shailendra Sharma
Prof. Rakesh K. Sharma
Prof. Anil Malik
Dr. Anmol Kumar, IFS
Shri. S. N. Tyagi, IFS

LOCAL ORGANIZING COMMITTEE

Prof. Vijai Malik
Prof. Bindu Sharma
Prof. Neelu Jain Gupta
Prof. Sanjeev K. Sharma
Prof. Mukesh Sharma
Prof. Anuj Sharma
Dr. Ramakant
Dr. Ashok Kumar
Dr. Saru Kumari
Dr. Neelesh Kapoor
Dr. Vinay Panwar
Dr. Sandeep Kumar

Dr. Dushyant Chawan
Dr. Pradeep Chaudhary
Dr. Sachin Kumar
Dr. Bhawana Bajpeyi
Dr. Nazia Tabassum
Dr. Sandeep Kumar
Dr. Ishwar Singh
Dr. Dharmendra Pratap
Dr. Pavitra Dev
Dr. Yogendra Gautam
Dr. Anil Yadav
Dr. Vivek Nautiyal

Dr. Meenu Gupta
Dr. Jitender Goyal
Dr. Ajay Shukla
Dr. D.K. Sharma
Dr. Dilshad Ali
Dr. Ajay Kumar
Dr. Preeti
Dr. Payal
Dr. Devendra Kumar
Dr. Dinesh Panwar
Dr. Laxman Nagar
Dr. Garima Malik

Dr. Ashwani Sharma
Dr. Kapil Swami
Dr. Pradeep Panwar
Dr. Shashank Rana
Dr. Amardeep Singh
Dr. Suman Verma
Dr. Amita Sharma
Ms. Nirlep Kaur
Dr. R.C. Arya
Mr. N.P. Singh
Dr. Harjender Singh
Dr. Nupur Prasad

Dr. Anuradha Singh
Mr. Sandeep Siwach
Dr. Punjab Singh Malik
Dr. Seema Rani
Dr. Shyam Singh
Dr. Amit Tomar
Ms. Everest
Dr. Shefali Poonia
Dr. Anshu Dhaka
Dr. Priyanka
Dr. Deepti

CONTACT PERSON

Prof. Pankaj Kumar
SVPUAT, Meerut; ☎ +91-9068289380

Prof. Jitender Singh
Organizing Secretary, All India Botanical Conference 2024
Department of Microbiology, CCS University, Meerut - 250004
Uttar Pradesh; E-mail: aibc.ccsumeerut2024@gmail.com
☎ +91-9997110409

Prof. Rahul Kumar
CCSU, Meerut; ☎ +91-8894130717

Dr. Anjali Malik
CCSU, Meerut; ☎ +91-9897177874





Messages



Anandiben Patel
Governor, Uttar Pradesh



सत्यमेव जयते

Raj Bhavan
Lucknow - 226 027

03 October, 2024

Message

I am pleased to learn that Chaudhary Charan Singh University, Meerut is organizing the prestigious XLVII All India Botanical Conference of the Indian Botanical Society, alongside the Birth Centenary celebrations of the late Prof. Y.S. Murty.

The inclusion of the International Symposium on **"Biotic Curiosities and Functional Diversity across the Plant Kingdom in the Climate Change Regime"** adds significant relevance to the event, as it addresses the critical challenges posed by climate change on biodiversity. I hope this conference will serve as a valuable platform for botanists, researchers and scholars to exchange knowledge and explore innovative solutions for conserving plant diversity.

I wish the organizers and participants great success in this important academic endeavor.

(Anandiben Patel)



Yogi Adityanath



CHIEF MINISTER
UTTAR PRADESH

पत्र संख्या-96/पीएस-सौरभ/2024

Lok Bhawan,
Lucknow - 226001

Date :

03 OCT 2024

Message

I am happy to know that Chaudhary Charan Singh University, Meerut is organising the 'XLVII All India Botanical Conference of the Indian Botanical Society', 'Birth Centenary of late Prof. Y.S. Murty' and International Symposium on 'Biotic curiosities and functional diversity across plant kingdom in climate change regime' from 16th to 18th October, 2024. A souvenir is also being published to mark the occasion.

Environment is a gift of Nature. Any disorder or chaos in the environment has far reaching effects. Climate Change is an environmental issue which has multidimensional implications. Global warming has an adverse impact on Biodiversity.

In this perspective, the events assume much significance. I hope that deliberations would be meaningful and the events would successfully achieve their objectives.

My best wishes for the entire endeavour.


(Yogi Adityanath)





CHAUDHARY CHARAN SINGH UNIVERSITY, MEERUT-250 004 (U.P.)

(NAAC A++ Accredited)

Professor Sangeeta Shukla
Vice Chancellor

B.Sc.

Ref. No. SVC/21/
Dated : 08.10.2024



MESSAGE

I am delighted to welcome you to the XLVII All India Botanical Conference on "Biotic Curiosities and Functional Diversity across the Plant Kingdom in Climate Change Regime," at Chaudhary Charan Singh University, Meerut.

This conference serves as an important platform for researchers, educators, and enthusiasts to converge and share insights on the dynamic interplay between biodiversity and the pressing challenges posed by climate change. The theme of the Conference is well planned in view of the current requirements.

As we gather to explore the remarkable adaptations of plant life, we must also recognize the crucial role that functional diversity plays in maintaining ecosystem resilience. The ongoing climate crisis demands innovative solutions and collaborative efforts to safeguard our planet's rich botanical heritage.

I encourage each of you to engage deeply in discussions, share your research, and foster connections that will inspire future collaborations. Together, we can contribute to a greater understanding of how plants respond to environmental changes and how we can protect them for generations to come. I am sure that issues related to Climate Change Regime will be taken care off during the deliberations in different technical sessions.

Thank you for being part of this vital dialogue. Let us embark on this journey of discovery and innovation together.

I want to extend my heartfelt wishes for a comfortable and enriching stay and wish overwhelming success of the conference.

(Sangeeta Shukla)
Vice Chancellor

Prof. Jitender Singh,
Department of Microbiology,
Chaudhary Charan Singh University,
Meerut.



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

डा० के० के० सिंह
कुलपति
Dr. K.K. Singh
Vice Chancellor



Phone : 0121-2888522 (O)
0121-2888566 (R)
Web : svbpmeerut.ac.in
E-mail : vc@svpuat.edu.in

FOREWORD

It is my pleasure to know that the Chaudhary Charan Singh University, Meerut in collaboration with Sardar Vallabhbhai Patel University of Agriculture & Technology, Meerut is organizing XLVII All India Botanical Conference of the Indian Botanical Society, Birth Centenary of late Prof. Y.S. Murty and International Symposium entitled "**Biotic Curiosities and Functional Diversity Across Plant Kingdom in Climate Change Regime**" from October 16-18, 2024.

Botany is the branch of biology that deals with the study of plants, including their structure, properties, and biochemical processes. Also included are plant classification and the study of plant diseases and interactions with the environment. The principles and findings of botany have provided the base for such applied sciences as agriculture, horticulture, and forestry. Plants have been of paramount importance to early humans, who depended upon them as sources of food, shelter, clothing, medicine, ornament, tools, and magic. Today it is known that, in addition to their practical and economic values, green plants are indispensable to all life on Earth.

The theme and scope of the conference is tailored to align with the interest and expertise of all stakeholders. Topics of the conference, like Plant Sciences, Plant Pathology, Biotechnology, Bioinformatics, Cytogenetics, Plant Physiology, Biochemistry, Ecology and Seed Science are apt and demand of the present day scenario. These topics will be explored through keynote presentations, panel discussions, oral and poster presentations during three-day symposium.

I extend my gratitude to the Organizing Committee, resource persons, facilitators, sponsors and participants to curdle an engaging and insightful deliberations and bringing out Souvenir of Abstract during the symposium. I am not only confident but sure also that participants will have meaningful and comfortable stay during the Symposium.

Wishing each participant, a fruitful and enlightening learning experience.


(K. K. Singh)





Message

It is my distinct pleasure to welcome you to the XLII All India Botanical Conference on "Biotic Curiosities and Functional Diversity across the Plant Kingdom in Climate Change Regime." As the Director of the ICAR-Indian Institute of Farming Systems Research, I am excited to see so many dedicated researchers, practitioners, and enthusiasts gathered to explore the intricate connections between plant diversity and climate resilience.

The theme of this conference is particularly timely, as we grapple with the profound impacts of climate change on agricultural systems and natural ecosystems alike. By examining the biotic curiosities and functional diversity within the plant kingdom, we have a unique opportunity to enhance our understanding of how plants adapt and thrive in shifting environments. The theme of this conference resonates deeply with the ongoing research and innovations, especially in the domains of sustainable farming systems (integrated, organic, natural farming systems, and conservation agriculture). As we navigate the complexities of climate change, it is imperative to explore how advanced microbiological studies, combined with ecological farming systems, can provide sustainable solutions. The functional diversity of plant species, coupled with the rich potential of soil microbiomes, holds immense promise for enhancing crop productivity, soil health, and biodiversity in environment friendly ways.

This conference serves as a platform for exchanging innovative ideas and fostering collaboration across disciplines. I encourage each of you to engage fully, share your findings, and explore potential partnerships that can strengthen our collective efforts in research and practice.

Let us work together to uncover new insights and develop strategies that not only address the challenges posed by climate change but also promote sustainable agricultural practices and biodiversity conservation.

Thank you for being part of this vital dialogue. I wish you all an inspiring and productive conference.

Warm regards,

(Dr. Sunil Kumar)

Director

ICAR-Indian Institute of Farming Systems Research, Modipuram



Pandhari Yadav,
IAS
Principal Secretary &
Director General,



Council of Science & Technology U.P.
(Dept. of Science & Technology, U.P)
Vigyan Bhawan, 09-Nabiullah Road,
Surajkund Park, Lucknow – 226018
Ph: 0522 – 2974686



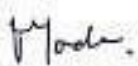
Foreward

I extend warm greetings to all delegates and participants attending this International Symposium on "**Biotic Curiosities and Functional Diversity Across the Plant Kingdom in a Climate Change Regime**" held in honour of the Birth Centenary of the Late Prof. Y. S. Murthy, organized by Chaudhary Charan Singh University, Meerut.

Climate change is a major driver of biodiversity loss, and this decline in biodiversity further exacerbates climate change, as degraded ecosystems are less capable of assimilating and storing CO₂. Humanity has a global responsibility to tackle these interconnected challenges. Climate change results in long-term shifts in temperature and weather patterns due to human activities, leading to an increase in average global temperatures and extreme, unpredictable weather-common manifestations of this urgent issue. In recent years, it has emerged as a global emergency, affecting not only human well-being but also the sustainability of various life forms.

I wish this symposium highlights the research needs and explores innovative tools and technologies to combat climate change. It aims to identify the most researched tools and technologies for addressing climate change, both in our country and worldwide, and provide a framework for evaluating their potential.

I hope that this symposium will serve as a platform for all participants to reflect on our discussions, challenge ourselves to take action, and inspire one another.


(Pandhari Yadav)





Prof. Y. Vimala

M.Phil. Ph.D. F.R.S., FSPRB, F.L.S. (London)

Professor Emeritus

Executive Councillor (Governor's Nominee)

Chief Editor, J. Indian bot. Soc.

Chaudhary Charan Singh University, Meerut-250004 (U.P.) India

Dean, Faculty of Engineering, Applied Science & Technology

Director, Biotechnology & Life Sciences

Shobhit Deemed University, Meerut

Ph: +91-9411905180

E-mail: yvimala17@gmail.com



Oct.9, 2024

Message

It is a great honour to be a part of the host institution (post-retirement) and welcome the august galaxy of vibrant researchers, esteemed scientists/educators, and budding botanists to the XLVII All India Botanical Conference on "Biotic Curiosities and Functional Diversity across the Plant Kingdom in Climate Change Regime."

This year's theme highlights the remarkable diversity and adaptability of plants, showcasing their incredible ability to respond to environmental shifts. Exploring biotic curiosities not only enriches our knowledge but also enhances our capacity to develop sustainable strategies for conservation in the changing world.

The focal theme of the conference, intended to show case novelties and curiosities in organizational and functional diversities, is likely to generate newer ideas and explore newer possibilities. This conference is a unique opportunity to acquaint oneself with inspiring life and works of a humble legendary botanist Prof. Y.S. Murty, instil new ideas and foster connections that will strengthen the collective efforts in botanical research and education.

Let us celebrate the wonders of plant life and reinforce our commitment to protecting our ecosystems. I look forward to the stimulating conversations and innovative solutions that will emerge from our time together.

Wishing you all a fruitful and inspiring conference.

(Y. Vimala)



चौधरी चरण सिंह विश्वविद्यालय, मेरठ
Chaudhary Charan Singh University, Meerut



Date: 04-10-2024



Message

It is with great pleasure that I welcome you to the XLVII All India Botanical Conference on "Biotic Curiosities and Functional Diversity across the Plant Kingdom in Climate Change Regime." As the Registrar of the host institute, I am delighted to see such a diverse gathering of researchers, educators, and students, all united by a common passion for botanical science.

This conference provides a vital platform to explore the intricate relationships within the plant kingdom, especially in the context of the ongoing challenges posed by climate change. The theme emphasizes the importance of understanding biotic curiosities and functional diversity, which are crucial for developing adaptive strategies for conservation and sustainable practices.

I encourage you to take full advantage of the discussions, presentations, and networking opportunities available during this event. Collaboration and knowledge-sharing are essential in our collective mission to safeguard our ecosystems and enhance the resilience of our agricultural systems.

Thank you for your participation, and I wish you an inspiring and productive conference filled with meaningful insights and connections.

Warm regards,


04.10.2024
[Dharendra Kumar]
Registrar



चौधरी चरण सिंह विश्वविद्यालय, मेरठ
Chaudhary Charan Singh University, Meerut

Prof. Sanjeev Kumar Sharma
Director Academics



Message

It is with great pleasure that I welcome you to the XLVII All India Botanical Conference on "Biotic Curiosities and Functional Diversity across the Plant Kingdom in Climate Change Regime." This gathering presents a unique opportunity for scholars, researchers, and enthusiasts to delve into the intricate relationships between biodiversity and the ever-evolving challenges posed by climate change.

Our focus on biotic curiosities and functional diversity highlights the remarkable adaptations and resilience of plant life. Understanding these dynamics is essential not only for advancing scientific knowledge but also for informing conservation efforts and sustainable practices.

I encourage all of you to engage actively in the sessions, share your insights, and foster collaborative discussions. Together, we can enhance our understanding of the plant kingdom and develop innovative solutions to the pressing environmental issues we face today.

Thank you for being part of this significant event. I look forward to the inspiring conversations and discoveries that await us.


(Prof. Sanjeev Kumar Sharma)



चौधरी चरण सिंह विश्वविद्यालय, मेरठ
Chaudhary Charan Singh University, Meerut

Prof. Beer Pal Singh
Director Research & Development



Message

Welcome to the XLVII All India Botanical Conference on "Biotic Curiosities and Functional Diversity across the Plant Kingdom in Climate Change Regime." It is both an honor and a pleasure to host this gathering of brilliant minds dedicated to exploring the complexities of our plant ecosystems.

As we navigate the challenges posed by climate change, the need for interdisciplinary dialogue and collaboration has never been more pressing. This conference aims to shed light on the remarkable adaptations and functional diversities within the plant kingdom, illuminating how these curiosities can inform our understanding of resilience in changing climates.

Our diverse program features keynote addresses, panel discussions, and interactive workshops that will highlight cutting-edge research and innovative approaches to conservation and sustainability. I encourage each of you to engage fully, share your insights, and foster connections that will advance our collective efforts.

Let us come together to celebrate the wonders of the botanical world and commit ourselves to protecting it for future generations.

Wishing you all a productive and inspiring conference.

Warm regards,


(Prof. Beerpal Singh)



चौधरी चरण सिंह विश्वविद्यालय, मेरठ
Chaudhary Charan Singh University, Meerut

Prof. Jaimala
Dean, Faculty of Science



Message

It is with great enthusiasm that I welcome you to the XLVII All India Botanical Conference on "Biotic Curiosities and Functional Diversity across the Plant Kingdom in Climate Change Regime." As the Dean of Science, I am thrilled to witness the gathering of such esteemed researchers, educators, and students, all united by a shared passion for understanding and preserving our planet's botanical heritage.

This conference comes at a crucial time, as we face unprecedented changes in our climate that challenge the resilience of plant ecosystems. By delving into the fascinating biotic curiosities and the remarkable functional diversity within the plant kingdom, we aim to uncover insights that can guide our conservation efforts and enhance our responses to environmental shifts.

Our program is designed to foster collaboration and spark innovative ideas. I encourage you to engage actively in discussions, share your research, and explore new partnerships. Together, we can contribute to a deeper understanding of the intricate relationships within our ecosystems and work towards sustainable solutions.

Thank you for being part of this important conversation. Let's make the most of our time together, celebrating the wonders of botany and reinforcing our commitment to safeguarding our natural world.

Best wishes for an inspiring and fruitful conference.


(Prof. Jaimala)





CH. CHARAN SINGH UNIVERSITY, MEERUT

DEPARTMENT OF GENETICS & PLANT BREEDING

आनुवंशिकी एवं पादप प्रजनन विभाग, चौ० चरण सिंह विश्वविद्यालय, मेरठ
University Campus, Meerut-250 004 (U.P) India

www.ccsuniversity.ac.in
Telefax: 0121-2604681

Ref. No.

Prof. Shailendra Sharma
Dean, Faculty of Agriculture



Date: 09.10.24

Message

I would like to take the opportunity to express my profound joy at the event of the XLVII All India Botanical Conference of the Indian Botanical Society and International Symposium on "Biotic Curiosities and Functional Diversity across Plant Kingdom in Climate Change Regime" is being organized by Department of Microbiology, Chaudhary Charan Singh University, Meerut from October 16-19, 2024.

Climate change has been perceived as one of the biggest threats to socioeconomic development, the impact being more pronounced in the developing nations. The world's most climate change susceptible area is Southeast Asia. In the future the trend of global warming will depend on human anthropogenic activities such as fossil fuel burning, deforestation, intensive farming and others that emit carbon dioxide and other greenhouse gases. Global crop production has been noticeably hampered in recent times and might be carried out for the next few decades as a consequence of climatic abnormalities such as irregularities in rainfall, increasing CO₂ concentration, and temperature. Integration of these factors affects normal growth duration, physiological responses of plants, brings pest outbreaks and unpredictable phenomena, and squeezes the available resources. Environmental safety and sustainability are put as the last option by the resource-poor farmers. I hope the deliberations and sharing of the core ideas, experiences, creative imaginations, innovations, and formulas of different expertise under different sub-themes will be a milestone for the solutions to ongoing challenging issues regarding climate change. Indeed, I believe that such kind of scholarly gatherings could play a vital role in making the world a better place and also making ready to tackle any difficult situations in the near future.

Finally, I wish the conference an eminent accomplishment in achieving its goal towards climate change adaptation thus enlightening global innovative in agricultural, forestry and applied sciences.

(Prof. Shailendra Sharma)





चौधरी चरण सिंह विश्वविद्यालय, मेरठ Chaudhary Charan Singh University, Meerut

Prof. M. K. Gupta
Coordinator, IQAC



Message

It's my indeed pleasure to welcome all the members to the XLVII All India Botanical Conference of the Indian Botanical Society and International Symposium on "Biotic Curiosities and Functional Diversity Across Plant Kingdom in Climate Change Regime" is being organized by Department of Microbiology, Chaudhary Charan Singh University, Meerut from October 16-18, 2024.

The Earth is rendering us all the resources to meet our daily needs, however the vigorous and indiscriminate usage of these resources is posing serious threat in the form of pollution and climate change respectively. Climate change consequences threaten the availability of our food and food production. Farmers are the firsthand to experience and impacts of climate change. It is high time for us to take necessary measures to mitigate these consequences which otherwise may risk the existence of our future generations.

The plenary sessions, interactive discussions on Climate Change are forth to derail the concrete outputs that can mitigate the disastrous consequences of climate change. The conference will also provide a platform for brighter minds to get together and ponder on many global issues and suggest innovative actions to meet the challenges. I hope all the participants will enjoy this academic fest. I wish the conference a grand success.

Dated: 09.10.2024


(Prof. M. K Gupta)



चौधरी चरण सिंह विश्वविद्यालय, मेरठ

Chaudhary Charan Singh University, Meerut

Prof. Jitender Singh

Organizing Secretary

XLVII All India Botanical Conference



Department of Microbiology



Preface

Welcome to the XLVII All India Botanical Conference on "Biotic Curiosities and Functional Diversity across the Plant Kingdom in Climate Change Regime." It is an immense honor to serve as the organizing secretary for this prestigious event, which brings together a diverse array of researchers, educators, and enthusiasts from across the nation. Thanks are due to the President Indian Botanical Society for selecting our University for this important conference. My sincere thanks to Hon'ble Vice Chancellor, CCSU, Meerut who has taken special attentions in each and every activity of the seminar.

As we gather to explore the remarkable adaptations and intricate relationships within the plant kingdom, we recognize the pressing challenges posed by climate change. The theme of this conference emphasizes the importance of understanding biotic curiosities-those unique traits and behaviors that allow plants to thrive in varying environments. By investigating functional diversity, we can gain valuable insights into the resilience of ecosystems and the vital roles that plants play in our world.

Over the next few days, you will have the opportunity to engage with thought leaders, participate in stimulating discussions, and share your research findings. Our aim is to foster collaboration and inspire innovative approaches to conservation and sustainable practices in the face of environmental change.

We are grateful for the contributions of our speakers, participants, and sponsors, whose support has made this conference possible. The Financial assistance from various agencies viz., Department of Biotechnology (DBT), Science and Engineering Research Board (SERB), Council of Scientific & Industrial Research (CSIR) and Botanical Survey of India (BSI) and other organizations are duly acknowledged.

I encourage everyone to connect, share ideas, and explore new avenues of research as we work together to advance our understanding of the plant kingdom. Let us embark on this journey of discovery and collaboration, dedicated to preserving and enhancing the rich diversity of our botanical heritage.

I hope this book "Souvenir and Compendium of Abstract" being printed and published for the Conference will be excellent source of reference for researchers. My fellow colleagues and students Ms. Sakshi, Ms. Aarti Thakur, Ms. Ekta Chikara Mr. Himanshu Maurya and Mr. Aditya needs special words of appreciation to bring out this book.

Once again, I welcome all the delegates attending the Conference.


(Jitender Singh)





UNIVERSITY RANKINGS 2024



About Chaudhary Charan Singh University, Meerut (NAAC A⁺⁺ Accredited)

Chaudhary Charan Singh University, Meerut (formerly Meerut University, Meerut) was established as an academic hub, in the year 1965 under Uttar Pradesh State Universities Act no. XIII. The pioneering programmes, in 1969, adhered to the primary goal of knowledge dissemination. Henceforth, it owns locational responsibility in agricultural belt and blends pursuits of innovations in science and culture, reflecting in its curricula and teaching-learning programmes. The lush green campus of the University which sprawls over 221.1 acres of land with built-up area of approximately 37.40 acres. The University houses state of art buildings that are spacious and are well connected with asphalted roads and high mast street lights with lush natural greenery.

The university affiliates 714 aided government and self-financed colleges/institutions, with more than 5.25 lakh students. The motto of the University 'Yatra Satyasya Paramam Nidhanam' (Where the truth has its supreme abode) is reflected in its vision and mission. The University mainspring orbits around student prosperity. It pioneered to implement National Education Policy-2020, exhibiting sensitivity through 88% revision of curricula in the last five years.

The University campus offers variety of schemes and programmes, with scholastic titles. Assortment of 460 'Value-Added and Related Discourses for Higher Accountability to the Nation', are grouped under the scheme 'VARDHAN'. Experiential learning was up-scaled through 1893 projects in the last five years. 'SPACE', the 'Students' Programmes for Academic Caliber and Excellence', identifies the meritorious students, and awards top rankers in all subjects, each year. Scholarships are awarded annually to Ph.D. research scholars belonging to families with limited financial means, including NET qualified candidates as well as meritorious but non-NET qualified students. 'SATYAM' the 'Student Aid and Training in Yoga and Meditation', 'SWASTH' the 'Student Wellness Aid Scheme & Training in



Health', 'FASTWITS' the 'Funding Assistance for Student and Teachers for Within India Travels', 'FUSIONCON' the 'Funding Support for International/ National Conferences', Kaushal Yojana-Skill Programme, 'URGS' the 'University Research Grants Scheme', besides, others. State-of-art Central Instrumentation Facility, Media Studios, Moot Court, Art Galleries, are signature facilities of the University. The serious research involvement of the faculty and scholars has been awarded by Clarivate as the best state university and the best Woman researcher in India under Web of Science powered Research Excellence Citation Awards-2023.



MISSION

The stated mission of the University is:

“To provide access to quality education and excellence through rigorous efforts of critical thinking, collaborative research, and knowledge creation of global standards in a cooperative ambience founded on Indian wisdom and values, transforming India into a developed

भारतीय बुद्धिमत्ता और मूल्यों पर आधारित सामंजस्यपूर्ण परिवेश में रचनात्मक सोच, सहयोगात्मक अनुसंधान तथा वैश्विक मानकों पर आधारित ज्ञान के परिशुद्ध प्रयासों के माध्यम से गुणवत्तापूर्ण शिक्षा और उत्कृष्टता द्वारा भारत को एक विकसित राष्ट्र में रूपांतरित करना है।

VISION

The stated vision of the University is:

“To produce such professionals who have global competence, vision, and skills as are necessary to meet the challenges of an emerging global knowledge economy, by the power of innovation, creativity, and efficient learning ability”.

नवाचारी सृजनात्मकता और दक्ष अधिगम योग्यता की क्षमता से युक्त वैश्विक सक्षमता, दृष्टि एवं कौशल से उभरते वैश्विक आर्थिक ज्ञानतंत्र की चुनौतियों के अनुरूप योग्य वृत्तिकों की निर्भिति।



Established in 1965

Our Journey

1969

- Department of Botany
- Department of Genetics & Plant Breeding
- Department of Mathematics
- Department of Physics
- Department of Russian Language
- Department of Sanskrit

1970

- Department of Horticulture
- Department of Psychology
- Department of Sociology
- Department of Education

1977

- Department of Economics
- Department of History
- Department of Political Science
- Department of Zoology

1978

- Department of English

1981

- Department of Statistics

1996

- Department of Biotechnology
- Department of Environmental Science
- Institute of Business Studies

1998

- Department of Microbiology
- Department of Plant Protection





Charak School of Pharmacy
Department of Jewellery Design

2023

2022

Department of Yoga
(Independent Department)

Department of Commerce

2017

2004

Faculty of Engineering & Technology
Department of Fine Arts
Department of Geography
Department of Home Science
Department of Library & Information Science
Department of Physical Education
Department of Toxicology

Department of Legal Studies

2003



2002

Department of Chemistry
Department of Food Science &
Technology
Department of Hindi
Department of Urdu

Department of Seed Science & Technology
Department of Journalism & Mass Communication

2001

RECOGNITION & APPROVALS

BY GOVERNMENT INSTITUTIONS & REGULATORY BODIES



University Grants Commission
(UGC)



Department of Higher Education,
Uttar Pradesh



NATIONAL ASSESSMENT AND
ACCREDITATION COUNCIL



Member of Association
of Indian Universities



Bar Council of India
(BCI)



National Medical Commission (NMC)
Formerly Medical Council of India (MCI)



Pharmacy Council of India
(PCI)



All India Council for Technical Education



National Council for
Teacher Education (NCTE)



DEPARTMENT OF SCIENTIFIC AND
INDUSTRIAL RESEARCH



All India Survey on
Higher Education



University Grants Commission
(UGC)



OVERVIEW

08 Faculties

37

Department

184

Faculty Members

Faculty With 12+ Years Average Teaching Experience

03 State-of-Art, Stepped auditoriums with a combined capacity of 1500 individuals

Diploma & P.G. Diploma Courses

22 U.G. Programmes
B.Sc./B.A./B.Tech./B.Pharmacy

47 P.G. Programmes
M.Sc./M.A./M.Tech.

93.65%
Students Pass Percentage Year - 2022-23

164+
ICT enabled Classrooms

85+
High-end Research Laboratories

1500+
Capacity Hostel for boys & girls

35+
ICT enabled Seminar Halls



24*7
Internet Connectivity



Foreign Collaborators and MoUs



UNIVERSITY LIBRARY

The central library of the University is housed in a four-storied modular pattern building in close proximity to the teaching Departments. Library membership is open to students, scholars and faculty members of the University and its affiliated colleges. Reference and bibliography services have been specially planned to meet the growing requirements of library members.

351
Working Days

2.5 Crores
Annual Budget

RFID
3M
SECURITY
DEVICE

332
E-Journals

117429
Total Titles

5500
Spiritual
Books

15946+
Ph.D. Thesis

36550
Bound Journals



167199
Total Volumes

173755
Books



9500
Spring Nature
E-Books

1000
Hindi Language
E-Books

3215
Thesis on
Shodganga

Turnitin/Drill bit
Plagiarism Software

5362
E-Content
UPHED PORTAL

3500
Institutional
Repository

42
Magazines

17
Newspaper

06
Databases

1000
Registration
NPTEL Local Chapter

3000
Braille
Collection

1350
E-Content
Bridge Library Portal

7500
E-Journals
UGC E-ShodhSindhu
INFLIBNET

CONTENTS

I. Abstract of Presidential Address	1-2
II. Abstracts of Medal Award Lectures	3-9
III. Abstracts of Memorial Lectures	10-12
IV. Abstracts of Invited Lectures	13-29
V. Abstracts of Woman Botanist Award Contest	30-32
VI. Abstracts of Young Botanist Award Contest	33-37
VII. Abstracts of Oral Presentations	38-185
VIII. Abstracts of Poster Presentations	38-185
IX. Index of Authors	186-190



PRESIDENTIAL ADDRESS

CHROMOSOME ORGANIZATION: DIVERSITY AND CURIOSITY

Umesh Chandra Lavania

INSA Senior Scientist, CSIR-National Botanical Research Institute, Lucknow – 226001.
(formerly: Senior-most Chief Scientist & Head, Division of Genetics and Plant Breeding, and AcSIR
Professor, CSIR-CIMAP, Lucknow – 226015)
Email: lavaniauc@yahoo.co.in

Through this presentation, an attempt shall be made to apprise curiosities attendant in organizational diversity and behaviour of chromosomes from academic and utilitarian prospective. The chromosomes, comprised of DNA and proteins are the major component of the nucleus in Eukaryotes, wherein about 4 cms long DNA fiber is compacted to form a chromosome of 1 μm in diameter and 10 μm in length. Chromosomes have defined territories in the nucleus and serve as the continuum for sustenance of heredity and variation both at asexual and sexual level realised through mitotic and meiotic division, respectively. Notwithstanding the above commonalities, the plants and animals significantly differ for their chromosome and cellular organization. The animal cell lacks cell-wall but owe dynamically organized well differentiated linkage groups with specific location of repeat families, in clear contrast to plants where cell has a well-defined cell-wall but lacks repeat family-based precise differentiation between the linkage groups.

Curiously, the plant systems offer unique *in planta* opportunities to realize variation through the incidence of polyploidy, intergenomic hybridity and genomic orientation, kinetochore function, *de novo* somatic diversity, polysomaty, endopolyploidy and polyteny in differentiating tissues, B chromosomes that at times become a major source of variation, adaptation and speciation. Drastic variations are encountered in form, function, and number of chromosomes in plants, ranging from $n=2$ in *Brachyscome dichromosomatica* to $n=320$ in *Sedum suaveolens* (Crassulaceae), at family level from $n = 4$ to 120 in the Brassicaceae, and at genus level from $n = 2$ to 45 in *Brachyscome* (Compositae) - in angiosperms; to $n=720$ in ferns. However, the cell size does matter to decide the size of chromosomes a cell can accommodate.

One of the key realizations in the "genomics era" is that polyploidy is ubiquitous in plants, and that all modern flowering plant genomes are derived from processes set in motion by a history of repeated, episodic whole-genome doubling, or polyploidy. A new thinking is beginning to emerge that concomitant with the climate change happening at a fast pace in the Anthropocene, it is likely that if global climate undergoes major change in coming centuries, then auto-polyploidization could be the important player leading to increase in chromosome number and dominance of perennial herbs.

However, when divergent diploid genomes are combined to form an allopolyploid genome, there are instances of genomic / genetic changes to realize genome elimination and / or gene silencing to realize hybrid stabilization. Whereas inactivation / elimination of centromeric histones lead to chromosome / genome elimination, but spatial position of the partner.

Keywords: Chromosome diversity, Chromosome dynamism, Climatic and Structural and Behavioral diversity.

AWARD LECTURES

PROF. BIRBAL SAHNI COMMEMORATIVE MEDAL LECTURE

RECENT ADVANCES IN INDIAN LICHENOLOGICAL RESEARCH

D. K. Upreti FNA, FNASc

CSIR Emeritus Scientist

Lichenology Laboratory

Plant Diversity Systematics and Herbarium Division

CSIR- National Botanical Research Institute, Lucknow

Email: upretidk@rediffmail.com

The initiation of taxonomic studies on Indian lichens dates back to the period of Linnaeus in the eighteenth century, who mentioned a single lichen species of the genus *Roccella* in the publication *Species Plantarum*. Erich Acharius during the years 1810-1814 described four species of lichens from India. Dr. D. D. Awasthi in the year 1965 published a catalogue of lichens from India, Nepal, Pakistan and Ceylon where 1310 species under 150 genera were recorded mostly based on the taxa described by foreign lichenologists. During sixties up to nineties of the last century Dr. D. D. Awasthi carried out systematic studies on lichens of the country and provided consolidated information on 1850 species belonging to 23 genera and 80 families of both micro lichens (crustose-squamulose) and macro lichens (foliose-fruticose). At present India is represented by 3029 species of lichens belonging to 469 genera and 88 families. Apart from taxonomy and diversity studies of lichens, studies on lichenicolous fungi growing on lichen thalli and endolichenic fungi growing inside the lichen thalli have been initiated for their bioprospection. At the end of the last century a fairly good account of lichens from different regions of the country was available and studies on other important aspects of lichenology were initiated at three major centres of lichenology in the country.

The lichens are well known for their use in air pollution monitoring both for organic, inorganic and metalloids together with radionucleoides in the environment. Utilizing lichen diversity and distribution pattern and metals accumulated, the air pollution monitoring in Himalayan cities such as Dehradun, Badrinath, Uttarkashi and Pauri together with Mahabaleshwar in northern western Ghats and Dhar in central Indian regions are available.

The biodeterioration activities of lichens on monument and historical buildings not only provide information on the damage to the buildings but also indicate the environmental changes in the surrounding area. The lichen biodeterioration of Bhimbetka world heritage zone and monuments of Dhar in Madhya Pradesh and major monuments of Uttar Pradesh were completed.

PROF. P MAHESHWARI COMMEMORATIVE MEDAL LECTURE

RELEVANCE OF BIOINOCULANTS IN SUSTAINABLE AGRICULTURE

S Ram Reddy

Professor Emeritus (Retd')

Department Botany

Kakatiya University, Warangal – 506009 TG, India

Email: sanditi.ramreddy@gmail.com

Climate change, global warming and burgeoning human population are current burning problems which underscore the need for sustainable agriculture. The sustainable agriculture system involves the modification of agricultural techniques in both current and traditional practices to provide the food needs of present and also future generations while conserving the natural environment. Sustainable agriculture can be achieved through integrated approach involving many components such as use of organic manures, crop rotation, crop residues, multiple cropping and biofertilizers.

Plants require ideal physical; chemical and biological resources present in the soil for proper growth. Soil microorganisms play an important role in mobilizing and augmenting different nutrients present in the soil. Among different groups of microorganisms, the role of diazotrophs phosphate solubilizers, mobilizers, PGPR, zinc solubilizers, potassium solubilizers, silica solubilizers and sulphur oxidizers in plant growth enhancement has been clearly demonstrated. Some microorganisms are being exploited for reclamation of pollution and salt affected soils. A great amount of work has been carried out and as a result they have been used as bioinoculants to enhance the crop growth and productivity, and the results of their application are proving the point. In the case of nitrogen, species of *Rhizobium*, *Azotobacter* and *Azospirillum* are being used as biofertilizers either alone or in combination. *Frankia* species are used as inoculants in some special tree species. *Azolla*, an aquatic fern plant, has been used as a natural biofertilizer for rice since ancient days. Phosphorus (P), though present abundantly in most soils, is not available due to insoluble state. P solubilizing bacterial and fungal species (*Aspergillus* and *Penicillium* spp.) solubilize bound phosphorus in soil and make it available to plant roots. Mycorrhizae especially arbuscular mycorrhizae (AMF) are proved to be efficient P mobilizers. Apart from P they impart several other benefits to their associated host plant. Plant growth promoting rhizobacteria (PGPR) and fluorescent pseudomonads provide a host of benefits to plants. Some endophytic bacteria associated with grass plants like sugarcane help the associated host plants. Zinc, potassium and silica are also identified as important nutrients for plants. Many bacterial species such as *Pseudomonas*, *Gluconacetobacter*, *Burkholderia*, *Serratia* and *Bacillus thuriangiensis* colonize the rhizosphere and solubilize Zn compounds. Many agricultural soils in India are reported to be potassium deficient. K solubilizing bacteria (KSB) such as *Bacillus mucilaginosus*, *Pseudomonas*, *Acidithiobacillus ferroxidans* and *Paenibacillus* solubilize K salts by producing organic acids. Silica plays a significant role in plant growth and also provides resistance against diseases and pests. Silicate solubilizing bacteria (SSB) (*Burkholderia*, *Bacillus*, *Pseudomonas* and

Enterobacteria) are reported to solubilize different kinds of silicates and make Si available to plants. Silicon biofertilizers have been developed and commercially produced and used in various crop species like rice, oat, barley wheat, cucumber and sugarcane. All these nutrient related biofertilizers are commercially produced and used in agriculture minimizing the use of chemical fertilizers. Some are even developed to the extent of nanofertilizers for the efficient and low-cost application.

PROF. VISHWAMBHAR PURI COMMEMORATIVE MEDAL LECTURE

EVOLUTION OF CLIMBING HABIT AND ITS IMPLICATIONS ON THE STEM ANATOMY AND THEIR STEM ARCHITECTURE

Kishore S. Rajput

Department of Botany, Faculty of Science, The Maharaja Sayajirao University of Baroda, Vadodra 390002 (Gujarat)

Email: ks.rajput15@yahoo.com, kishor.rajput@gmail.com

Competition for above (sunlight) and underground (water and minerals) resources compelled several vascular plants to shift from self-supporting to non-self-supporting (climbing) habits. They evolved independently and repeatedly in several lineages of the vascular plants including both non-flowering and flowering. Shifting to climbing habits helped these groups to conserve energy and divert it towards extension growth instead of radial growth. Consequently, mechanical tissues were impaired due to their narrow stem diameter; thus, they were forced to rely on external objects for support. To address this issue, external morphology was altered by developing various mechanisms such as tendrils, sticky aerial roots/pads, hooklike structures etc., to climb over the host. During this course of evolution, they have not only reformed their external morphology but also transformed growth patterns by employing variant secondary growth. Changes in growth trajectories influenced the stem architecture like having narrow stems in transverse view, possessing less xylem per distal leaf area, less phloem and cortical tissue, and an increase in stem thickness by forming successive cambia or neoformed vascular cylinders. Besides these, many climbing species are characterised by the presence of interxylary phloem, interxylary cambia (may be uni- or bifacial in the differentiation of its derivatives), functionally inverse cambia, formation of phloem wedges, dissected/furrowed xylem, lignified secondary xylem in plates, isolated strands of lignified elements, radial vessels and sieve elements, high and wide rays, and sometimes even radial vascular bundles. It also includes phloem ray dilation and dedifferentiation of ray cells into vascular cylinders, an abundance of unlignified axial parenchyma in the secondary xylem, dimorphism of sieve elements and vessels, the presence of vasicentric tracheid and a variety of lianescent syndrome. The eco-physiological functions of these features are linked to supplying mineral nutrients to large leaf areas through narrow stems and transporting photosynthate from source to sink.

An increase in stem diameter by forming successive cambia, abundance of unlignified parenchyma, high and wide rays, and formation of phloem wedges are attributed to the stem torsion to provide flexibility for the protection of the conducting tissues from air embolism. In addition, the presence of vessel dimorphism (wide plus narrow/fibriform) serves as an added mechanism to address the issue of narrow stems and supply minerals and nutrients. It is ascribed that wide vessels are more efficient in the conduction of water, minerals, and nutrients. However, they are prone to air embolism while narrow (fibriform) vessels are resistant to it. Similarly, dedifferentiation of unlignified xylem parenchyma into interxylary phloem and development of intraxylary (internal) phloem at the pith margin offer the most secured route for translocation of photosynthate against abiotic (temperature) and biotic stress such as sap feeding or bark

damaging insects because both types of phloem are enclosed within and inside the xylem respectively. The formation both phloem types is correlated with sudden and profuse flowering that occurs seasonally. Some of the taxa like *Canavalia*, *Entada*, *Merremia*, *Mucuna* etc., initiate additional meristem within the secondary xylem known as 'interxylary cambium' to increase interxylary phloem production to meet the demand vs. supply of the photosynthate. Taxa like, *Argyreia*, *Entada*, *Hebanthe eriantha*, *Leptadenia* etc., also produce radial sieve elements to facilitate rapid photosynthate translocation while taxa like members of the Combretaceae, *Merremia*, *Mucuna* etc., develop radial vessels or perforated rays for efficient water and mineral conduction. The presence of dimorphic sieve elements (narrow and wide diameter) within the same cross-section is often observed in phloem wedges and is associated with hormonal imbalance, which is constantly associated with the leaf orthostichies. Since the climbing members are prone to mechanical injury due to arboreal animals or slipping of from the host, their stem is characterised by occurrence of an abundance of axial parenchyma, dissected/ furrowed xylem, high and wide rays, and phloem wedges is said to be vital in facilitating stem twisting and providing protection against internal injury, which are susceptible to mechanical damage. Like electric cables, neo-formed vascular cylinders (neo-formations) are formed external to the main vascular cylinder and might contribute to enhancing the tensile strength of the stem particularly in species that are subjected to swaying conditions. Several anatomical modifications are yet to be understood in the climbing members. However, the relentless pursuit of financial gain, recognition, and success by researchers is causing a decline in fundamental scientific research, not just in India but worldwide.

Keywords: Cambial variants, climbers, inter- and intraxylary phloem, lianas stem anatomy, neo-formations, secondary xylem, successive cambia.

PROF. Y.S. MURTY COMMEMORATIVE MEDAL LECTURE

NaNOENCAPSULATED PLANT ESSENTIAL OILS: A POTENTIAL TOOL FOR PROTECTING FOODS AND HERBAL RAW MATERIALS FROM STORAGE FUNGI AND AFLATOXIN B₁

Dr. Abhishek Kumar Dwivedy

Department of Botany, Institute of Science, Banaras Hindu University, Varanasi-221005

Email: abhishekdwivedy1987@gmail.com

The study encompasses nanoencapsulation and characterization of *Illicium verum* and other essential oils to increase their bioefficacy against storage fungi and aflatoxin B₁. In addition, the probable mode of action of essential oils has also been worked out, suggesting the plasma membrane as target site. The antiaflatoxigenic target was assessed by methylglyoxal estimation. The antifungal and antiaflatoxigenic mode of action targeting ergosterol, methylglyoxal, and proteins involved in aflatoxin B₁ biosynthesis and *in situ* efficacy in food systems open the way to develop cost-effective target-based eco-friendly preservatives of stored food commodities by providing nanoencapsulated essential oils as an alternative of synthetics.

Keywords: Essential oils; Nanoencapsulation; Food Preservation; Herbal raw materials; Antifungal; Antiaflatoxigenic; Mode of action

MEMORIAL LECTURES

PROF. UMA KANT SINHA MEMORIAL LECTURE

INVASIVE PLANTS: EMERGING ISSUES, OPPORTUNITIES AND CHALLENGES

Daizy R. Batish

Department of Botany, Panjab University, Chandigarh – 160014

E-mail: daizybatish@yahoo.com

Invasive alien species are regarded as the major drivers of global changes as they deplete biodiversity, alter ecosystem services and cause biotic homogenization. In addition, these also impact the human health and cause far-reaching ecological and socio-economic consequences. The introduction of invasive plant species in different ecosystems is facilitated by human-mediated transportation, migration, and trade. Various anthropogenic activities including deforestation, have led to their global expansion and climate change has further escalated the invasion risk by altering various abiotic and biotic conditions. Warmer temperatures and elevated levels of carbon create conditions suitable for invasive species to spread. Limited information is available on the mechanisms by which these adapt to the novel and challenging environments. Further, these have also not been evaluated for their economic benefits and livelihood generation in terms of biotechnological, nanotechnological and industrial aspects. Addressing these issues require extensive research on their economic prospects and understanding their traits providing invasion success. In future, the research should emphasize on cost-benefit analysis and societal acceptability in order to achieve their sustainable management. Use of modern tools like GIS & remote sensing and molecular approaches (proteomics, genomics and metabolomics) could also be useful in unravelling the impacts of invasive plant species.

Keywords: Invasion, Ecosystem services, Environmental degradation, Sustainability, Trait-based ecology, Cost-benefit analysis.

PROF. GOPINATH PANIGRAHI MEMORIAL LECTURE

PLANT INVASION IN INDIA: GLEANINGS AND INVESTIGATIONS THROUGH AGES

Patil D. A.

Post-Graduate Department of Botany,
S.S.V.P. S's L.K.Dr.P.R. Ghogrey Science College, Dhule-424002, Maharashtra, India.
Email: dapatil_10aug@yahoo.com

Biological invasion of exotic species is thought as the second worst threat to biodiversity after habitat destruction (CBD 1992). Biologists also thought it a form of 'biological pollution' responsible for global environmental changes. It is one of the major causes of species extinction. At this backdrop, knowledge and status of exotic species is essential. Plant invasion in India as mirrored in ancient Indian treatises, apart from researches carried out to date are limelighted in this endeavor.

Information on exotic plants are tapped from (i) Vedas, Samhitas, Nighantus, (ii) Ancient Sanskrit scriptures *viz.*, Kalidasa's poetry and dramas, Vrikshayurveda by Parasara and Surapala, (iii) Information from archaeological sites, ancient temples, caves and stupas, (iv) Exotic plants of Harappan period, (v) Data on common exotic food plants, spices and condiments, (vi) worships of deities and astrology, (vii) Information from folk songs, proverbs, vernacular plant and Linnaean names, (viii) Results of researches to date, (ix) Taxa with ambiguous nativity, (x) Data on Maharashtra state, etc. Certain expected realms of researches in bioinvasion in India are put forth. The data so accrued may be of help while extending measures for biodiversity management and conservation in Indian subcontinent.

INVITED LECTURES

RICE GENOMICS: STRUCTURE AND DEVELOPMENT-RELATED GENE FUNCTION

Akhilesh K. Tyagi,

Department of Plant Molecular Biology, University of Delhi, South Campus
New Delhi 110021, India

Rice genome was the first crop genome to be completely sequenced. It revealed gene content, genetic markers and interesting features of genome organization. Pan genome approach further enriched this knowledge and revealed genome diversity. After decoding rice genome sequence, significant progress has been made in transcriptomics (the messages generated from genes) and gene discovery by way of genetic mapping, overexpression or knock-down/out of genes in transgenics and phenotypic analysis. This has potential to fill the gap between the genome and the phenotype and help practice genomics-assisted molecular breeding. One of the primary aims of ongoing investigations in our group is to understand phylogeny, regulatory networks and gene function. By analysing molecular model-based relationship of encoded proteins by members of several gene families, we have identified new genes and clades in rice genome. Further, highly significant number of genes is differentially expressed in different organs at different time of development, which provides useful input for selecting target genes/promoters for functional genomics. We have undertaken study of anther and seed related genes to identify genes involved in male sterility and seed development. Some of these genes have pleiotropic effects. Results of these effects and analysis of their molecular basis of action will be presented. The knowledge generated is expected to reap the benefit of genomics research for plant improvement.

ROLE OF PLANT TAXONOMY IN BIODIVERSITY CONSERVATION, CLIMATE CHANGE AND SUSTAINABLE UTILIZATION

Ashiho Asosii Mao

Botanical Survey of India, CGO Complex, 3rd MSO Bldg., Block- F, 5th Floor, DF Block, Sector -1, Salt Lake City, Kolkata -700064,
Email: aamao2008@gmail.com

Plant taxonomy plays a vital role in biodiversity conservation, climate change adaptation, and the sustainable utilization of plant resources. By classifying and identifying plant species, taxonomists provide the foundational knowledge required to preserve biodiversity, which is essential for maintaining ecosystem health, resilience, and the provision of ecosystem services. The availability of large databases of species distributions across different genera and families, along with occurrence records from plant taxonomic studies, has become crucial for documenting and understanding range size patterns across geographical and environmental gradients. Taxonomy, once a flourishing service science, has experienced a decline in attention to the evolving needs of its consumers over the years. This disconnect has not only hindered the progress of taxonomy but also limited its potential to contribute meaningfully to various fields of biodiversity studies.

In regions like the Western Ghats and the Northeastern Himalayas, both biodiversity hotspots, plant taxonomy contributes directly to conservation efforts. High-altitude species are particularly sensitive to climate-induced habitat changes, and taxonomy helps in identifying these species, their distribution, and their ecological roles. By understanding the niche dynamics of species through taxonomy, conservationists can predict how species may respond to environmental changes such as temperature fluctuations and habitat loss. This knowledge aids in the establishment of conservation priorities, and helping to design protected areas. Niche dynamics studies provide insights into how species utilize environmental resources and interact with their ecosystems. By analysing species' ecological niches, researchers can identify critical habitats that require protection and establish micro reserves, especially in non-protected areas. This is particularly important in fragmented habitats, where smaller patches of biodiversity may still play a crucial role in sustaining broader ecosystems. Herbaceous genera, which are more vulnerable to habitat loss and fragmentation, often serve as excellent focal species for modelling future conservation areas, providing critical information for safeguarding biodiversity in the face of climate change.

Climate change poses significant threats to biodiversity, especially in fragile ecosystems such as high-altitude regions. Taxonomy aids in understanding how species ranges may shift because of climate fluctuations. The ability to track these shifts enables researchers to model potential future scenarios, including identifying areas that may become refugia for certain species or those that may experience increased vulnerability. Through taxonomic studies, species that are more adaptable or more susceptible to changing conditions can be identified, aiding in targeted conservation strategies.

GENOME EDITING TOOL: CRISPR-CAS AND CLIMATE CHANGE RESILIENCE

Ashwani Kumar

Alexander von Humboldt Fellow (Germany), JSPS Fellow (Japan)

Former Professor and Head, Department of Botany, University of Rajasthan, Jaipur 302004.

https://www.researchgate.net/profile/Ashwani_Kumar1

Email: ashwanikumar214@gmail.com

Mobile: +91 9461663610

Global warming is causing climate change which UN Secretary General has termed as climate emergency. Plants face various challenges from their environment, such as cold, drought, salinity, diseases, and pests. In contrast to transgenic technology that randomly inserts genetic materials into a genome, genome-editing technology works on a specific genome sequence within the genome. Neumann et al. (2020) and Kumar et al. (2024) reviewed the sequence of the emergence of gene editing platforms leading to the emergence of CRISPR. CRISPR-Cas systems are adaptive immune mechanisms in prokaryotes that protect them from invading pathogens. Ishino and colleagues found unusual clusters of repeated DNA sequences interrupted by short sequences in *E. coli* in 1987. They found five homologous sequences of 29 nucleotides arranged in direct repeats having dyad symmetry to form a palindromic structure. Francisco Mojica investigated the similar patterns of interspersed repeats and spacers in Archaeal genomes. Mojica named them “short regularly spaced repeats” (or SRSRs) as the sequences were interspersed and not in “tandem repeats.” Later, Mojica became the first to realize that all these Archaeal and bacterial sequences are functionally related. Rudd Jansen at Utrecht University renamed this pattern of DNA “CRISPR,” which stands for clustered regularly interspaced short palindromic repeats. They also discovered another set of DNA sequences that were always linked to CRISPR. They called these “Cas genes,” short for CRISPR-associated genes. By 2005, three independent groups of scientists discovered that the sequences in between the CRISPR repeats matched parts of viral DNA from invading phages and plasmids. CRISPR-based immunity generally involves three discrete phases, namely, adaptation, expression, and interference. The acquisition, which is conserved among all CRISPR-Cas types, results in the formation of extensive CRISPR arrays as immune “memory.” Gasiunas reported that new spacer sequences from the infecting phage are acquired into the bacterial CRISPR array. In 2012, the research groups led by Emmanuelle Charpentier and Jennifer A. Doudna published a landmark paper detailing the application of a class II CRISPR-Cas9 system for gene editing which earned them 2020 Nobel Prize in Chemistry. Chylinski revealed that the CRISPR-Cas locus is typically composed of an operon encoding the Cas proteins and a repeat-spacer array consisting of interspersed identical repeat sequences and unique invader-targeting spacer sequences. CRISPR-Cas9 is now widely used to study gene function and develop genome-edited organisms. Ishibashi reported that the discovery of a new single RNA-guided endonuclease, CRISPR-Cas12a, in addition to the conventional CRISPR-Cas9, has broadened the number of editable target sites on the genome. (<https://www.whatisbiotechnology.org/index.php/science/summary/crispr>). There are two

classes of CRISPR-Cas systems, Class 1 and Class 2, which differ in the number and type of Cas proteins they use, 6 types, and 33 subtypes. Characteristically, the CRISPR-Cas systems include (a) the gene coding for a CRISPR-associated protein (Cas protein), (b) noncoding RNA sequences, and (c) the repeats dispersed with the short DNA sequences named "protospacers." Li et al. also discussed how CRISPR-Cas systems can improve the biotic and abiotic stress tolerance of crops by modifying genes in various ways, such as knockout, insertion, and replacement. These modifications can result in mutants that have lost, reduced, or activated gene functions, which can make the plants more resilient to stress. A review shall be presented.

DIAGNOSTICS IN PHYTOPATHOGENIC FUNGI: FROM GENETIC DIVERSITY TO CURRENT EXPLOITATION

Nguyen Bao Quoc

Faculty of Biological Sciences, Nong Lam University, Ho Chi Minh City, Vietnam

Email: baoquoc@hcmuaf.edu.vn

Mobile: +84 932082205

Phytopathogenic fungi pose a significant threat to global food security and agricultural productivity. Accurate and timely diagnosis of these fungal pathogens is crucial for effective disease management and prevention. In recent years, the exploitation of fungal diagnostics has expanded beyond traditional disease detection and surveillance. Diagnostic information is now used to inform disease forecasting, risk assessment, and the development of novel control measures. To serve the purpose of diagnosing fungal diseases, the genetic diversity of phytopathogenic fungi is regarded as one of various approaches and considered as a key factor in their ability to adapt to changing environments and overcome control measures. By understanding the genetic variation within and among fungal species, more targeted and effective diagnostic strategies can be developed. For instance, the use of molecular markers can help identify specific fungal strains or genotypes associated with virulence or resistance to fungicides. In addition, traditional diagnostic methods, such as morphological observation and culturing, have been instrumental in fungal identification for decades. However, the advent of molecular techniques has revolutionized the field, providing greater accuracy, sensitivity, and speed. DNA-based methods, including polymerase chain reaction (PCR), sequencing, real-time PCR, LAMP, RPA have become indispensable tools for detecting and characterizing fungal pathogens. In this review, we discuss the results obtained in diagnosing fungal diseases by harnessing the power of genetic diversity as well as the challenges and limitations associated with current diagnostic practices. By understanding the advancements in fungal diagnostics, we can improve disease control strategies and mitigate the economic impact of phytopathogenic fungi on agriculture.

Keywords: diagnostics, fungal diseases, fungi, molecular, genetic diversity

DIVERSITY OF MICROBES, THEIR CONSERVATION AND ROLE IN SUSTAINABLE AGRICULTURE

Manoharachary C

Department of Botany, Osmania University, Hyderabad 500007

Telangana India

Email: cmchary@gmail.com

Microbial diversity forms key to human survival and also for economic security as it ensures a vast variety and reservoir of resources that can be utilized by humans for their benefits and welfare. Diversified microbes have yielded important biological products that also include antibiotics, drugs, enzymes, growth promoters, biofertilizers, biostimulants, biocontrol agents and others useful to humans. These aspects give boost to agriculture, pharmaceuticals, industries, biotechnology, and other related ventures. Despite of having acknowledged values of microbes, our knowledge of their diversity and many of their key roles in sustainable global life support system is scarce. India has got one-third of global diversity of microbial world. Therefore, indepth exploration, evaluation, conservation and related issues are essential for scientific, industrial, social development including for sustainable agriculture. The study of microbial diversity of the natural world using ingenious and innovative methods to assess the diversity provides with bountiful source of new and valuable products. There is a need to conserve microbial diversity from different habitats as the microbes are vitally important life forms on the earth for mankind because of their ubiquitous nature and cosmopolitan distribution in their role. Both ex-situ and in situ conservation methods are to be employed. For sustainable agriculture, emphasis needs to be laid on less chemical inputs and more use of organic inputs including microbial inoculants. Microbial inoculants serve as biofertilizers supplying more mineral nutrients, enhance plant growth and yield and also serve as biocontrol agents suppressing soil-borne, root borne, and foliar disease-causing microbes/pathogens besides maintaining plant and soil health. In this regard the role of nitrogen fixers, P-solubilizers, Mycorrhizal fungal, Mycoparasites, Trichoderma, PGPR etc will be emphasized in brief.

Keywords: Agriculture, Conservation, Diversity, Estimates, Plant health, Soil health.

USING PHYLOGENOMICS TO DISENTANGLE COMPLEX EVOLUTIONARY RELATIONSHIPS

Prof. Hanno Schaefer,

Technical University of Munich, Plant Biodiversity & TUM herbarium, Department Life Science Systems, Emil-Ramann-Str. 2, D-85354 Freising, GERMANY
Email: hanno.schaefer@tum.de

Modern sequencing technologies like Illumina and Nanopore sequencing allow us to obtain large genomic datasets including nuclear, mitochondrial and plastid DNA sequences from all kinds of plant material in the lab but also directly in the field.

The analyses of such datasets with hundreds of genes from three different cell compartments reveals in most lineages a significant amount of conflict. This is not only restricted to the well-known cases of nuclear versus plastid signal but instead it is often among the nuclear genes where we find conflicting signal.

Focusing on the Cucurbitales, an order of more than 3000 species and 7-8 families (including the commercially important Cucurbitaceae and Begoniaceae), I show the frequency of those conflict cases and discuss their possible origin. The most enigmatic family among the currently accepted Cucurbitales are the holoparasitic Apodanthaceae with 12 species in the genera *Apodanthes* (Central & South America) and *Pilostyles* (America, Africa, Arabia, and Australia). While earlier phylogenetic analyses based on few nuclear and mitochondrial gene regions confidently placed Apodanthaceae with Cucurbitales, our more comprehensive data shows that this signal is restricted to a few mitochondrial gene regions while the bulk of the genes place Apodanthaceae in Malpighiales. The explanation for this surprising conflict might lie in the parasitic history of the ancestors of today's Apodanthaceae but more work is needed to obtain definite answers.

In conclusion, I argue that evolution in plants has not followed a tree-like path and embracing the observed frequent reticulation using network approaches instead of phylogenetic trees seems a good solution even if this means that evolutionary pathways are more difficult to visualize and harder to understand.

While we now have the tools to rapidly produce and analyze huge genome datasets, we still suffer from a massive lack of ecological data for most plant species. Reducing this deficit of natural history data should be a priority for the coming years since most of it can only be collected in natural environments and not in herbaria or other collections. Since we are losing those natural habitats and their biodiversity at an ever-increasing speed, our opportunities to collect and analyze ecological data for our floras (and faunas) are vanishing. It should be a priority to study and document the natural history of our wild organisms as long as it is still possible.

ROLE OF HDA9-HDA19-HAT3 REPRESSOR COMPLEX DURING DEHYDRATION STRESS IN FOXTAIL MILLET

Manoj Prasad

University of Delhi South Campus, New Delhi

National Institute of Plant Genome Research, Aruna Asaf Ali Marg, New Delhi

Department of Plant Sciences, University of Hyderabad, Hyderabad

E-mail: manoj_prasad@nipgr.ac.in; manojprasad@south.du.ac.in

Climate change inflicts several stresses on plants, of which dehydration stress severely affects growth and productivity. Foxtail millet (*Setaria italica*) is one of the C4 panicoid crops known as an attractive model to study the dehydration stress; however, no systematic and detailed investigations have been made to decipher the role of epigenetics in regulating the genes involved in dehydration stress responses. In particular, the molecular links between histone modifiers and their regulation remain elusive. The acetylation of lysine residue 9 of histone H3 (H3K9ac) is a well-studied epigenetic mark in plants. The hyper- and hypoacetylation of H3K9 results in the activation and repression of target genes, respectively. Histone acetylation is dynamically regulated by histone acetyltransferases (HATs) and histone deacetylases (HDACs) (Kumar et al. 2021; Cellular & Molecular Life Sciences; <https://doi.org/10.1007/s00018-021-03794-x>). In this study, a histone deacetylase, SiHDA9, was found to be significantly up-regulated in the sensitive cultivar. Further characterization indicated that SiHDA9 interacts with SiHAT3.1 and SiHDA19 to form a repressor complex. SiHDA9 might be recruited through the SiHAT3.1 recognition sequence onto the upstream of dehydration-responsive genes to decrease H3K9 acetylation levels. The silencing of SiHDA9 resulted in the up-regulation of crucial stress responsive genes, namely, SiRAB18, SiRAP2.4, SiP5CS2, SiRD22, SiPIP1;4, and SiLHCB2.3, which imparted dehydration tolerance in the sensitive cultivar. Overall, this study delineates the importance of histone acetylation of H3K9 for dehydration tolerance and provides mechanistic insights into the role of SiHDA9 in removing the acetylation to negatively regulate the dehydration-tolerance mechanism (Kumar et al. 2024; Journal of Experimental Botany; <https://doi.org/10.1093/jxb/erad425>)

BIOREMEDIATION AND IMPROVED PRODUCTIVITY OF SALINE AGRO-ECOSYSTEMS USING SUSTAINABLE MICROBIAL TECHNOLOGY: A LAB TO LAND APPROACH

Naveen Kumar Arora

Department of Environmental Science, School of Earth and Environmental Sciences
Babasaheb Bhimrao Ambedkar University, Lucknow 226025, Uttar Pradesh, India

Email: nkarora.bbau@gmail.com

Climate change is a major concern of the present time and the key culprit are ever increasing carbon emissions. Agriculture and food security are key sectors that are affected by climate change. About 3.6 billion people already live in areas highly susceptible to climate change, with two billion people lacking essential micronutrients required to live a healthy life. Food and Agriculture Organization estimates that the increasing population requires 60 percent increment in food productivity by 2050. The Intergovernmental Panel on Climate Change's (IPCC) further warns that with no actions taken, the productivity of major crops is expected to reduce by 17% globally by 2050. This major loss in productivity will increase the price of cereals by 1-29%, leading to an additional 1-183 million people at the risk of hunger. Due to climate change and injudicious use of chemicals, soil salinization is becoming a major issue affecting one billion hectares of land area affecting 7% of globe. Physical and chemical solutions to remediate the saline fields are unsustainable and biological solutions are required for sustainable reclamation.

Plant growth promoting microbes are better solutions to increase the productivity of saline lands. The interactions between plants and microbes protect the plants from environmental stresses and support better productivity. Central region of Uttar Pradesh are severely affected by soil salinity, affecting the agricultural productivity and livelihood of villagers. Diverse groups of halo-tolerant plant growth promoting microbes (HT-PGPM) including pseudomonads, rhizobia, *Bacillus*, *Trichoderma* were selected and checked for plant growth promoting and stress tolerance traits under saline conditions. Selected strains were positive for phytohormone production, assimilation of nutrients and exhibition of various salt stress amelioration properties (such as antioxidant activity, osmoregulation, exopolysaccharide production). Bioinoculants were developed using selected strains and were tested with various crops under saline conditions. The application of the developed bioinoculants not only helped in remediating the saline fields but also significantly increased the productivity of major crops such as cereals, oilseeds, legumes, and vegetables resulting in improved livelihood. The developed technology is a sustainable solution to remediate saline fields and increase the economic status of farmers.

Keywords: Bioremediation, Salinity, PGPM, Novel Bioformulation, Sustainable Development

PLANT SCIENCE IN VRIKSHAYURVEDA

R.L.S. Sikarwar

Department of Environmental Science,
A.K.S. University, Satna (M.P.)- 485 001

Email: sikarwarrls@gmail.com, rlssikarwar@rediffmail.com

It is mentioned in Rigveda that Vedic Indians had knowledge about food production by plants, importance of light in food production and energy storage. Apart from the Vedas, plants have also been described in the post Vedic literature such as Upanishads, Samhitas, Shastras, Puranas, Ramayana, Mahabharata and Mahakavyas etc. There is evidence in post Vedic literature that botanical science was developed as an independent branch. Agriculture (Krishi Parasara), tree-horticulture (Upvan Vinod) etc. were also based on botanical science. Sage Parasara had named this branch of botanical science as *Vrikshayurveda*. Literally *Vrikshayurveda* means "the science of plant life". It is written by sage Parasara in the first century B.C. and considered as the most ancient text in the field of botanical science. It is clear from the above evidences that in India the Botany was fully developed in the first century B.C. Rishi Parasara's *Vrikshayurveda* is a great contribution to the Botany from ancient India. Many scientific branches of Botany including origin of life, ecology, distribution of forests, morphology, classification, nomenclature, histology, and physiology were dealt in this ancient work. Earlier *Vrikshayurveda* was revealed by Brahma and embodied in the *Atharvaveda*. Later Parasara at Chaitravana of Himalayas has revealed the total text as the answers to the questions of sages. It is presumed that this book was written by Parasara to teach Botany to ancient *Ayurvedic* students. This book is divided into six parts (*Kaandas*) viz., *Bijotpatti Kaanda*, *Vanaspati kaanda*, *Vaanaspatis kaanda*, *Gulma kshupa kaanda*, *Virudha valli kaanda*, *Chikitsa kaanda*. The *Cikitsa kaanda* is now missing. *Bijotpatti Kaanda* is further divided into 8 chapters viz. 1: *Bijotpatti-sutriyaadhyaya* (germination of seeds, concept of photosynthesis, concept of ascent of sap, classification of plants) 2: *Bhumivarga-sutriyaadhyaya* (deals with different types of soils), 3: *Vanavarga-sutriyaadhyaya* (deals with different types of forests), 4: *Vrikshanga-sutriyadhyaya* (deals with different parts of plant, e.g. types of leaves, leaf venation, concept of cell), 5: *Pushpanga-sutriyadhyaya* (Flower and its parts, types inflorescences), 6: *Phalaanga-sutriyadhyaya* (different types of fruits and its parts), *Ashtaanga-sutriyadhyaya* (deals 8 parts of the plant, types of bark, roots, stems) and 8: *Dwiganiya-Adhyaya* (types of seeds based on cotyledons, different types of families) are described in detail. Similarly, other *kandas* are also further divided into chapters dealing with different aspects of plant sciences. After the study of *Vrikshayurveda*, anybody can say that botany is nothing but mere Latin translation of Sanskrit words of *Vrikshayurveda*. The real father of botany is Rishi Parasara not Theophrastus. We should change the mindset of students and teachers to teach the father of Botany is Rishi Parasara. Details will be discussed during the presentation.

IMPACT OF MEDICINAL AND AROMATIC PLANTS MOLECULES ON AGEING AND AGE-RELATED NEURODEGENERATIVE DISEASES IN *CAENORHABDITIS ELEGANS*

Rakesh Pandey, Ph.D., DAAD Fellow, FNAAS

Professor Emeritus AcSIR & CSIR-Emeritus Scientist

CSIR - Central Institute of Medicinal and Aromatic Plants, P.O. CIMAP,

Lucknow – 226015, India

E-mail address: rakeshpandey66@gmail.com

Plants play major role in the Asian society for combating human diseases since ancient times. The farmers, rural folks and tribals in India even now depend largely on the surrounding plants for their day-to-day requirements. Increasing demand for medicinal and aromatic plants (MAPs) has generated huge interest in the farming community in growing MAPs. MAPs are largely cultivated by Indian farmers as it is profitable in terms of finances as well as time. Plants such as Ashwagandha, Aromatic grasses, Basils, Saptarandha, Satawar, Kalmegh, Ghritkumari, Mulethi, Brahmi, Isabgol etc. are largely grown by farmer in different parts of India. These plants and their parts or derivatives are much in demand by huge number of perfumery and pharmaceutical agencies. Among MAPs the major medicinal plant derived molecules are known to be a rich source of diverse activities that could serve as the basis of rational drug design but the mode of action of various molecules are still not known. Aging and age-related diseases have an ever-increasing economic impact on the prosperity of nations. It is associated with an accumulation of damaged/discarded proteins in cells which correlates with a decline in normal physiological function of an organism. *Caenorhabditis elegans* is one of the promising and experimentally proven models for ageing and age-related neurodegenerative research worldwide. The adult *C. elegans* worm is self-fertilizing hermaphrodite with a 3-day life cycle, and a mean life span of approximately 18–20 days when cultured at 20°C. Importantly, more than 85% *C. elegans* genes have human homologues and the loss of function of the equivalent genes has also been shown to extend the lifespan of mammals. This suggests that mechanisms found to influence ageing in *C. elegans* are likely to have a conserved role in regulating longevity in humans. Besides its short lifespan, the ease of genetic and dietary manipulations has also led *C. elegans* to become established at the forefront of ageing and cognitive studies. Large numbers of phytomolecules from MAPs have proven their antiaging and cognitive booster activity in *C. elegans* will be highlighted in the present lecture.

BIODIVERSITY OF MEDICINAL PLANTS OF NEPAL-A HEALTH CARE OVERVIEW

Dr. Roshan Kumar Yadav

Member, Nepal National Commission for UNESCO Ministry of Education, Science and Technology
Government of Nepal, Kathmandu, Nepal
Email: *fsroshan@gmail.com*

Medicinal plants are used as a source of drugs for the treatment of various human and livestock health. According to WHO, "A medicinal plant is any plant which in one or more of its organs, contains substances that can be used for therapeutic purpose, or which are precursors for chemo pharmaceutical semi-synthesis" Nepal is a country full of medicinal herbs and shrubs. Because of the diverse climatic conditions of Nepal, many types of medical herbs are available. Nepal has significant variation in altitude ranging from 67 meters in southeastern Terai to the tallest mountain on earth, Mt Everest, measuring 8,848 meters. This gives Nepal a remarkable variety of its flora and fauna resources. Nepal has 35 different types of forests and 118 different ecosystems. Most of the high-value medicinal herbs are available in northern Nepal. In Nepal, we use these herbs in Ayurveda medicine and also as home remedies. Nepal is one of the popular countries with medicinal herbs, shrubs, or trees. Our medicinal plants are useful for the treatment of various medical conditions. Moreover, medicinal herbs and plants come under one of the top export products of Nepal. These days too, we first try home remedies instead of going to the doctor for a checkup, if we have any of the medical conditions. If medicinal herbs in our home don't heal us, only after we choose hospitals and doctors for option. Thus, today in this lecture we will learn about top 20 best medicinal plants of Nepal and also some herbal products manufactured in Nepal with its composition and uses.

GLYOXALASE PATHWAY IN PLANTS: FUNCTIONAL DIVERSITY UNDER NORMAL AND STRESS CONDITIONS

Sudhir K Sopory
ICGEB, New Delhi
Email: sopory@hotmail.com

Of the many genes and pathways that affect plant responses under stress and normal growth stages our group has worked in details on the role of Methylglyoxal (MG): Glyoxalase pathway module. MG is a toxic compound, whose levels increase in response to various stress conditions leading to deleterious effects threatening the survival of the plants. Our studies have shown that one of the major pathways for the detoxification of MG is via glyoxalases system, involving glyoxalase I and II. We have also discovered glyoxalase III pathway that is glutathione independent. Each of these enzymes constitute a large family. We have characterised many members of this family. The Gly I family members show both Zn and Ni dependent enzyme activity whereas some other members do not show any activity. The effect of MG is however dose dependent and at lower concentrations it seems to work as a signalling molecule

Our results show that transgenic plants over expressing GlyI and II were tolerant to multiple stresses. Our recent work has also shown an involvement of glyoxalase pathway in plant microbe associations. Recently it has been shown that stress priming induced memory can lead to stress tolerance. In this context role of melatonin and prion like proteins has been indicated. Our results show that melatonin does regulate glyoxalase I and II encoding genes. A detailed bioinformatics study on prion proteins in plants has been carried out and their role in plant development and in stress memory is being explored.

MODERN TECHNIQUES FOR VIRUS DETECTION IN CLONALLY PROPAGATED FRUIT CROPS: SHAPING THE FUTURE OF CLEAN PLANT INITIATIVES

Virendra Kumar Baranwal*, Malyaj R Prajapati and Susheel Kumar Sharma

ICAR-National Professor

Division of Plant Pathology, ICAR-Indian Agricultural Research Institute, New Delhi-110012

Correspondence email: vbaranwal2001@yahoo.com

The cultivation of clonally propagated fruit crops such as apple, citrus, grape, peach, plum and pear is increasing as they are more remunerative to farmers and have export potential. As quality planting materials of better variety of fruit crops are not readily available locally, these are being imported and cultivated by farmers. However, imported planting material of clonally propagated fruit crops have invited new risks and may introduce new viruses which can cause serious constraints in improving productivity in these fruit crops in long run. A study in grapevine using conventional ELISA and PCR based methods showed the presence of viruses associated with leaf roll disease in grapevine for the first time in the year 2011-12. As more than 100 viruses are now recorded in grapevine, high throughput sequencing (HTS) developed in the beginning of the 21st century is the only available tool for parallel detection of several targeted and non-targeted known/unknown viruses in crops like grape and other clonally propagated fruit crops. HTS is a novel tool which requires standardization of nucleic acid template preparation protocol, library preparation, sequencing, assembly of sequencing, mapping of reads, sequence annotation and identification of viruses using sequence databases. In India, HTS was applied for virome analysis of nursery plants of two popular cultivars of grapevine and it showed the presence of 18 viruses and 5 viroids. These viruses and viroids were confirmed through PCR/RT-PCR amplification and sanger sequencing. HTS has also been used to determine the seasonal dynamics of viruses in grapevine. In other HTS based study, unknown viruses and viroids were identified in other clonally propagated fruit crops like apple, pear, peach and plum. The study indicated that new viruses in clonally propagated fruit crops were probably introduced in India through introduction of planting material. Management of viruses in clonally propagated fruit crops rely on the use of clean planting material and that has been achieved by implementation of indexing, virus elimination and certification programme in many countries. An Atm Nirbhar Clean Plant Programme has been initiated by Government of India in order to meet the growing demand of certified clean planting material for clonally propagated fruit crops.

UNRAVELING THE HIDDEN STORY OF ROOTS: THE ROLE OF TRANSCRIPTION FACTORS IN ROOT ARCHITECTURE

Vidhu A Sane

Molecular Biology and Biotechnology, CSIR-National Botanical Research Institute, Lucknow-226001, India.

Academy of Scientific and Innovative Research (AcSIR), Ghaziabad-201002, India

Email: va.sane@nbri.res.in; sanevidhu@rediffmail.com

Root development is a complex process influenced by both environmental and plant developmental cues. While the tomato, an agronomically important crop, has been widely studied, its root development remains less explored. To understand the role of various transcription factors (TFs) in root development, a differential transcriptomic analysis of tomato was conducted in our lab. This analysis aimed to identify genes governing root development in tomato and led to the identification of 279 genes that were differentially expressed in root tissue. These genes were categorized into different TF families, including WRKYs, MYBs, and HSFs, which were specifically or predominantly expressed in tomato roots under normal growth conditions. The TF members selected for this study are repressors by nature. We developed overexpression (OE), suppressor, and CRISPR tomato lines to elucidate their functions in controlling root architecture. Our results indicate that the selected genes play a significant role in the development of primary and lateral roots. These genes influence root growth by regulating the auxin and gibberellic acid (GA) pathways and their cross-talk.

PLANT STRESS BIOLOGY: EMERGING APPROACHES

Prof. Vinay Sharma

Amity Institute of Biotechnology, Amity University Rajasthan, Jaipur

Email: vsharma4@jpr.amity.edu

This paper has reviewed wet lab and bioinformatics approaches developed by us in identifying genes/ proteins in plants under stress. Biotic stress owing to infection of the plants by phytopathogens causes immense losses in crop yield, up to 12% annually. Abiotic stress is another major cause of crop losses worldwide, reduces average yield by more than 50% for major crops. In recent times, through high-throughput technologies whole genome sequences of a large number of crop plants and their bacterial and fungal pathogens are now available. However, with the ever-growing sequence data, the functional prediction/ annotation of proteins has become a challenging task. We shall discuss how a combination of wet lab and in silico approaches can help in identifying stress related genes in plants.

THE ROLE OF ALGAE IN THE DIET OF ATHLETES: ENHANCING PERFORMANCE AND RECOVERY

Arvind Pareek

Department of Botany, Maharshi Dayanand Saraswati University, Ajmer

Email: arvindmdu@gmail.com

Algae, a group of photosynthetic organisms, have gained attention as a potential solution to the problems associated with global food security. Saturated with vital nutrients such as vitamins, minerals, proteins, and omega-3 fatty acids, algae present a viable and sustainable substitute for conventional food sources. When compared to conventional crops, its cultivation uses less land and water, making it a more environmentally responsible method of producing food. Presentation will discuss the nutritional advantages of algae, the technological developments in algae farming, and the possible difficulties in incorporating algae into a diet. Algae have the potential to significantly improve nutritional results and diversify food sources on a global scale with more research and development. Due to their remarkable nutritional makeup, algae are becoming more and more popular as a beneficial dietary addition for sportsmen. Algae, being abundant in necessary amino acids, high-quality proteins, omega-3 fatty acids, antioxidants, and vitamins, can provide numerous advantages for both physical performance and recuperation. Two well-known microalgae, Spirulina and Chlorella, have been emphasised for their potential to improve cardiovascular health overall, lessen exercise-induced oxidative stress, and improve muscle recovery. Furthermore, athletes may benefit from an advantage in correcting typical dietary shortages due to the bioavailability of nutrients found in algae. Practical aspects of include algae-based supplements in an athlete's diet, reviews the scientific data in favour of algae use in sports nutrition, and assesses the effects of algae on performance indicators and recovery timeframes will be discussed. As scientific understanding advances, algae could become a key component in optimizing athletic performance and promoting long-term health.

**WOMAN BOTANIST AWARD
CONTEST**

PLANT MOLECULAR PHARMING: A PROMISING APPROACH FOR PRODUCTION OF RECOMBINANT THERAPEUTIC PROTEINS IN PLANTS

Shweta Jha

Department of Botany, J.N.Vyas University, Jodhpur

Email: jha.shweta80@gmail.com

Background and Aims: Plants can be used as "bioreactor" to produce the proteins of clinical and medicinal importance. Therapeutic human serum protein- α 1-antitrypsin (AAT or alpha-1-PI) is a well characterized serine protease inhibitor of human plasma. In the present study, an attempt has been made to overexpress and purify alpha-1-PI protein from transgenic tomato plants, for further therapeutic applications.

Methods: The alpha-1-PI gene was designed and codon-optimized as per dicot plants preferences, and targeted to various subcellular locations. The protein was purified from leaves using immunoaffinity chromatography. Structural integrity and identity of the purified protein was confirmed by MS/MS, and pharmacokinetic behavior was studied in rat model system. Site-specific mutations were incorporated in the recombinant alpha-1-PI by substituting single amino acids.

Key Results: Highest accumulation and biological activity of recombinant alpha-1-PI protein was observed in the endoplasmic reticulum. The purified protein exhibited high yield and homogeneity, but lower in-vivo half-life as compared to the native human protein. Site-specific variants of the protein resulted in enhanced conformational/thermal stability, and oxidation resistance.

Conclusions: In the current study, the significance of using plant as a bioreactor for the production of clinically important recombinant alpha-1-PI protein was demonstrated, along with protein engineering for increasing its stability and biological activity.

CROSS-TALK BETWEEN BLUE LIGHT SENSING CRYPTOCHROMES AND GIBBERELLIN METABOLISM PATHWAY IN *ARABIDOPSIS*

THALIANA

Sushma Mishra

Department of Botany, University of Lucknow, Lucknow

Email: mishra_sushma@lkouniv.ac.in

Background: Gibberellin (GA) is a phytohormone that regulates plant height among various physiological roles. In plants, GA levels are regulated by a fine balance in the expression of GA catabolism and GA anabolism genes. Several studies have reported the antagonistic effect of light and GA in regulating seedling height. Cryptochromes (CRY) are blue-light receptors that mediate various light responses in plants. This prompted us to investigate the probable cross-talk between light and GA signal transduction pathways.

Aim: The objective of the present study was to investigate the cross-talk between light and gibberellin signal transduction pathways in *Arabidopsis* seedlings using molecular approach.

Methods: Young *Arabidopsis* seedlings (*Arabidopsis thaliana* ecotype Col-0) were grown in blue light or dark conditions. RNA was isolated from the seedlings, followed by cDNA synthesis, which was used as a template for real-time PCR analysis.

To study the promoter regulation of AtGA2ox1 (gibberellin catabolism gene in *Arabidopsis*) in response to light, pGA2ox1 was fused to β glucuronidase (GUS) reporter gene and transformed into *Arabidopsis* plants by *Agrobacterium*-mediated transformation.

Results: Blue light induces the expression of AtGA2ox genes in young *Arabidopsis* seedlings. Using Yeast One-Hybrid assay and Electrophoretic Mobility Shift Assay, we identified two transcription factors, HY5 and BTF3, that interact with AtGA2ox1 promoter to regulate photomorphogenesis.

Conclusions: The understanding of regulation of gibberellin metabolism genes and its interaction with light, is key to the regulation of plant height, and would be instrumental in creating genetic variation for crop improvement strategies.

**YOUNG BOTANIST AWARD
CONTEST**

LINKING ETHNOBOTANY TO MOLECULAR BIOLOGY FOR THE DISCOVERY OF DROUGHT-TOLERANT AND NUTRITIONALLY RICH PLANT

Ajay Kumar

Department of Plant Science, Central University of Kerala, Kasaragod- 671320, Kerala

Email: botanistajay@gmail.com

Background and aims: Drought stress significantly impacts global agricultural productivity. A transition toward inclusive, sustainable, and climate-resilient agronomy is crucial to address food security challenges. Traditional food plants (TFPs), adapted to fragile environments, offer promising alternatives to staple crops. This study documents ethno-agrobiodiversity of tribals for the discovery of drought-tolerant and nutritionally rich plants.

Methods: Based on ethnobotanical exploration of ethno-agrobiodiversity and nutritional profiling of selected plants, this study investigated and compared the drought tolerance potential of five TFPs viz. *Alternanthera sessilis*, *A. ficoidea*, *Celosia argentea*, *Cissus quadrangularis*, and *Talinum triangulare*. Progressive drought treatments— withholding water for 6 days (6DAT), 12 days (12DAT), and 18 days (18DAT)—were applied. Morphological parameters, osmolytes, and antioxidants were analysed, and the molecular mechanisms underlying photosynthesis in the most drought-tolerant TFP were explored.

Key results: *C. quadrangularis* exhibited robust stress tolerance up to 18 DAT. Other TFPs demonstrated adaptive capacity under less severe or moderate drought conditions up to 12DAT, followed by wilting symptoms by 18DAT. However, extended stress (28DAT) in

C. quadrangularis revealed reduced photosynthesis rate and downregulated expression of PS1, PS2, cytochrome b6 complex, and carbon fixation-related genes.

Conclusions: The study provided insights into plant adaptation to water scarcity and aid in screening drought-tolerant plants. Underutilised TFPs hold promise for climate-resilient agriculture and enhanced food security.

Keywords: Drought screening; traditional food plants; drought tolerance; *Cissus quadrangularis*; osmolytes; antioxidants

DIVERSITY OF CARYOPHYLLACEAE JUSS. IN UTTARAKHAND (INDIA)

Satish Chandra*

Department of Botany, Pandit Shivram Government Degree College Tyuni, Dehradun
Uttarakhand, India

E-mail: satishchandrasemwal07@gmail.com

Orcid: 0000-0003-4188-2372

Family Caryophyllaceae Juss. in the Uttarakhand is represented by 24 genera 75 species, 2 subspecies and 6 varieties. On the basis of the herbarium history, literature survey and own observation, 11 taxa have been excluded from the flora of Caryophyllaceae of Uttarakhand. *Cherleria sedoides* is reported first time from India and Uttarakhand. Hitherto misidentification of the *Cherleria sedoides* and *Cherleria biflora* in the Himalaya has been resolved. *Stellaria depressa* is new record to the flora of Uttarakhand. New combinations of *Stellaria patens* subsp. *patens*, *Stellaria patens* subsp. *semivestita* and *Sabulina kashmirica* var. *foliosa* have been proposed. On the basis of taxonomic history and observation of the live and herbarium specimen's synonymy of *Sagina purii* for *S. apetala* has been concluded. Identification ambiguity of the *Cerastium glomeratum* and *C. fontanum* subsp. *vulgare* has been resolved.

Keywords: Alpine meadows, *Arenaria*, *Cherleria*, New record, new combination, *Silene*, *Stellaria*,

Fissidentaceae Schimp. (Bryophyta) of the Western Ghats, India

Manjula K.M.¹ and Manju C.N.²

¹ KSCSTE-Malabar Botanical Garden & Institute for Plant Sciences, Kozhikode, Kerala

Email- manjulazgc@gmail.com

² Department of Botany, University of Calicut, Thengalloor, Malappuram, Kerala

Email- manjucali@gmail.com

The family Fissidentaceae are a monogeneric family established by Hedwig (1801) with cosmopolitan distribution mainly in the tropics. The first published record of *Fissidens* Hedw. from the Western Ghats was from the Nilgiri hills in Tamil Nadu by Montagne (1842). This study is one of the first detailed works on a single family in the Western Ghats with a total of 62 species, two subspecies and six varieties of the genus *Fissidens* from various micro and macro habitats. With four new taxa and more than twenty new records to various geographical areas. Also recorded endemic species. The study also emphasized the distribution pattern of this family in the Western Ghats. The species *F. viridulus* is earlier considered as a synonym of *F. bryoides*. It re-examined, and re-instated as part of this study.

Physiological Responses and Early Detection of Leaf Spot Disease Caused

by *Alternaria Alternata* in *Ficus Religiosa*

Upma Bhatt

Department of Botany, Mohanlal Sukhadia University, Udaipur, Rajasthan.

Email: bhattupma154@gmail.com

Ficus religiosa, commonly known as the peepal tree, exhibits various physiological survival tactics against *Alternaria alternata*, the causative agent of leaf spot disease. This study investigates the impact of *A. alternata* infection on the photosynthetic efficiency of *F. religiosa* using chlorophyll *a* fluorescence (ChlF) analysis. Leaves from infected and non-infected plants were collected and categorized based on the severity of infection. ChlF measurements revealed significant distortions in the OJIP transient curve in infected leaves, indicating stress-induced alterations in photosynthetic performance. In NSL JI and IP distortion is key marker of *A. alternata* infection. It is important to measure OJIP for early detection of disease which is very important for cure before infection gets severe. Notably, the study identified increased minimal fluorescence in NSL and severely infected leaves, suggesting potential damage to the photosynthetic apparatus. Conversely, maximum fluorescence remained relatively stable except in severely infected leaves where it significantly decreased. Plant responses to mild stress conditions involve intricate mechanisms aimed at self-protection and adaptation. The augmentation in antenna size, denoted by ABS/RC enhancement, signifies a strategic effort by the plant to mitigate stress effects. Furthermore, various parameters in mild stress conditions and NSL exhibit enhancements, reflecting the plant's endeavour to cope with stress factors. Specific and phenomenological energy fluxes, quantum efficiencies, and performance indices were calculated using the JIP-test. The results demonstrated an increase in energy dissipation (DI/RC) and a decrease in electron transport (ET/RC) in infected leaves, highlighting a compromised photosynthetic efficiency. This research holds paramount significance in highlighting the utility of ChlF in detecting incipient disease symptoms that may not be visually perceptible, providing valuable insights into the physiological strategies employed by *F. religiosa* to combat the biotic stress imposed by *A. alternata* and unravelling the intricate interplay between plant hosts and their pathogens.

Keywords – *Alternaria alternate*, Biotic stress, Chlorophyll fluorescence, *Ficus religiosa*,

INDEX TO PRESENTATION

Session – I	
Mycology, Microbiology, and plant pathology	
Oral Presentation	
Abstract No.	Title of the Abstract
OP-I-01	<i>Cladosporium</i> Fruit Rot of <i>Gliricidia</i> from Gujarat Arun Arya
OP-I-02	Abiotic and Fungal Deterioration of Currency Coins and Associated Health Arun Arya, Chitra Arya and Dhara N. Zaveri
OP-I-03	Endophytic Mycobiota of Pharmaceutical Plant <i>T. Bellirica</i> (Gaertn.) Roxb. and their Antimicrobial Potential Against Selected Clinical Pathogens Megha Sakshi, Reena Mohanka and Vishnu Shankar Sinha
OP-I-04	Exploring the Antimicrobial Potential of <i>Mitragyna parvifolia</i> (Roxb.) Korth Meha Mepani And Meenakshi Sudhir Vaidya
OP-I-05	Effect of Pegionpea Sterility Mosaic Virus Infection on Leghaemoglobin in Nodules of Pegionpea (<i>Cajanus Cajan Millisp.</i>) Neha Kumari Sonkar and Shail Pande
OP-I-06	Comparative Genomic Analysis of Nodulation and Nitrogen Fixation Genes in <i>Sinorhizobium</i> Strains Nodulating Wild and Crop Legumes in India Nisha Tak and Hukam S. Gehlot
OP-I-07	Plant Growth Promoting Rhizobia are Eco-Friendly Strategy: Enhancing Vegetative and Reproductive Parameters of <i>Sesbania sesban</i> Through Bacterial Consortium Prashant Kumar and Sandeep Kumar
OP-I-08	Prevalence of Tomato Leaf Curl New Delhi Virus in the Agricultural Fields of Bihar Punam Ranjan
OP-I-09	Plant Growth Promoting Effects of Volatile Compounds of <i>Trichoderma</i> Identified using ITS rRNA Shruti Ojha
OP-I-10	GC-MS Phytochemical Analysis and Antibioassay Study on Leaf Extract of <i>Phyllanthus niruri</i> L. Against Various Pathogens Pushpa Salo Linda, Krishna Pyare, and Vinay Oraon
OP-I-11	Fungicidal Efficacy of Some Selected Phytoextracts Against Fusarium Wilt in Chickpea (<i>Cicer arietinum</i>) Shyam Singh

OP-I-12	The PGPR Breakthrough: Unlocking Heritable Immunity for Sustainable Crop Improvement Prashant Singh
Session – I Mycology, Microbiology, and Plant Pathology Poster Presentation	
PP-I-01	Encapsulated Geranial into Chitosan Nanoemulsion as Novel Antifungal Against Dermatophytes Arati Yadav and Abhishek Kumar Dwivedy
PP-I-02	Isolation and Screening of Chlorpyrifos Resistant Bacterial Strains for Biodegradation of Chlorpyrifos in Soil System Avanish Prajapati and Rajesh Kumar Sharma
PP-I-03	Molecular Characterization of Microsymbionts in <i>Trifolium repens</i> Rajpurohit Riya, Tak Nisha, and Gehlot Hukum S.
PP-I-04	Molecular Characterization of Root-Nodule Microsymbionts of <i>Neptunia oleracea</i> Lour. Frequently Growing in Tripura. Rawal Abhishek, Tak Nisha and Gehlot Hukum S.
PP-I-05	A Survey of Keratinophilic Fungi Isolated from Soil in Ajmer District, Rajasthan. Renu Jangid and Tahira Begum
PP-I-06	Biochemical and Molecular Characterization of Rhizobia Associated with Efficient Cultivars of <i>Vigna radiata</i> Grown in Rajasthan Shilpa Sharma, Hukam S. Gehlot and Nisha Tak
PP-I-07	Phenotypic and Biochemical Characterization of Microsymbiont Associated with <i>Cicer arietinum</i>. Jhinjha Sunil, Senwar Ramesh, Mishra Aanchal and Tak Alkesh
PP-I-08	Study on the <i>In-Vitro</i> Efficacy of Fungicides Against <i>Fusarium oxysporum</i>. <i>Vasinfectum</i> Causing <i>Fusarium</i> wilt in Lady-Finger. Km Pooja, Shyam Singh, Sanjulata and Mohd Ajaz
PP-I-09	Assessment of Antibacterial Activity of <i>Lantana Camara</i> L. Archana Kumari Singh and Vishnu Shankar Sinha
PP-I-10	Antimicrobial Effect of Flame Lily (<i>Gloriosa superba</i> L.) Pallavi Sharma and Tulika Mishra
PP-I-11	From Extreme Heat to Innovative Applications: the Role of Metagenomics in Unveiling Hot Spring Microbial Diversity Aarti Thakur, Ekta Chhikara, Sakshi, Dinesh Panwar and Jitender Singh
PP-I-12	Exploring Soil Dumping Sites for Plastic-Degrading Bacteria Through Metagenomic Approach Ekta Chhikara, Aarti Thakur, Sakshi, Laxman Nagar and Jitender Singh

PP-I-13	Exploration and Documentation of Macro Fungal Diversity of Girnar Hills and its Surroundings (Gujarat) Chhaya Singh, Chirag Tank, Ajit M. Vasava and Kishore S. Rajput
---------	--

Session – II Algae, Bryophytes and pteridophytes Oral Presentation	
S. No.	Title of the Abstract
OP-II-01	Study on Biodegradation of Polythene by Fresh Water Microalgae Ameeta Sharma and Mamta Sharma
OP-II-02	GC-MS Profiling and Antioxidant Activity of <i>Chlorella vulgaris</i>: A Potential Dietary Supplement for Athletes Anil Chahar and Neha Singh
OP-II-03	Effect of Different pH Values on the Growth of <i>Dunaliella parva</i>: an Isolate from Sambhar Lake, Jaipur (Rajasthan) Ankita Khorwal
OP-II-04	Endemic Pteridophytes of the Western Ghats of India and its Conservation A. Benniamin
OP-II-05	Role of Climatic Variables on Diversity and Distribution Pattern of Thelypteroid Ferns in a Dry-Moist Deciduous Forest Ecosystem of The Pachmarhi Biosphere Reserve, Madhya Pradesh Damini Yadav and Ajit Pratap Singh
OP-II-06	Pteridobiodiversity of District Sonebhadra P. C. Misra and Shraddha Tiwari
OP-II-07	Algae based diet formulation for sustainable aquaculture in NE India Hunmily Teronpi and Partha Pratim Baruah
OP-II-08	Exploring Alga <i>Dunaliella</i>: A Promising Source of Antioxidants Pramila Prajapat
OP-II-09	Physiology of biotic and abiotic stresses in plants Prerna Chourasiya and Neel Kamal Rathore
OP-II-10	A Structural Morphology, Anatomy and Histochemical Studies of <i>Hypnea valentiae</i> (Turn) Mont, Rhodophyceae. R.Vellaiyan
OP-II-11	Bryophytes as Nesting Material for Birds: a Case Study from Mukteshwar Sapana Pant and S.D. Tewari
Session – II Algae, Bryophytes and pteridophytes Poster Presentation	
PP-II-01	Seasonal Variations of Diatoms in the Anasagar Lake of Ajmer Manju Parihar

PP-II-02	Assessment of Cyanobacterial Isolates for Laccase Production: a Possible Solution for Plastic Pollution Sapna Jain
PP-II-03	Exploring Algae as a Source of Natural Fiber Trideep Chetia and P. P. Baruah
PP-II-04	Trends of Species Diversity and Distribution Pattern of Pteridophytes across Variable Elevation Gradients in West Kameng of Arunachal Pradesh, India Nivedita Mall and Ajit Pratap Singh
PP-II-05	Green Synthesis of Selenium Nanoparticles using Algal Extracts and their Potential Applications Km Payal Chaurasia and Sanjay Singh
PP-II-06	Diversity of Chlorophyceae from Mamchari Dam, District Karauli (Rajasthan) India Rameshi Meena and Vijendra K Sharma
PP-II-07	Diatoms as Indicators of Ecological Health in the Rivers of Kumaun Himalaya, India Saleha Naz1 and Prateek Srivastava1

Session – III	
Seed Plant, Anatomy, and Reproductive Biology	
Oral Presentation	
S. No.	Title of the Abstract
OP-III-01	A Developmental Pattern of Successive Cambia and Structure of Secondary Xylem in <i>Brachypterum scandens</i> (Roxb.) Wight & Arn. ex Miq. Tanmay Rohit and Kishore S. Rajput
OP-III-02	Stem anatomy and formation of cambial variant in <i>Mucuna monosperma</i> Roxb. ex-Wight (Fabaceae). Meera Rami, Rajaram V. Gurav and Kishore S. Rajput
OP-III-03	Development of Phloem Wedge in <i>Merremia</i> S.L. (Convolvulaceae) Dhara G. Ramoliya, Vinay M. Raole and Kishore S. Rajput
Session – III	
Seed Plant, Anatomy, and Reproductive Biology	
Poster Presentation	
PP-III-01	RNA Storage in Seeds Veena Halale Manjunath and Szymon Swiezewski
PP-III-02	Stem Anatomy of Morning Glories (<i>Ipomoea</i> Sps.) Growing in the Arid areas of Gujarat Khyati D. Thacker and Vinay M. Raole
PP-III-03	Stomatal Variations in <i>Morus</i> Poonam Pandey
PP-III-04	Significance of Trichome Morphology Among the Various Tribes of Family Asteraceae Preeti Gupta, Shweta Shekhar, and Jyoti Gupta

Session – IV	
Taxonomy, Ethnobotany and Plant Resource Utilization	
Oral Presentation	
S. No.	Title of the Abstract
OP-IV-01	A Taxonomic Revision of the Genus <i>Rhynchosia</i> Lour. (Fabaceae) in India Ajay Kumar Mishra and Vijay V. Wagh
OP-IV-02	A Structure-Based Drug Design Approach for the Identification of Antiviral Compounds of <i>Asparagus racemosus</i> Wild. Targeting the Chikungunya Virus Aman Agrawal and Vijai Malik
OP-IV-03	Is the genus <i>Heptapleurum</i> (Araliaceae) Taxonomically Impediment? Amrutha Sundaran and K. A. Sujana
OP-IV-04	Conservation, Propagation and Resource Utilization of Cucurbits of therapeutic potential through <i>in vitro</i> studies Anjali Choudhary and Sumitra Kumari Choudhary
OP-IV-05	Ethnomedicinal uses of Some Plants in the Treatment of Jaundice by Tribal Communities of West Singhbhum District, Jharkhand, India Dara Singh Gupta and Manjula Gupta
OP-IV-06	<i>Piper betle</i> (L.) Cultivars: a Possible Solution to Mitigate Oral Cancer Risks in Quid Chewers Devangi Chachad
OP-IV-07	Taxonomic Discrepancies Pertaining to <i>Blumea lacera</i> (Burm.f.) DC. Jaydeep J. Sharma and Padamnabhi S. Nagar
OP-IV-08	Enumeration of Medicinal Plants Used for the Treatment of Poison Bites by The Malayali Tribes of Dharmapuri District, Tamil Nadu, India. M. Kannan ¹ and T. Senthil Kumar
OP-IV-09	Protective Effect of <i>Crateva religiosa</i> G. Forst. on the Liver and Kidney of Letrozole Induced Polycystic Ovarian Syndrome (Pcos) Induced Rats. Meenaloshini P and T. Senthil Kumar
OP-IV-10	Ethnobotanical Study of Sacred Plants Used in Religious and Social Ceremonies in Rohilkhand Division, Uttar Pradesh Shweta Pandey and Nandini Pandey
OP-IV-11	Green & Dry Fodder used by the Villagers of South-Eastern Rajasthan Neelkamal Rathore, Vijay Kumar Yadav and Neerja Shrivastava
OP-IV-12	Unraveling Phytochemical Diversity and Medicinal Potential of <i>Sida Rhombifolia</i> Complex: a Chemotaxonomic Investigation from Northern India Pooja Jain and Vijai Malik
OP-IV-13	Documentation of Traditional Ethnomedicinal Knowledge Used by Rural Community of Rishikesh and its Adjoining areas, Garhwal Himalaya, India Pratibha Sharma and Vijay V. Wagh
OP-IV-14	Identification Knowledge of Plants by Malayali Tribal of Chitteri Hills, Eastern Ghats, Tamil Nadu, India. R. Prabakaran ¹ and T. Senthil kumar

OP-IV-15	Conservation Challenges and Innovative Approaches for Aquatic Medicinal Plant Protection in Karauli District, Rajasthan. Ram Singh Meena and Neelkamal Rathore
OP-IV-16	Taxonomic Revision and typification of genus <i>Pimpinella</i> (Apiaceae) in the Western Ghats with a Special Focus on Conservation Status Rekha C. and K.M. Manudev
OP-IV-17	Diversity And Endemism of Clematis (Ranunculaceae) in Western Ghats of India Sonam Maurya, Raghvendra Singh & K.M. Prabhukumar
OP-IV-18	A Survey and Analysis of Biodiversity and Ethnobotanical Assessment of Herbal Plants at Keoladeo National Park, Rajasthan Suresh Kumar, Atul Tiwari, and Neetu Singh
OP-IV-19	The genus <i>Impatiens</i> L. (Balsaminaceae) in Silent Valley National Park, southern Western Ghats of Kerala V.S. Hareesh, V.B. Sreekumar and M. Sabu
OP-IV-20	Grass Flora of Indian Scriptures Vivek Kumar and Vijai Malik
OP-IV-21	FTIR, GC-MS Based Phytochemical Profiling, Radical Scavenging and Antimicrobial Activity of <i>Hyptis Suaveolens</i> (L.) Poit: A Comprehensive Approach Sanjay Kumar Mishra
OP-IV-22	Ethnobotanical uses, Nutritional Value and Phytochemistry of <i>Dioscorea alata</i> L. Kishan Kumar Prajapati, Rakesh Pandey and V.N. Pandey
OP-IV-23	Iron Weed: a Pharmacognostic Profile Saloni Kothari And Devangi Chachad
Session – IV Taxonomy, Ethnobotany and Plant Resource Utilization Poster Presentation	
PP-IV-01	Study of Dominant Flora of Nasirabad Valley, Ajmer, Rajasthan, India. Surbhi Agarwal and Dilip Gena
PP-IV-02	Efficacy of <i>Cymbopogon khasianus</i> Essential Oil Infused Chitosan Nanoemulsion for Mitigation of <i>Aspergillus flavus</i> and Aflatoxin B1 Contamination in Stored <i>Syzygium cumini</i> Seeds. Jitendra Prasad, Monisha Soni, Arati Yadav, Kishor Kumar Paul, and Manish Kumar Jha
PP-IV-03	Vedic Astrology: Status of Biodiversity Ingrained Ahirrao, Y.A., Patil, M.V. and D.A. Patil
PP-IV-04	Status of medicinal plants in Nawabganj Bird Sanctuary: A Ramsar Site, Unnao, Uttar Pradesh Aanchal Verma, Pratibha, Priyanshi Singh and Alka Kumari

PP-IV-05	Plantation of Indigenous Trees <i>Vis-À-Vis</i> Exotic Trees Prasanjit Mukherjee and Peeyush Kumar
PP-IV-06	<i>Batrisu vasanu</i>: A folk Polyherbal Formulation of Gujarat from the Perspective of Unani Medicinal System Mahendee M. Sameja, Kamartaha I. Saiyed and Vinay M. Raole
PP-IV-07	Checklist of <i>Acanthaceae juss.</i> of Gujarat. Parth H. Rathava, Gulzar Malek and Jaydeep Sharma
PP-IV-08	Nomenclatural Insights on the Genus <i>Derris Lour.</i> (Fabaceae) in India Anishya, Rajkumari Sanayaima Devi and Shruti Kasana
PP-IV-09	Pharmacognostical and Phytochemical Analysis on Stem and Bark of <i>Nothopogia Castanaefolia</i> (Roth.) Ding Hou. Chandanshive Yugandhara S. and Jadhav Varsha D.
PP-IV-10	<i>In-Vitro</i> Anti-Inflammatory Activity of <i>Garcinia Talbotii</i> Raizada Ex Santapau Priyanka Shukla and Meenakshi Vaidya
PP-IV-11	Resolving the taxonomic disparity in the infraspecific taxa of <i>Polyalthia longifolia</i> Kangana S. and Kasana S
PP-IV-12	The Apiaceae: Ethnomedicinal Family as Source for Industrial uses Savita Malik
PP-IV-13	Western Ghats: a Reservoir of Flora Mohd Asif, Venkatesan K., Mokhtar Alam, Kabiruddin Ahmed, R. Murugeswaran, Sathish Kumar, Ram Pratap Meena and N. Zaheer Ahmed
PP-IV-14	Experimental Investigation into the Cultivar-Specific Response of two Cucumber (<i>Cucumis sativus</i> L.) Genotypes Subjected to Simulated Acid Rain Stress Jigyasa Prakash and Madhoolika Agrawal
PP-IV-15	Plants and its Different Traditional Applications: A Major Natural Resource for Conservation and Sustainable Utilization- An Enumeration and Documentation. Arpita Chakraborty, Jyoti Kumar, and Moumita Chakraborty
PP-IV-16	A Survey of Ethnomedicinal Plants of District Hapur, Uttar Pradesh: Treatment of Liver disorders Amita Sharma, and Soniya Rani
PP-IV-17	Influence of Plant-Based Supplements Ashwagandha (<i>Withania Somnifera</i>) and Khejri (<i>Prosopis Cineraria</i>) on Sports Performance Neha Singh
PP-IV-18	Study of Aluminum-accumulation in two Species of Genus <i>Spermacoce</i>, Rubiaceae, Collected from Ranchi District, Jharkhand. Aroma Aishwarya Barla and Ajay Kumar Srivastava
PP-IV-19	Chickpea (<i>Cicer arietinum</i> L.): Origin and Domestication in Historical Perspective C. R. Patil, A. M. Patil, S. B. Khairnar, and D. A. Patil

PP-IV-20	A Review of Study on Anthropogenic Activities in River Water Rajkumar Yadav and Avshesh Kumar
PP-IV-21	Emphasis on Indian Culture S. K. Tayade and D. A. Patil
PP-IV-22	Acanthaceae of Kerala, with special emphasis on Western Ghats endemics C. Murugan and Basil Paul

Session – V Cytogenetics, Plant Breeding and Molecular Biology Oral Presentation	
Sr. No.	Title of the Abstract
OP-V-01	Biomagnetic Effects on Basic Functions of Chromatin Hit Kishore Goswami
OP-V-02	Biochemical Characterization of Mutants of Ajara Ghansal (<i>Oryza sativa</i>) landrace from Kolhapur. Namrata Shedbale, Shitalkumar Desai, Vishwas Bapat and Nikhil Gaikwad
OP-V-03	Performance of Putative Mutants of Black Rice and Kalbhat (<i>Oryza sativa</i> L.) in M3 generation. Ranjit K. Londhe, Shitalkumar P. Desai, Akesh G. Jadhav, Vinod J. Dhole, Vishwas A. Bapat and Nikhil B. Gaikwad.
OP-V-04	Karyomorphological Analysis of <i>Ophiorrhiza trichocarpon</i> Blume (Rubiaceae) – a Species Newly Recorded from the Western Ghats of India. S. N. Preethamol A and John. E. Thoppilb
OP-V-05	Palynological Studies of Some <i>Argyria</i> Lour species from Maharashtra. S.S. Lavate and N.B. Gaikwad
OP-V-06	Nutraceutical evaluation of mutants of Kala Jirga (<i>Oryza sativa</i> L.) Non-basmati Aromatic Rice from Kolhapur Sadhana Kamble, Akesh Jadhav, Vishwas Bapat and Nikhil Gaikwad
OP-V-07	DNA Barcoding Reveals Distinct Genetic Profiles for <i>Cycas revoluta</i> and <i>Cycas rumphii</i> Suresh Kumar
OP-V-08	Identification and Characterization of Novel Salinity Tolerant Genes from <i>Oryza coarctata</i> c-DNA Library Swati Mishra, Soni Chowrasia, Joshitha Vijayan, M.Z. Abdin and Tapan Kumar Mondal
OP-V-09	Appraisal of cyto-genotoxicity of some macrolide antibiotics in the root tip cell of <i>Allium cepa</i> L. Vishnu Shankar Sinha and Nandjee Kumar
Session – V Cytogenetics, Plant Breeding and Molecular Biology Poster Presentation	
PP-V-01	Tracing Chromosomal Evolution Along a Phylogenetic Framework in <i>Senecio</i> (Asteraceae) Akanksha S. Jeswani, Siddharthan Surveswaran and Manoj M. Lekhak
PP-V-02	Evaluation of a Few Accessions of Finger Millet (<i>Eleusine coracana</i> (L.) Gaertn) Mayur C. Kalambe and Rupesh S. Badere

PP-V-03	Meiotic and Karyomorphological Characterization of Male and Female <i>Cycas rumphii</i> Utkarsha Gupta
PP-V-04	Unlocking The Potential of <i>Lablab Purpureus</i> (L.) Sweet as a Vegetable and its Improvement Vishnu V.S.
PP-V-05	Phylogenetic Delineation of Cycadales using Nuclear and Plastid DNA Sequences. Neeta Kushwaha
PP-V-06	Exploring Dietary Fiber Enhancement in Wheat: Identification of High B-Glucan and Arabinoxylan Sources from Wild Relatives for Biofortification Upendra Kumar, Sourav Panigrahi, Priyanka Balyan, Sundip Kumar, and Om Parkash Dhankher
PP-V-07	Genetic Innovation for Optimizing Nutrient use Efficiency: Building Agricultural Resilience for Climate Change. Manu Yadav
PP-V-08	Tracing Chromosomal Evolution Along a Phylogenetic Framework in Senecio (Asteraceae) Akanksha S. Jeswani, Siddharthan Surveswaran and Manoj M. Lekhak

Session – VI Ecology and Environmental Biology Oral Presentation	
Sr. No.	Title of the Abstract
OP-VI-01	Endemic Vascular Plants of Karimpuzha Wildlife Sanctuary, Kerala, India - a Preliminary Study Akhil Sajan. and K. A. Sujana
OP-VI-02	Status of Vegetation and Diversity in a Corridor Between Two Wildlife Sanctuaries North Western Ghats of Maharashtra Kadale Anil S., S. S. Rahangdale and Rahangdale S.R.
OP-VI-03	Divergent Responses of Ascorbate and Glutathione Pools in Ozone-Sensitive and Ozone-Tolerant Wheat Cultivars under Elevated Ozone and Carbon dioxide Interaction Ashish Kumar Mishra, Shashi Bhushan Agrawal and Supriya Tiwari
OP-VI-04	Colour Endemism of Indian <i>Impatiens</i> (Balsaminaceae) with A Special Reference on Yellow Himalayan Balsams Diksha Kumari and KM Prabhukumar
OP-VI-05	Forest Ecological Status of Raipur Forest Range, Mussoorie Forest Division Uttarakhand Manisha Pandey, S.P Joshi and Sachin Sharma
OP-VI-06	A Preliminary Study on the Horizontal Zonation of Shola Forests at three Different Altitudes Navya S. and Sujana K. A.
OP-VI-07	Black Soldier Fly Larvae: a Biotic Curiosity with Natural Ability for Solid Waste Management and Circular Economy in the Indian Himalayan Region Paromita Ghosh
OP-VI-08	Vegetation Biomass and Carbon Stock Assessment of Sawai Mansingh Sanctuary, Rajasthan Pragya Dadhich
OP-VI-09	Phytosociological Assessment for Conservation and Management of Native Diversity Within Forest Ecosystems: Case Study of Padajhar Mahadev Sacred Grove, Bhainsrorgarh Wildlife Sanctuary, Rajasthan, India Priyal Vijayvargiya And Pratima Shrivastava
OP-VI-10	Long-Term Health Risk Assessment of Heavy Metal Contamination in Rice Grains from Urban Markets of Indo-Gangetic Plains of Northern India Priyanka Singh and Rajesh Kumar Sharma
OP-VI-11	Generalized Weed Risk Score “Apg-Iv Grade-Lamiids” in Udhm Singh Nagar District, U.K. India. Sachin Sharma, S.P. Joshi and Manisha Pandey
OP-VI-12	Status of Ground Vegetation and Shift of People’s Approach in the Sacred Groves in North Western Ghats

	Savita S. Rahangdale and Sanjaykumar R. Rahangdale
OP-VI-13	Plant Invasion: Assessment of the Impact of Transportation Pathways on Native and Alien Plant Diversity of Gorakhpur District, Uttar Pradesh Sneha Singh, Arunava Datta and Virendra K. Madhukar
OP-VI-14	Biodiversity of Aquatic Macrophytes in Motijheel Lake of Motihari, Bihar. Amrita Singh
OP-VI-15	An Overview of Gymnosperms and their Conservation in the Andaman and Nicobar Islands, India Lal Ji Singh, Anil Kumar Midigesi, Gautam Anuj Ekka, Pankaj A. Dole, Mahadeva Kumar, S.
OP-VI-16	A Sustainable Eco- Model for Conserving & Developing the Village Ponds in Western Uttar Pradesh S.N. Tyagi IFS (Ret.)
Session – VI Ecology and Environmental Biology Poster Presentation	
PP-VI-01	Study of History and Paleoclimatic Situation of Fossil Development in Salkhan, Sonbhadra, India Ramashray Singh
PP-VI-02	Habitat Distribution Modeling for Reintroduction of <i>Flacourtia jangomas</i> (Lour.) Raeusch. (Salicaceae): an Indigenous Fruit Tree of Terai Region Jyoti Gupta, Pragya Sourabh, Shweta Shekhar and Preeti Gupta
PP-VI-03	Unveiling The Interplay: a Comparative Study of Crustose Lichens <i>Rinodina exigua</i> and <i>Rinodina sophodes</i> Through Integrated Analysis Vartika Gupta, Seshu Lavania and Sanjeeva Nayaka
PP-VI-04	Nitric Oxide: a Key Signalling Molecule in Mitigation of Drought Induced Oxidative Stress Madhuri Sharma and G. S. Shekhawat
PP-VI-05	Fabrication and Characterization of Graphene Incorporated Natural Fibers for Enhanced Properties Manjula Gupta and Dara Singh Gupta
PP-VI-06	Use of Microalgae for Phycoremediation of Environmental Pollutants and Biofuel Production: an Integrated Approach Khushaboo Soni And Sanjay Singh
PP-VI-07	Identification, Characterization and Reduction Mechanism of Hexavalent Chromium-Reducing Bacteria Isolated from Dumpsites of Western Uttar Pradesh.

	Akansha Garg and Alok Srivastava
PP-VI-08	Assessment of Heavy Metal (Mercury) Contamination in Periphytic Diatoms Based on their Morphological Abnormalities Sangeeta And J. N. Maurya
PP-VI-09	Functional/Biochemical Characterization of salt tolerant fungal endophytes and their effect on growth and yield of saline-affected wheat Priyanka Prajapati and R. N. Kharwar
PP-VI-10	Plant Growth Promoting Rhizobacteria: A Sustainable Strategy for Abiotic Stress Mitigation in Plants Anjan Kumar Sarma and Kangkana Deka
PP-VI-11	Effect of Grazing on Phytosociology Grasslands of Gangatic Plain of Bakhtiyarpur, Patna, Bihar S.N. Prasad Sinha and Subhash Chandra
PP-VI-12	Development of Low-Cost Bioremediation System Using <i>Oscillatoria princeps</i> Algae for Wastewater Treatment in Jharkhand. Sumit Kumar Pathak and Sangita Kumari
PP-VI-13	Evaluation of Biosorption Potential of Cadmium-Tolerant Bacterial Isolates Prerna Chauhan and Alok Srivastava
PP-VI-14	Climate Change and Food Safety Neelam Pandey and Ashwani Kumar
PP-VI-15	Energy Budget Studies of Land-Based Animal Production Systems in High-Altitude Pastures of Ladakh, Trans-Himalaya Harshita Joshi, Prachi Joshi, Subrat Sharma
PP-VI-16	Principal Component Analysis (PCA) and Conservation Status of Dioecious Flora of the Allahabad District, Uttar-Pradesh, India. Ankita Verma and Deepak Kumar Gond
PP-VI-17	Identification and Characterization of Functional Groups in Epiphytic Lichen <i>Pyxine cocolosus</i> (Sw.) Nyl. in Proximity to Coal Based Thermal Power Plants in Uttar Pradesh, India Namita Gupta, S. K. Dwivedi and D. K. Upreti
PP-VI-18	Effect of Industrialization on Hydrological Cycle Md. Shamim Ahmad and Rizwana Perveen

Session – VII	
Plant Physiology & Biochemistry	
Oral Presentation	
Sr. No.	Title of the Abstract
OP-VII-01	Hemin- Mediated Activation of HO-1 and Regulation of Cadmium-Induced Oxidative Stress in <i>Sorghum bicolor</i> L. Anita and G. S. Shekhawat
OP-VII-02	Effect of Exogenous Phytohormone Treatment on Antioxidant Activity, Enzyme Activity and Phenolic Content in Wheat (<i>Triticum aestivum</i> L.) Sprouts and Identification of Metabolites of Control and Treated Samples By UHPLC-MS Analysis. Anjali Yadav and Shachi Singh
OP-VII-03	Estimation of Total Phenolics, Flavonoids, Tannins and Alkaloids in <i>Bauhinia racemosa</i> Lam. Leaves Ankit Yadav and Meenakshi Vaidya
OP-VII-04	<i>In-Vitro</i> Antioxidant Activity of Hydroalcoholic Extract of Leaves of <i>Hydnocarpus Pentandrus</i> (Buch. - Ham) Oken Darshika Acharya and Meenakshi Vaidya
OP-VII-05	Metabolic Responses of Sunflower Seedlings Under Differential PAR Conditioning and Arsenic Stress Geeta Yadav and Prof. S. M. Prasad
OP-VII-06	Physicochemical Analysis of <i>Piper cubeba</i> L.F. and <i>Zanthoxylum rhetsa</i> (Roxb.) DC Fruits Farzan Afkham and Meenakshi Sudhir Vaidya
OP-VII-07	Salinity/Cd Induced Oxidative Stress in Plants: An Insight in the Cyto-Protective Role of HO-1 in the Changing Scenario of Climate Change G. S. Shekhawat
OP-VII-08	GC-MS Analysis and Phytochemical Screening of Wild Underutilized Medicinally Important Legume <i>Mucuna Nivea</i> (Roxb). DC. Kamlakar C. More, Sunil Tayade, Prashant Gawande and Surendra Manik
OP-VII-09	Identification of Bioactive Compounds in Seeds of <i>Holoptelea Integrifolia</i> Through GC-MS Analysis and Assessment of its Utility in Sports Nutrition Kana Ram Kumawat and Neha Singh
OP-VII-10	Effect of Imbibition (GA and Like Compound) on Enzymatic Activity on <i>Phaseolus vulgaris</i> Seeds Renu Rani
OP-VII-11	Exogenous Application of Methyl-Jasmonate Confers Salt Stress Tolerance in <i>Triticum aestivum</i> L. By Orchestrated Regulation of Antioxidants, RoS Detoxification and Nutrients Balance Sandeep Kumar Barwal, Sajad Hussain Shah, Salim, and Yerramilli Vimala

OP-VII-12	GC-MS Profiling of <i>Martynia annua</i> L. Fruit Extracts: Antioxidant Activity and Toxicity Assessment using <i>Caenorhabditis Elegans</i> Sanjay Saini
OP-VII-13	Effect of Salicylic Acid Treatment on Morphological Biochemical and Physiological Parameters of <i>Plumbago zeylanica</i> Shachi Singh
OP-VII-14	Pharmacognostical and Preliminary Phytochemical Characterization of Stem of <i>Cajanus scarabaeoides</i> (L.) Thouars Siddharth K. Katkole and Prof. Varsha D. Jadhav
OP-VII-15	Effect of Arsenic on Gametophyte Development in <i>Pteris vittata</i> Ritu Jain
OP-VII-16	Medicinal Activity of <i>Oxalis corniculata</i> L. (Family- Oxalidaceae): Assessment of Phytochemical and Pharmacological Properties Rima Julie Bhaunra and Ajay Kumar Srivastava
Session – VII Plant Physiology & Biochemistry Poster Presentation	
PP-VII-01	Investigation of Regulatory Mechanism of Salinity Tolerance of <i>Atriplex Griffithii</i> at Morpho-Physiological Level Deepak Choudhary and Shweta Jha
PP-VII-02	<i>In-Vitro</i> Callus Propagation and Bioactive Metabolites Estimation under Salt Stress in <i>Cissus quadrangularis</i> L. using HPLC Juhi Dhillon, Laxman Nagar and Vimala Y
PP-VII-03	Evaluation of Salt-Induced Oxidative Stress and its Impact on Various Growth Factors in <i>Sorghum Bicolour</i> L. : an Important Crop of Arid and Semiarid area” Nihar Mathur and G.S. Shekhawat
PP-VII-04	Investigating the Antioxidant Properties and Chemical Composition of <i>Linum usitatissimum</i> L. (Flaxseed) Extract Using LC-MS Analysis Sanghadeep S. Ukey
PP-VII-05	Appraising the Phytochemical Diversity, Bio-Activities and Characterization of Commercial <i>W. somnifera</i> L. Dunal Varieties Sarika sharma
PP-VII-06	Pollution-Induced Alterations in Stomatal Behavior and Carbon Concentrating Ability across Plant Types Tushar D. Mhashakhatri and Shravan D. Kumbhare
PP-VII-07	Comprehensive Phytochemical and Essential oil Profiling of <i>Pogostemon</i> species S. A. Momin and R.V. Gurav
PP-VII-08	Biochemical Toll of Leaf Colour Variations in Safflower (<i>Carthamus tinctorius</i> L.): a Tale of Light and Dark Green Mutants

	Chaitanya A. Borkar
PP-VII-09	Study of <i>In-Vitro</i> Antiurolithiatic Activity of Aqueous Extract of Corn Silk Aishwarya Parab, Himanshu Dawda and Usha Mukundan
PP-VII-10	Unveiling the Antioxidant Potential of <i>Flemingia precox</i> var. <i>robusta</i>: a Phytochemical Investigation Namdev M Sindhikar, Manoj M Lekhak, Sushma A Patil and Umesh B Jagtap
PP-VII-11	Identification of Bioactive compounds and quantification of Naphthalene in <i>Nardostychnus jatamansi</i> DC Piyali Paul and Dara Singh Gupta
PP-VII-12	Investigation of Antiulcer Effects of <i>Schleichera oleosa</i> (Lour.) Oken. Bark and Leaves using Ethanol Gastric Ulcer Induction Model in Rats. Meenakshi Sudhir Vaidya
PP-VII-13	Ecology and Environment Evolution of Water Quality indices (WQIS) for surface and Groundwater Manish Kushwaha and Dr. R.L.S. Sikarwar
PP-VII-14	Impact of Plant Growth Regulators on the Growth and yield of Chilli (<i>Capsicum annum</i> L.) Parshuram V. Pawar
PP-VII-15	Impact of Mycorrhizae on Banana Growth Across Various Cultivation Systems in Nanded District, Maharashtra, India Hanumnat R Aglave
PP-VII-16	GC-MS metabolite Analysis and Antibacterial Activity of <i>Eucalyptus globulus</i> Extract M. M. V. Baig

Session – VIII	
Plant Biotechnology, Bioinformatics and Nanobiotechnology	
Oral Presentation	
S. No.	Title of the Abstract
OP-VIII-01	Characterization and Antimicrobial Properties of Green Synthesized Ag NPS using <i>Lantana camara</i> Anamika Ratan, Manjul Mungali, Sarvesh Singh, Ashwani Kumar
OP-VIII-02	Green Synthesis and Characterization of Calcium hydroxide Nanoparticles using <i>Commelina benghalensis</i> L. Leaf Extract A.V.P. Karthikeyan, C.M. Kiruthika and M. Jay Chithra
OP-VIII-03	Anti-Bacterial and Anticancer Efficiency of Zinc Oxide and Silver Nitrate Nanocomposite Biosynthesis of <i>Martynia annua</i>. L Bhuvaneshwari. M.
OP-VIII-04	Identification of natural inhibitors of <i>Allium hookeri</i> Thwaites against EGFR-Kinase using molecular docking, molecular dynamics simulation and MMPBSA approaches Deepti Teotia and Vijai Malik

OP-VIII-05	Enhanced Dye Production in <i>Lawsonia inermis</i> (L.) using <i>In Vitro</i> Aeroponic Regeneration Techniques Kishor Joshi and Kheta Ram
OP-VIII-06	Bioactive Potential of Methanolic Leaf Extract of <i>Secamone emetica</i> for Antioxidant, Anti-inflammatory and Anticancer Activities: Integrating Molecular Docking and Dynamics Simulation Against COX Enzyme Madhavan Sowmiya and Kuppusamy Selvam
OP-VIII-07	Synthesis and Characterization of Chitosan-Encapsulated Zinc Oxide Nanocomposite for Antibacterial and Antidiabetic Activity using <i>Breynia vitis-idaea</i> Mathiazhagan Lavanya and Kuppusamy Selvam.
OP-VIII-08	<i>In-Vitro</i> Mass Multiplication of Ornametally Potential Wild Orchid <i>Eulophia Nuda</i> Lindl. and <i>Eulophia andamanensis</i> Rchb.F. M.S. Jadhav and R.V. Gurav
OP-VIII-09	Topic- <i>Illicium verum</i> Hook. f. essential oil infused chitosan nanoemulsion as shelf-life enhancer of Custard apples Monisha Soni and Abhishek Kumar Dwivedy
OP-VIII-10	<i>Centratherum punctatum</i> mediated green synthesis of gold nanoparticles and its antioxidant, toxicity, and anticancer activity N Ahamed Sherif and A Nizar Ahamed
OP-VIII-11	Anti-Microbial and Antiproliferative Efficiency of Zinc Oxide Nanoparticle Biosynthesis of <i>Ecbolium viride</i> (Forsk) Nandhini. S and K. Selvam
OP-VIII-12	Primary Metabolite Contents, Proteomic and Antioxidant Analysis of <i>Spirulina platensis</i> Neelam Solanki and Suman Parihar
OP-VIII-13	Insights into Mechanism of Salinity Stress Tolerance Factors in <i>Atriplex</i>, an Important Xero-Halophytic species Shweta Jha ¹ , Sudipa Maity, Deepak Choudhary, and Kiran Ambatipudi
OP-VIII-14	Enhanced Phenolics Production in <i>Cassia fistula</i> Through Auxin and Cytokinin Optimization Sushil Kumar and Vimala Y.
OP-VIII-15	Nanoparticles Based Amelioration of Abiotic Stress in Agriculture for Enhanced Crop Productivity Nilima Kumari
Session – VIII Plant Biotechnology, Bioinformatics and Nano Poster Presentation	

PP-VIII-01	Engineered Nanoparticles (ENPS) as Nano-Fertilizers for Sustainable Agriculture: in Changing Scenario of Climate Bhawana Palawat and G. S. Shekhawat
PP-VIII-02	<i>In-vitro</i> propagation of <i>Cyperus arenarius</i> Hance ex C.B. Clarke: a Sedge Plant of Indian Thar Desert Ishaka Sharma and Ashok Kumar Patel
PP-VIII-03	<i>In Vitro</i> callogenesis of <i>Convolvulus prostratus</i> and Evaluation of its Primary Metabolites Gourav and Suman Parihar
PP-VIII-04	Synthesis, Characterization, and Application of Chitosan Nanoparticles for Enhancing Growth, Yield, Antioxidant Enzyme Activity, and Resource Efficiency in Chickpea Cultivation Mohan Kapse and Dhiraj Naik
PP-VIII-05	<i>Tylophora indica</i>: a potential medicinal plant for asthma and bronchitis Poonam Jodha and Suman Parihar
PP-VIII-06	Effect of Carbon Source on Multiple Shoot Induction in <i>Beta vulgaris</i> spp. <i>vulgaris</i> L. Sachita Meshram
PP-VIII-07	Enhanced dye production in <i>Lawsonia inermis</i> (L.) using <i>in vitro</i> aeroponic regeneration techniques Kishor Joshi and Kheta Ram
PP-VIII-08	Enhancing Sugarcane Growth and Resilience: The Role of Plant Growth-Promoting Rhizobacteria (PGPR) Aditya Pathak, Pankaj Kumar, Himanshu Kumar, Malyaj R. Prajapati, Jitender Singh, Rekha Dixit, and Kamal Khilari
PP-VIII-09	Characteristics of Microbiome in Sugarcane Rhizosphere using High-throughput Metagenomics Himanshu Kumar, Malyaj R. Prajapati, Pankaj Kumar, Jitendra Singh, Aditya Patak, Rekha dixit, Satya Prakash, Kamal Khilari
PP-VIII-10	Current status of epiphytic lichens diversity in Satna district, Madhya Pradesh Shweta Tiwari, Gaurav K. Mishra, Kanchan Awasthi, D.K. Upreti

OP-I-01

CLADOSPORIUM FRUIT ROT OF GLIRICIDIA FROM GUJARAT

Arun Arya

Visiting Faculty, Navrachna University, Vasna- Bhayali Road, Vadodara 391410

E mail: sarojarun10arya@rediffmail.com

Gliricidia is a genus of [legume](#) family, [Fabaceae](#). Its native range is Mexico to Peru, but *Gliricidia sepium* has been widely introduced to other tropical zones including India. The species *G. sepium* is a small, deciduous, ornamental tree, cultivated and used for a variety of purposes in tropical regions. The genus name *Gliricidia* means "mouse killer" in reference to the traditional use of the toxic seeds and bark of *G. sepium* as [rodenticides](#). The tree is leafless when in flower and bears fruits during April and May in India and countries with same climate. The flowers attract a lot of bees and some [lycaenid](#) butterflies-particularly the Peablu (*Lampides boeticus*) and other native birds. A fruit rot caused by *Cladosporium cladosporoides* ([Fresen.](#)) G.A. de Vries was observed and is reported here as new fruit rot on this tree from Gujarat. The fungus *Cladosporium* belongs to Hyphomycetes group of Fungi imperfecti.

OP-I-02

ABIOTIC AND FUNGAL DETERIORATION OF CURRENCY COINS AND ASSOCIATED HEALTH RISKS

Arun Arya, *Chitra Arya and *Dhara N. Zaveri

Visiting Faculty, Navrachna University, Vasna- Bhayali Road, Vadodara 391410, *Department of Botany, Faculty of Science, The Maharaja Sayajirao University of Baroda, Vadodara 390002

E mail: sarojarun10arya@rediffmail.com; dhara.zaveri-botany@msubaroda.ac.in

The currency coins constitute an essential component in day-to-day business. Although online transaction by mobile apps is promoted coins are still in use. A study was undertaken to find out the associated fungal spores with Indian and foreign coins. A total of 11 fungal entities belonging to 7 genera were found associated with coins. Three species of *Aspergillus* were found. The fungal organisms like species of *Aspergillus*, *Penicillium*, *Rhizopus* and *Fusarium* are reported to cause skin allergy and respiratory diseases. The coins which showed abiotic deterioration were photographed and recorded. Certain methods are suggested for cleaning and removal of harmful effects of fungi on coins and associated health risks.

Keywords: Abiotic causes, Fungi, *Aspergillus*, *Penicillium*, *Rhizopus*, Deterioration, Allergy.

OP-I-03

ENDOPHYTIC MYCOBIOTA OF PHARMACEUTICAL PLANT *T. BELLIRICA* (GAERTN.) ROXB. AND THEIR ANTIMICROBIAL POTENTIAL AGAINST SELECTED CLINICAL PATHOGENS

Megha Sakshi¹, Reena Mohanka² and Vishnu Shankar Sinha³

^{1,2}Department of Botany, Patna University, Patna, Bihar, India, ³P.G. Department of Botany, Kolhan University, Chaibasa, Jharkhand, India

Endophytic mycobiota are promising microbial resources with potential for drug discovery. *Terminalia bellirica* (Gaertn.) Roxb. is a pharmaceutically important deciduous tree with potential for harboring diverse endophytes. This study aimed to explore the endophytic mycobiota associated with *T. bellirica* and evaluate their antimicrobial potential against clinically relevant pathogens. A total of 124 endophytic fungal isolates were obtained from various plant parts and locations, representing the groups Ascomycetes, Coelomycetes, Hyphomycetes, and Mucormycetes. The genus *Aspergillus* was found to be the most prevalent. The colonization rate and fungal diversity were greater in location II than in location I. Antifungal assays indicated that several isolates exhibited inhibitory activity against clinical pathogens: *Candida albicans* and *Saccharomyces cerevisiae*. Notably, isolate MAB4 exhibited strong antibacterial activity against *Escherichia coli*, whereas MAL9, MKB6, and MAB1 showed moderate antibacterial effects. Amphotericin B served as the standard antifungal agent, and Streptomycin was used as the standard for antibacterial testing. These results indicate that *T. bellirica* harbors a diverse endophytic mycobiota with potential antimicrobial properties. The present work can provide valuable insights in harnessing these endophytic fungi isolates for drug developments of human usage.

OP-I-04

EXPLORING THE ANTIMICROBIAL POTENTIAL OF *MITRAGYNA PARVIFOLIA* (Roxb.) KORTH

Meha Mepani and Meenakshi Sudhir Vaidya

S.V. K. M's Mithibai College of Arts, Chauhan Institute of Science and Amrutben Jivanlal College of Commerce and Economics (Autonomous) Affiliated to University of Mumbai, Vile Parle - West Mumbai 400056, India.

Email: mepanimeha@gmail.com ; minakshispv@gmail.com

The increasing prevalence of antibiotic-resistant microorganisms necessitates the exploration of alternative antimicrobial agents derived from natural sources. Medicinal plants have been integral to traditional medicine systems around the world for centuries. *Mitragyna parvifolia* (Roxb.) Korth, a member of the Rubiaceae family, has become highly significant in traditional

medicine, particularly in Ayurveda. This plant contains a variety of bioactive compounds that offer therapeutic benefits, making them essential in the treatment and prevention of numerous health conditions. This study investigates the antimicrobial potential of *Mitragyna parvifolia* bark using the disc diffusion method. The disc diffusion assays revealed significant zones of inhibition against gram-positive bacteria like *Bacillus cereus*, *Staphylococcus aureus* and gram-negative bacteria like *Escherichia coli* and *Pseudomonas aeruginosa* as well as fungal strains like *Candida tropicalis* and *Candida albicans* indicating potent antimicrobial activity. Further investigation into the specific bioactive compounds responsible for this activity is recommended to optimize extraction techniques and enhance the development of natural antimicrobial agents from the bark of *Mitragyna parvifolia*.

OP-I-05

EFFECT OF PEGIONPEA STERILITY MOSAIC VIRUS INFECTION ON LEGHAEMOGLOBIN IN NODULES OF PEGIONPEA (*CAJANUS CAJAN MILLISP.*)

Neha Kumari Sonkar¹ and Shail Pande²

¹Research scholar, Department of Botany, D.D.U Gorakhpur University, Gorakhpur-27300; ²Principal, D.A.V. PG College, Gorakhpur -273001

Pegionpea (*cajanus cajan millisp.*) is an important leguminous crop belonging to the family fabaceae. Being leguminous crop the plant fixes nitrogen with the help of nodules in their roots and improving soil fertility. Localized spread from seed-infected crop plants or weed is sometimes spread by vectors. Present study deals with content of leghaemoglobin and number of rhizobium in nodules of roots of pegionpea sterility mosaic virus infected plant. It was discovered that infected plant's nodule have low amount of leghaemoglobin content compared with healthy control plants and they harbor less number of bacteria when compared with healthy control plants and this captiously affects nitrogen fixation by infected plants.

OP-I-06

COMPARATIVE GENOMIC ANALYSIS OF NODULATION AND NITROGEN FIXATION GENES IN *SINORHIZOBIUM* STRAINS NODULATING WILD AND CROP LEGUMES IN INDIA

Nisha Tak and Hukam S. Gehlot

BNF and Microbial Genomics Lab., Department of Botany, Centre of Advanced Study, Jai Narain Vyas University, Jodhpur-342001 (Rajasthan) India

E-mail: nishatak13@gmail.com

Sinorhizobium strains are the dominant root nodule symbionts associated with various nodulating wild and crop legumes in India. We compared the genomes of newly described species *Sinorhizobium aridi* isolated from hot and arid climatic conditions of deserts in three continents

(Asia, Africa and America). The nodulation and nitrogen fixation gene cassettes of *Sinorhizobium* strains were analyzed and compared using the SEED tool of RAST pipeline and JGI-IMG portal. Our analysis suggests *Sinorhizobium* from India harbor a unique set of symbiosis essential genes suggesting evolution of accessory genes based on local edaphic and climatic conditions.

OP-I-07

**PLANT GROWTH PROMOTING RHIZOBIA ARE ECO-FRIENDLY STRATEGY:
ENHANCING VEGETATIVE AND REPRODUCTIVE PARAMETERS OF *SESBANIA*
SESBAN THROUGH BACTERIAL CONSORTIUM**

Prashant Kumar and Sandeep Kumar

Department of Botany and Microbiology, Gurukula Kangri (Deemed to Be University),
Haridwar, Uttarakhand, India 249404

Email: sandeepchokar@gmail.com

Traditional green manure, *Sesbania sesban* (L.) Merr., improves soil fertility and structure, and is therefore able to contribute in sustainable agriculture. Seventy different types of bacteria (designated SSP01–SSP70) were isolated from the root nodules of this wild plant species using several media (YEMA, CRYEMA, and NAM). The isolates were identified based on their physio-morphological and biochemical characteristics. The results demonstrated that the bacterial isolates from the Jayanti root nodules had a spherical convex surface and a milky white colony. Selected seven bacterial isolates namely SSP01, SSP02, SSP03, SSP05, SSP07, SSP08, and SSP10 were screened, and then evaluated for PGP characteristics. A cross-infectivity test was performed for the confirmation of a suitable consortium, followed by pot trail experiment and observed that the consortium of SSP01+SSP03 showed the significant potential by enhancing (approximately 35-40%) in length and weight (fresh and dry) of roots and shoots, as well as in the number of flowers and seeds, compared to the control and other treatments.

Utilizing 16S rRNA molecular sequencing, the bacteria in the consortium were identified as *Enterobacter* sp. (SSP01) and *Acinetobacter* sp. (SSP03) by Macrogen, South Korea. The results signify improved uptake of nutrients i.e. nitrogen, crucial for boosting the overall health and yield of plants. Based on these findings, bacterial consortia are a promising tool for future green manure management strategies, highlighting the importance of microbial inoculants in ever green revolution and improving crop performance.

OP-I-08

PREVALENCE OF TOMATO LEAF CURL NEW DELHI VIRUS IN THE AGRICULTURAL FIELDS OF BIHAR

Punam Ranjan

**Plant Molecular Virology Lab, Department of Botany,
Patna Science College, Patna University, 800005.**

E mail- punamranjanbotpsc@pup.ac.in, gayatripunam@gmail.com

Over the past few decades, begomovirus infection has spread across India with an ever-expanding range of host plants. We investigated the association of tomato-infecting begomovirus in the major tomato-growing regions of Bihar. The presence of begomovirus DNA-A component was analyzed in the total DNA isolated from the selected tomato field samples collected during 2022-2023. The viral DNA-As cloned in pJET1.2 vector were validated by the PCR and restriction digestion, and the begomovirus species was identified by Sanger sequencing. An alarmingly increased incidence of Tomato leaf curl New Delhi virus infection in tomatoes and other crops in Bihar was observed.

OP-I-09

PLANT GROWTH PROMOTING EFFECTS OF VOLATILE COMPOUNDS OF TRICHODERMA IDENTIFIED USING ITS RRNA

Shruti Ojha

Department of Botany, Maharshi Dayanand Saraswati University, Ajmer, Rajasthan, India

Microbial volatile organic compounds (VOCs) play important roles in plants influencing their physiology and development. *Trichoderma* is well known for the production of signal molecules that influence the growth of plants and other fungi. The objective of this research was to compare the effect of different *Trichoderma* species obtained from soil and surface sterilized roots. Fungi were isolated across the USA and *Trichoderma* strains were identified using ITS rRNA, and tested on the dominant arid grass, *Bouteloua gracilis* (blue grama) in a closed chamber experiment. *Trichoderma gamsii* (DS71) showed the greatest growth-promoting abilities in *B. gracilis* compared to the controls. *Trichoderma* high abundance in soils across multiple ecosystems as demonstrated by Illumina sequencing showed important ecological functions of these fungi as regulators of plant growth through multiple mechanisms. Future research will be

conducted to evaluate factors that influence *Trichoderma*-plant interactions using different growth conditions (e.g. temperature and media).

Keywords: Grasses, Plant-growth, *Trichoderma*, Volatile.

OP-I-10

GC-MS PHYTOCHEMICAL ANALYSIS AND ANTIBIOGRAM STUDY ON LEAF EXTRACT OF PHYLLANTHUS NIRURI L. AGAINST VARIOUS PATHOGENS

Pushpa Salo Linda¹, Krishna Pyare² and Vinay Oraon³

¹Department of Botany, Jamshedpur Workers College, Jamshedpur, Kolhan University, Chaibasa

²University Department of Botany, Kolhan University, Chaibasa

³Biotechnology, University Department of Botany, Morhabadi, Ranchi University, Ranchi, Jharkhand

Email: p.s.linda28@gmail.com

Medicinal plants have many bioactive compounds, which are used for curing various infectious diseases. Bioactive compounds are known for their medicinal properties such as antifungal, antibacterial, antiulcer, antidiabetic, anti-inflammatory, insecticidal, antioxidant etc. The aim of the current research work was to determine the phytochemical profile by GC-MS and investigate antimicrobial potential of traditional medicinal plants *Phyllanthus niruri* L. of Dalma range of East Singhbhum district of Jharkhand. *Phyllanthus niruri* L. is a traditional medicinal herb. The chromatogram of GC-MS analysis of methanolic leaf extracts of *Phyllanthus niruri* L. showed 36 peaks showing the presence of 36 compounds. Antibioassay study was done by disc diffusion method of ethanolic, acetone and aqueous leaf extract on pathogenic microorganisms. The extracts revealed inhibited growth of *Staphylococcus aureus*, *Escherichia coli*, *Candida albicans* and *Trichophyton* species.

Keywords: GC-MS, Antibioassay, antimicrobial, pathogenic microorganisms

OP-I-11

FUNGICIDAL EFFICACY OF SOME SELECTED PHYTOEXTRACTS AGAINST FUSARIUM WILT IN CHICKPEA (*CICER ARIETINUM*)

Shyam Singh

Department of Botany, Meerut College, Meerut

Email: drshyamsingh62@gmail.com

The present study was carried out to assess the fungicidal efficacy of some phytoextracts such as *Azadirachta indica*, *Zingiber officinale*, *Allium cepa*, and *Argemone maxicana* against wilt fungi in chickpea i.e., *Fusarium oxysporum* f. sp. *ciceri*. The fungal growth of *Fusarium oxysporum* was inhibited by almost all selected phytoextracts used in the following experiment. The maximum fungal growth inhibition was done by *Azadirachta indica* (55.19%) followed by *Allium cepa* (48.52%), *Zingiber officinale* (47.44%) and *Argemone maxicana* (42.80%) respectively. Thus, *Azadirachta indica*, *Allium cepa*, and *Zingiber officinale* can be used as potential phytoextracts against wilt causing fungi *Fusarium oxysporum* in chickpea for their maximum antifungal activity.

OP-I-12

THE PGPR BREAKTHROUGH: UNLOCKING HERITABLE IMMUNITY FOR SUSTAINABLE CROP IMPROVEMENT

Prashant Singh

Assistant Professor, Institute of Science, Department of Botany, Banaras Hindu University, Varanasi, 221005, UP.

Ensuring food security in the 21st century is a complex challenge that requires addressing multiple factors, with the stability and enhancement of crop yields being paramount. Among the central concerns is the need to develop crops that are more resistant to diseases, as pathogenic microbes present a continuous and significant threat to plant health. Traditionally, chemical treatments have been relied upon for pathogen control; however, the environmental consequences of such methods, along with the growing awareness of potential risks to ecosystems and human health, underscore the urgency of finding alternative, sustainable approaches. Reducing dependency on chemical interventions has thus emerged as a critical goal in modern plant pathology research, directing attention toward a deeper understanding of plant immune systems and the mechanisms through which pathogens manipulate these defenses. One of the most promising avenues of research in this context is the study of plant defense mechanisms, particularly the concept of defense priming, which represents a highly effective, sustainable, and economically viable method for enhancing crop resistance to pathogens. Defense priming allows plants to precondition their immune systems to respond more efficiently to environmental stress signals. Unlike constitutive defenses, which remain active regardless of threat levels and often lead to significant metabolic costs, priming prepares the plant to mount a more robust defense only when necessary. This method minimizes the expenditure of energy and resources, making it an ecologically sound adaptation. While priming may not offer complete immunity, its broad-spectrum protection, durability, and ability to be inherited by subsequent plant generations present a valuable strategy for integrated disease management. The ecological efficiency of this system positions defense priming as a pivotal tool in developing resilient crop varieties that can withstand a range of biotic challenges. In this context, we explored the compelling field of Plant Growth Promoting Rhizobacteria (PGPR) Immune Priming, where primed traits are passed on to subsequent generations. This intergenerational transfer of primed immunity holds profound implications for sustainable agriculture, as it suggests that a single priming event could confer long-lasting resistance to diseases across multiple plant generations, reducing the need for repeated chemical treatments. The integration of defense priming into crop management practices could revolutionize plant protection strategies by offering a sustainable, environmentally friendly alternative to traditional pathogen control methods. By leveraging the natural defense systems of plants and their interactions with beneficial microbes like PGPR, we can create more resilient crops that are better equipped to thrive in the face of increasing disease pressure, all while minimizing environmental impact. The potential to pass on these primed traits to future generations offers a long-term solution to crop protection, contributing significantly to global food security in an era where the need for sustainable agricultural practices has never been more pressing.

PP-I-01

ENCAPSULATED GERANIAL INTO CHITOSAN NANOEMULSION AS NOVEL ANTIFUNGAL AGAINST DERMATOPHYTES

Arati Yadav* and Abhishek Kumar Dwivedy

Laboratory of Herbal Pesticides, Centre of Advanced Study in Botany, Institute of Science, Banaras Hindu University, Varanasi-221005, India

* E-mail: artiy82440@gmail.com; Tel.: +91 7905242538

The present study investigates the potential of chitosan-coated nanoencapsulated geranial (Ge-Ne) as an antifungal agent against *Trichophyton mentagrophytes*. The prepared Ge-Ne was characterized through SEM, FTIR and XRD analysis. The study found that Ge-Ne had a minimum inhibitory concentration (MIC) at 0.15 $\mu\text{L}/\text{mL}$, which is higher than that of free geranial (Ge). While Minimum Fungicidal Concentration (MFC) of Ge and Ge-Ne was found to be 0.5 $\mu\text{L}/\text{mL}$ and 0.3 $\mu\text{L}/\text{mL}$ highlighting its strong inhibitory effect on *T. mentagrophytes*. Ge-Ne showed enhanced radical scavenging activity IC_{50} value 10.52 $\mu\text{L}/\text{mL}$ for DPPH. Overall findings contribute to the development of efficient and stable antifungal formulations, offering alternative approaches to synthetic antifungal drugs.

PP-I-02

ISOLATION AND SCREENING OF CHLORPYRIFOS RESISTANT BACTERIAL STRAINS FOR BIODEGRADATION OF CHLORPYRIFOS IN SOIL SYSTEM

Avanish Prajapati, Rajesh Kumar Sharma

Laboratory of Ecotoxicology, Department of Botany, Institute of Science, Banaras Hindu University, Varanasi 221005, India

Email: avanishpk420@gmail.com

In agriculture, pesticides play an imperative role in protecting crops against insect pests which results in yields loss and lowers the crop quality. The present study evaluates the degradation of chemical pesticides, especially chlorpyrifos using bacterial isolates. Nineteen chlorpyrifos resistant bacteria isolates were isolated from contaminated soil using mineral salt media supplemented with chlorpyrifos at the rate 50 mg L^{-1} . Six bacterial isolates showed tolerance to chlorpyrifos level up to 2000 mg L^{-1} . The developed consortia using these bacterial isolated will be helpful in degrading the chlorpyrifos accumulated in soil for sustainable crop production and further preventing its entry into food chain.

PP-I-03

MOLECULAR CHARACTERIZATION OF MICROSymbionTS IN *TRIFOLIUM REPENS*

Rajpurohit Riya, Tak Nisha and Gehlot Hukum S.

BNF and Microbial Genomics Lab, Department of Botany, Centre of Advanced Study, Jai Narain Vyas University, Jodhpur-342001 (Rajasthan) India.

E-mail: riyarajpurohit30@gmail.com

Rhizobium species nodulate *Trifolium repens* plants, also known as white clover in several parts of the world, including China, America, Africa, Spain, and Europe. Rhizobia convert atmospheric nitrogen to ammonia inside root nodules with the help of the nitrogenase enzyme. Rhizobia has been isolated from root nodule of *Trifolium repens* and purified using YEMA and TY media. Rhizobia are characterized at genetic level including Isolation of DNA, Thermal reactions/PCR, RAPD, gene amplification and sequencing. RPO1 primer is used for DNA fingerprinting of 30 rhizobial strains and form three groups. Certain strains are selected for MLSA. 16S rRNA gene is amplified to estimate the divergence among bacteria. Rhizobial strains of *Trifolium repens* identified as Rhizobium species based on *recA* gene. Symbiotic genes (*nodA*, *nifH*) amplified for nodulation and nitrogen fixation identification. Phylogenetic tree has been constructed using different tool like BLASTn, MEGA7 software, ClustalW, Neighbor-Joining method.

PP-I-04

MOLECULAR CHARACTERIZATION OF ROOT-NODULE MICROSymbionTS OF *NEPTUNIA OLERACEA* LOUR. FREQUENTLY GROWING IN TRIPURA.

Rawal Abhishek, Tak Nisha, and Gehlot Hukum S.

BNF and Microbial Genomics Lab, Department of Botany, Centre of Advanced Study, Jai Narain Vyas University, Jodhpur-342001 (Rajasthan), India.

E-mail: abhishekrawal62@gmail.com

Neptunia oleracea Lour. also referred to as sensitive *Neptunia* or water mimosa. It is a pantropical nitrogen-fixing perennial legume. In India, it is reported in the southern and northeastern regions. A recent study identified sixty-three root nodule microsymbionts from four distinct locations in Tripura. RPO1 primer-based DNA fingerprinting of fifty-five microsymbionts showed the formation of 26 genetic groups. PCR amplification of protein-coding housekeeping gene *recA* was performed to identify isolated microsymbionts. Based on *recA* gene isolates were identified as *Rhizobium undicola*. Certain selected microsymbionts were recommended for multi-locus sequence analysis (MLSA) and Phenotypic, Biochemical, and PGP-activity assays based on the *recA* gene sequences and phylogeny. Cross-inoculation of a few chosen strains was performed on *Vigna* cultivars in an aseptic Glass house environment.

PP-I-05

A SURVEY OF KERATINOPHILIC FUNGI ISOLATED FROM SOIL IN AJMER DISTRICT, RAJASTHAN.

Renu Jangid¹, Tahira Begum²

¹Department of Botany, Maharshi Dayanand Saraswati University, Ajmer, Rajasthan, India.

²Department of Botany, Samrat Prithviraj Chauhan Government College Ajmer, Rajasthan, India

Email: renufg77@gmail.com

Soil is natural habitat for certain micro-organism. Keratinophilic fungi are soil inhabitants usually present in all types of soil and grow as saprophytes. They utilize keratin as a nutrient substrate for growth; therefore, they play a significant role in the degradation of keratin residues in nature. These fungi include dermatophytes, which are a potential source of infectious diseases in humans and animals. One thirty-six soil samples were collected from various habitats of Ajmer district, Rajasthan (India). The Physico-chemical properties of collected soil samples were analyzed and also examined keratinophilic fungi in soil microflora using hair baiting techniques for isolation. Out of one thirty-six soil samples were tested, ninety-eight soil samples (72%) were found to be positive as they are yielding keratinophilic fungi. The isolated fungal species belong to 8 genera and 17 species. Following keratinophilic fungi were recorded predominantly: *T. mentagrophytes*, *Aspergillus niger*, *Chrysosporium* sp., *Microsporum gypseum*, *Fusarium solani*, *T. rubrum*, *A. flavus*, *A. fumigatus*, *F. oxysporum*, *T. tonsurans*, *F. verticilloides*, *T. Terrestre*, *Penicillium*, *M. canis*, *Blastomyces*.

PP-I-06

BIOCHEMICAL AND MOLECULAR CHARACTERIZATION OF RHIZOBIA ASSOCIATED WITH EFFICIENT CULTIVARS OF VIGNA RADIATA GROWN IN RAJASTHAN

Shilpa Sharma, Hukam S. Gehlot and Nisha Tak

BNF and Microbial Genomics Lab., Department of Botany, Centre of Advanced Study, Jai Narain Vyas University, Jodhpur-342001 (Rajasthan) India

E-mail: shilpa0013.sharma@gmail.com

Microsymbionts such as rhizobia are responsible for 50% of bioavailable nitrogen and hence are potent for sustainable agriculture. Present study is based on symbionts isolated from efficient cultivars of *Vigna radiata* MEHA (IPM 99-125) and PDM 139 (Samrat) grown in Rajasthan. Salt tolerance ability showed 4 strains out of 10 symbionts and 15 PDM strains out of 18 symbionts could survive at high salt concentrations up to 3%. Only 3 strains of PDM were found to metabolize starch by producing the amylase enzyme. Nine MEHA strains and 13 PDM strains tested positive results for utilization of citrate as carbon source. Nitrate reductase activity

was shown by 3 MEHA and 5 PDM strains. Good phosphate solubilizing ability was seen in 3 MEHA and 2 PDM strains, reported good clear halo zones. Total 14 strains showed very good amounts of ammonia production. DNA fingerprinting was carried out using RPO1 Primer and genetic grouping was done to obtain four genotypes in MEHA strains and high genetic diversity in PDM forming fifteen genotypes. Based on BLASTn search results and *recA* gene sequence MEHA strains were found similar to *Sinorhizobium* AG14 bacteria isolated from nodules of *Acacia tortilis* subsp. *raddiana* in arid soils of Tunisia. Amplification of symbiotic genes *nodA* (that codes for N-acyltransferase enzyme) was successful in 2 strains and *nifH* gene (that codes for Nitrogenase Fe protein) was amplified in total of thirteen strains.

PP-I-07

PHENOTYPIC AND BIOCHEMICAL CHARACTERIZATION OF MICROSymbiont ASSOCIATED WITH *CICER ARIETINUM*.

Jhinjha Sunil, Senwar Ramesh, Mishra Aanchal and Tak Alkesh

BNF and Microbial Genomics Lab, Department of Botany, Centre of Advanced Study, Jai Narain Vyas University, Jodhpur-342001 (Rajasthan) India.

Email id: suniljhinjha2000@gmail.com

Legumes play a crucial role in sustainable agriculture due to their ability to fix nitrogen through symbiosis with nitrogen-fixing bacteria. In the present study, we focus on the phenotypic and biochemical characterization of microsymbionts associated with *Cicer arietinum* in Rajasthan. A total of 10 strains were isolated from root nodules of *Cicer arietinum* and purified. Most of the strains were able to tolerate a temperature range of 30-40°. Most of the strains were able to survive at a pH range of 6-10 and 2% salt concentration. Besides biochemical characterization, most of the strains show positive results for phytase, cellulase, and citrate utilization activity. Understanding the diversity and functional attributes of these bacteria can facilitate the development of novel biotechnological applications for enhancing crop productivity.

PP-I-08

STUDY ON THE *IN-VITRO* EFFICACY OF FUNGICIDES AGAINST *FUSARIUM OXYSPORUM*. *VASINFECTUM* CAUSING *FUSARIUM WILT* IN LADY-FINGER.

Km Pooja, Shyam Singh, Sanjulata and Mohd Ajaz

Department of Botany, Meerut College, Meerut 250005, Uttar Pradesh, India

Lady-finger is one of the most cultivated vegetable crops. It is affected by several fungal, bacterial, and viral diseases. Among these *Fusarium* wilt caused by *Fusarium oxysporum* causes 10-45% yield loss. We have used the five fungicides to control the *fusarium* wilt. Fungicides Mancozeb 75% WP; Carbendazim 50 WP; Carbendazim 12%+Mancozeb 64% (Saaf 75% WP); Copper oxychloride 50% WP (Blitox) and Vitavax were used against *Fusarium oxysporum* in 1, 1.5, 2, & 2.5% concentration. Results of study suggested that Copper oxychloride 50% WP (Blitox) is more

effective and Vitavax is less effective to control the *Fusarium oxysporum* at the same concentration.

PP-I-09

ASSESSMENT OF ANTIBACTERIAL ACTIVITY OF *LANTANA CAMARA* L.

Archana Kumari Singh and Vishnu Shankar Sinha

University Department of Botany, Kolhan University, Chaibasa, Jharkhand, India

E. mail: archana2thebest@gmail.com; vish20nu@gmail.com

The present paper assessed the antibacterial activity of *Lantana camara* L. (Verbenaceae). Ethanol, Methanol, and Double distilled water extracts were prepared by cold extraction. These extracts were bio-assayed *in vitro* to determine their bioactivity and the growth of *E. coli* and *S. aureus* by agar disc diffusion and agar well diffusion method. The obtained results revealed the antibacterial activity of leaf extracts of *L. camara* was 6-14 mm on *E. coli* and 6-21mm on *S. aureus* while these extracts enhance the efficacy of antibiotics with *L. camara* (6-42 mm) which support the folkloric use of selected plants to cure various infectious diseases.

PP-I-10

ANTIMICROBIAL EFFECT OF FLAME LILY (*GLORIOSA SUPERBA* L.)

PALLAVI SHARMA AND TULIKA MISHRA*

Department of Botany, Deen Dayal Upadhyay Gorakhpur University, Gorakhpur
Uttar Pradesh-273309

Email: tulika.mishra.2000@gmail.com

There is a growing need to create novel antimicrobial drugs that can combat the emergence of antimicrobial resistance and reduce the need for antibiotics. *Gloriosa superba* (Flame Lily) is a stunning climber plant and a commercially important medicinal plant. It belongs to the Colchicaceae family. The present research uses the disc-diffusion method to conduct an antibacterial assay against a methanol extract of *G. superba*'s leaf, seed, and tuber. Out of the three extracts used, the seed extract had the highest antibacterial action. The diameter of the zone of inhibition of seed extract on bacterial growth is as follows: *Staphylococcus aureus* (4.2 mm), *Bacillus subtilis* (4.4 mm), *Streptococcus pyogenes* (5.3 mm), *Pseudomonas aeruginosa* (5.8 mm), *Escherichia coli* (8.6 mm) and *Salmonella typhi* (7.1 mm). Further phytochemical and pharmacological research are necessary to find out the precise mechanism of the antibacterial activity of flame lily and to validate its other ethnobotanical uses in indigenous medicine.

PP-I-11

FROM EXTREME HEAT TO INNOVATIVE APPLICATIONS: THE ROLE OF METAGENOMICS IN UNVEILING HOT SPRING MICROBIAL DIVERSITY

Aarti Thakur, Ekta Chhikara, Sakshi, Dinesh Panwar and Jitender Singh

Department of Microbiology, Chaudhary Charan Singh University, Meerut-250004, India

E-mail: rtithakur.life@gmail.com

Hot springs, with extreme temperatures and unique chemical conditions, support diverse microorganisms with remarkable adaptations. This review explores various sites Globally and India which have the dominant microbial phyla-*Thermotogae*, *Aquificae*, *Crenarchaeota*, and *Firmicutes*-each exhibiting specific structural and metabolic traits for survival. Techniques such as metagenomics and high-throughput sequencing are crucial for uncovering these microorganisms' complex interactions and functions. *Thermotogae* are fermentative with a distinctive outer membrane, *Aquificae* utilize hydrogen, *Crenarchaeota* engage in sulfur metabolism, and *Firmicutes* are known for their spore-forming capabilities. Understanding these adaptations through advanced techniques enhances insights into thermophily, microbial ecology, and biogeochemical cycles in extreme environments. Functional gene profiling of metagenomic sequences revealed genes responsible for thermophilic adaptations. These included heat-stable enzymes such as thermophilic proteases, DNA polymerases, and lipases, along with stress-response genes like heat-shock proteins and DNA repair enzymes. Additionally, antibiotic resistance genes were identified, suggesting selection for unique resistance mechanisms in the harsh environment.

PP-I-12

EXPLORING SOIL DUMPING SITES FOR PLASTIC-DEGRADING BACTERIA THROUGH METAGENOMIC APPROACH

Ekta Chhikara*, Aarti thakur, Sakshi, Laxman Nagar and Jitender singh

Department of Microbiology, Chaudhary Charan Singh University, Meerut - 250004

E. mail: ektachhikara015@gmail.com

Plastic waste accumulation in soil dumping sites poses a severe environmental threat due to its persistence and low biodegradability. High-throughput sequencing of environmental DNA allowed for the discovery of microbial communities enriched with plastic-degrading genes. Key enzymes, reported including PETases, esterases, and hydrolases, were identified by previous workers, providing insights into the metabolic pathways involved in plastic breakdown. The analysis revealed diverse bacterial taxa capable of degrading various plastic polymers, with specific focus on their genetic adaptations to thrive in polluted environments. The research on plastic degrading Bacteria offers a comprehensive understanding of the microbial potential for plastic degradation in soil ecosystems and highlights the role of metagenomics in developing

sustainable approaches for plastic waste bioremediation. The findings may lead to the development of future strategies to harness microbial communities for effective plastic waste management.

PP-I-13

EXPLORATION AND DOCUMENTATION OF MACRO FUNGAL DIVERSITY OF GIRNAR HILLS AND ITS SURROUNDINGS (GUJARAT)

Chhaya Singh¹, Chirag Tank¹, Ajit M. Vasava¹ and Kishore S. Rajput^{1*}

¹Department of Botany, Faculty of Science, The Maharaja Sayajirao University of Baroda, Vadodara 390002, Gujarat.

*E. mail: ks.rajput15@yahoo.com

Gujarat state is known for its wide range of climatic conditions starting from dry deciduous forest (Saurashtra and central Gujarat) to moist deciduous forest (South Gujarat), arid and semiarid forest (North Gujarat) to pure desert (Kachchh) and largest coastal area. Despite this, the fungal diversity of Gujarat state is inadequately documented. Therefore, it is always being an exciting field of intense research for such unexplored regions. The majority of land in this area of the Gir forest and Girnar forest occupies mountainous areas. Therefore, extensive field work and survey of Girnar hills and its surrounding areas resulted in documentation of 36 species of Macrofungi out of which 10 species are new records for the state.

SECTION- 2
Algae, Bryophytes and Pteridophytes

OP-II-01

STUDY ON BIODEGRADATION OF POLYTHENE BY FRESH WATER MICROALGAE

Ameeta Sharma^{1*} and Mamta Sharma²

^{1,2} Department of Microbiology and Biotechnology, IIS (Deemed to be University), Jaipur-302020, India

E. mail id: ameeta141@yahoo.com

Microalgae have been explored for their prospective to biodegrade plastic waste as they generate extracellular enzymes competent of degrading certain types of plastics. The present study was successful in isolating ten algal species growing on the surface of polythene waste from the fresh water bodies. The Biodegradable, LDPE and HDPE polythene sheets were treated with ten algal isolates. These treated samples were analyzed for weight loss and changes in morphological and chemical characteristics via FTIR and SEM. The results showed that among the isolated algae, *Oocystis solitaria*, *Phormidium tenue* and *Scenedesmus carinatus* possessed the high capabilities to degrade the polyethylene samples.

Keywords: Biodegradation; Biodegradable Polythene; HDPE; LDPE; Microalgae.

OP-II-02

GC-MS PROFILING AND ANTIOXIDANT ACTIVITY OF *CHLORELLA VULGARIS*: A POTENTIAL DIETARY SUPPLEMENT FOR ATHLETES

Anil Chahar and Neha Singh

Department of Sports Bioscience, Central University of Rajasthan, Bandarsindari, Ajmer

Email: anilchahar444@gmail.com

Chlorella vulgaris is a green, freshwater microalga belongs to the family Chlorellaceae. Present study designed to identify the phytochemical constituents in the extracts of various solvents through GC-MS profiling, and to analyse its antioxidant activity. The process of extraction for various solvents in increasing order of polarity i.e.; petroleum ether ethyl acetate, methanol and distilled water was performed using Soxhlet apparatus. The quantity of extract was 16.16 %, 6.18%, 3.95%, and 3.49% in distilled water, methanol, ethyl acetate, and pet ether extracts, respectively. In GC-MS analysis the number of phytoconstituent peaks was found to be 47, 25, 24, and 12 in petroleum ether, methanol, ethyl acetate, and distilled water extracts, respectively. The *in vitro* antioxidant activity of each solvent was evaluated through the DPPH assay and further assessed its importance in sports nutrition.

OP-II-03

EFFECT OF DIFFERENT Ph VALUES ON THE GROWTH OF *DUNALIELLA PARVA*: AN ISOLATE FROM SAMBHAR LAKE, JAIPUR (RAJASTHAN)

Ankita Khorwal

Department of Botany, Maharshi Dayanand Saraswati University, Ajmer, India

Email: khorwalanki11@gmail.com

Dunaliella is a green, unicellular, halotolerant microalga, mainly occurring in a hypersaline environment. *Dunaliella* is the richest natural source of β -carotene and glycerol that is used in different applications such as food sources and cosmetics, etc. *Dunaliella parva* was isolated from the hypersaline Lake Sambhar, Jaipur (Rajasthan, India). The purpose of this study is to determine the optimum pH value to achieve maximum growth of *Dunaliella parva*. The best cell growth was observed between 7 to 8.5 pH, with the highest cell density at pH 7 and 8 with 3.44×10^6 and 3.09×10^6 cells/ml and optical density 0.21 and 0.19, respectively, on the 10th day of inoculation. After the 10th day, cell growth was retarded. On the basis of this study, it can be concluded that the cells of *Dunaliella* alga are best grown on pH 7 and 8, and the harvesting day of alga is after the 10th day of inoculation.

OP-II-04

ENDEMIC PTERIDOPHYTES OF THE WESTERN GHATS OF INDIA AND ITS CONSERVATION

A. Benniamin

Botanical Survey of India, Western Regional Centre, Pune

Email: fernsbenni@gmail.com

India's rich and diverse Pteridophytic flora, encompassing 1,157 species, is attributed to its varied eco-climatic conditions, soil types, and altitudes. Significant strides in cataloging endemic Pteridophytes have been made, with notable contributions by Chandra and Fraser-Jenkins. Fraser-Jenkins' recent assessment (2008) identified only 49 truly endemic species after rectifying previous misidentifications. Among these, the Western Ghats stands out, harboring 37 endemic species, underscoring its importance as a biodiversity hotspot. The Western Ghats' unique eco-climatic conditions foster this high endemism. Of these 37 species, the Dryopteridaceae family is predominant with 15 species, followed by Selaginellaceae with 7 species. Notably, six species are confined to a single state within the Western Ghats, and twelve species span two states. This distribution highlights the region's intricate ecological tapestry and the necessity for state-specific conservation strategies. This intricate distribution pattern highlights the necessity for state-specific conservation strategies. Additionally, five species of Pteridophytes are localized in the Andaman and Nicobar Islands, while other biogeographic zones such as the Trans-Himalaya, Desert, and

Coasts harbor no endemic Pteridophytes. The details about distribution of endemic species and its conservation will be discussed during the conference.

OP-II-05

ROLE OF CLIMATIC VARIABLES ON DIVERSITY AND DISTRIBUTION PATTERN OF THELYPTEROID FERNS IN A DRY-MOIST DECIDUOUS FOREST ECOSYSTEM OF THE PACHMARHI BIOSPHERE RESERVE, MADHYA PRADESH

Damini Yadav^{1,2} and Ajit Pratap Singh*^{1,2}

¹Pteridology Lab, Plant Diversity, Systematic and Herbarium Division, CSIR- National Botanical Research Institute, Lucknow- 226001, Uttar Pradesh, India

²Academy of Scientific and Innovative Research (AcSIR), Ghaziabad-201002, India

E. mail: ajit.p.singh@nbri.res.in

Ecological survey of a dry-moist deciduous forest ecosystem of the Pachmarhi Biosphere Reserve, Madhya Pradesh, has revealed that the family Thelypteridaceae is dominant and comprises five genera, viz. *Ampelopteris*, *Christella*, *Trigonospora*, *Pseudocyclosorus* and *Pronephrium*. Present study aims to investigate the role of climatic variables on the diversity and distribution pattern of Thelypteroid ferns in this biosphere reserve. Present contribution has comprehensively explained the structural composition and ecological adaptability of the Thelypteroid ferns along the elevation gradients. It also provides insights into how the temperature and relative humidity (RH) influence the distribution and environmental patterns of these ferns along the elevation gradients. Findings of the present study suggest that the species of this family show variable distribution ranges from 200-1400m, indicating their adaptability to different environmental conditions. Some genera, such as *Christella*, have shown a wide distribution across maximum altitudinal ranges. However, in contrast, some genera have shown a specific distribution range, such as genus *Ampelopteris*, which occurs at low elevation and *Trigonospora* and *Pronephrium* at low to mid-elevation. The *Pseudocyclosorus* is prevalently distributed at mid-elevations. Thelypteroid ferns prevalently occur where the relative humidity ranges from ~35% to 89.83% and temperature from ~17.93°C to 32.54°C. Data analysis has shown a significant correlation between taxa and RH and a weak correlation with temperature, suggesting that RH plays a crucial role in the diversity and distribution of Thelypteroid ferns in this ecosystem. In conclusion, our findings highlight the significance of environmental factors in shaping the diversity and structural changes in the Thelypteroid ferns in this unique ecosystem, which is presented and discussed in the present contribution.

Keywords: Pteridophytes, Thelypteridaceae, climatic variables, elevation gradient, diversity, distribution, Pachmarhi Biosphere Reserve.

OP-II-06

PTERIDOBIODIVERSITY OF DISTRICT SONEBHADRA

***P. C. Misra and Shraddha Tiwari**

*Department of Botany, Hemwati Nandan Bahuguna Govt. P. G. College, Naini, Prayagraj, U.P. India. Department of Botany, Bhawan's Mehta P. G. College, Bharwari, Kaushambi, U.P. India.

E. mail: drpcmisra@gmail.com

In this paper the biodiversity of pteridophytes of Sonebhadra has been described in detail. Sonebhadra lies under 24.4570°N and 82.9932° E and is spread over an area of 6788.0 sq Km square kilometer. Pteridophyta is a small but most interesting group of vascular plants which attracts all classes of people from careless rural persons to professional scientists. They attract them because of their beauty and grace. Their association with beautiful scenes, their often-peculiar structure and possible connection with plants of the past ages of the earth history. The term pteridophyta is derived from Greek word "Pteron" (means feather like) and "Phyta" (Plants). The name was originally given to this group because of their pinnae or feather like fronds.

The different pteridophytes enumerated below. These pteridophytes have been collected in different seasons from diverse localities of sonebhadra. However, there is scanty report available about the pteridophytes of this area. In present study a comprehensive work has been done in these pteridophytes. The various pteridophytes are Selaginellaceae (*Selaginella*), Adiantaceae (*Adiantum caudatum*), (Lygodiaceae) *Lygodium flexuosum*. Pteridaceae (*Pteris vittata*, *Cheilanthus farinosa*).

OP-II-07

ALGAE BASED DIET FORMULATION FOR SUSTAINABLE AQUACULTURE IN NE INDIA

Hunmily Teronpi^{1&2} and Partha Pratim Baruah¹

¹Department of Botany, Gauhati University, Guwahati-781014, Assam, India

^{1&2}Department of Botany, North Gauhati College, Guwahati-781031, Assam, India

E. mail: ppbaruah@gauhati.ac.in

Inventorying algae rich diet for the fish is one of the potent research trends in recent years for sustainable aquaculture practices throughout the globe. An exploration was therefore made with a few autochthonous algal candidates isolated from Karbi hill streams for the *Labeo bata*, the much sought after carp fish of NE India. Rich natural protein and lipid contents added value to these algae rich diet which was not only reflected in overall health status and efficient performance in *Labeo bata* but also the study opens up a window for commercial application in days ahead.

Keywords: Algae, Algal feed, Karbi hill streams, *Labeo bata*, Sustainable aquaculture.

OP-II-08

EXPLORING ALGA *DUNALIELLA*: A PROMISING SOURCE OF ANTIOXIDANTS

Pramila Prajapat

Department of Botany, Maharshi Dayanand University, Ajmer

E. mail: tanishqprajapat@gmail.com

Dunaliella is a unicellular halophilic microalga in the Chlorophyceae class, widely known for its carotenoid content. The study investigates the extraction of bioactive compounds from alga *Dunaliella* using four kinds of solvents viz. Petroleum ether, Ethyl acetate, Ethanol, and Water according to their increasing polarities using Soxhlet apparatus. The extracts were obtained from 100 grams of dried Algal powder. Further evaluated the composition of these extracts using Gas-Chromatography Mass Spectroscopy. A total of 115 compounds were identified from all the extracts among which were 31 from Petroleum ether, 29 from Ethyl acetate, 24 from Ethanol, and 31 from aqueous extract. The antioxidant activities of these compounds were analyzed by the in-vitro DPPH and in-vivo Juglone assay using the model *C. elegans*, which will be discussed in detail.

Keywords: Antioxidant activity, Bioactive compounds, *C. elegans*, *Dunaliella*, and Solvent Extraction.

OP-II-09

PHYSIOLOGY OF BIOTIC AND ABIOTIC STRESSES IN PLANTS

Prerna Chourasiya* and Dr. Neel Kamal Rathore**

Research Scholar (Botany), University of Kota (Raj.) *

Professor, Department of Botany, Govt. College, Kota (Raj.) **

Email: Prernachourasiya196@gmail.com; Neelkamakrathor@gmail.com

Plants are subjected to a wide range of environmental stresses which reduces and limits the productivity of agricultural crops. These stresses categorized as biotic stress and abiotic stress. Plants show some physiological effects for resistance of these stresses by stress avoidance, stress tolerance and stress acclimatization mechanism. Biotic stress like pathogen stress and abiotic stresses are due to temperature or water imbalance in plants. Plants make strategies to face the stress condition by changing physiologically, morphologically and also at Cellular level. Water stress, salt stress, Temperature stress are some of major stresses plants usually go through with many changes. Major cause of one of the stresses is pollution which cause chemical and ion imbalance that is known as metal toxicity. Examples of such sensitive plants are Peach, Oak, Grape, Apple and Pine. Stresses effects activities like Photosynthesis, Respiration, Osmosis, Gaseous exchange in plants. Some of the living organisms such as bacteria, viruses, fungi, parasites and weeds or cultivated plants causes several damages or diseases in plants that results stress. Plant shows different strategies for control of these diseases by forming mechanical barriers,

biochemical resistance, hypersensitive response and synthesis of Phytoalexins. Plants have characteristics to overcome any kind of stresses by adapting themselves accordingly.

Keywords: Stress acclimatization, metal toxicity, hypersensitive response, Phytoalexins.

OP-II-10

A STRUCTURAL MORPHOLOGY, ANATOMY AND HISTOCHEMICAL STUDIES OF *HYPNEA VALENTIAE* (TURN) MONT, RHODOPHYCEAE.

R.Vellaiyan

PG and Research Department of Botany, Government Arts College (A), Karur-05.

A perennial red macro algae *Hypnea valentiae* (Turn) Mont, belongs to the family Hypneaceae was collected from Mandapam coastal areas in Ramanathapuram District. The seaweeds are purple to red in colour, it grows up to 10 to 20 cm in long and 2 mm in diameter, the thallus of algae in cylindrical, striate with short branches contain cystocarp. The oldest axes reduced to form a small discoid hold fast. The present investigation deals with the preparation and quantification of Carrageenin and Agar-agar, similarly morphological, anatomical and histochemical evaluation of carbohydrate, protein, lipids and nucleic acids was done in vegetative and reproductive parts of algae.

Keyword: Hypnea; Carrageenin; Seaweed; hold fast; bio active substance; cystocarp.

OP-II-11

BRYOPHYTES AS NESTING MATERIAL FOR BIRDS: A CASE STUDY FROM MUKTESHWAR

Sapana Pant* & S.D. Tiwari

Department of Botany, Indira Priyadarshini Govt. Girls Post Graduate College of Commerce Haldwani, Nainital

Email- sapanapant2017@gmail.com

Bryophytes are a naturally occurring green group of surface-dwelling plants that contribute significantly to the Himalayan vegetation. Despite their ubiquitous distribution, these plants are largely ignored. Many of the birds, intelligently select bryophytes out of the vast array of vegetal matter as nesting material. During our bryo-exploratory survey in and around the Mukteshwar area of district Nainital, we encountered some abandoned bryophyte-incorporated bird nests which were categorized as rough, finely designed and mossy nests. In all, 18 bryophyte species including 3 leafy liverworts, and 15 pleurocarpous mosses were documented. The present study underscores the strategic selection of specific bryophytes by birds due to their unique characteristics.

PP-II-01

SEASONAL VARIATIONS OF DIATOMS IN THE ANASAGAR LAKE OF AJMER

Manju Parihar

Department of Botany, Maharshi Dayanand Saraswati University, Ajmer, India

Email: manjumdsu@gmail.com

Diatoms are unicellular, autotrophic algae that possess a silica cell wall. Anasagar is an artificial freshwater lake located in Ajmer, Rajasthan, India. The present study was carried out from July 2023 to June 2024 to record the seasonal change in the diversity of Diatom flora in Anasagar Lake. A total of 62 diatom species belonging to 21 genera were recorded during the study period. The genera including, *Navicula*, *Gomphonema*, *Encyonopsis*, *Kobayasiella*, *Nitzschia*, *Pinnularia*, *Eunotia*, *Achnantheidium*, *Stauroneis*, *Cymbella*, *Achnanthes*, *Rhopalodia*, *Frustulia*, *Synendra*, *Sellaphora*, *Actinella*, *Luticola*, *Encyonema*, *Hippodonta*, *Tabularia*, and *Surirella* were observed in the Lake. Species of the genus *Gomphonema*, *Nitzschia*, *Stauroneis*, *Navicula*, *Frustulia*, *Eunotia*, and *Pinnularia* were recorded throughout the year, while others were distributed in different seasons. This study reveals that the highest number of diatom species were recorded in the months with no rainfall and the months with rainfall consistently had a lower number of diatom species.

PP-II-02

ASSESSMENT OF CYANOBACTERIAL ISOLATES FOR LACCASE PRODUCTION: A POSSIBLE SOLUTION FOR PLASTIC POLLUTION

Sapna Jain

Department of Botany, Maharshi Dayanand Saraswati University, Ajmer

Email- sapnamgias05@yahoo.com

To lessen the problem of plastic pollution, microbial biodegradation of plastics is currently getting a lot of attention. These artificial polymers may be broken down by a variety of microorganisms, including bacteria, fungus, yeast, and algae, as well as by their enzymes. Laccases (EC 1.10.3.2), manganese peroxidases (EC 1.11.1.13), and lignin peroxidases (EC 1.11.1.14) are the most often observed enzymes that are probably responsible for PE depolymerization. Seven heterocystous and non heterocystous strains of cyanobacteria are investigated for laccase production. They were isolated and identified from algal bloom on polythene bags, collected from the five different water waste sites nearby Anansagar lake of Ajmer and were grown and cultured in BG11 liquid medium before being assessed for their capabilities to produce laccase enzyme. Preliminary screening of isolated strains was carried out on guaiacol containing BG 11 medium for laccase production. Formation of green colour using ABTS (2,2'- azinobis(3-ethylbenzthiazoline-6-sulfonate) confirms the capability of laccase production by the isolates. Some of the cyanobacterial strains showed positive results. High laccase producing isolates were examined for morphological and biochemical characteristics and the predominant isolates were identified.

PP-II-03

EXPLORING ALGAE AS A SOURCE OF NATURAL FIBER

Trideep Chetia¹ and P. P. Baruah²

Plant Ecology Laboratory, Department of Botany, Gauhati University, Assam, India.

Email- ¹chetiatrideep95@gmail.com; ²ppbaruah@gauhati.ac.in

Extensive application of synthetic fibers in industries worldwide has led to increased health hazards and impacts on the environment associated with their production, application and waste generation. The transition towards developing recyclable, biodegradable, eco-efficient and sustainable materials has encouraged the commercial use of natural fibers and composites in automobiles, textiles, furniture, packing and construction. Natural fibers such as cotton, hemp, jute etc. are used dominantly, but their adequate production is declining due to utilization of cultivable land for agricultural practices and irrigation problems resulting from declining water bodies. Recently, algae have attracted attention as one of the possible sources of natural fiber since they do not require land for cultivation and have higher growth rates when compared to land plants. The present study has been carried out to review the extraction of fiber from algae and its application in various industrial sectors.

Keywords: Natural fiber, algal fiber, industrial application of algae, filamentous algae, bioprospection.

PP-II-04

TRENDS OF SPECIES DIVERSITY AND DISTRIBUTION PATTERN OF PTERIDOPHYTES ACROSS VARIABLE ELEVATION GRADIENTS IN WEST KAMENG OF ARUNACHAL PRADESH, INDIA

Nivedita Mall and Ajit Pratap Singh*

Pteridology Lab, Plant Diversity, Systematic and Herbarium Division, CSIR-National Botanical Research Institute, Lucknow-226001, Uttar Pradesh, India

*E. mail- ajit.p.singh@nbri.res.in

Establishment of the species of pteridophytes in any area are regulated by diverse environmental factors, including the elevation gradient. Topography and diverse environmental factors (altitude up to 15000 ft, annual rainfall 607.4 mm, temperature -3°C to 25°C, relative humidity 80.72%) of the West Kameng in Arunachal Pradesh are quite variable, and might be playing significant role in establishment of varied trends of fern species composition. Present study attempts to identify the role of such factors sustaining extent of fern's diversity at five variable elevation gradients (A, B, C, D, E) in West Kameng. We made subsequent ecological survey and carried out quadrat-based quantitative analysis of the pteridophytes. We provide information about occurrence of 130 species, 53 genera and 25 families of pteridophytes encountered within the quadrat. Based on these species, we have investigated the trends of fern species diversity at five variable altitude ranges from a low (A) altitude to high (E) altitude.

Highest species diversity (63 species) occur at mid (C) altitude range, however, minimum diversity (12 species) at highest (E) elevation range. It was also observed that the highest shared species occur between two (C) and (D) elevation ranges, however, minimum shared species occur between (A) and (E) elevation range. Analysis of data has provided information about the relationship amongst the family, genus, and species summarizing linear regression indicated by correlation coefficients at all the elevation gradients. Investigation has identified areas with high and low species composition to prioritize and take initiatives for further management and conservation. Above the mid-elevation ranges, there is a gradual decline in the species diversity with increasing elevation gradients which are discussed and interpreted in the contribution.

Keywords: Pteridophytes, species diversity, distribution pattern, altitudinal range, West Kameng.

PP-II-5

GREEN SYNTHESIS OF SELENIUM NANOPARTICLES USING ALGAL EXTRACTS AND THEIR POTENTIAL APPLICATIONS

Km Payal Chaurasia and Sanjay Singh*

Department of Botany, CMP Degree College,
Prayagraj, 211002, Uttar Pradesh, India

Email: payalchaurasia35@gmail.com; cmpanjay@gmail.com

Selenium, an essential trace microelement, is required for living organisms' growth and development. We chose green biosynthesis over traditional physical and chemical synthesis methods due to its ecological friendliness. Biosynthesis, the creation of SeNPs using natural plant and algal extracts, has drawn attention for its environmental friendliness, safety, availability, and cost-effectiveness. Green synthesised selenium nanoparticles (SeNPs) have immense significance due to their biocompatibility and usage in applications such as electronics, sensors, catalysis, optics, antimicrobial agents, energy processing, etc. This study synthesised selenium nanoparticles using *Spirulina* sp. extract as a capping and reducing agent. We characterised the synthesised nanoparticles using a variety of methodologies, including UV-Vis spectroscopy, transmission electron microscopy (TEM), scanning electron microscopy (SEM), Fourier transform infrared (FTIR) spectroscopy, X-ray diffraction (XRD), etc. We are currently investigating the biological characteristics of SeNPs and their diverse applications, including anti-inflammatory, antimicrobial, antifungal, antidiabetic, and other properties.

PP-II-6

DIVERSITY OF CHLOROPHYCEAE FROM MAMCHARI DAM, DISTRICT KARALI (RAJASTHAN) INDIA

Rameshi Meena 1* and Vijendra K Sharma 2

¹Department of Botany Government PG College Karali-322241(Rajasthan)

²Joint Director, P and C Department of Commissionerate, College Education, Jaipur, Rajasthan

Email. Meena.rameshi58@gmail.com

Chlorophyceae symbolize a morphologically varied group of photosynthetic organisms frequently identified as green algae. This is the largest and heterogeneous group of freshwater algae extending in size from microscopic unicellular or coenocyte to large colonies and broad filamentous forms. The Present work is a part of assessment of fresh water algal flora of Chlorophyceae in Mamchari dam. Diversity of green algae of Mamchari dam was studied for two year from February 2018 to January 2020. Present article deal Chlorophyceae with 23 taxa belonging to fourteen genera. Chlorococcum- one species, Chlorella -one species, Pediastrum - two species, Scenedesmus -two species, Chlamydomonas - one species, Volvox -one species, Closterium -two species, Cosmarium - two species, Spirogyra - six species, Zygnema - one species, Coleocheate -one species, and Oedogonium -two species, Chara -one species and Nitella -one species. Thallus diversity of morphology ranges from non-motile Chlorella to well organized thallus of Chara showing tendency towards tree habit, through coenobial Scenedesmus, Pediastrum to unbranched filamentous Spirogyra, Oedogonium. All the species were collected and observed abundantly during winter and summer season.

Key words: Chlorophyceae, Diversity, Mamchari dam.

PP-II-07

DIATOMS AS INDICATORS OF ECOLOGICAL HEALTH IN THE RIVERS OF KUMAUN HIMALAYA, INDIA

Saleha Naz^{1*} and Prateek Srivastava¹

¹Department of Botany, University of Allahabad, Prayagraj, India

Diatom indices are progressively employed in assessing the level of contamination and trophic status of lotic environments. This study aims to assess the ecological health of the Rivers of the Kumaun region of Uttarakhand by exploring the physico-chemical factors and diatom assemblages. Samples were collected from 20 sites in June 2024. A total of 150 diatom taxa belonging to 35 genera were identified. Multivariate analyses revealed the clustering of sites and the relationship between diatom assemblage composition and environmental variables. Diatom indices revealed that the Kumaun rivers are slight to medium polluted, oligotrophic -mesotrophic and have a high diversity of diatoms. The quality of water is ranging from moderate to good quality; quality ranging from moderate to good.

Keywords: Biomonitoring, Water quality, Diatom indices, OMNIDIA, Kumaun, River

SECTION- 3
Seed Plants, Anatomy and Reproductive Biology

OP-III-01

A DEVELOPMENTAL PATTERN OF SUCCESSIVE CAMBIA AND STRUCTURE OF SECONDARY XYLEM IN *BRACHYPTERUM SCANDENS* (ROXB.) WIGHT & ARN. EX MIQ.

Tanmay Rohit¹ and Kishore S. Rajput^{1*}

¹Department of Botany, Faculty of Science, The Maharaja Sayajirao University of Baroda, Vadodara 390002, Gujarat.

*Author for correspondence: ks.rajput15@yahoo.com

The presence of the successive cambia is a common cambial feature in majority of the non-self-supporting genera of the Fabaceae. *Brachypterum scandens* (syn. *Derris scandens*), under histological investigation showed distinct crescent-shaped successive cambia that originate from the phloem parenchyma cells. This cambium has similar bidirectional activity like regular vascular cambium whereas functionally inverse cambium initiated on the inner margin of the secondary xylem formed by first successive cambium. The secondary xylem is diffuse-porous with distinct rings and shows the presence of dimorphic vessels, fibre tracheid, fibres, abundant lignified axial parenchyma, and uni-biseriate rays. The structure of the secondary xylem and the development of successive cambia are correlated with climbing habits.

Keywords: Cambial variant, inverse cambia, dimorphic vessels, Fibre-tracheids.

OP-III-02

STEM ANATOMY AND FORMATION OF CAMBIAL VARIANT IN *MUCUNA MONOSPERMA* ROXB. EX WIGHT (FABACEAE).

Meera Rami¹, Rajaram V. Gurav² and Kishore S. Rajput^{1*}

¹Department of Botany, Faculty of Science, The Maharaja Sayajirao University of Baroda, Vadodara 390002, Gujarat.

²Department of Botany, Shivaji University, Kolhapur-416 004, Maharashtra.

*Author for correspondence: ks.rajput15@yahoo.com

Most climbing species of the subfamily Papilionoideae (Fabaceae) exhibits development of cambial variant, which is thought to provide an alternate route for increasing stem diameter and enabling efficient mineral and photosynthate supply within restricted stem diameter. Histological investigation on the stem of *Mucuna monosperma* exhibited formation of neo-formed vascular cylinders from dilating phloem rays and interxylary phloem develops by dedifferentiation of axial parenchyma. The secondary xylem was characterized by the presence dimorphic vessels, abundance of unlignified parenchyma, tall multiseriate rays and fibres. In thick stems, development of cambial variants stem structure is correlated with climbing habit and its significance in relation to eco-physiological wood anatomy.

Keywords: Wood anatomy, Interxylary phloem, Neo-formed vascular cylinders.

OP-III:03

DEVELOPMENT OF PHLOEM WEDGE IN *MERREMIA* S.L. (CONVOLVULACEAE)

Dhara G. Ramoliya¹, Vinay M. Raole¹ and Kishore S. Rajput^{1*}

¹Department of Botany, Faculty of Science, The Maharaja Sayajirao University of Baroda, Vadodara 390002, Gujarat. *Address for correspondence: ks.rajput15@yahoo.com

The liana habit has evolved with structural alterations in the vascular tissues to enhance stem flexibility during stem torsion. Formation of phloem is well known in tribe Bignonieae of Bignoniaceae in which a segment of the vascular cambium ceases / sluggish towards inner side while externally it shows enhanced production of phloem from the single cambium. This differential activity of the cambium forms depressions that deepen into distinct phloem wedges. However, formation of such wedges was observed in *Camonea umbellata*, *C. pilosa*, *Merremia hederacea*, and *Distimake quinquefolius* (Convolvulaceae). In these members, segments of the cambium remain bidirectional but deposit un lignified parenchyma internally and phloem externally. Subsequently, un lignified parenchyma within these wedges differentiates into sieve elements. The number of phloem wedges differ from species to species and may have 2-5 wedges depending on the species. Ontogeny of phloem wedges and formation of sieve elements in them is described in detail and correlated with the eco-physiological conditions and climbing habit.

Keywords: Phloem wedge, *Camonea*, *Merremia*, cambium, secondary growth.

PP-III-01

RNA STORAGE IN SEEDS

Veena Halale Manjunath and Szymon Swiezewski

Institute Of Biochemistry and Biophysics, Polish Academy of Sciences

Email- veenahm@ibb.waw.pl, szymon.swiezewski@gmail.com

The process of seed maturation is essential for preparing seeds for desiccation and subsequent germination. During this phase, seeds accumulate not only storage materials but also mRNAs that are translated immediately after water uptake. Germination studies involving Pol II transcription inhibitors indicate that seeds can depend on these stored mRNAs for a considerable time after water uptake. However, the mechanisms and place of mRNA storage in dry seeds remain hidden, with recent research suggesting their association with ribosomes. I used oligo(dT) FISH, to detect mRNA accumulation in the cell nucleus of dry *Arabidopsis thaliana* seeds. My finding suggests a possible new, additional mechanism for mRNA storage in seeds. In my poster I will describe the spatial aspects of messenger RNA storage in cell nuclei in *Arabidopsis* seed.

PP-III-02

STEM ANATOMY OF MORNING GLORIES (*IPOMOEA* SPS.) GROWING IN THE ARID AREAS OF GUJARAT

Khyati D. Thacker* and Vinay M. Raole

Department of Botany, Faculty of Science, The Maharaja Sayajirao University of Baroda, Vadodara 390002 (Gujarat). *Address for correspondence: khyatithacker5@gmail.com

Ipomoea L. (Convolvulaceae) has cosmic habitat range growing from aquatic to extreme xerophytic conditions. Stem anatomy of six species of *Ipomoea* growing in the arid to thorn forest (Kachchh) is studied here. All species exhibited intraxylary phloem while intraxylary cambium was bifacial in *I. eriocarpa*. Interxylary phloem was observed only in *I. kotschyana*. Formation complete ring of successive cambia was observed in *I. sindica* and *I. eriocarpa* while neofomed vascular cylinders were observed in *I. coptica* and *I. tuberculata* which consequently formed irregular stem outline. Formation of inverse cambia was seen in *I. coptica* and *I. sindica* while *I. tuberculata* formed ray cambia. Detailed anatomy of all species is described and correlated with ecological wood anatomy.

Keywords: Successive cambia, inter- and intraxylary phloem, inverse cambium, ray cambium.

PP-III-03

STOMATAL VARIATIONS IN MORUS

Poonam Pandey

Department of Botany, Chaudhary Mahadeo Prasad Degree College
University of Allahabad, Allahabad-211002-UP

E- mail: poonampandey1784@gmail.com

Mulberry (genus *Morus*) is an economically important woody plant with an altered ploidy level. Anatomical studies showed that the *Morus* species have evolved distinct stomatal traits to optimize gas exchange, water use efficiency and photosynthetic response to environmental condition. Present studies of morphological characters and their variation in different taxa will interpret that these characters and their variation may prove a basis for solving many taxonomic enigmas.

Key words: Stomata, *Morus*, taxonomy

PP-III-04

SIGNIFICANCE OF TRICHOME MORPHOLOGY AMONG THE VARIOUS TRIBES OF FAMILY ASTERACEAE

Preeti Gupta¹, Shweta Shekhar^{2*} and Jyoti Gupta³

^{1,3} Department of Botany, D.D.U. Gorakhpur University, Gorakhpur-273009

² Department of Botany, University of Allahabad, Prayagraj-211002

*Corresponding author: shwetashkhar@allduniv.ac.in

With an objective to study the various pattern of trichome morphology, 34 taxa belonging to 16 different tribes in family Asteraceae were selected and comparative study of trichomes were done under the compound microscope. The trichomes ranged from glandular to non-glandular, unicellular to multicellular, which were found to be stable in different replicates. Out of the 34 taxa observed in the present study, 28 taxa (82.35%) showed NGM type of trichomes in majority of parts observed along with some other types in combination such as GM and NGU whereas 10 taxa (29.41%) showed GM trichomes in combination with NGM and NGU, 5 taxa (14.70%) have NGU trichome in combination with NGM and GM type and only 01 taxa (2.94%) of the tribe Cichorieae [*Sonchus asper* (L.) Hill] was observed with a unique type of trichome *i.e.* GU type which was not present in any of the observed taxa during the present study. Trichomes were totally absent in the 2 taxa (5.88%). Overlapping of more than one type of trichome were also observed in many tribes during the present study. From the present research, it can be concluded that trichome characters may be very important tool of identification.

SECTION- 4
**Taxonomy, Ethnobotany and Plant
Resource Utilization**

OP-IV-01

A TAXONOMIC REVISION OF THE GENUS *RHYNCHOSIA* LOUR. (FABACEAE) IN INDIA

Ajay Kumar Mishra^{1,2} and Vijay V. Wagh^{1,2}

Plant Diversity, Systematics and Herbarium Division, CSIR–National Botanical Research Institute, Lucknow, Uttar Pradesh, India, Academy of Scientific and Innovative Research (AcSIR), Ghaziabad, Uttar Pradesh, India

Email: ajaytaxo@gmail.com

Rhynchosia Lour. (1790), a genus of papilionoid legumes (Fabaceae, Papilionoideae), is widely distributed across tropical and subtropical regions, extending from Mexico into parts of the United States, as well as Africa and Madagascar. This study is based on an extensive review of literature, supplemented by our own field surveys across various localities, consultations with multiple herbaria, and analysis of relevant databases. Our findings indicate that India hosts 32 taxa, including one subspecies and two varieties. Perennial and herbaceous species represent the majority, followed by annuals and shrubs. The Eastern Ghats exhibit the highest species diversity of *Rhynchosia* in India.

OP-IV-02

A STRUCTURE-BASED DRUG DESIGN APPROACH FOR THE IDENTIFICATION OF ANTIVIRAL COMPOUNDS OF *ASPARAGUS RACEMOSUS* WILLD. TARGETING THE CHIKUNGUNYA VIRUS

Aman Agrawal and Vijai Malik

Department of Botany, CCS University Meerut

Email: amanmahavan1995@gmail.com

This study focuses on the in-silico identification of potential antiviral compounds of *Asparagus racemosus* Willd for the treatment of chikungunya virus (CHIKV) infection through molecular docking and molecular dynamics (MD) simulation analysis. A library of compounds was screened against key CHIKV proteins using molecular docking to identify those with high binding affinities. The top candidates were further analyzed using MD simulations to evaluate the stability and dynamics of their interactions with the viral proteins. Additionally, binding free energy calculations were performed to quantify the strength of these interactions. The integrated approach led to the identification of several promising antiviral compounds with strong binding affinities, stable interactions, and favorable binding free energies. These findings provide a basis for further experimental validation and development of effective antiviral therapies against CHIKV, potentially contributing to improved treatment options for this debilitating viral infection.

OP-IV-03

IS THE GENUS *HEPTAPLEURUM* (ARALIACEAE) TAXONOMICALLY IMPEDIMENT?

Amrutha Sundaran and K. A. Sujana

Botanical Survey of India, Southern Regional Centre, Coimbatore

Email: amruthasundaran15@gmail.com

The genus *Heptapleurum* Gaertn. has been reinstated as the largest genus within the Asian clade of *Schefflera*, encompassing 321 species by the recent advances in molecular phylogenetics. This study explores the taxonomic impediments of *Heptapleurum* due to its morphological resemblance, nomenclatural challenges and ambiguous generic boundaries. It also provides an overview of the current status of the genus *Heptapleurum* in India, noting 30 taxa and 2 ornamentals in which the highest species diversity (17 taxa) was found in Southern India.

Keywords: Asian clade, *Heptapleurum*, India, *Schefflera*, Taxonomic impediment

OP-IV-04

CONSERVATION, PROPAGATION AND RESOURCE UTILIZATION OF CUCURBITS OF THERAPEUTIC POTENTIAL THROUGH IN VITRO STUDIES

Anjali Choudhary*¹, Sumitra Kumari Choudhary¹

¹Biotechnology Unit, Department of Botany, UGC - Centre of Advanced Study (CAS), Jai Narain Vyas, University, Jodhpur - 342001, Rajasthan (India)

*Presenting Author: anjalichoudhary3109@gmail.com

The *Cucurbitaceae* is a wonder group of plants with nutritional and therapeutic values found throughout the globe. The use of medicinal herbs for healing is as old as humans itself. Cucurbit wild relatives form a reservoir of genes related to yield, nutritional quality and resistance to various biotic and abiotic stresses. Many naturally grown cucurbits are conventionally being used as ethnomedicine in tribal/rural areas. Rajasthan offers a great genetic diversity of wild and indigenous cucurbits in different geographical regions. *Corallocarpus epigaeus* (Rottler) Hook.f. and *Momordica balsamina* L. belonging to family Cucurbitaceae are two medicinally valuable plant species. The healing potential of these plants includes antifungal, antibacterial, antiviral, antioxidant activity, anti-inflammatory, antidiabetic, haemopoietic, cardiovascular, immune-regulatory, and anti-cancerous activities. Present study is aimed with exploration, documentation and conservation of these cucurbit plants resources for their better management and efficient utilization. Biotechnological techniques have been proved to be efficient for conservation and mass propagation of rare and superior genotypes of medicinal cucurbits. Here we report that we have developed standardized plant tissue culture protocol for mass propagation of these elite plant species. This protocol may be applicable for- large scale propagation of planting material, germplasm conservation, plant breeding/utilization in crop improvement and for phytochemical analysis / extraction of secondary metabolites etc.

OP-IV-05

ETHNOMEDICINAL USES OF SOME PLANTS IN THE TREATMENT OF JAUNDICE BY TRIBAL COMMUNITIES OF WEST SINGHBHUM DISTRICT, JHARKHAND, INDIA

Dara Singh Gupta¹ and Manjula Gupta²

University Deptt. of Botany, Kolhan University, Chaibasa, Jharkhand

Email: - darasgupta.jcc@gmail.com

To investigate the ethno medicines used in treatment of jaundice by tribal communities in West Singhbhum district, Jharkhand. An ethnomedicinal study was conducted in the ten villages of West Singhbhum district, during 2022-2023 to collect information from traditional health healers/tribal communities/Knowledgeable person on the use of medicinal plants for the treatment of jaundice by the tribal community of West Singhbhum district, Jharkhand, India. This paper provides ethnomedicinal information on the plants used to treat jaundice by three important indigenous communities of West Singhbhum district – Santhals, Mundas and Ho. The traditional knowledge of the studied indigenous communities on herbal preparations used for treating jaundice was collected through structured questionnaire (Martin, 1995) and personal interviews. The present study enumerates 14 species of plants belonging to 13 families used by the tribal communities and medicinal healers of West Singhbhum district, Jharkhand in the treatment of jaundice. The importance of traditional medicinal system among the tribal communities of West Singhbhum district of Jharkhand has been highlighted in the present study.

OP-IV-06

***PIPER BETLE* (L.) CULTIVARS: A POSSIBLE SOLUTION TO MITIGATE ORAL CANCER RISKS IN QUID CHEWERS**

Devangi Chachad*

Department of Botany, Jai Hind College, Basantsing Institute of Science, J.T. Lalvani College of Commerce, Mumbai-400020, Maharashtra, India.

devangi.chachad@jaihindcollege.edu.in

Piper betle, often referred to as the "Golden Heart of Nature" and the "Green Gold of India," has been extensively utilized for its vast array of therapeutic and medicinal properties. Despite the wealth of reports on the medicinal properties of *P. betle*, the variety and regional differences in common names pose challenges in correlating data for specific material. Oral cancer remains a significant concern in Asian countries, primarily due to the prevalent practice of chewing betel quids containing tobacco, coupled with smoking and alcohol consumption. This study aims to identify a novel herbal chemotherapeutic agent by harnessing the antioxidant properties of *P. betle*, thereby offering additional benefits to quid chewers. Furthermore, this research seeks to highlight the differences among various *P. betle* varieties such as Calcutta, Maghai, Banarasi, Poona and determine the optimal combination for mitigating the risk of oral cancer.

OP-IV-07

**TAXONOMIC DISCREPANCIES PERTAINING TO *BLUMEA LACERA* (BURM.F.) DC.
Jaydeep J. Sharma* and Padamnabhi S. Nagar**

Department of Botany, Faculty of Science, The Maharaja Sayajirao University of Baroda,
Vadodara, Gujarat – 390002
Email: jaydeepsharma51@gmail.com

Blumea genus (Inuleae-Asteraceae) worldwide is represented by 89 species of which 29 species are reported from India. In spite of being the largest genus of Asteraceae in India, identification and characterization of the species under this genus was always challenging. Present study deals with taxonomic discrepancies in keys and description which has leads to the misidentification of *Blumea malcolmii* as *Blume lacera*. Through thorough literature survey and critical examination of type specimens, it was found that in many previous works, *B. malcolmii* was misidentified as *B. lacera*. The reason for this being the morphological similarities and the inclusion of the characters like texture and capitulescence which are not stable characters in case of *Blumea* genus. It was found that characters like presence of trichomes on corolla tube and length of anther tail in comparison to the thickness of the filament are more reliable characters for the delimitation of the above two species.

OP-IV-8

**ENUMERATION OF MEDICINAL PLANTS USED FOR THE TREATMENT OF
POISON BITES BY THE MALAYALI TRIBES OF DHARMAPURI DISTRICT, TAMIL
NADU, INDIA.**

M. Kannan¹ and T. Senthil Kumar²

¹Department of Botany, Directorate of Distance Education, Vinayaka Missions Research Foundation (Deemed to be University) Salem-636 308, Tamil Nadu. ²Department of Botany, Bharathidasan University, Tiruchirappalli-620 024, Tamil Nadu,
Email: khannanzone@gmail.com; senthilbdc@gmail.com

A survey was carried out on medicinal plants used for the poison bites by the *Malayali* tribes of Dharmapuri District, Tamil Nadu, India. Using standard methods, field surveys were made in the study area. About 41 plant species were documented with parts of the plants used and medicinal values along with their dosage forms. They enumerated plants species are distributed in 38 genera under 19 families. Among the 19 families, Combretaceae and Caesalpiniaceae were found to be dominated with 5 species each and among the 38 genera, *Andrographis*, *Cassia* and *Strychnos* were represented by 2 species each. Survey revealed that plants are used for the treatment of snake bites, insect bites, dog bite and poisoning victims. Plant parts such as roots and stem barks are widely used and other plant parts such as seeds, latex, fruits, flowers, pseudostem etc., are also used. The dosage forms namely paste, juice, decoction and consumption of fresh parts as such are in use. They are administered either orally or by external applications.

OP-IV-09

PROTECTIVE EFFECT OF *CRATEVA RELIGIOSA* G. FORST. ON THE LIVER AND KIDNEY OF LETROZOLE INDUCED POLYCYSTIC OVARIAN SYNDROME (PCOS) INDUCED RATS.

Meenaloshini P and T. Senthil Kumar

Department of Botany, Bharathidasan University,
Tiruchirappalli-620 024

E-Mail: meenaloshini.p1998@gmail.com ; senthilbdc@gmail.com

Traditional medicinal plants harness the therapeutic properties. In this study, we investigated the effect of hydroalcoholic bark extract from *Crateva religiosa* (CRE) on oxidative stress markers in letrozole induced polycystic ovarian syndrome (PCOS) rats. The study included five groups: Control, letrozole – induced PCOS, standard pioglitazone, and two CRE concentrations (100 and 200 mg/kg). Our findings demonstrated that CRE reduced reactive oxygen species (ROS) levels, decreased enzymes alanine aminotransferase, alkaline phosphatase, aspartate aminotransferase and lowered the urea, uric acid, and creatinine levels. Histopathological analysis revealed improved liver and kidney health in the CRE treated groups. While these results are promising, further research is needed to validate the clinical efficacy of *C. religiosa* in mitigating PCOS- related liver and kidney damage.

OP-IV-10

ETHNOBOTANICAL STUDY OF SACRED PLANTS USED IN RELIGIOUS AND SOCIAL CEREMONIES IN ROHILKHAND DIVISION, UTTAR PRADESH

Shweta Pandey, Nandini Pandey*

Faculty Department of Botany, Govt. College for Girls Sector-14 Gurugram

Email: shwetapandey2002@gmail.com

The study was conducted for the investigation of the plant species integral relationship with religious and social rituals in the Rohilkhand Division. The present study contributes to the conservation of ethnobotanical knowledge and promote the informed usage of plant resources in cultural practices. During the study 51 sacred plants were analysed and documented belonging to 20 different families. These species in Rohilkhand division have been used for various religious and social ceremonies.

GREEN & DRY FODDER USED BY THE VILLAGERS OF SOUTH-EASTERN RAJASTHAN

Neelkamal Rathore¹, Vijay Kumar Yadav² and Neerja Shrivastava¹

¹Government P.G. College, Kota, Rajasthan, ²HNB Garhwal University (A Central University), Srinagar-Garhwal, Uttarakhand

*Email: yadavvijaykumar3@gmail.com

The study was conducted in the South-eastern part of Rajasthan at Hadoti Region of Jhalawar and Baran Districts. The survey was made based on semi structured questionnaire. The study showed that dependencies of indigenous or tribal people on wild plants using for fodder purpose. Overall, 54 plant species were observed belongs to monocotyledon (20 species, 20 genera and 4 families) and dicotyledons (34 species, 30 genera and 12 families) which were used as dry and green fodder. The green fodder includes *Cynodon dactylon*, *Dichanthium annulatum*, *Eleusine indica*, *Pennisetum* spp., *Apluda mutica*, *Heteropogon contortus*, *Panicum antidota*, *Chloris virgata* and *Eragrostis tenella* were common grasses used as fodder. Leaves of *Zizipus* spp., *Prosopis cineraria*, *Moringa oleifera*, *Flacourtia indica*, *Celastrus paniculatus*, *Cannabis sativa*, *Bridelia retusa* and *Acacia nilotica* were used in the form of hay and straw for cattle feed. Seeds and Pods of *Indigofera oblongifolia*, *Indigofera cordifolia*, *Gossypium barbadense*, *Acacia leucophloea* along with whole plant, hay, straw and oil cakes of *Pisum sativum*, *Cicer arietinum*, *Brassica campestris*, *Saccharum officinarum*, *Papaver somniferum*, *Nicotiana tabacum*, *Linum usitatissimum*, *Foeniculum vulgare*, *Pennisetum typhoides*, *Echinoschinus echinatus*, *Crotalaria juncea*, *Celastrus paniculatus*, *Zey mays*, *Triticum aestivum* were used as fodder. Hay of *Medicago sativa*, *Hordeum vulgare*, *Vigna sinensis*, *Cynodon dactylon*, *Saccharum officinarum* and *Arachis hypogaea* were used in different seasons. Fresh material straw of cultivated crops *Avena sativa*, *Hordeum vulgare*, *Triticum aestivum*, *Medicago sativa*, *Vicia faba*, *Pisum sativum* var. *arvense* and *Oryza sativa* are common cattle feed. Oil Cakes of cultivated crops of *Arachis hypogaea*, *Linum usitatissimum*, *Sesamum indicum*, *Gossypium barbadense* and *Brassica campestris* were commonly used as cattle feed. Dry fodder includes crops residues, cereal straws, pulses and other legume crops like groundnut that contribute roughages gathered from different sources and concentrate feed includes food grains and their preparation such as flour, and by products of milling and household processing, like husk, bran, oilseeds, oil cakes and meals.

Key words: Green and dry fodder, Hadoti, Jhalawar Tribals

OP-IV-12

UNRAVELING PHYTOCHEMICAL DIVERSITY AND MEDICINAL POTENTIAL OF *SIDA RHOMBIFOLIA* COMPLEX: A CHEMOTAXONOMIC INVESTIGATION FROM NORTHERN INDIA

Pooja Jain & Vijai Malik*

Department of Botany, Chaudhary Charan Singh University Meerut- 250004

*Email**: Poojagoel01995@gmail.com & gathwalajai@gmail.com

The study investigates phytochemicals of *Sida rhombifolia* complex collected from Uttar Pradesh and Uttarakhand, utilizing GC/MS techniques. A total of 96 phytochemicals were identified during this investigation. It was found that Squalene is ubiquitous, while delta lactone and 7-hexadecenoic acid methyl ester are exclusive to *S. rhombifolia* ssp. *retusa*. Alpha-Tocospiro A and 8,11,14-docosatrienoic acid methyl ester is characteristic of *S. rhombifolia* var. *scabrida*. Presence of beta-amyrone and 4-octadecenoic acid methyl ester in *S. rhombifolia* signifies novel addition to the phytochemical profile of this complex. Statistical analyses, including two-way random ANOVA, coupled with Partial Least Squares Discriminant Analysis (PLSDA) and Hierarchical Cluster Analysis (HCA), confirm significant phytochemical diversity in *S. rhombifolia* var. *scabrida* as compared to other profiles of complex.

Keywords: *S. rhombifolia* Complex, Phytochemical diversity, PLSDA, ANOVA, HCA.

OP-IV-13

DOCUMENTATION OF TRADITIONAL ETHNOMEDICINAL KNOWLEDGE USED BY RURAL COMMUNITY OF RISHIKESH AND ITS ADJOINING AREAS, GARHWAL HIMALAYA, INDIA

Pratibha Sharma^{1,2} and Vijay V. Wagh^{1,2}

¹Plant Diversity, Systematics and Herbarium Division, CSIR-National Botanical Research Institute, Lucknow-226001 (Uttar Pradesh), India

²Academy of Scientific and Innovative Research (AcSIR), Ghaziabad, Uttar Pradesh, India

Email-Sharmapratibha129@gmail.com

The variety of medicinal plants utilized in traditional Indian medicine makes ethnomedical knowledge of the Himalayas fascinating. But because information is shared so little and is mostly passed down orally, there is a risk that it will be lost. To preserve the traditional ethnomedical knowledge, survey was carried out among the rural & tribal community of Rishikesh and its adjoining areas during different seasons between January 2022 and January 2023, in order to document traditional ethnomedical plants. A total of 89 ethnomedical plant species were identified that have traditionally been utilized as remedies for a range of illnesses. Fabaceae was the most prevalent families. Several quantitative analyses were used. The study highlights the potential of ethnomedical research and emphasizes the

necessity to record traditional knowledge regarding the therapeutic uses of plants for human benefit.

Keywords: Ethnomedicinal, Rishikesh, Garhwal Himalaya, Traditional knowledge

OP-IV-14

IDENTIFICATION KNOWLEDGE OF PLANTS BY MALAYALI TRIBAL OF CHITTERI HILLS, EASTERN GHATS, TAMIL NADU, INDIA.

R. Prabakaran¹, T. Senthil Kumar²

¹Department of Botany, Ramakrishna Mission Vivekananda College (Autonomous), Mylapore, Chennai-600004, Tamil Nadu.

²Department of Botany, Bharathidasan University, Tiruchirappalli-620 024, Tamil Nadu, **E-mail:** discoverypraba@gmail.com, E-mail: senthilbdc@gmail.com)

The present study is conducted to document the identification knowledge of plants by *Malayali* tribal of Chitteri hills, Eastern Ghats of Tamil Nadu, India. Periodical field visits were made in the study area covering all seasons. Interviews with traditional healers and other knowledgeable inhabitants and farmers were conducted. The tribal people of study area are using 320 plant species in their day-to-day life. They use the morphological characters of plants such as bark surface, leaf colour, leaf taste and exudates, underground plant parts and ecology of species as criteria for the identification of 135 species belongs to 105 genera under 46 families. The documentation of the knowledge of *Malayali* tribal in the identification of plants of Chitteri hills is to be accorded top priority in the preservation of our ancient traditional knowledge.

OP-IV-15

CONSERVATION CHALLENGES AND INNOVATIVE APPROACHES FOR AQUATIC MEDICINAL PLANT PROTECTION IN KARALI DISTRICT, RAJASTHAN.

Ram Singh Meena and Neelkamal Rathore*

Associate Professor, Department of Botany Govt. PG College, Karali-322241, Rajasthan
Professor, Department of Botany Government PG College, Kota-324001, Rajasthan

E-mail: rsm0109@gmail.com

Aquatic medicinal plants play a crucial role in maintaining ecosystem balance and providing valuable resources for traditional medicine. However, these plants face numerous conservation challenges due to anthropogenic pressures and environmental changes. This research paper focuses on the conservation challenges and innovative approaches for protecting aquatic medicinal plants in Karali District, Rajasthan. The study employs a mixed-methods approach, combining field

surveys, interviews with local communities and stakeholders, and geospatial analysis to assess the current status of aquatic medicinal plants, identify key threats, and propose innovative conservation strategies. The field surveys revealed a total of 34 species of aquatic medicinal plants belonging to 21 families and 3 classes (Monocotyledons, Dicotyledons, and Pteridophytes). Some notable species include *Bacopa monnieri* (Brahmi), *Centella asiatica* (Gotu kola), *Nymphaea nouchali* (Blue lotus), and *Acorus calamus* (Sweet flag). The findings highlight the need for community participation, sustainable harvesting practices, and the integration of traditional knowledge with modern conservation techniques. The paper concludes by emphasizing the importance of collaborative efforts among government agencies, NGOs, and local communities in implementing effective conservation measures to safeguard the aquatic medicinal plant diversity in Karauli District.

OP-IV-16

TAXONOMIC REVISION AND TYPIFICATION OF GENUS *PIMPINELLA* (APIACEAE) IN THE WESTERN GHATS WITH A SPECIAL FOCUS ON CONSERVATION STATUS

Rekha C.* & K.M. Manudev

Centre for Post Graduate Studies & Research, Department of Botany
St. Joseph's College (Autonomous), Devagiri, Medical College PO, Kozhikode District, Kerala

*Email: rekhachappan217@gmail.com

Pimpinella L. (Apiaceae) comprises nearly 150 species widely spread throughout the Old World, especially in Asia, Europe, North West America, and Africa. In India, the genus is currently represented by 25 species and two varieties, among these 11 species are endemic to Peninsular India. *Pimpinella* is morphologically distinct from other genera in having simple or palmately to pinnately ternate leaves, cordate-ovoid or oblong-ovoid mericarps having oil canals with slight lateral compression and a constriction at the commissure, and the presence of inconspicuous, filiform, or slender ribs. The present study highlights a taxonomic revision of *Pimpinella* in the Western Ghats, by discussing its diversity along with detailed photo plates, taxonomic key and schizocarp-micromorphology using SEM analysis. Lectotypes are designated for five taxa and *Pimpinella pulneyensis* Gamble, treated as conspecific to *P. leschenaultii* is reinstated here. In addition, the conservation status of all the species of *Pimpinella* present in the Western Ghats is assessed here based on the guidelines laid out by IUCN.

OP-IV-17

DIVERSITY AND ENDEMISM OF *CLEMATIS* (RANUNCULACEAE) IN WESTERN GHATS OF INDIA

Sonam Maurya^{1,2}, Raghvendra Singh² & K.M. Prabhukumar^{*1,3}

¹Plant Diversity, Systematics & Herbarium Division, CSIR–National Botanical Research Institute, Rana Pratap Marg, Lucknow, India

²Centre of Advanced Study in Botany, Institute of Science, Banaras Hindu University, Varanasi, 221005, Uttar Pradesh, India

³Academy of Scientific and Innovative Research (AcSIR), Ghaziabad -201002 Uttar Pradesh, - India. *Email: prabhu.krishna@nbri.res.in

Genus *Clematis* L., the climber of Ranunculaceae family comprises about 386 species (POWO, 2024). In India, the genus is represented by 33 taxa (Prabhukumar *et al.*, 2017) mainly distributed in the Eastern Himalayas, the neighbouring North-Eastern states and the Western Ghats. The present paper discusses the identity and distribution of *Clematis* species distributed in Western Ghats of India. The paper also discusses the unique purple-coloured sepals and presence of staminodes in south Indian taxa along with the discovery of two new species of *Clematis* from southern parts of Western Ghats. This work will help the researchers for the proper identification and documentation of *Clematis* in Western Ghats and the discovery of two new species emphasizes the need of further studies on Western Ghats and other different geographical regions of the country.

OP-IV-18

A SURVEY AND ANALYSIS OF BIODIVERSITY AND ETHNOBOTANICAL ASSESSMENT OF HERBAL PLANTS AT KEOLADEO NATIONAL PARK, RAJASTHAN

Suresh Kumar^{*}, Atul Tiwari^{} and Neetu Singh^{***}**

Department of Botany,

Government Degree College, Mant, Mathura (U.P.), **Principal, S.V.D. Institute of Education Awagarh, Etah U.P.) *Email id -singhskbotany@gmail.com

Keoladeo National Park, a UNESCO World Heritage Site, is home to an exceptional variety of flora, including herbal plants that are vital both ecologically and medicinally. This research focuses on cataloging and analyzing the diversity of herbal species present in the park, emphasizing their ecological roles, distribution, and potential uses in traditional medicinal practices. Through detailed field surveys and botanical assessments, the study identifies various herbal species, classifying them based on abundance, habitat preferences, and ecological contributions.

The study not only provides a deeper understanding of the plant species that inhabit this unique ecosystem but also highlights the significant roles these plants play in supporting local biodiversity. These herbal plants contribute to ecosystem stability by providing habitat, food, and

protection for various species. Moreover, many of these species hold cultural importance for local communities, who rely on their medicinal properties. Conservation of these plants is crucial, not just for maintaining biodiversity but also for preserving traditional knowledge and practices.

The research underscores the urgent need for sustainable conservation strategies to protect these valuable herbal resources. By focusing on conservation efforts, we can safeguard both the ecological integrity of Keoladeo National Park and the cultural heritage associated with its diverse plant life.

OP-IV-19

THE GENUS *IMPATIENS* L. (BALSAMINACEAE) IN SILENT VALLEY NATIONAL PARK, SOUTHERN WESTERN GHATS OF KERALA

V.S. Hareesh^{1*}, V.B. Sreekumar² and M. Sabu¹

¹ KSCSTE-Malabar Botanical Garden and Institute for Plant Sciences, Olavanna, Kozhikode–673 014, Kerala, India, ²KSCSTE-Kerala Forest Research Institute, Peechi, Thrissur-680 653, Kerala, India ***Email:** hareeshhariz@gmail.com

Balsams, also referred to as "jewel weeds," are attractive plants in the Balsaminaceae family, which have intriguing and multicolored flowers. The family, which is represented by *Hydrocera* and *Impatiens*, has more than 1000 species (Mabberley 2008, Fischer 2004, Yu et al 2016). Located in the southwest of the Nilgiri phytogeographical region, Silent Valley National Park is considered to have the second-highest concentration of *Impatiens* in the Western Ghats. The present study recorded the occurrence of 21 species of *Impatiens* in Silent Valley National Park, which includes one species new to science, one species new to the flora of Kerala and two species new to the National Park.

OP-IV-20

GRASS FLORA OF INDIAN SCRIPTURES

Vivek Kumar¹ and Vijai Malik*

Department of Botany, CCS University, Meerut-250004, India

Email: Vivekkumarph.d2021@gmail.com¹, gathwalajai@gmail.com*

Poaceae (grass family) are the fifth large family of angiosperms after Asteraceae, Orchidaceae, Fabaceae and Rubiaceae. It comprises of 780 genera and around 12,000 species. In India, it is represented by 278 genera and 1760 species. Grasses play most important role in our life such as foods, medicines, cattle-fodder and many different things. Grass is widespread all over the world and has been used in various ways since ancient times. Grass has been considered sacred by our ancestors. There is an ocean of knowledge about trees and plants in the Vedas and Puranas. Vedic literature is the oldest universally accepted literature, which reflects the diversity of huge knowledge. Without any doubt, the literal meaning of Veda is supreme knowledge.

Vedas are the basic source of cultural life of Indians. The term Veda refers to the entire divine literature including Rigveda, Yajurveda, Samaveda, Atharvaveda, Brahmana, Aranyaka,

Upanishads and six Vedaangas. Ancient Indian texts like vedas, puranas, upnishad, Kuran, bible, gurugaranth sahib etc. mention and describe the effects and applications of a variety of unknown grasses. Many of grasses have not yet been recognized by the common man. The value of grasses has been respected by all civilizations around the world. The present work is an effort to bring out the hidden knowledge about grasses in Indian scriptures for the welfare of mankind.

OP-IV-21

FTIR, GC-MS BASED PHYTOCHEMICAL PROFILING, RADICAL SCAVENGING AND ANTIMICROBIAL ACTIVITY OF *HYPTIS SUAVEOLENS* (L.) POIT: A COMPREHENSIVE APPROACH

Sanjay Kumar Mishra

Department of botany, Ewing Christian college (university of Allahabad), Prayagraj Uttar Pradesh, 211003.

Email: sanjaiy1975@gmail.com

Hyptis suaveolens (L.) Poit, an invasive weed of the family Lamiaceae, holds significant potential as an aromatic medicinal plant, traditionally used by healers and local practitioners to address a wide array of ailments. Despite its traditional use for treating various ailments, there remains a scarcity of information regarding the phytochemical profile and pharmacological properties of the plant. Therefore, the current study aims to investigate the phytochemical constituents and assess the antioxidant and antimicrobial activities of *Hyptis suaveolens* (L.) Poit. Advanced techniques like FTIR and GC-MS have been employed in order to identify the phytochemical present in the methanolic leaf extract of the plant. The therapeutic potential of the methanolic leaf extract was evaluated for radical scavenging activity using the DPPH assay and antimicrobial effectiveness employing the disc diffusion method, respectively. Standard methods were used to determine the IC₅₀ for radical scavenging and the MIC for antimicrobial activities. Present findings revealed the significant in vitro antioxidant and antimicrobial activities displayed by the methanolic leaf extracts of *Hyptis suaveolens* are attributed to the diverse array of bioactive secondary metabolites, including unique terpenes and fatty acids such as methyl 11, 12-octadecanoate, cis-5, 8, 11, 14, 17, eicosapentaenoic acid, squalene, beta-caryophyllene, and n-hexadecanoic acid. Due to their lipophilic nature and containing carbonyl and hydroxyl groups, these compounds play a vital role in the observed pharmacological effects. The study underscores the potential therapeutic applications of *Hyptis suaveolens*, highlighting the need for further exploration and utilization of this plant for natural medication development.

OP-IV-22

**ETHNOBOTANICAL USES, NUTRITIONAL VALUE AND PHYTOCHEMISTRY OF
DIOSCOREA ALATA L.**

Kishan Kumar Prajapati, Rakesh Pandey* and V.N. Pandey*

Experimental Botany and Nutraceutical Lab, Department of Botany, DDU Gorakhpur University,
Gorakhpur U.P.-273009.

Email- vnpgu@yahoo.co.in* rpcg12@gmail.com*

Dioscorea alata, commonly known as the water yam or purple yam, represents a significant species that belongs to the family Dioscoreaceae. It is characterized by its climbing vines and large and starchy tubers. The species exhibits considerable genetic diversity and morphological variability, including differences in tuber colour, shape, and size. *D. alata* is widely distributed in tropical and subtropical regions, thriving in various environmental conditions.

This species has immense cultural significance, serving as a staple food, traditional medicine and in rituals. Nutritionally, *D. alata* is rich in carbohydrates, dietary fibres and essential vitamins and minerals such as vitamin C, vitamin B6, potassium, and manganese.

D. alata is a prominent source of many bioactive compounds such as diosgenin, alkaloids, saponins, and flavonoids which shows a wide range of pharmacological activities, including anti-inflammatory, antioxidant, antidiabetic, and anticancer properties etc. Ethnobotanical uses, nutritional values and phytochemistry of *D. alata* has been discussed and presented in this paper in the light of present and future uses.

OP-IV-23

Iron Weed: A Pharmacognostic Profile

Saloni Kothari and Devangi Chachad *

Department of Botany, Jai Hind College, Basantsing Institute of Science, J.T. Lalvani
College of Commerce, Mumbai-400020, Maharashtra, India.
salonikothari5@gmail.com, devangi.chachad@jaihindcollege.edu.in

Baccharoides anthelmintica L., commonly referred to as Iron weed or Kali Jeeri, and has been an integral part of local medicine, employed to treat a wide array of ailments such as asthma, sores, inflammation, skin conditions, kidney issues, eye irritation, and hiccups. This medicinal plant exhibits diverse pharmacological properties, including antimicrobial, anticancer, antidiabetic, anti-inflammatory, analgesic, antipyretic, and larvicidal activities. Despite its potent therapeutic potential, limited anatomical information is available. Hence, this study encompasses an in-depth analysis of pharmacological and physicochemical of both the whole plant and seeds, aiming to bridge this knowledge gap. In the current study important parameters like Macroscopy and Microscopy are included to help in identification in case of adulteration. Various physicochemical parameters are enlisted as they are known to confer the pharmacological properties to the said plant.

Keywords: *Baccharoides anthelmintica* L., Pharmacognosy, Physicochemical parameters.

PP-IV-01

STUDY OF DOMINANT FLORA OF NASIRABAD VALLEY, AJMER, RAJASTHAN, INDIA.

Surbhi Agarwal¹ and Dilip Gena²

Department of Botany, Samrat Prithviraj Chauhan Government College,
Ajmer-305001

Vegetation of Nasirabad valley of Ajmer district has been studied. A detailed proportional relationship between monocots and dicot plants has also been evaluated. A total of 16 families, 87 genera, and 165 species of monocot plants have been reported from the town. For dicots, 85 families, 286 genera, and 492 species have been analyzed. In total, 101 families including 373 genera and 657 species have been accounted for in the floristic survey from the valley. The dominant family included Fabaceae followed by Poaceae and Cyperaceae. This study has been conducted to evaluate the current taxonomical flora status from all possible dominant field areas of Nasirabad valley, Ajmer district. The study also included the phytogeographical and ecological parameters for a better understanding and evaluation of the abundance and diversity of different flora categories. This field research focuses on the primary information on the flora of Nasirabad valley, Rajasthan, which could be of great importance related to ecological, medicinal, morphological, and economic importance to the taxonomical world.

PP-IV-02

EFFICACY OF *CYMBOPOGON KHASIANUS* ESSENTIAL OIL INFUSED CHITOSAN NANOEMULSION FOR MITIGATION OF *ASPERGILLUS FLAVUS* AND AFLATOXIN B₁ CONTAMINATION IN STORED *SYZYGIVUM CUMINI* SEEDS.

**Jitendra Prasad¹, Monisha Soni¹, Arati Yadav¹, Kishor Kumar Paul¹,
Manish Kumar Jha^{1*}**

Umakant Banjare¹, Somenath Das², and Abhishek Kumar Dwivedy¹

¹Laboratory of Herbal Pesticides, Department of Botany, Institute of Science, Banaras Hindu University, Varanasi – 221005, ²Department of Botany, Burdwan Raj College, Purba Bardhaman, W. B. -713104 **Email:** mjha1010@gmail.com

The study explores the bioefficacy of *Cymbopogon khasianus* essential oil encapsulated into chitosan biomatrix (CKEO-ChNe) against *Aspergillus flavus* and aflatoxin B₁ (AFB₁) contamination in stored *Syzygium cumini* seeds. CKEO-ChNe was characterized through SEM, AFM, FTIR, and XRD analyses. CKEO-ChNe inhibited *A. flavus* (0.32 µL/mL) and AFB₁ production (0.28 µL/mL), altered ergosterol biosynthesis, methylglyoxal levels, and leakage of cellular contents. *In situ* trials revealed that CKEO-ChNe protected the stored *Syzygium cumini* seeds against fungal and AFB₁ contamination without altering the sensorial characteristics. Hence, CKEO-ChNe may be recommended as a biorational preservative to extend the shelf life of stored *Syzygium cumini* seeds.

PP-IV-03

VEDIC ASTROLOGY: STATUS OF BIODIVERSITY INGRAINED

Ahirrao, Y.A.¹, Patil, M.V.² and D.A. Patil³

¹. S.S.V.P. Sanstha's Arts, Commerce and Science College, Shindkheda,
District Dhule, M.S. (India)

^{2&3}. Post-Graduate Department of Botany, S.S.V.P. Sanstha's
L.K.Dr.P.R. Ghogrey Science College, Dhule-424005, M.S. (India)

Email: yaabotany@gmail.com

Plant World is significant in religions throughout the ages. Astrology is a traditional discipline dealing with Grahas (Planets), Rashis (Signs of Zodiac) and Nakshatras (Stars). Plants have been appropriated with these since Vedic period and still in vogue. These plant taxa are advised TO worship for better human life. The present communication is aimed at knowing status of plant species associated with them. The researches carried out to date are also compared. Five plant species turned out to be exotic in origin. A necessity is reiterated to study the realm of Vedic astrology collaboratively involving knowledgeable experts in plant taxonomy, history, astrology, Sanskrit and English languages to avoid further ambiguity.

Keywords: Vedic Astrology, Sacred Plants, Biodiversity

PP-IV-04

STATUS OF MEDICINAL PLANTS IN NAWABGANJ BIRD SANCTUARY: A RAMSAR SITE, UNNAO, UTTAR PRADESH

Aanchal Verma, Pratibha, Priyanshi Singh, Alka Kumari*

Department of Botany, University of Lucknow, Lucknow-226007

Email: kumarialkasanjay@gmail.com

The Protected Area (PA) is one of the *in-situ* conservation measures adopted globally for the conservation of species, habitats and ecosystems. Chandra Shekhar Azad Bird Sanctuary (CSABS) is one of the diverse evergreens protected wetland situated in Unnao district of Uttar Pradesh, India. In order to study the medicinal plants growing inside premises of the sanctuary we collected around 135 species of plants in which 90 species are medicinally useful. Among these root part of 25 species is medicinally useful while leaves of 30 species are used as medicine. Besides whole plant of 35 species is useful as medicine in Ayurveda system. Due to rapid growth and development villagers of adjacent areas are harnessing the utility of medicinal plants, so analysis of their threat status becomes imperative. During field survey threat status of each and every medicinal plant has also been assessed and it was observed that some potential medicinal plants are under rare and threatened categories. So, their conservational measures have also been suggested. Further work on phytochemical characterization and secondary metabolites of some promising species is under progress.

Keywords: Nawabganj, Bird Sanctuary, Floral diversity, wetlands, medicinal use.

PP-IV-05

PLANTATION OF INDIGENOUS TREES VIS-À-VIS EXOTIC TREES

¹Prasanjit Mukherjee & ^{2*}Peeyush Kumar

¹Department of Botany, K.O. College, Gumla, Jharkhand

²Centre for Social and Environmental Research, Ranchi

Email: peeyush.kumar90@gmail.com

Indigenous trees like *Ficus religiosa* (Peepal), *Ficus benghalensis* (Banyan), *Azadirachta indica* (Neem), *Moringa oleifera* (Drumstick), *Mangifera indica* (Mango), *Tamarindus indica* (Tamarind), *Shorea robusta* (Sal) grow either at a faster rate or at a moderate rate, form canopies and provide shade. Some of these indigenous trees have religious importance and are worshipped and are also being conserved by the religious sentiments of the local people. In the tribal areas of Jharkhand many of these tree species serve as a source of food while some of them have medicinal value. Medicinal formulations have been prepared by tribal people since ages from these indigenous trees. Though exotic trees grow at a faster rate yet plantation of such tree species without proper research can lead to plant stress. Instead of using exotic tree species the indigenous tree species can be planted along the roadside owing to their numerous uses and their adaptability. The ecosystem and environment is much adaptive to the indigenous species as compared to exotic species.

PP-IV-06

BATRISU VASANU: A FOLK POLYHERBAL FORMULATION OF GUJARAT FROM THE PERSPECTIVE OF UNANI MEDICINAL SYSTEM

Mahendee M. Sameja*, Kamartaha I. Saiyed and Vinay M. Raole

Department of Botany, Faculty of Science,

The Maharaja Sayajirao University of Baroda, Vadodara, Gujarat-39002, India

Email: mahendeesameja30@gmail.com

Batrisu vasanu or Katlu is an ethnobotanical popular polyherbal folk Galactagogue and postpartum remedy from Gujarat. As the preparation and its uses are not reported precisely earlier from the Unani system, tried to focus on qualitative analysis of the ingredients added. Study was undertaken in the central Gujarat region's major districts Vadodara, Ahmadabad, and Panchmahal and Five Commercial suppliers were chosen. Made the checklist from the ingredients mentioned on the pack, their botanical details were analysed using Unani and Ayurvedic Pharmacopoeias. Total 57 medicinal herbs of 53 species, from 49 genera belonging to 34 plant families were reported. Nine plant taxa were found in all the samples examined, with the highest Relative Frequency of Citation value. The samples were having a highly inconsistent polyherbal composition. Although this polyherbal composition is not included in the Tibbi system, it gives us an opportunity to confirm the plant taxa from the Unani perspective.

PP-IV-07

CHECKLIST OF ACANTHACEAE JUSS. OF GUJARAT

Parth H. Rathava*, Gulzar Malek and Jaydeep Sharma

Department of Botany, Faculty of Science, The Maharaja Sayajirao University of Baroda,
Vadodara -390002

Email: parth.h.r20@gmail.com

Checklist of *Acanthaceae* Juss. species in Gujarat. This included gathering and synthesizing information from research articles, review papers, and other scientific literature to document the diversity, Ethnobotanical uses and distribution of *Acanthaceae* Juss. species in the region. We distributed Gujarat into the 5 major zones [Kutch zone, North zone, Saurashtra zone, Central zone and South zone]. We've listed the 42 Genera and 118 Species of *Acanthaceae* Juss. in all over review, research articles and Flora and e-floras of Gujarat. Among them we've 32 genera and 83 species documented scientifically correctly. Additionally, the objective encompassed assessing the conservation status of these Species using the IUCN Red Data List criteria and also during our review, we identified the 15 species is IUCN listed based on the IUCN Red Data List among its *Lepidagathis bandraensis* Blatt. is Near Threatened and *Dicliptera leonotis* Dalzell ex C.B. Clarke is Critically Endangered found and recognizing the contributions of various researchers and institutions in this field. Based on it we've made key of the species for better identification and added the ethnobotanical uses. We have also identified 19 genera and 30 species in Gujarat, each unique to a single district, without overlapping across multiple districts.

PP-IV-08

NOMENCLATURAL INSIGHTS ON THE GENUS *DERRIS* LOUR. (FABACEAE) IN INDIA

Anishya^{1,2*}, Rajkumari Sanayaima Devi¹ & Shruti Kasana²

¹Department of Botany, Deen Dayal Upadhyaya College, University of Delhi Dwarka, New Delhi-110078, New Delhi, India

²Department of Botany, University of Delhi, New Delhi- 110007, New Delhi, India

* E-mail: anishyasah2001@gmail.com

The genus *Derris* Lour. (Fabaceae) comprises ca. 50 species of which 23 species are reported from India. The name *Derris* is derived from a Greek word meaning skin or a leathery covering which is the characteristic feature of its pods. Members of this genus are mostly Lianas with some shrubs or small trees. It is a medicinally important genus and is widely used for its anticancerous, antitumor, and insecticidal activities. While comprehensively reviewing the genus in India, we encountered various taxonomic uncertainties and tried to resolve them. In the present study, a detailed account of all the species in India has been provided with special emphasis on their nomenclature.

PP-IV-09

PHARMACOGNOSTICAL AND PHYTOCHEMICAL ANALYSIS ON STEM AND BARK OF *NOTHOPEGIA CASTANAEFOLIA* (ROTH.) DING HOU.

Chandanshive Yugandhara S. and Jadhav Varsha D.

Department of Botany, Shivaji University, Kolhapur

E-mail - yugandharabotany@gmail.com and vdj_botany@unishivaji.ac.in

The genus *Nothopegia castanaefolia* is an endemic tree belonging to the Anacardiaceae family. Stem and bark powder treated with various chemical reagents was observed under visible and ultraviolet light showing various shades and different patterns of fluorescence effect useful for standardization and obtaining the quality standard. A phytochemical study of stems and bark was carried out using various solvents. The study reveals the presence of Alkaloids, Carbohydrates, Reducing Sugar, Glycosides, Protein and Amino Acids, Flavonoids, Phenols, Tannins, Phytosterols, Lignin, Quinones, Coumarins and Fixed oil. Among the studied phytochemicals Alkaloids, Reducing Sugar, Glycosides, Protein and Amino Acids, Flavonoids, Phenols and Tannins show a presence in all solvent systems. In a proximate study of stem shows the higher content of Dry matter (65.5%) and Moisture content (34.5%), Crude fibre (47.19%), Carbohydrate (13.08%), Total ash (3.42%), Crude protein (1.57%), and Crude fat (0.24%) while in bark Dry matter (62.5%) Moisture content (37.5%), Carbohydrate (32.27%), Crude fibre content (20.3%), Total ash (8.45%), Crude fat (0.87%) and Crude Protein (0.612%). In this proximate analysis, stem and bark show a higher content of Dry matter and Moisture followed by Crude Fibre and Carbohydrates. The anatomical study of stem and bark was used for the proper identification of plants.

PP-IV-10

IN VITRO ANTI-INFLAMMATORY ACTIVITY OF *GARCINIA TALBOTII* RAIZADA EX SANTAPAU

Priyanka Shukla and Meenakshi Vaidya

S.V. K. M's Mithibai College of Arts, Chauhan Institute of Science and Amrutben Jivanlal College of Commerce and Economics (Autonomous)

Affiliated to University of Mumbai, Vile Parle - West Mumbai 400056, India.

Email: shuklapriyanka2602@gmail.com; meenakshi.vaidya@mithibai.ac.in

Genus *Garcinia* is a member of the Guttiferae Juss. however, it is currently placed in Clusiaceae Lindl. family. The *Garcinia talbotii* Raizada ex. Santapau is native to western ghats. By using *in-vitro* techniques, the anti-inflammatory properties of *Garcinia talbotii* Raizada ex Santapau leaf extracts- hydroalcoholic, aqueous, and alcoholic were evaluated. It was investigated using a test for the prevention of albumin denaturation, in which BSA and egg albumin is used. Diclofenac sodium was used as standard drugs. The concentration range were upto 1000µg/ml. In

BSA, hydroalcoholic extract showed 98.76% inhibitory action, aqueous extract shows 97.62% inhibitory action, and alcoholic extract shows 98.77% inhibitory action at an 800 µg/ml concentration. In egg albumin, hydroalcoholic extract showed 98.37% inhibitory action, aqueous extract shows 97.62% inhibitory action, and alcoholic extract showed 99.93% inhibitory action at 200 µg/ml, 800 µg/ml, and 400 µg/ml concentrations, respectively indicating *Garcinia talbotii* leaves can be a potential source of anti-inflammatory agents.

PP-IV-11

RESOLVING THE TAXONOMIC DISPARITY IN THE INFRASPECIFIC TAXA OF *POLYALTHIA LONGIFOLIA*

Kangana S.^{1*}, Kasana S.¹

¹ Department of Botany, University of Delhi, University Road, Faculty of Science, University Enclave, Delhi, 110007

* Email- kanganasinghal8@gmail.com

Polyalthia Blume is a genus in family Annonaceae with nearly a 100 species. A widely cultivated species of this genus with high ornamental value is *Polyalthia longifolia*. It is native to India and Sri Lanka and includes two infraspecific taxa, namely *P. longifolia* var. *longifolia* and *P. longifolia* var. *angustifolia*. These varieties- have been cited in various scientific literature but need taxonomic verification. Recent molecular studies that transferred many species of *Polyalthia* to *Monoon* have also necessitated that their taxonomic placement is clarified. This study aims to elucidate the taxonomic history of these varieties, focusing on the varietal differences based on molecular and morphological data. This research underscores the need for precise taxonomic delineation of these varieties classified under *Polyalthia longifolia*.

PP-IV-12

THE APIACEAE: ETHNOMEDICINAL FAMILY AS SOURCE FOR INDUSTRIAL USES

Savita Malik

Department of Botany, R. G.P.G. College, Meerut

Apiaceae family commonly known as Umbelliferae is a family of mostly aromatic flowering plants. Family Apiaceae comprises about 450 genera and 3500 species. This family is worldwide in distribution. Many species of this family are cultivated for their fragrant leaves and attractive flowers. The family is particularly important to humans for herb plants useful for flavour, fragrance, and medicinal properties. The medicinal importance of family revealed their importance as potential source of natural agrochemicals as well as their biological activities such as, antitumour, antimicrobial, antiinflammetry, analgesic, radical scavenging, diuretic, gastrointestinal and antiobesity properties.

WESTERN GHATS: A RESERVOIR OF FLORA

Mohd Asif*¹, Venkatesan K.¹, Mokhtar Alam², Kabiruddin Ahmed¹, R. Murugeswaran³, Sathish Kumar¹, Ram Pratap Meena², N. Zaheer Ahmed²

¹Regional Research Institute of Unani Medicine, Chennai, Tamil Nadu, India.

²Central Council for Research in Unani Medicine,
M/o of AYUSH, Govt. of India, New Delhi, India.

³National Medicinal Plant Board, M/o of AYUSH, Govt. of India, New Delhi, India.

Email: asifgc2616@gmail.com

Since the inception of the human civilization plants have been exploited for the various purpose for satisfying the basic needs of the life. Forest areas as a whole are one of the main repositories for the valuable medicinal plants. Since the plants grown in the wild under stress are more potent in terms of active phytoconstituents than the cultivated in the field. Till now only few areas have been explored properly in terms of distribution, diversity and endemism. But in the modern era interest, awareness and attention by the general public to the traditional system and demand of the organic herbal and pharmaceutical products have created a pressure on the taxonomist, researchers and scientist to explore new areas of the biodiversity, identify the new species of the medicinal plants to characterize, identify and explore the facile, ecofriendly, safe, more effective organic novel and natural molecule than synthetic chemicals. Nonetheless, selecting the appropriate candidate plants using Unani wisdom, traditional recorded use, tribal non-documented use, and a thorough literature review should be the first step in the development of new plant-based drugs. Plants are the reservoir of diverse active phytoconstituents such as alkaloids, flavonoids, glycosides, terpenoids, phenol, oil, carbohydrates, sugars, organic acid, gum, tannins, fibers and minerals. These phytoconstituents are the first and foremost part for displaying the innumerable pharmacological and biological activities and thereby play a vital role in suppressing the various deadly diseases and disorders. So, this study was conducted with the aim to explore the distribution and diversity status of the medicinal plants of the Western Ghats region in general and Unani medicinal plants in particular. Additionally, the traditional medicine system's knowledge will open the door for continued research into medicinal plants for the production of pharmaceuticals.

PP-IV-14

EXPERIMENTAL INVESTIGATION INTO THE CULTIVAR-SPECIFIC RESPONSE OF TWO CUCUMBER (*CUCUMIS SATIVUS* L.) GENOTYPES SUBJECTED TO SIMULATED ACID RAIN STRESS

Jigyasa Prakash* and Madhoolika Agrawal

Laboratory of Air Pollution and Global Climate Change, Department of Botany, Institute of Science, Banaras Hindu University, Varanasi-221005

Email: jigyasaprakashbhu@gmail.com

Acid rain remains a global environmental issue adversely impacting plant health. The present field-based experiment was aimed to assess the effect of simulated acid rain (SAR) of different pH i.e., 7.0 (control), 5.6, 5.0 and 4.5 on two genotypes of *Cucumis sativus* L. (cucumber) Swarna Ageti (SwA) and Gujarat Cucumber-1 (Guj1) with emphasis on reactive oxygen species (ROS) production, defense strategies and consequent physiological changes at vegetative and reproductive growth stages. The results suggested that a higher accumulation of ROS and limited induction of the antioxidant defense system led to more impairment of photosynthesis in SwA than Guj1 depicting its higher sensitivity towards SAR. The findings revealed that variation in the regulation of the antioxidant defense system under SAR exposure was genotype-specific which profoundly modified the extent of negative impact.

PP-IV-15

PLANTS AND ITS DIFFERENT TRADITIONAL APPLICATIONS: A MAJOR NATURAL RESOURCE FOR CONSERVATION AND SUSTAINABLE UTILIZATION- AN ENUMERATION AND DOCUMENTATION.

¹Arpita Chakraborty, ²Jyoti Kumar, ³Moumita Chakraborty

¹Department of Botany, Narajole Raj College, Narajole, Paschim Medinipur, West Bengal.

²Professor (Retired), University Department of Botany, Ranchi University, Ranchi, Jharkhand.

³Department of Zoology, Kharagpur College, Kharagpur, Paschim Medinipur, West Bengal.

Email: arpitascmbotany88@gmail.com

Vigorous survey was carried out for two years from the present and successful findings were came into light for documentation in TKDL and also in PBR's. Actually, in Ghatal sub-division of Paschim Medinipur district of West Bengal due to sudden so-called outbreak of urban living and also synchronic rising up of modern cost-effective medicine therapy our traditional medicine therapy has been out of attention of the common people day by day. In this context, this research work looks backward and documented the scientific formulations of traditional medicinal applications of plants in the said areas. Plant *Terminalia arjuna* (Roxb.exDC) Wight&Arn., *Achyranthes aspera* L., *Scoparia dulcis* L., *Cocos nucifera* L., *Euphorbia tirucalli* L., *Croton bonplandianus* Baill., *Oxalis corniculata* L., *Abelmoschus esculentus* (L.) Moench, *Punica granatum* L., *Abrus precatorius* L., *Allium ascalonicum* L., *Gymnema sylvestre* (Retz.) R.Br.ex

Schult., *Citrus acida* Pers. are taken into consideration. Primarily, the particular plant parts used for the specific disease, the preparation of medicine from the plant, method of application of the medicine are thoroughly documented. It has been also noticed the formulation of medicines makes at least a little bit difference from one traditional herbal practitioner to another. Here is their secrecy of hereditary practice. The ethnomedicinal data collected from survey work has been furthered analysed employing suitable statistical tools like Informant Consensus Value for Plant Part (CPP), Consensus Factor (Fic), Fidelity Level (FL%), Preference Ranking Exercise, Importance Value (IVs) and Pearson Correlation Coefficient (PCC). The PCC between IVs & FL show a positive and significant association. Our future investigation will be carried out on focusing bioassays of the investigated plants for their scientific validation.

Keywords: Documentation, TKDL, PBR's, Consensus Value for Plant Part (CPP), Consensus Factor (Fic), Fidelity Level (FL%), Preference Ranking Exercise, Importance Value (IVs) and Pearson Correlation Coefficient (PCC).

PP-IV-16

A SURVEY OF ETHNOMEDICINAL PLANTS OF DISTRICT HAPUR, UTTAR PRADESH: TREATMENT OF LIVER DISORDERS

Amita Sharma¹, and Soniya Rani²

¹Department of Botany, Raghunath Girls' Post Graduate College, Meerut, U.P., India

²Research Scholar, Department of Botany, Raghunath Girls' Post Graduate College, Meerut, U.P., India

Email: Soniyasaxena1186@gmail.com

Liver disorders are recognized as a serious worldwide health problem. This research paper deals with the exploration of ethnomedicinal plants that treat liver problems. A total of 36 ethnomedicinal plant species belonging to 28 families and 34 genera were used by the local people of district Hapur. Plants were found to cure various liver disorders like inflammation, jaundice, hepatitis, fatty liver, fibrosis, cirrhosis, and carcinoma. Fabaceae was the dominant family. Among the genera, *Allium* (2 spp.), and *Phyllanthus* (2 spp.) were the dominant genera. This research aims to preserve the ancient treasure collected through folklore and herbal healers to treat liver disorders. Further pharmacological surveys of the conventional medicinal plants and phytochemicals that have a vital role in treating chronic liver disorders may be used as powerful medications.

PP-IV-17

INFLUENCE OF PLANT-BASED SUPPLEMENTS ASHWAGANDHA (*WITHANIA SOMNIFERA*) AND KHEJRI (*PROSOPIS CINERARIA*) ON SPORTS PERFORMANCE

NEHA SINGH

Department of Sports Bioscience, Central University of Rajasthan, Bandarsindri, Kishangarh, Ajmer

Email: neha.singh@curaj.ac.in

Ashwagandha (*Withania somnifera*) and Khejri (*Prosopis cineraria*), were studied for its potential benefits in sports performance. Forty athletes (18-25 years old) participated in a 4-week concurrent training and supplementation program. They were divided into four groups according to supplementation and training. Supplementation involved 500 mg of Ashwagandha after breakfast and 500 mg of Khejri after lunch for relevant groups. Groups undergoing concurrent training with Ashwagandha and Khejri (G1) or Khejri alone (G2) showed significant physical fitness improvements compared to non-training groups (G3 and G4). G1 had lower resting heart rate, higher upper and lower body power, greater muscle strength and endurance, and enhanced handgrip strength compared to G3, with similar improvements seen in G2 versus G4. Both G1 and G2 showed significant increases in muscle mass and decreases in body fat percentage compared to G3 and G4. In a nutshell, integrating Ashwagandha and Khejri supplementation with concurrent training significantly improves physical fitness and body composition in combat athletes, indicating that this combined approach is more effective than supplementation alone.

PP-IV-18

STUDY OF ALUMINUM-ACCUMULATION IN TWO SPECIES OF GENUS *SPERMACOCE*, RUBIACEAE, COLLECTED FROM RANCHI DISTRICT, JHARKHAND.

Aroma Aishwarya Barla¹ and Ajay Kumar Srivastava²

¹Research Scholar, Department of Botany, Ranchi University, Jharkhand

²Head, Department of Botany, St. Xavier's College, Ranchi, Jharkhand

Aluminum accumulation is an uncommon phenomenon, observed in certain groups of plants, which are often acknowledged as hyperaccumulators. *Spermacoce* Linn. is a genus belonging to the family Rubiaceae, also known as the Madder family. The present study was conducted on two species of *Spermacoce*, namely *Spermacoce ocymoides* and *Spermacoce articularis*, a common weed plant found in the districts of Jharkhand. The species were collected from 3 different locations, and taken to histochemical tests and ICP-OES for qualitative and quantitative tests for Aluminum accumulation. Both the plants showed marked positive results in terms of Aluminum accumulation.

PP-IV-19

Chickpea (*Cicer arietinum* L.): Origin and Domestication in Historical

¹Patil C. R., ²A. M. Patil, ³S. B. Khairnar and ⁴D. A. Patil

^{1,2}Department of Botany, Rani Laxmibai Mahavidyalaya, Parola- 425111, Jalgaon (M.S.). India

³B.S.S.P. M' S Arts, Com., Sci., College, Songir, Dist. Dhule

⁴Post-Graduate Department of Botany, S.S.V.P. S's L. K. Dr. P. R. Ghogrey Science College, Dhule-424005 (M.S.) India

E-mail: patilajay231@gmail.com; crpatil115@gmail.com; sbk12472@gmail.com; dapatil_10aug@yahoo.com

The past literary resume indicated that origin and domestication of the leguminous crop viz., Chickpea (*Cicer arietinum* L.) has been concluded based on limited criteria and disciplines. The present authors, therefore, felt a need for its reinvestigation with particular emphasis on Indian civilization. This study incorporated all realms of enquiry and knowledge to arrive at better conclusion. Certainly, Indian subcontinent is also one of the ancient centers of its domestication, although it originated outside India.

Keywords: Chickpea, origin, Domestication, India.

PP-IV-20

A REVIEW OF STUDY ON ANTHROPOGENIC ACTIVITIES IN RIVER WATER

Rajkumar Yadav and Avshesh Kumar

Institutional Address-Department of Botany, T.D.P.G. College, Jaunpur, U.P (222002).

Water, which makes up over 70% of the land and is the most manageable natural resource, is essential to all ecosystems in order to preserve biodiversity and the integrity of the biota. Globally, anthropogenic-driven alterations in the nitrogen biogeochemistry of running rivers are becoming a major problem. Integrated river basin management action plans can be created using systematic data on these problems.

Keywords-Water, Anthropogenic and P.

PP-IV-21

LENTIL (*LENS CULINARIS* MEDIK.): ORIGIN, DOMESTICATION AND ETHNOGRAPHY WITH PARTICULAR EMPHASIS ON INDIAN CULTURE

¹S. K. TAYADE AND ²D. A. PATIL

¹Post-Graduate Department of Botany, S I Patil Arts, G B Patel Science and STKV Sangh Commerce College, Shahada, District-Nandurbar, MS – 425 409 India.

² Post -Graduate Department of Botany, L. K. Dr. P. R. Ghogery Science College, Dhule. MS - 424 005 India E-mail-dapatil_10aug@yahoo.com

Pulses are well-acknowledged as the rich sources of protein and hence favoured as a main dish all over. They are second in importance to the cereals. Lentil (*Lens culinaris* Medik.) is one such protein-rich crop species widely consumed worldwide, inclusive of India. Its origin and domestication have been highlighted in past but these investigations are based on limited studies. The present authors, therefore, re-investigated this realm of research in holistic approach involving as many as disciplines of enquiry and knowledge to arrive at better conclusion with particular emphasis on Indian culture. India also deserves to be one of the ancient centers of domestication

Keywords: Lentil, *Lens culinaris*, Origin, Domestication, India.

PP-IV-22

ACANTHACEAE OF KERALA, WITH SPECIAL EMPHASIS ON WESTERN GHATS ENDEMIC

C. Murugan* and Basil Paul**

*Botanical Survey of India, Hq, Kolkata 700 064, West Bengal.

Email: sivanthimurugan@rediffmail.com

**Botanical survey of India (SRC, Coimbatore 641 002, Tamil Nadu)

Email: basilpaul35@gmail.com

The Western Ghats of Kerala covers 21,856 km² (56%) of the total area of the state. Out of 203 Acanthaceae taxa reported from Kerala, 83 taxa of 13 genera are endemic to the Western Ghats (19 taxa exclusively present in Kerala). *Strobilanthes* stands top with 40 taxa followed by *Andrographis* (10) *Gymnostachyum* (5) and *Lepidagathis* (5). The peak flowering; fruiting phenology was observed between November and March. The district Idukki (48) has the maximum number of endemic taxa followed by Palakkad (40), Thiruvananthapuram (31) and Wayanad (30). The geographic and climatic factors cause high endemism in the region.

Keywords: The Western Ghats, Kerala, Acanthaceae, Endemic, Taxa.

SECTION- 5
**Cytogenetics, plant breeding and
molecular biology**

OP-V-01

BIOMAGNETIC EFFECTS ON BASIC FUNCTIONS OF CHROMATIN

Hit Kishore Goswami

Retired Professor of Botany & Genetics
24, Kaushalnagar, P O Misrod, Bhopal (MP) 462047
(hitkishoreg@gmail.com)

Biomagnetic studies on chromosomes had hypothesized that magnetic forces might have resulted in chelation and removal of Fe ++ and Ca ++ and other metallic elements thereby unfolding coils of the packed chromosomes at prophase and metaphase. The packaging events of phosphates, sugars and nucleic acid molecules might have been assisted by the magnetic fields generated in oceanic water within the evolving cells. Electrostatic and magnetic forces hold key among molecular configurations and related reactions within the chromatin. Our recently published experiments strongly suggest the most probable role of magnetic field-forces intervening since the early phases of cell-evolution (the PreCambrian).

OP-V-02

BIOCHEMICAL CHARACTERIZATION OF MUTANTS OF AJARA GHANSAL (*ORYZA SATIVA*) LANDRACE FROM KOLHAPUR.

Namrata Shedbale¹, Shitalkumar Desai¹, Vishwas Bapat² and Nikhil Gaikwad¹

¹ Department of Botany, Shivaji University, Kolhapur-416004

² Department of Biotechnology, Shivaji University, Kolhapur-416004

Email: nbgaikwadsu@gmail.com

Rice (*Oryza sativa* L.) is one of the world's major food crops and staple food. Ajara Ghansal is a non-basmati aromatic rice landrace from Kolhapur Maharashtra, India It shows some constraints like low yield, tallness, lodging and long maturity period. Induced mutation breeding program was launched by using EMS, SA and gamma rays which has overcomes this problem and 16 mutants were obtained. The result on proximate composition showed that in gelatinization property all mutants showed high alkali digestion (Low 55-69°C) and soft gel in gel consistency. In dry rice powder the highest carbohydrate content was (38.95 %) found in the EM 2 mutant. The starch content was highest content (35.06 %) was found in EM 2 mutant. The HT 9 mutant showed highest protein content (2.38). Similarly, soaked rice water with intervals of 24, 48 and 72hr and cooked rice water were analyzed for carbohydrate and protein content. Soaked rice water was analyzed and there was 0.38-fold enhancement in carbohydrate content from mutant DF4 and 0.61-fold of enhancement in protein content in HT 9 mutant than control at 72 hr. In cooked rice water, the carbohydrate content ranged from (23.18 to 58.59 %) and protein content varied from (0.53 to 0.68 %). The highest carbohydrate content was found in the LR 2 mutant (58.59 %) which was increased by 0.62-fold and the HT2 mutant had the highest protein content (0.68) which was enhanced by 0.22-fold as compared to the control. From the above study, it was found that the DF 4, HT 2, HT 9, EM 2 and LR 2 mutants showed elevated nutritional potential.

OP-V-03

PERFORMANCE OF PUTATIVE MUTANTS OF BLACK RICE AND KALBHAT (*ORYZA SATIVAL.*) IN M₃ GENERATION.

Ranjit K. Londhe¹, Shitalkumar P. Desai¹, Akesh G. Jadhav¹, Vinod J. Dhole², Vishwas A. Bapat³ and Nikhil B. Gaikwad*¹
nbgaikwadsu@gmail.com

¹Department of Botany, ³Department of Biotechnology, Shivaji University, Kolhapur – 416004, Maharashtra

²Nuclear Agriculture and Biotechnology Division, Bhabha Atomic Research Centre, Trombay, Mumbai – 400085

Mutation breeding program was initiated in black rice and kalbhat rice landraces by using EMS, Gamma rays and Electron beam treatments and 71 and 65 putative mutants were selected from black rice and kalbhat respectively for higher yield, early maturity and reduction in height (dwarf) traits from M₂ generation. In M₃ generation out of 71 putative mutants of black rice 26 mutants were expressed true to type behaviour with frequency of 36.60%, whereas in case of kalbhat, 26 mutants reported true to type expression out of 65 putative mutants with frequency of 40.00%. True to type expression of mutants from black rice were induced with EMS 1.2% and Electron beam 300Gy treatment while in case of kalbhat EMS 0.8% and EMS 1.2% treatment are the most effective treatment for induction of true to type expressing mutants in M₃ generation. Further study of expression of these mutants in successive generation and their characterization will help to develop improved plant type of black rice and kalbhat for cultivation.

OP-V-04

KARYOMORPHOLOGICAL ANALYSIS OF *OPHIORRHIZA TRICHOCARPON* BLUME (RUBIACEAE) – A SPECIES NEWLY RECORDED FROM THE WESTERN GHATS OF INDIA.

S. N. Preethamol^{A*} and John. E. Thoppil^B

^ADepartment of Botany, Sree Narayana Guru College, Chelannur, Kozhikode, Kerala

^BCell and Molecular Biology Division, Department of Botany, University of Calicut, Kerala, India, 673635

Email: preethamolnsn92@gmail.com, jethoppil@gmail.com

The present study reports the karyomorphological details of *Ophiorrhiza trichocarpon*. The chromosome number was found as $2n = 22$. As per Abraham and Prasad chromosomal classification, 18 chromosomes were with nearly median and 4 with nearly submedian centromeres and the karyotypic formula was $18\text{ nm} + 4\text{ nsm} (-)$. The chromosome length ranged from 1.10 – 1.84 μm . The total chromosomal length was found to be 30.86 μm . Various karyomorphometric indices and the nearly median and nearly submedian nature of the chromosomes revealed the primitive nature of the species in terms of its evolution.

OP-V-05

PALYNOLOGICAL STUDIES OF SOME ARGYREIA LOUR SPECIES FROM MAHARASHTRA

S.S. Lavate and N.B. Gaikwad

Department of Botany, Shivaji University, Kolhapur, 416004

Email: nbgaikwadsu@gmail.com

The field of palynology is used in terms of its contributions to angiosperm systematics and phylogeny. The family Convolvulaceae is essentially europalynous. The present work aims to utilize pollen morphological characters of this family which might be of help in solving problems of unsettled taxonomy. The pollen grains of *Argyreia* are pantoporate, reticulate and echinate type and show minute variation in their spine morphology and exine structure. It is spherical and spiny with 40–60 circular pores. Among the investigated species pollen grains of *A. boseana*, *A. cuneata*, *A. elliptica*, *A. lawii*, *A. pilosa*, *A. sericea*, *A. nervosa*, and *A. sharadchandraji* are more or less of the same type with spines broad at the base and gradually taper towards the apex. Whereas in the case of *A. cymosa* spines are broad at the base and blunt at the apex. *A. pilosa*, *A. elliptica* and *A. setose* pollen grains show bifurcating tips. Sharp truncated tips were observed in *A. sharadchandraji* and *A. lawii*. The average size of the studied pollen grains ranges from 75 to 90 μ .

Keywords: Pantoporate, *Argyreia*, Echinate, Convolvulaceae

OP-V-06

NUTRACEUTICAL EVALUATION OF MUTANTS OF KALA JIRGA (*ORYZA SATIVA* L.) NON-BASMATI AROMATIC RICE FROM KOLHAPUR

Sadhana Kamble¹, Akesh Jadhav¹, Vishwas Bapat² and Nikhil Gaikwad¹

¹ Department of Botany,

² Department of Biotechnology

Shivaji University, Kolhapur-416004

nbgaikwadsu@gmail.com

Considering the importance of mutation breeding in crop improvement induced mutation studies were carried out in the Kala Jirga landrace by using EMS, SA and gamma rays treatment and mutants were obtained. This study aimed to evaluate nutraceutical parameters such as gelatinization, gel consistency, Protein, carbohydrate and starch analysis. The results revealed that all 18 mutants of Kala Jirga showed low gelatinization temperature (55-69°C) with soft gel consistency. In dry rice powder protein content ranged from (1.31 to 3.1 %) where the highest protein content (3.1%) was found in the HT 9 mutant which showed a 0.5-fold enhancement in the protein content than the control. The carbohydrate content in dry rice powder was varied

from (34.21 to 49.30%) and highest content (49.30 %) was found in the EM 15 mutant which showed a 0.30-fold enhancement than the control. Starch content ranged from (32.07 to 44.37 %) and the EM15 mutant showed highest starch content (44.37%) which was increased by 0.30-fold as compared to the control. Similarly, soaked rice water with intervals of 24, 48 and 72hr and cooked rice water were analysed for protein and carbohydrate content. Soaked rice water evaluated under three intervals reported 0.7-fold enhancement in protein content of the EM 15 mutant (2.5%) and 0.4-fold of enhancement in carbohydrate content of the EM 18 mutant (64.00%) than control at 72hr. In cooked rice water, protein content ranged from (0.60 to 1.28 %) and carbohydrate content varied from (28.09 to 52.27%). The highest protein content was found in the EM 16 mutant (1.28%) which was increased by 0.5-fold and the HT 10 mutant had the highest carbohydrate content (52.27%) which was enhanced by 0.4 fold as compared to control. Based on the above study it can be concluded that the HT 9, EM 15, EM 18, EM 16 and HT 10 mutants showed higher nutritional potential.

OP-V-07

DNA BARCODING REVEALS DISTINCT GENETIC PROFILES FOR *CYCAS REVOLUTA* AND *CYCAS RUMPHII*

Suresh Kumar

Department of Botany, Chaudhary Mahadeo Prasad Degree College
University of Allahabad, Allahabad-211002-UP

Barcodes are short molecules of DNA that have the unique ability to identify an unknown specimen to species, even in the absence of diagnostic morphological characteristics. These sequences may provide a new forensic tool for the conservation of plants and animals, particularly endangered species like *Cycas*. We tested the potential of chloroplast regions- noncoding atpF/H, and chloroplast coding rpoC1 and the nuclear ribosomal internal transcribed spacer (nrITS2), - suggested by the Plant Working Group of the Consortium for the Barcode of Life (CBoL) to produce distinctive identifiers of *Cycas*. Here, we distinguished between the two species, *Cycas revoluta* and *Cycas rumphii*, which were the subject of a controversy over their respective morphological and geographic ranges. We interpret our results in the context of a newly proposed {intrinsic limit} to resolution in plant DNA barcoding studies, which is defined as the proportion of unambiguous species identification.

OP-V-08

IDENTIFICATION AND CHARACTERIZATION OF NOVEL SALINITY TOLERANT GENES FROM *ORYZA COARCTATA* CDNA LIBRARY

Swati Mishra^{1,2}, Soni Chowrasia¹, Joshitha Vijayan¹, M.Z. Abdin² and Tapan Kumar Mondal¹

¹ ICAR-National Institute for Plant Biotechnology, LBS Building, IARI, New Delhi, India - 110012, ²Jamia Hamdard University- 110062
(*correspondence: mondalk@rediffmail.com)

Oryza coarctata, a halophytic wild rice species can endure extreme salinity and submergence, indicating it possesses genes for various abiotic and biotic stress tolerance. mRNA was extracted from leaves of *O. coarctata* and cDNA library prepared. The cDNA was cloned into pDONR™222 and were transformed into Gateway-compatible plant transformation binary vector, pK7FWG2. The *E. coli* harbouring cDNA library was mobilized into *Agrobacterium* strain. The *Arabidopsis* (Col-0) was transformed with cDNA library using floral dipping method. The putative T0 plants has been screened on selection media which resulted the generation of 10 number of kanamycin resistant plants. These putative plants will be further validated by PCR and sequencing of foreign gene and will be advanced for next generation (T1) to generate the homozygous lines.

OP-V-09

APPRAISAL OF CYTO-GENOTOXICITY OF SOME MACROLIDE ANTIBIOTICS IN THE ROOT TIP CELLS OF *ALLIUM CEPA* L.

Vishnu Shankar Sinha¹ and Nandjee Kumar²

¹. Department of Botany, Kolhan University, Chaibasa, Jharkhand – 833202, India.

². Department of Botany, Magadh University, Bodh-Gaya, Bihar-823234, India.

Email: vish20nu@gmail.com ; kumarnandjee@gmail.com)

The paper reports the cyto-genotoxicity of aqueous solutions of some macrolide antibiotics *i.e.* *Erythromycin* (C₃₇ H₆₇ NO₁₃), *Azithromycin* (C₃₈ H₇₂ N₂ O₁₂) and *Roxithromycin* (C₄₁ H₇₆ N₂ O₁₅) in the root tip cells of *Allium cepa* L. The Plant Assay was carried out at different concentrations (0.03%, 0.625%, 0.125%, 0.25% and 0.50%) of antibiotics for four hours treatment. Mitotic index was reduced from 18.36 ± 0.52 (control) to 03.98 ± 0.16 (0.50%) while the chromosomal aberrations (stickiness, fragment, disturbed metaphase/anaphase, bridge, laggard and micronuclei) induced from 5.10 % to 40.09%. The gradation of cyto-genotoxicity of antibiotics was noted as Roxithromycin > Erythromycin > Azithromycin (confirmed by ANOVA test).

PP-V-01

TRACING CHROMOSOMAL EVOLUTION ALONG A PHYLOGENETIC FRAMEWORK IN *SENECIO* (ASTERACEAE)

Akanksha S. Jeswani¹, Siddharthan Surveswaran², and Manoj M. Lekhak¹

¹ Shivaji University, Kolhapur, India

² University of Hyderabad, Hyderabad, India

Email id: aksjeswani@gmail.com

Changes in chromosome number are widely recognized as important evolutionary forces that have a profound impact on diversification and speciation. These variations can occur through whole genome duplication resulting in polyploidy or through chromosomal rearrangements and fusions, leading to either increase or decrease in chromosome numbers. The genus *Senecio* L., one of the largest genera within the family Asteraceae, demonstrates a remarkable variation in chromosome numbers. Various chromosome counts, viz. $2n=10, 20, 36, 38, 40, 46, 60, 78, 80, 96, 100, ca. 140, 160, 175, 180, 182, \text{ and } 184$ are on record for *Senecio* species. The most frequent count is $2n=40$. The success, persistence, and diversification of *Senecio* can largely be attributed to polyploidy that has shaped its evolutionary history. In the current study, we analyse the evolution of chromosome numbers using the software ChromEvol 2.0, a likelihood-based tool that traces chromosome number changes along a phylogenetic tree. We reconstructed the phylogenetic tree using an internal transcribed spacer (ITS) gene. The result shows that the haploid ancestral chromosome number is based on $n=5$.

PP-V-02

EVALUATION OF A FEW ACCESSIONS OF FINGER MILLET (*ELEUSINE CORACANA* (L.) GAERTN)

Mayur C. Kalambe and Rupesh S. Badere

Department of Botany, RTM Nagpur University, MJP Educational Campus, Amravati Road, Nagpur- 440033

Email: pratibhakalambe15@gmail.com

The major cereals viz. rice and wheat are vulnerable to the adverse effects of climate change. Moreover, recent researches have also indicated the ill-effects of unrestrained consumption of these food grains on health. Therefore, alternative source of food grains is need. Under such circumstances millets can be resorted to. However, the lower yield of millets as compared to cereals restrict their acceptability among farmers. *Eleusine coracana* (L.) Gaertn. (Finger millet) is commonly known as Ragi or mandua. It has a unique nutritional composition with high level of minerals, dietary fibers and amino acids. From long time it has been viewed as 'orphan crop' due to paltry breeding efforts. Whatsoever, genetic diversity is required for efficient breeding of the varieties. Thus, we evaluated six accessions of finger millet to ascertain the variability in the traits of the crop. The accessions varied with respect to each other. However, still, if needed, the genetic

variability can be broadened by induced mutagenesis to isolate the desired mutants for crop improvement.

Keywords: millet, nutraceutical, Poaceae, ragi, yield

PP-V-03

MEIOTIC AND KARYOMORPHOLOGICAL CHARACTERIZATION OF MALE AND FEMALE *CYCAS RUMPHII*

Utkarsha Gupta

Department of Botany, Chaudhary Mahadeo Prasad Degree College
University of Allahabad, Allahabad-211002-UP

Cycas rumphii is a dioecious gymnosperm, endemic to the Andaman and Nicobar Islands of India, and also found in Sri Lanka, Malaysia, and Australia. The male cones are shortly stalked and ellipsoidal to oblong, while the megasporophylls are ovate-lanceolate with small teeth. This study presents the somatic karyotype and idiogram of *Cycas rumphii*, showing that both male and female plants have the same chromosome number ($2n = 22$) but different karyotype formulas, distinguishable by satellite chromosomes. The karyotype is allotted Stebbins class and is supported by meiotic studies indicating a haploid chromosome number of $n = 11$.

Key words: *Cycas*, Cytogenetics, sex determination, karyotype, satellite chromosome

PP-V-04

UNLOCKING THE POTENTIAL OF *LABLAB PURPUREUS* (L.) SWEET AS A VEGETABLE AND ITS IMPROVEMENT

Vishnu V.S.

Department of Botany, Kannur University, Mananthavady Campus, Wayanad
E-mail: vishnuvs2212@gmail.com

Lablab purpureus is an important, underutilized legume vegetable crop; it is a rich source of protein, carbohydrates, dietary fiber, and micronutrients. This study evaluated the morpho-agronomic diversity in 50 lablab accessions from Kerala and Tamil Nadu based on 88 morphological and yield contributing traits and proximate analysis. The findings revealed significant morphometric variations among all the accessions and tender pods are excellent sources of carbohydrates, protein, vitamins etc., and very low levels of anti-nutritional factors. The genetic variability study showed the presence of wide variability in yield contributing traits was observed among accessions. The present study also demonstrated that silencing MIPS gene expression in *Lablab* effectively reduced phytate content and improved *L. purpureus*.

Key words: Lablab purpureus; nutritional analysis; underutilized crop

PP-V-05

PHYLOGENETIC DELINEATION OF CYCADALES USING NUCLEAR AND PLASTID DNA SEQUENCES

Neeta Kushwaha*

Department of Botany, Chaudhary Mahadeo Prasad Degree College
University of Allahabad, Allahabad-211002-UP

The order Cycadales of gymnosperm is a diverse group of plants with a high degree of endemism of multiple species in each genus. The phylogenetic status of the group is still not ascertained due to scattered efforts to classify the genus. The present is an effort to rebuild the phylogenetic relationships among the four extant species of cycads based on distance, maximum parsimony, and maximum likelihood criteria using three different markers viz; the nuclear ITS2 sequence, chloroplast noncoding atpF/H, and chloroplast coding rpoC1 gene. This would probably delineate a precise phylogeny with the gene tree-species tree reconciliation methods used in the study.

Key words: Cycads, Phyloeny, ITS2, atpF/H, rpoC1

PP-V-06

EXPLORING DIETARY FIBER ENHANCEMENT IN WHEAT: IDENTIFICATION OF HIGH B-GLUCAN AND ARABINOXYLAN SOURCES FROM WILD RELATIVES FOR BIOFORTIFICATION

Upendra Kumar^{1&2*}, Sourav Panigrahi², Priyanka Balyan³, Sundip Kumar⁴, and Om Parkash Dhankher⁵

^{1*}Department of Plant Science, Mahatma Jyotiba Phule Rohilkhand University, Bareilly 243001, India

^{2*}Department of Molecular Biology and Biotechnology, College of Biotechnology, Chaudhary Charan Singh Haryana Agricultural University, Hisar, Haryana, 125004, India

³Department of Botany, Deva Nagri P.G. College, Meerut, CCS University, Meerut, India

⁴Molecular Cytogenetics Laboratory, Department of Molecular Biology & Genetic Engineering, College of Basic Sciences & Humanities, GB Pant University of Agriculture & Technology, Pantnagar, 263145, India

⁵Stockbridge School of Agriculture, University of Massachusetts Amherst, MA, 01003, USA

Email: baliyan.upendra@gmail.com

Dietary fibres especially non-starch polysaccharides including β -glucan and arabinoxylan from cereal grains are important for better human health. They are not digested in the small intestine showing a bulking effect. Non-starch polysaccharides especially β -glucan is beneficial in lowering cholesterol levels and helping in the amelioration of type-II diabetes in humans. 2% or higher β -glucan content in a daily diet is considered adequate for good health. Wheat (*Triticum aestivum* L.) is the foremost staple food crop of the world providing the maximum carbohydrate required in the diet along with dietary fibre. Malnutrition complications can be resolved with

increased grain dietary fibre contents especially β -glucan by breeding wheat is a sustainable and valuable solution to this problem. While large-scale screening has found high levels of dietary fibre content in wild relatives of wheat, modern wheat cultivars have lesser variation in their grain dietary fibre content. In this investigation, we explored a panel of 478 wheat genotypes including 37 wild relatives of hexaploid wheat, 441 accessions of tetraploid and hexaploid wheat for their dietary fibre content along with their protein and starch content to identify promising genotypes for dietary fibre biofortification of wheat. The average β -glucan, arabinoxylan, protein and starch content in the whole panel was found to be 0.93%, 5.77%, 13.37% and 68.51% respectively. The most promising sources of high dietary fibre are *Aegilops peregrina* and *Aegilops kotschy*, progenitors of hexaploid wheat that can be utilized as a potential genetic resource to improve dietary fibre content for nutritional security in hexaploid wheat.

PP-V-07

**GENETIC INNOVATION FOR OPTIMIZING NUTRIENT USE EFFICIENCY:
BUILDING AGRICULTURAL RESILIENCE FOR CLIMATE CHANGE**

Manu Yadav

Department of Bioscience and Biotechnology, Banasthali Vidyapith University, Tonk,
Rajasthan-302022

Division of Genetics, Indian Agricultural Research Institute, New Delhi-110012

Email: ymanu4030@gmail.com

Transgenic technologies have emerged as a promising strategy to improve nutrient use efficiency (NUE) in crops, crucially addressing food security challenges exacerbated by climate change. This abstract explores recent advancements and challenges in developing transgenic crops aimed at improving NUE under changing environmental conditions. Climate change-induced stresses such as heat, drought, and soil nutrient variability severely impact agricultural productivity worldwide. Transgenic technologies offer tools to fortify crop resilience by modulating genes involved in nutrient uptake, utilization pathways and assimilation. Plants acquire and utilize essential nutrients more efficiently by increasing their efficiency like nitrogen, phosphorus, and micronutrients, transgenic technologies promise to strengthen crop yields while minimizing environmental impacts associated with excessive fertilizer use. Even with significant progress, implementing transgenic crops for improved NUE is burdened by regulatory, socio-economic, and ethical considerations. Balancing scientific advancements with public perception and environmental safety remains a critical challenge. Additionally, ensuring equitable access to these technologies for smallholder farmers is essential for sustainable agricultural development. In conclusion, transgenic technologies hold immense potential to enhance NUE and resilience of crops in the face of climate change. Continued research, coupled with robust regulatory frameworks and inclusive stakeholder engagement, will be key element in realizing the full potential of transgenic crops for global food security, farmers and sustainability. A concept shall be presented.

TRACING CHROMOSOMAL EVOLUTION ALONG A PHYLOGENETIC FRAMEWORK IN *SENECIO* (ASTERACEAE)

Akanksha S. Jeswani¹, Siddharthan Surveswaran², Manoj M. Likhak¹

¹ Shivaji University, Kolhapur, India

² University of Hyderabad, Hyderabad, India

Email: aksjeswani@gmail.com

Changes in chromosome number are widely recognized as important evolutionary forces that have a profound impact on diversification and speciation. These variations can occur through whole genome duplication resulting in polyploidy or through chromosomal rearrangements and fusions, leading to either increase or decrease in chromosome numbers. The genus *Senecio* L., one of the largest genera within the family Asteraceae, demonstrates a remarkable variation in chromosome numbers. Various chromosome counts, viz. $2n=10, 20, 36, 38, 40, 46, 60, 78, 80, 96, 100, ca. 140, 160, 175, 180, 182, \text{ and } 184$ are on record for *Senecio* species. The most frequent count is $2n=40$. The success, persistence, and diversification of *Senecio* can largely be attributed to polyploidy that has shaped its evolutionary history. In the current study, we analyse the evolution of chromosome numbers using the software ChromEvol 2.0, a likelihood-based tool that traces chromosome number changes along a phylogenetic tree. We reconstructed the phylogenetic tree using an internal transcribed spacer (ITS) gene. The result shows that the haploid ancestral chromosome number is based on $n=5$.

SECTION- 6
Ecology and Environmental biology

OP-VI-01

ENDEMIC VASCULAR PLANTS OF KARIMPUZHA WILDLIFE SANCTUARY, KERALA, INDIA - A PRELIMINARY STUDY

Akhil Sajan and K. A. Sujana

Botanical Survey of India, Southern Regional Centre, Coimbatore-641003

akhilsajan997@gmail.com

Karimpuzha Wildlife Sanctuary is located within the Nilgiri Biosphere Reserve and 18th Wildlife Sanctuary in Kerala. The sanctuary is rich in biodiversity and harbors significant endemic and threatened species due to its unique geographical features. This work documents the distribution of Indian endemics in Karimpuzha Wildlife Sanctuary. During the study 278 endemic angiosperm taxa belonging to 86 families, 5 pteridophyte taxa belonging to 4 families and 2 gymnosperms from 2 families were documented. In angiosperms Acanthaceae and Rubiaceae are the dominating families with 23 taxa each. *Impatiens* is the largest genus represented by 10 taxa. The study also examines the IUCN status and the range of endemism for these species.

OP-VI-02

STATUS OF VEGETATION AND DIVERSITY IN A CORRIDOR BETWEEN TWO WILDLIFE SANCTUARIES NORTH WESTERN GHATS OF MAHARASHTRA

***¹Kadale Anil S., ²S. S. Rahangdale And ³Rahangdale S.R.**

¹Research Scholar, Annasaheb Awate College Manchar, Dist. Pune – 410 503

²Hon. Balasaheb Jadhav Arts, Commerce and Science College, Ale, Dist. Pune – 412 411

³Prof. Ramkrishna More Arts, Commerce & Science College, Akurdi, Pune – 411 044

The study of community structure is essential for an understanding of sustainability of vegetation and for designing appropriate conservation measures for different natural resources including flora and fauna. Only species richness of an area does not reveal the sustainability of that vegetation. For this, study of community structure is essential. In the northern Western Ghats, the area between Bhimashankar wildlife sanctuary and Kalsubai-Harishchandragad Wildlife sanctuary is a non-declared corridor for wildlife as well as for floral elements also. A study was done to explore it in terms of plant community structure and diversity. Total five locations along a possible corridor between two wildlife sanctuaries are assessed. The results of the study revealed that, the composition of vegetation is diverse and species distribution across the stretch between two sanctuaries is highly uneven and discontinuous. The results also showed that, the locations are varying with respect to species composition and age of the trees in them.

OP-VI-03

DIVERGENT RESPONSES OF ASCORBATE AND GLUTATHIONE POOLS IN OZONE-SENSITIVE AND OZONE-TOLERANT WHEAT CULTIVARS UNDER ELEVATED OZONE AND CARBON DIOXIDE INTERACTION

Ashish Kumar Mishra¹, Shashi Bhushan Agrawal², Supriya Tiwari¹

¹Laboratory of Ecotoxicology, Department of Botany, Institute of Science, Banaras Hindu University, Varanasi 221005, India

²Laboratory of Air Pollution and Global Climate Change, Department of Botany, Institute of Science, Banaras Hindu University, Varanasi 221005, India

Email: ashishvns7856@gmail.com

Crop plants face complex stress from tropospheric ozone (O₃), underscoring the need for food security-focused strategies. This study examines the combined effects of elevated ozone (eO₃) and elevated carbon dioxide (eCO₂) on O₃-sensitive (PBW-550) and O₃-resistant (HUW-55) wheat cultivars. The findings reveal that eCO₂ mitigates eO₃ stress more effectively in the O₃-sensitive PBW-550 than in the O₃-resistant HUW-55. This differential response is linked to variations in the Halliwell-Asada pathway (AsA-GSH cycle) and the ascorbate and glutathione pools. While eCO₂ enhances glutathione regeneration in PBW-550, it fails to do so in HUW-55 under eO₃ conditions. The study suggests that O₃-sensitive cultivars like PBW-550 may achieve better yields under future conditions with high O₃ and CO₂, guiding agricultural strategies for sustained productivity.

OP-VI-04

COLOUR ENDEMISM OF INDIAN *IMPATIENS* (BALSAMINACEAE) WITH A SPECIAL REFERENCE ON YELLOW HIMALAYAN BALSAMS

Diksha Kumari^{1,2} and K.M. Prabhukumar*^{1,2}

¹Plant Diversity, Systematics & Herbarium Division, CSIR–National Botanical Research Institute, Rana Pratap Marg, Lucknow, India–226001.

²Academy of Scientific and Innovative Research (AcSIR), Ghaziabad – 201002, Uttar Pradesh, India. *Email: prabhu.krishna@nbri.res.in

The genus *Impatiens* Riv. ex Linnaeus (Balsaminaceae) represented by 1118 taxa all over the world. The members of the genus are commonly known as 'Balsams' and mainly distributed to five distinct areas of the world: eastern Himalaya, southern India and Sri Lanka, South East Asia, tropical Africa and Madagascar. In India, the genus *Impatiens* consists of 340 taxa, mainly distributed in the Himalayas, the neighbouring North-Eastern states and the Western Ghats. Balsams are well known for its vibrant colorful, lush blooms and impatient nature of fruits exhibits notable regional, sectional and color endemism. Their ability to thrive in shaded areas while offering an eye-catching appearance makes them a beloved choice for gardeners, especially where shade is a challenge. In 1859, Hooker and Thomson proposed 12 sections within the genus *Impatiens*, of

which two are exclusive to the Western Ghats, while the remaining sections are found in both the Western Ghats and the Himalayas. Flowers come in shades of white, yellow, pink, purple, red and even bi-color patterns, offers an avenue for studying color endemism, particularly in India. Despite their widespread presence, detailed investigations into the color-specific adaptations and regional endemism remain sparse. This research explores the phenomenon of color endemism within this genus, focusing on its geographic distribution, variations, and ecological significance across various regions of the Indian subcontinent. The present study focusing on the yellow color endemism in Indian balsams with a special reference on the Himalayan species.

Keywords: Balsams, endemism, *Impatiens*, Himalayas, Western Ghats.

OP-VI-05

FOREST ECOLOGICAL STATUS OF RAIPUR FOREST RANGE, MUSSOORIE FOREST DIVISION UTTARAKHAND

Manisha Pandey* S.P Joshi and Sachin Sharma

Eco-Taxonomy Research Laboratory, Department of Botany, D.A.V. (P.G) College, Dehradun,
Uttarakhand-248001.

Hemvati Nandan Bahuguna Garhwal (A Central University) Srinagar, Garhwal, Uttarakhand,
India.

Email: manishapandey614@gmail.com

The study was conducted in Raipur Forest, Dehradun Garhwal Himalaya, with the primary objective of gaining insights into the growth patterns of tree species during the summer season. A plot design was employed, with the main plot size set at 0.1 hectares. The study documented 61 plant species, belonging to 60 genera and 36 families. *Shorea robusta* was found to be the dominant species, with a frequency of 70% and IVI of 193.99. A total of 140.90 Mg/ha carbon stock and 299.78 Mg/ha Biomass were recorded in the study site. The forest displays five strata or layers and nine sub-strata or sub-layers.

OP-VI-06

A PRELIMINARY STUDY ON THE HORIZONTAL ZONATION OF SHOLA FORESTS AT THREE DIFFERENT ALTITUDES

Navya S. and Sujana K. A.

Botanical Survey of India, Southern Regional Centre, Coimbatore-641003
snavyaagri@gmail.com

Shola forests are distinctive ecosystems characterized by closed tropical montane wet evergreen forests and adjacent grasslands, typically found at elevations above 1,500 m asl. These forests often contain a water source within the forest patch. Unlike other forest types, which exhibit vertical stratification, Sholas exhibit a notable horizontal zonation from the margins to the interior, as observed in field studies. At the margins, where the transition from grassland to forest is evident,

the plant community predominantly includes species in genera such as *Leucas*, *Osbeckia*, *Hedyotis*, *Strobilanthes*, *Calamus* and *Rubus*. Moving inward to the second zone, common genera include *Syzygium*, *Symplocos*, *Pavetta*, *Ligustrum*, *Psychotria*, *Memecylon*, *Hypericum* and *Ardisia*. In the innermost zone near to streamlet, the plant community is characterized by species of genera *Litsea*, *Schefflera*, *Impatiens*, *Actinodaphne*, *Neolitsea*, *Elaeocarpus* and *Cinnamomum*. This zonal distribution of plant communities has been documented in Shola forests across three different altitude ranges: (Agasthyamalai) 1,500–1,900 m, (South Wayanad) 1,800–2,200 m and (Nilgiris) 2,200–2,600 m. It clearly shows that the plant species may change with altitude but the genera remain constant.

OP-VI-07

BLACK SOLDIER FLY LARVAE: A BIOTIC CURIOSITY WITH NATURAL ABILITY FOR SOLID WASTE MANAGEMENT AND CIRCULAR ECONOMY IN THE INDIAN HIMALAYAN REGION

Paromita Ghosh

(Forest Ecology), Scientist - F, Head Centre for Socio-Economic Development
G. B. Pant National Institute of Himalayan Environment, Kosi - katarmal,
Almora – 263643 Uttarakhand

Solid waste management is a worldwide problem, with more alarming scenarios in highly populated countries like India. The Himalayan region faces more severe challenges due to extreme topography and climate and managing solid waste in the region is a daunting task. This is a mini review article that intends to spread awareness on a biotic curiosity, the black soldier fly larvae and its technological application in organic waste management for more efficient bioconversion of biodegradable waste. The Black soldier fly larvae convert biodegradable waste into organic fertilizer and the larvae is a highly nutritious animal feed. Thus, the application has immense potential to solve the problem of solid waste in the Himalayas in both urban and rural setup. The benefits and significance of the Black soldier fly larvae farming are described to draw the attention of waste managers and enabling administrators and policy makers to take steps in improving the efficiency of solid waste management and reinstate circular economy.

OP-VI-08

VEGETATION BIOMASS AND CARBON STOCK ASSESSMENT OF SAWAI MANSINGH SANCTUARY, RAJASTHAN

Pragya Dadhich

Research scholar, J.D.B. Govt. Girls College, Kota

Pragyadadhich225@gmail.com

Out of many benefits we receive from forests, two major global environmental benefits are biodiversity conservation and carbon sequestration. Tropical forests dominate the role of forests in the global carbon flux and stocks, and therefore it is required for researchers and policymakers to estimate the carbon stock and sequestration potentials. Carbon stored in aboveground biomass of the trees typically constitutes the largest pool and is followed by below ground biomass and then by litter, soil etc. Carbon stock potential of a forest is directly affected by deforestation and degradation. Carbon stock assessment projects help us to check ability of any particular forest to store carbon or to act as carbon sinks. Current study was carried out in Sawai Mansingh Sanctuary of southeast Rajasthan to enumerate role of this area in carbon Sequestration and to understand the relation between diversity, density, and role of different tree species in carbon storatoin. A total 24 quadrates of 100m× 100m were laid randomly for sampling and for estimation of biomass carbon sequestration non-destructive field measurement method was used. All tree species were identified and verified and data was collected in form of diameter at breast height. A total 46 tree species were recorded in study area; of which *Anogeissus pendula* Edgew was most dominant and *Butea monosperma* (Lam.) Taubert show the highest carbon sequestration potential. All recorded 5812 trees of different girth classes stored about 94156.38 kg of biomass accounting for 47078.19 Kgs of carbon.

Keywords: biomass, carbon, forest.

OP-VI-09

PHYTOSOCIOLOGICAL ASSESSMENT FOR CONSERVATION AND MANAGEMENT OF NATIVE DIVERSITY WITHIN FOREST ECOSYSTEMS: CASE STUDY OF PADAJHAR MAHADEV SACRED GROVE, BHAINSRORGARH WILDLIFE SANCTUARY, RAJASTHAN, INDIA

Priyal Vijayvargiya¹ and Pratima Shrivastava²

(Department of Botany, Govt. College, Kota), (University of Kota, Kota, Rajasthan)

(Email: priyalvijay3@gmail.com)

Sacred groves are also part of forests and has a significant contribution in forest ecology, managed in a slightly different way than general forest areas due to involvement of their respective authorities or communities. In this particular study author deeply analysed the results of Phytosociological studies conducted at padajhar mahadev sacred grove falls under

Bhainsrorgarh Wildlife Sanctuary of Rajasthan. Total 78 species are reported belonging to 35 families with the highest contribution of Fabaceae (20.5%). Although biodiversity indices values indicating medium to high diversity but 29.48% are found scheduled in different categories at global, national or regional levels. Competition with Exotic Species (80%), Selective Cutting and Grazing (73.3%) are identified as high categories threats for the floral wealth of the area. Highest IVI has been recorded for *Lantana camara* L. which clearly indicates the high Degree of invasion in the sample plots at the grove area which is a serious threat for the survival and regeneration of native plant species. Results are clearly indicating to include additional steps in the management planning like lantana eradication, awareness programmes and plantation of species native to the area to maintain the ecological balance and to conserve the biodiversity of the sacred grove and maintain forest integrity.

OP-VI-10

**LONG-TERM HEALTH RISK ASSESSMENT OF HEAVY METAL
CONTAMINATION IN RICE GRAINS FROM URBAN MARKETS OF INDO
GANGETIC PLAINS OF NORTHERN INDIA**

Priyanka Singh and Rajesh Kumar Sharma

Laboratory of Ecotoxicology, Department of Botany, Institute of Science, Banaras Hindu
University, Varanasi 221005, India

Email: rajeshbhu78@gmail.com

Nineteen rice grain varieties collected from urban markets of Varanasi were analysed for heavy metals such as Cd, Cr, Pb, Ni, Cu, Zn, and Co by using an atomic absorption spectrophotometer and health risk indices were computed. The concentrations of both Pb and Ni in grains were below the detection limits. Whereas, concentration of Cd, Cr, Cu, Zn, and Co varied from 0.25 to 10.50 $\mu\text{g g}^{-1}$ dw. Cd level in grains exceeded international safety limits. Hazard quotient and lifetime cancer risk values were above a unit and exceeded safety limits, respectively for selected heavy metals, indicating risk to local population. Thus, long-term consumption of contaminated rice is not recommended.

OP-VI-11

GENERALIZED WEED RISK SCORE "APG-IV GRADE-LAMIIDS" IN UDHAM SINGH NAGAR DISTRICT, U.K. INDIA.

***Sachin Sharma¹, S.P. Joshi² and Manisha Pandey³**

^{1, 2, 3} Eco-Taxonomy Research Laboratory,

Botany Department, D.A.V. (P.G.) College, Dehradun, Uttarakhand, 248001, India, [Hemvati Nandan Bahuguna Garhwal (A Central University) Srinagar, Garhwal, U.K. India]

Email: sachin54907@gmail.com

The widespread expansion of alien weed plant is disturbing ecological and agricultural systems. Early detection and prevention of high-risk introductions are crucial to reducing losses and boosting benefits. The (A-WRA) System has been a successful prediction project for predicting naturalizations in udham singh nagar. A study evaluated 30 weed species in the Lamiids Grade of the APG-IV. The study found that 56% of the reported weed species were of low rank, 37% had medium rank status, and 7% had a high risk rank. Study found that *Calotropis procera* represents the maximum weed risk score (21.6) and *Hygrophila auriculata* represents the minimum (1.92).

OP-VI-12

STATUS OF GROUND VEGETATION AND SHIFT OF PEOPLE'S APPROACH IN THE SACRED GROVES IN NORTH WESTERN GHATS

Savita S. Rahangdale¹ and Sanjaykumar R. Rahangdale²

¹Department of Botany, Hon. Balasaheb Jadhav Arts, Commerce & Science College, Ale, Dist. Pune, Maharashtra

² Department of Botany, Prof. Ramkrishna More College, Akurdi, Pune – 44, Maharashtra, India

Sacred grove is a traditional way of life conserving the relics of original forests vegetation many of the endemic taxa in India. It not only conserves the forest but also the biotic and abiotic resources and the cultural things. This natural and cultural heritage is under pressure of different developmental activities. A study was undertaken to evaluate the effect of such developmental activities on the sacred groves. Total 114 sacred groves across the Pune and Ahmednagar districts were studied. The results of this study revealed significant losses of endemic taxa and their habitats in and around the sacred groves have been taken place due to various activities. The major activities include, grazing, pilgrimage, tourism, festivals, construction of roads, paths, and renovation of temples. There is also a significant shift in the local people's approach towards sacred groves from 'nature centric' to 'human centric' type. This is an alarm for the traditional way of conservation.

OP-VI-13

PLANT INVASION: ASSESSMENT OF THE IMPACT OF TRANSPORTATION PATHWAYS ON NATIVE AND ALIEN PLANT DIVERSITY OF GORAKHPUR DISTRICT, UTTAR PRADESH

Sneha Singh^{1*}, Arunava Datta² and Virendra K. Madhukar¹

¹Department of Botany, D.D.U. Gorakhpur University, Gorakhpur-273009, India,

²Department of Botany, Raja Narendralal Khan Women's College (Autonomous), Gope Palace, P.O: Vidyasagar University, Dist: Paschim Medinipur, Pin: 721102

Email: snsneha1011@gmail.com

India is one of the most populous country in the world, due to which there is a huge pressure on the natural resources, resulting in the shrinkage of plant communities, and the exposure of forests to various invasive alien species. Subsequent increases in transportation infrastructures have a major impact on plant communities, therefore, the roads and railway side habitats may be used for developing the green corridor to mitigate the pollution, restoration, and conservation of the native plants. 115 species were recorded out of which 34.8% were found only along roadsides, 22.6% along the railway sides, and 42.6 % were common to both habitats. 70% are native and 30% are alien plant diversity.

OP-VI-14

BIODIVERSITY OF AQUATIC MACROPHYTES IN MOTIJHEEL LAKE OF MOTIHARI, BIHAR.

Amrita Singh

Dr. S. K. S. W. College, Motihari

The present study was undertaken to identification and listing of aquatic macrophytes of Motijheel lake located in Motihari town. Aquatic macrophytes were collected from different sites and listed on seasonal basis for a period of two years i.e. 2023-2024. A total of 55 aquatic plants belonging to 21 families were identified. Total aquatic macrophytes were recorded from the Motijheel lake during the study period were categorized into marginal, submerged, floating and emergent. Out of 55 species, 32 belongs to Dicotyledons, 20 species to monocotyledons, and 3 species to pteridophytes.

OP-VI-15

AN OVERVIEW OF GYMNOSPERMS AND THEIR CONSERVATION IN THE ANDAMAN AND NICOBAR ISLANDS, INDIA

Lal Ji Singh*, Anil Kumar Midigesi, Gautam Anuj Ekka, Pankaj A. Dole, Mahadeva Kumar, S.

Botanical Survey of India, Andaman and Nicobar Regional Centre, Port Blair, Andaman and Nicobar Islands, India.

*Corresponding author's E-mail:- laljisinhg1970@rediffmail.com

Gymnosperms are primitive, ancient and archaic group of plants they evolved during the middle Devonian period of Paleozoic era about 390 million years ago. Jurassic period perhaps the best time for Gymnosperms, dominated on the earth hence it is considered as golden phase of Gymnosperms. Currently only few species of Gymnosperms are existing in the most of the geographical regions of the world including the Andaman and Nicobar Islands (ANI). Botanically the plant group is characterized by naked seeds, manoxylic or pycnoxylic wood and anemophilous pollination. In ANI's three families of Gymnosperms viz. Gnetaceae, Cycadaceae and Podocarpaceae are known to distributed, among them, the family Cycadaceae represented by one genus, *Cycas* L. which includes three species viz. *C. dharmrajii* L.J. Singh, *C. pschance* R.C. Srivast. and *C. zeilanica* (J. Schust.) A. Lindstr. & K.D. Hill of them first two are endemic to ANI and later one is known from Sri Lanka, where it extinct in wild according to recent studies. It is observed that among the cycads, *C. zealanica* is relatively common which found in most of the islands and other two endemic species viz. *C. dharmrajii*, *C. pschance* are found only in the type locality with limited individuals. Family Gnetaceae represented by one genus, *Gnetum* L. with four species viz. *G. gnemon* L. *G. latifolium* Blume, *G. montanum* Markgr., and *G. scandens* Roxb. and two infraspecific taxa namely *G. latifolium* var. *funiculare* Markgr. and *G. latifolium* var. *macropodum* (Kurz) Markgr are recorded. Family Podocarpaceae comprises two species under two genera, *Nageia* Gaertn. is represented by *N. wallichiana* (Presl.) O. Kuntze and *Podocarpus* (L' Herit.) Pers. by *P. neriifolius* D. Don. During field explorations it was observed that the gymnosperms are narrowly distributed and struggling to survive in these Islands. Cycads are mainly concentrated on the coastal habitats in Andaman group of Islands and in the inland forests in the grasslands of Nicobar group of Islands. *Podocarpus neriifolius* D. Don only distributed in the Evergreen forests of Andaman group of Islands which is one of the chief wood yielding tree species. *Nageia wallichiana* (Presl.) O. Kuntze found only in the evergreen forests of Great Nicobar Island which is a potential wood yielding species. *Araucaria* spp., *Cupressus* spp., *Cycas revoluta* Thunb., *Thuja occidentalis* L., *Zamia furfuracea* L.f. ex Aiton are commonly grown as ornamentals in the gardens and households. Gymnosperms are facing severe threat due to anthropogenic activities like over exploitation in various ways, land transformation and shifting cultivation and natural calamities like cyclonic winds, coastal soil erosion, landslides and tsunamis. It is also observed that cycad populations are under severe threat in the islands. *Cycas zealanica* in the various remote islands of Andaman's including coastal region of Sri Lanka. In Andaman its population is severely affected by 2004 Indian ocean tsunami and in Sri Lanka it got extinct during the same. In the view of conservation, germplasm of threatened plants of Cycads, *Gnetum*, *Nageia*, *Podocarpus*, are conserved conserving at Dhanikhari Experimental Garden Cum Arboretum (DEGCA) of Botanical Survey India, Nayashahar, South Andaman.

Keywords: Botanical Garden, Conservation, Diversity, Gymnosperms, Island Ecosystem

OP-VI-16

A SUSTAINABLE ECO- MODEL FOR CONSERVING & DEVELOPING THE VILLAGE PONDS IN WESTERN UTTAR PRADESH

SN Tyagi, IFS (Ret.)

Ex APCCF Forest Department, Gujarat State,
Gandhinagar (Gujarat) Email: sntyagi10@gmail.com

In Western Uttar Pradesh, due to intensive agriculture, there remained hardly any wilderness area left in the villages for sustenance of local wild flora & fauna. Luckily, quite a good number of village ponds are still existing, but due to heavy desiltation in past and many other factors there has been no water collection for last a few decades. As a result, very dense vegetation: variety of trees, shrubs, herbs and grasses have developed inside these ponds harbouring a lot of wild fauna such as small reptiles, birds & mammals. Indeed, these ponds are acting like mini sanctuaries, helping our agricultural ecosystem in several ways. These ponds are in fact ecological assets. As they are smaller in size, they do not qualify to be designated wetlands and get proper protection. There is an urgent need to conserve these smaller, un-attended bodies.

Currently, these ponds are getting excavated and stone pitched under the pond's beautification scheme: Amrit Talav Scheme. It is Recreational model. There is no alternative scheme or model available to the village people for conserving the ecological status of these ponds. An alternative Ecology based model is suggested for sustainable development of these ponds with People's Participation. The model proposed here aims to conserve the biodiversity of village ponds & side by side generating regular income to the village panchayats from bamboo

harvests which are being planted on the borders of the ponds enhancing Ecological as well as Economic Value of these ponds. This model has been successfully tested in village Kundarki Bhur, District Amroha, the native village of the author.

PP-VI-01

STUDY OF HISTORY AND PALEOCLIMATIC SITUATION OF FOSSIL DEVELOPMENT IN SALKHAN, SONBHADRA, INDIA

Ramashray Singh

Assistant Professor, D.A.V. (P.G.) College Muzaffarnagar, U.P.
ramashrayscience@gmail.com

The fossils found in the Sonbhadra Fossils Park are algae and stromatolites types of fossils. The park is spread over an area of about 25 hectares in Kaimoor Range, adjacent to Kaimoor Wildlife Sanctuary. It comes under jurisdiction of the State forest department. Geologists have been aware of the fossils found in the present-day park area since the 1930s. People who have carried out research in the area include Mr. Auden (1933), Mr. Mathur (1958 and 1965), and Professor S. Kumar (1980–81). On 23 August 2001, the area was featured in an article written

by journalist Vijay Shankar Chaturvedi for the Hindi newspaper Hindustan. Subsequently, it was formally inaugurated as a fossil park by District Magistrate Bhagawan Shankar on 8 August 2002.^[1] An international workshop was organized in December 2002, attracting participation from 42 delegates from India and abroad. Canadian geologist H.J. Hoffman was impressed by the fossils, and remarked that he had not seen such "beautiful and clear fossils" anywhere else in the world.^[2] In 2004, researcher Mukund Sharma further explored the area.^[1]

In 2013, the state government sanctioned ₹ 12.5 million for the development of the Salkhan Fossils Park. Sonbhadra (also known as Sonbhadra) or Sonanchal is the second largest district by area of Uttar Pradesh after Lakhimpur Kheri. It is the only district in India which borders four states, namely Madhya Pradesh to the west, Chhattisgarh to the south, Jharkhand in the south-east and Bihar to the north-east. The district has an area of 6,788 km² (2,621 sq mi) and a population of 1,862,559 (2011 census),⁴ with a population density of 270 inhabitants per square kilometer (700/sq mi).

PP-VI-02

HABITAT DISTRIBUTION MODELING FOR REINTRODUCTION OF *FLACOURTIA JANGOMAS* (LOUR.) RAEUSCH. (SALICACEAE): AN INDIGENOUS FRUIT TREE OF TERAI REGION

Jyoti Gupta¹, Pragya Sourabh², Shweta Shekhar³ and Preeti Gupta⁴

¹Department of Botany, DDU Gorakhpur University Gorakhpur-273009, India

²Department of Botany, Mansarovar Global University, Sehore 466111, Madhya Pradesh, India

^{3*}Department of Botany, University of Allahabad, Prayagraj

⁴Department of Botany, DDU Gorakhpur University Gorakhpur-273009, India

*Email: shwetashkhar@allduniv.ac.in

Flacourtia jangomas (Lour.) Raeusch., commonly known as paniala, is an important underutilized fruit tree of Terai region. Due to the wide spectrum of pharmacological, cytotoxic and nutraceutical properties, the fruits of *F. jangomas* has been in high demand. In the present study, an extensive survey has been conducted to observe the distribution pattern of male and female tree population of *F. jangomas* in between 2020 to 2024 in Gorakhpur district. A decline in male and female population have been reported during the study. The decrease in population is due to over exploitation, increased urbanization, change in environment and infection caused by insects in the leaves, flowers, and fruits which is alarming. Therefore, the present study was carried out to predict the current suitable habitat of *F. jangomas* in India using Maxent species distribution model. Output of maxent model reveal that the suitable habitat for distribution is Uttar Pradesh and Kerala with an area of 50,734 km² of highest suitability. Future prediction model for 2050 showed loss of habitat area with an optimal geographic distribution of 25,050 km² for this important plant which is alarming and measures should be taken timely.

PP-VI-03

UNVEILING THE INTERPLAY: A COMPARATIVE STUDY OF CRUSTOSE LICHENS *RINODINA EXIGUA* AND *RINODINA SOPHODES* THROUGH INTEGRATED ANALYSIS

Vartika Gupta^{1,2}, Seshu Lavania¹ and Sanjeeva Nayaka²

¹Department of Botany (Environmental Science), University of Lucknow, Lucknow -226007, U.P., India

²Lichenology Laboratory, CSIR-National Botanical Research Institute, Rana Pratap Marg, Lucknow-226001, U.P., India
Email: vartika1292@gmail.com

Lichens play pivotal roles in ecosystems, contributing significantly to soil formation, nutrient cycling and serve as valuable biomonitors, facilitating the assessment of ecosystem sustainability, particularly concerning air quality. The aim of the study involves a comprehensive investigation of two crustose lichen species, *R. sophodes* and *R. exigua*, collected from the Bahraich District, U.P., India, where anthropogenic activities, mainly factories, brick kiln operations and vehicular emissions, surround the sampling sites. In the present study, Chl. a ranged from 0.27 ± 0.01 to $0.99 \pm 0.01 \mu\text{g g}^{-1}$ followed by Chl. b (0.33 ± 0.01 to 0.52 ± 0.02), total chl. (0.6 ± 0.003 to 1.51 ± 0.03), chl. degradation (0.98 ± 0.01 to 1.20 ± 0.04), carotenoids (0.33 ± 0.01 to 0.48 ± 0.01) and protein (0.33 ± 0.01 to $2.25 \pm 0.02 \mu\text{g g}^{-1}$). Whereas, metal concentration of Al in the lichen thalli ranged from 508.52 ± 7.23 to $831.45 \pm 10.81 \mu\text{g g}^{-1}$ followed by As (11.33 ± 0.24 to 15.6 ± 0.28), Cd (4.9 ± 0.03 to 7.94 ± 0.11) and Cr (35.57 ± 0.22 to $29.62 \pm 0.06 \mu\text{g g}^{-1}$). The SEM-EDX analysis revealed the presence of crystals, irregular, round and rough surface of lichen thalli and oxalates accumulation with higher weight percentage of 79.59%. Thus, it is revealed that *R. sophodes* exhibited higher levels of chlorophyll content and protein compared to *R. exigua*, thus exhibiting variations in metabolic activities and adaptation strategies. Furthermore, the result of the study holds significance for environmental monitoring by using cost-effective and easy sampling methods. The study also presents a holistic perspective that has the potential to shape future research directions and contribute to informed strategies for environmental management.

Keywords: Biomonitor, Heavy metal, ICP-MS, Lichenized fungi, Pollutants

PP-VI-04

NITRIC OXIDE: A KEY SIGNALLING MOLECULE IN MITIGATION OF DROUGHT INDUCED OXIDATIVE STRESS

Madhuri Sharma and G. S. Shekhawat

Plant Biotechnology and Molecular Biology Lab, Department of Botany,
Jai Narain Vyas University, Jodhpur (Rajasthan) 342001
Email: madhurisharma1836@gmail.com

Global climate change is leading to increased abiotic stresses in crops, such as drought or water stress, which significantly affect crop productivity, posing a major threat to agriculture worldwide. So, it is highly desirable to understand drought tolerance mechanisms in crops. Nitric

oxide (NO) acts as a key signalling molecule that enhances drought tolerance by regulating signaling cascade which involves in physiological, biochemical and molecular responses. NO reduces oxidative damage through regulation of some transcription factors (WRKY, DREB, AREB, and AP2/ERF), and antioxidant enzyme activity. Additionally, NO interacts with abscisic acid (ABA) to promote stomatal closure, which helps minimize water loss and improve drought tolerance. NO influences the expression of drought-responsive genes (BADH, P5CS, and RD29A), which are involved in osmotic adjustment. Moreover, NO-induced alterations in cytosolic calcium level and the regulation of ion channels contribute to stomatal regulation and overall stress responses. Understanding the role of NO in drought stress response through various strategies help to enhance crop productivity and produce climate resilient crops under water-lack conditions.

Keywords: Drought stress, Nitric oxide, Antioxidant enzymes, drought responsive gene, stomatal regulation

PP-VI-05

**FABRICATION AND CHARACTERIZATION OF GRAPHENE INCORPORATED
NATURAL FIBERS FOR ENHANCED PROPERTIES**

Manjula Gupta^{1*}, Dara Singh Gupta²

¹Research Scholar, University Department of Botany, Kolhan University Chaibasa
Pin: 833202 Jharkhand, *Corresponding author, ²Assistant Professor, University Department of
Botany, Kolhan University, Chaibasa, 833202 Jharkhand
Email: manjulagupta516@gmail.com

Graphene is a carbonic material, having mechanical strength, conductive, antimicrobial properties, and high surface area. Aim of the present investigation was to study the spinning activity of silkworm silk by feeding graphene coated *Ziziphus jujuba* leaves and characterize the enhanced properties. It is for the first time in India, graphene coated *Ziziphus jujuba* Mill leaves (a non tasar silkworm food plant) fed by tasar silkworm and spin a high tensile strength silk fiber. Raman spectroscopy confirmed the presence of graphene in excrement of silkworm whereas FTIR analysis indicated that graphene additions may hindered the conformation transition of fibroin protein of silk from random coil and α -helix to β -sheet, which might contribute to increase the tensile strength.

PP-VI-06

USE OF MICROALGAE FOR PHYCOREMEDIATION OF ENVIRONMENTAL POLLUTANTS AND BIOFUEL PRODUCTION: AN INTEGRATED APPROACH

Khushaboo Soni and Sanjay Singh

Department of Botany, CMP Degree College
University of Allahabad, Prayagraj, 211002, Uttar Pradesh, India

Microalgae are well-suited for algae-based biorefineries and can make significant contributions to renewable fuels. They offer strategies to lessen the negative impact of heavy metal pollution on the environment. Worldwide, people widely employ oleaginous microalgae to develop integrated and sustainable environmental technologies. Microalgae can serve as a means to extract biofuels and simultaneously eliminate environmental contaminants such as heavy metals. Microalgae has a range of external and internal defense mechanisms to endure the detrimental effects of several environmental pollutants that enhance the buildup of lipids. We used advanced analytical techniques such as GC-MS, FTIR spectroscopy, ICP-MS, and AAS to investigate the ability of algae to sequester heavy metals and the properties of algal oils used in biofuel production. They are a highly appealing option for biofuel and bioremediation production. This study investigates the use of algae to remove harmful substances from aquatic bodies, as well as the subsequent generation of bioenergy from the resulting algae biomass.

PP-VI-07

IDENTIFICATION, CHARACTERIZATION AND REDUCTION MECHANISM OF HEXAVALENT CHROMIUM-REDUCING BACTERIA ISOLATED FROM DUMPSITES OF WESTERN UTTAR PRADESH.

Akansha Garg and Alok Srivastava

Department of Plant Science, MJP Rohilkhand University Bareilly, U.P. 243006
Email: gargiakansha1999@gmail.com, alokplantscience@gmail.com

Hexavalent chromium (Cr(VI)) is one of the hazardous heavy metals which is carcinogenic to human and poses significant risk to environment. Bacterial detoxification is a cost-effective and eco-friendly approach to reduce the Cr(VI). To study the Cr(VI) reduction efficiency, bacteria were isolated from dumpsites of Western Uttar Pradesh in various weather conditions. After testing the chromium-tolerance of bacterial isolates, di phenyl carbazide (DPC) tests were performed to evaluate the Cr(VI) reduction efficiency. One of the efficient bacteria was characterized by whole genome sequencing. The result indicated that strain effectively reduce the Cr(VI) as depicted by its gene analyses.

PP-VI-08

ASSESSMENT OF HEAVY METAL (MERCURY) CONTAMINATION IN PERIPHYTIC DIATOMS BASED ON THEIR MORPHOLOGICAL ABNORMALITIES

Sangeeta^a and J. N. Maurya^a

Department Of Plant Science, MJP Rohilkhand University, Bareilly 243006, Uttar Pradesh, India

One of the main reasons heavy metals are persistent pollutants is because they are not biodegradable. These heavy metals enter our environment as a result of numerous human activities, which are the main sources of metal pollution in aquatic ecosystems. Mercury is a heavy element that has been linked to numerous research on environmental buildup and public health concerns worldwide. Because of its biological toxicity, mercury is one of the heavy metals that is most harmful. This research summarizes current thoughts on diatom's role in indicating metal toxicity in freshwater bodies. It explains every step involved, scientific achievements, existing problems, and objectives in the process.

Keywords: Diatom, heavy metals, aquatic ecosystem, mercury.

PP-VI-09

FUNCTIONAL/BIOCHEMICAL CHARACTERIZATION OF SALT TOLERANT FUNGAL ENDOPHYTES AND THEIR EFFECT ON GROWTH AND YIELD OF SALINE-AFFECTED WHEAT

Priyanka Prajapati and R. N. Kharwar*

Mycopathology and Microbial Technology Laboratory, CAS in Botany, Institute of Science, Banaras Hindu University, Varanasi-221005, Uttar Pradesh, India

* E-mail's Id: rnkharwar@gmail.com

This study evaluated the impact of salt-tolerant endophytic fungi on salt-sensitive wheat. Four wheat genotypes were analyzed, yielding 40 fungal isolates, with six showing high salt resistance. Three fungi, *Aspergillus medius*, *Cladosporium parahalotolerant*, and *Aspergillus versicolor*, exhibited positive results in biochemical tests and were identified through 18S rDNA sequencing. *C. parahalotolerant* and *A. medius* demonstrated a synergistic effect, leading to further experimentation. Microscopy confirmed root colonization, enhancing root and shoot length by day 21. These findings suggest these fungi can improve agricultural productivity by imparting stress tolerance, crucial for climate change adaptation.

PP-VI-10

PLANT GROWTH PROMOTING RHIZOBACTERIA: A SUSTAINABLE STRATEGY FOR ABIOTIC STRESS MITIGATION IN PLANTS

Anjan Kumar Sarma* and Kangkana Deka

Faculty of Science, Assam down town University, Sankar Madhab Path, Gandhi Nagar, Panikhaiti, Guwahati, Assam, India, PIN-781026

*Corresponding author: aksbot82@gmail.com

Plant Growth Promoting Rhizobacteria (PGPR) are soil bacteria that enhance plant growth and development. They play a significant role in mitigating abiotic stress in plants. PGPR colonize the rhizosphere and impart abiotic stress tolerance through a variety of mechanisms. Utilizing PGPR as bioinoculant is an eco-friendly approach to overcome abiotic stress in plants. Consequently, the exploration of efficient PGPR strains as bioinoculants is a key area of focus for enhancing crop production by reducing abiotic stress. The study aims to understand the ecology and diversity of PGPR, the effects of abiotic stress on plant life, PGPR response to abiotic stress, the mechanisms employed by PGPR to counteract abiotic stress and their utilization as bioinoculants to help plants cope with abiotic stress. Moreover, in vitro study confirmed that efficient strain of PGPR has the potentiality to reduce the adverse effect of abiotic stress in plants.

Keywords: Abiotic stress, biostimulant, mitigation, rhizobacteria

PP-VI-11

EFFECT OF GRAZING ON PHYTOSOCIOLOGY GRASSLANDS OF GANGATIC PLAIN OF BAKHTIYARPUR, PATNA, BIHAR

S.N. Prasad Sinha and Subhash Chandra

Department of Botany, G.D.M College, Harnaut, Nalanda, Bihar - 803110

The present study deals with effect of grazing on phytosociology of grasslands of gangatic plain of Bakhtiyarpur, Patna, Bihar. The study area was confined to the diara area of Bakhtiyarpur, Patna, Bihar which is about 46km southeast from Patna (25°27' North Latitude and 85°31' E Longitude). It is situated in the middle Gangetic plain. It is approximately 51m above the Mean Sea Level. Studies made on effect of grazing on phytosociology and productivity of grasslands of gangatic plain of Bakhtiyarpur, Patna, Bihar. The field observations and samplings were carried out at interval of one month on protected and grazed grass lands from June 2022 to June 2023.

Key words:- Phytosociology, *Bothriochloa pertusa*, grassland.

PP-VI-12

DEVELOPMENT OF LOW-COST BIOREMEDIATION SYSTEM USING OSCILLATORIA PRINCEPS ALGAE FOR WASTEWATER TREATMENT IN JHARKHAND.

Sumit Kumar Pathak and Sangita Kumari

Department of Botany

Yogoda Satsanga Mahavidyalaya, Ranchi, Jharkhand

The present study is a novel approach to grey water treatment utilizing *Oscillatoria princeps*, a resilient cyanobacterium, in a cost-effective bioremediation system. Through a combination of laboratory experimentation and field trials, the efficiency of this system in removing contaminations from grey water source was evaluated. The results demonstrate promising outcomes, showcasing the potential of *Oscillatoria princeps* as a sustainable solution for grey water treatment, particularly in resource-constrained settings. We have designed our system practically in our college, Yogoda Satsanga Mahavidyalaya. *Oscillatoria princeps* is a promising source of bioactive metabolites used in both pharmaceutical and nutraceutical applications and also has antimicrobial activity. *Oscillatoria princeps* is the most common species encountered on submerged polythene particles. *Oscillatoria princeps* constitutes an attractive, environment-friendly and cost-effective option. The integration of this low-cost bioremediation system not only addresses environmental concerns associated with grey water discharge but also offers a practical and scalable solution for wastewater management.

Key Words: *Oscillatoria princeps*, bioremediation, wastewater.

PP-VI-13

EVALUATION OF BIOSORPTION POTENTIAL OF CADMIUM-TOLERANT BACTERIAL ISOLATES

Prerna Chauhan and Alok Srivastava

Department of Plant Science MJP Rohilkhand University Bareilly, Uttar Pradesh 243006
prernachauhan7417@gmail.com, alokplantscience@gmail.com

In this study, the bioremediation potential of bacterial isolates was investigated for cadmium detoxification. The bacteria were isolated from wastewater samples from dump sites in Bareilly, and then tested for cadmium tolerance by increasing the cadmium concentrations in the isolation media. Bacteria were then biochemically characterized and assessed for cadmium detoxification and/or reduction by the isolated bacterial isolates using FTIR, AAS. FTIR studies revealed that functional groups on bacterial surfaces, such as nitrogen in exopolysaccharides, facilitated cadmium binding. AAS quantified significant reductions in cadmium levels, showing cadmium removal and/or detoxification by certain isolates.

PP-VI-14

CLIMATE CHANGE AND FOOD SAFETY

Neelam Pandey¹ and Ashwani Kumar²

¹. CSIR-Indian Institute of Toxicology, Lucknow (India)

². Department of Botany, Rajasthan University, Jaipur (India)

Climate change profoundly impacts food safety across the globe, presenting multifaceted challenges that demand urgent attention. Alterations in temperature, precipitation patterns, and extreme weather events disrupt food production, processing, distribution, and storage systems, heightening the risk of contamination, spoilage, and foodborne illnesses. Additionally, climate change exacerbates existing food safety concerns like mycotoxin contamination and the proliferation of foodborne pathogens. To confront these challenges, a comprehensive approach integrating adaptation and mitigation strategies throughout the food system is imperative. Investment in climate-resilient agricultural practices, infrastructure enhancement for storage and transportation, and bolstering surveillance and monitoring systems are essential measures. Strengthening regulatory frameworks to uphold food safety standards amidst evolving environmental conditions is equally critical. Collaboration among diverse stakeholders is indispensable for effective action. Governments, international organizations, researchers, farmers, food producers, and consumers must unite to devise and implement integrated solutions. Such collective efforts are vital for addressing the intricate nexus between climate change and food safety. In conclusion, urgent action is warranted to mitigate the adverse impacts of climate change on food safety and ensure the integrity and safety of the global food supply. By proactively implementing adaptation strategies, fostering collaboration, and embracing innovative approaches, it is possible to build resilience and safeguard food safety amidst a changing climate.

PP-VI-15

ENERGY BUDGET STUDIES OF LAND-BASED ANIMAL PRODUCTION SYSTEMS IN HIGH-ALTITUDE PASTURES OF LADAKH, TRANS-HIMALAYA

Harshita Joshi¹, Prachi Joshi², Subrat Sharma³

¹Department of Botany, IPGGPG College of Commerce, Haldwani Kumaun University, Nainital-263001, e-mail id- joshiharshita452@gmail.com

²Assistant Professor, SSJDWSSS Government P.G. College Ranikhet Almora, Uttarakhand, India, e-mail id- prachi.pragya21@gmail.com

³Dean Research Studies, University of Ladakh, e-mail id- subrats63@gmail.com

The high-altitude rangelands of Ladakh, trans-Himalaya, are marked by their rugged topography and inhospitable conditions such as extreme temperature, scarce natural resources, water scarcity, and limited agricultural land due to poor soil profile development. However, the Changpas, nomadic pastoral communities of high-altitude pastures (HAPs), have developed indigenous agro-pastoralism and transhumant pastoralism practices by establishing a synergistic relationship with the harsh environment. Based on the repeated surveys in HAPs of Ladakh, here

we analyze the energy input and output of agro-based production system in terms of seed, labour (human and animal), farmyard manure, and agronomic yield, while animal-based production system in terms of fodder, milk, pashmina, and sheep wool. The oat (*Avena sativa* L.) used as dry fodder in the winter season in HAPs, is a highly energy-efficient crop. The farmyard manure shows higher input among the different inputs, signifies the importance of livestock herding to maintaining the traditional crops.

Keywords: Changpas, Energy input and output, High-altitude pastures (HAPs), Pastoralism, Trans-Himalaya.

PP-VI-16

PRINCIPAL COMPONENT ANALYSIS (PCA) AND CONSERVATION STATUS OF DIOECIOUS FLORA OF THE ALLAHABAD DISTRICT, UTTAR-PRADESH, INDIA

Ankita Verma* and Deepak Kumar Gond

Chaudhary Mahadeo Prasad Degree College, Department of Botany (A Constituent PG College of University of Allahabad), Mahatma Gandhi Marg, George Town, Prayagraj- 211002, Uttar Pradesh, India [Email: ankita2596ver@gmail.com*](mailto:ankita2596ver@gmail.com)

Dioecy, where species have separate female and male plants, is widespread among flowering plants, and an estimated 6% of species are dioecious worldwide. This study deals with an account of the Principal Component Analysis of dioecious plants of the Allahabad district, based on extensive fieldwork and herbarium studies as well as their conservation status according to the IUCN red list. About 52 dioecious species belonging to 20 different families and 42 genera are reported in this study. The result of PCA shows that dominating genera of dioecious flora belong to two medium sized woody trees i.e., *Diospyros* (3 species) and *Morus* (4 species) and one woody climber i.e., *Tinospora* (2 species). Only 7.2% flora of the district is occupied by dioecious plants of Angiosperms. According to the IUCN data, out of 52 species 17 species (32.6%) are Least Concern, 34 species (65.3%) are Not Evaluated, and 1 species (1.9%) is Data Deficient.

Keywords: dioecious; diversity; flora; PCA; IUCN

Identification and Characterization of Functional Groups in Epiphytic Lichen *Pyxine cocola* (Sw.) Nyl. in Proximity to Coal Based Thermal Power Plants in Uttar Pradesh, India

¹Namita Gupta, ¹S. K. Dwivedi and ²D. K. Upreti

¹Department of Environmental Science, Babasaheb Bhimrao Ambedkar University, Raebareilly Road, Lucknow (U.P.), India-226025

²Lichenology Laboratory, CSIR- National Botanical Research Institute, Rana Pratap Marg, Lucknow (U.P.), India -226001
Email: namitag09@gmail.com

Thermal power plants rely on fossil fuels such as coal, oil, or natural gas to produce heat, but they are significant contributors to environmental pollution, emitting metals and other harmful substances. However, the utilization of Fourier Transform Infrared Spectroscopy (FTIR) methods to assess atmospheric pollution in disturbed tropical environments using the spectral properties of lichens has been underexplored. In this study, toxitolerant foliose lichen, *Pyxine cocola* (Sw.) Nyl. was collected from various disturbed sites around Panki and Feroze Gandhi Unchahar National Thermal Power Plants (TPPs) in Uttar Pradesh, India, and subjected to FTIR analysis. The objective was to investigate and compare the functional groups associated with metal accumulation in lichen thalli. Results of the FTIR analysis revealed similar absorption bands in appearance but varying in intensity, indicating that both TPPs produce comparable chemical components with varying metabolite quantities. The identified specific functional groups responsible for distinct characteristics within the chemical composition of phytochemical compounds in lichens. The presence of metabolites in *P. cocola* spectra enhanced the detection probability of IR bands in various regions, including 3500-3300 cm⁻¹ (N-H and O-H groups), 3300-2500 cm⁻¹ (O-H stretching; carboxylic acid), 1450-1400 cm⁻¹ (C=O symmetric stretching –COO-). FTIR offers a faster and more reliable approach, particularly with the cost-effectiveness and wide distribution of lichens. This study highlights the valuable information obtained through FTIR analysis, which enhances understanding of chemical involvement in polluted environments.

Keywords – Bioaccumulation, FTIR Spectroscopy, Lichens, Metabolites, Pollution, Thermal Power Plants

PP-VI-18

Effect of Industrialization on Hydrological Cycle

Md. Shamim Ahmad & Rizwana Perveen*

Oriental College Patna City

Our present study on indigenous of *Fathua* (Patna) direct influence the population of green plants and highly affected of hydrological cycle including rainfall. Vegetation of green plants is reduced due to pollutants of industries viz. SO_2 , SO_3 , NO_2 , output of hydrocarbon and high temperature. Precipitation and evapo-transpiration are necessary for hydrological cycle but these process is highly affected due to impact of industries.

Keywords – *Fathua* (Patna), Population of green plants, Hydrological cycle, Industries de-forestation

PP-VII-19

WHAT EFFECTS DOES THE EXTERNAL SUPPORT HAVE ON THE CLIMBING EFFICIENCY OF HERBACEOUS CLIMBERS? AN INVESTIGATION INTO THE ROLE OF NUTRIENTS AND STRUCTURAL SUPPORT ON ADAPTIVE CLIMBING STRATEGIES IN ANNUAL AND PERENNIAL HERBACEOUS CLIMBERS

Bhagyashri Gharjale and Dhiraj Naik

Botany Department, Bajaj College of Science, Civil Lines, Wardha-442001, Maharashtra

Email- gharjalebhagyashri21@gmail.com,

Annual and perennial climbers are one of the most fascinating growth forms that has attracted interests of naturalists since Darwin time. Darwin's observation on plant movements i.e. circumnutation had inspired many botanists to study plant structures using climbers. The constant curvature hypothesis suggests that twining shoots form stable helices with constant curvature on cylindrical supports, regardless of support diameter (Putz & Holbrook, 1991). However, limited studies with small sample sizes have directly tested this hypothesis. Furthermore, despite the abundant variety of climbing plants in the Indian continent, no research has been conducted to investigate the behavioural characteristics of climbers in India. We conducted experiments on three herbaceous climbers—*Merremia dissecta*, *Ipomoea purpurea*, *Clitoria ternatea*—to examine the effects of support thickness, and nitrogen fertilisation on success rate and internode characteristics (curvature, diameter, length). Our results indicate that stem curvature is not constant but varies with support thickness and nitrogen conditions, challenging the constant curvature hypothesis. We also found that climbers adapt to wider supports by thickening stems and reducing curvature. This study enhances understanding of the climbing mechanisms and ecological dynamics of stem-twiners in forest ecosystems.

Keywords- annual and perennial climber, behavioural characters, climber success

SECTION-7
Plant Physiology & Biochemistry

OP-VII-01

HEMIN- MEDIATED ACTIVATION OF HO-1 AND REGULATION OF CADMIUM- INDUCED OXIDATIVE STRESS IN *SORGHUM BICOLOR* L.

Anita* and G. S. Shekhawat

Plant Biotechnology and Molecular Biology Lab., Dept. of Botany, JNV University, Jodhpur-342005, Rajasthan, India
Email – missanitakumari1992@gmail.com

The current investigation assessed the impact of external hemin on cadmium-induced toxicity regarding metal accumulation and stress tolerance in *Sorghum bicolor*. The augmentation of hemin under cadmium-induced stress environments ameliorated plant development by augmenting biomass and photosynthetic pigments. This augmentation also encouraged antioxidant activities including CAT, APX, GPX and HO-1 levels, however simultaneously mitigating oxidative impairment and enhancing cadmium tolerance in plants. Moreover, the utilization of hemin improves the efficacy of *S. bicolor* in cadmium removal by enhancing the uptake of cadmium through roots and facilitating its transfer from roots to leaves tissues. Hence, the investigation proposes that hemin holds promise in enhancing stress tolerance and accumulation capabilities of cadmium-tolerant plants.

Keywords: Hemin. Heme oxygenase. *Sorghum bicolor*. Cadmium stress. Antioxidant

OP-VII-02

EFFECT OF EXOGENOUS PHYTOHORMONE TREATMENT ON ANTIOXIDANT ACTIVITY, ENZYME ACTIVITY AND PHENOLIC CONTENT IN WHEAT (*TRITICUM AESTIVUM* L.) SPROUTS AND IDENTIFICATION OF METABOLITES OF CONTROL AND TREATED SAMPLES BY UHPLC-MS ANALYSIS

Anjali Yadav and Shachi Singh

Department of Botany, MMV, Banaras Hindu University, Varanasi 221005, UP, India.
Email Id: anjaliyadav8909@gmail.com
Email Id: singhshachi@gmail.com

Wheat sprouts were treated with phytohormones such as Indole acetic acid, Salicylic acid and Gibberellic acid, either individually or in combination, to enhance their nutritional profile. The study assessed various parameters, including total phenolic and flavonoid content, peroxidase and phenylalanine ammonia-lyase activity. Antioxidant activity was measured through DPPH and FRAP assays. The results indicated that the phytohormone treatments led to increased levels of phenolic compounds, enzymatic and antioxidant activities. UHPLC-ESI-MS analysis was utilized to identify the compounds present in both control and treated samples, revealing the presence of phenolic acids, polyphenols, simple sugars, amino acids, dipeptides, lipids, and fatty acids.

OP-VII-03

ESTIMATION OF TOTAL PHENOLICS, FLAVONOIDS, TANNINS AND ALKALOIDS IN *BAUHINIA RACEMOSA* LAM. LEAVES

Ankit Yadav and Meenakshi Vaidya

S.V. K. M's Mithibai College of Arts, Chauhan Institute of Science and Amrutben Jivanlal College of Commerce and Economics (Autonomous)
Affiliated to University of Mumbai, Vile Parle - (West), Mumbai 400056, India.
Email: ayyahoo06@gmail.com; meenakshi.vaidya@mithibai.ac.in

Bauhinia racemosa Lam. belonging to the family Fabaceae, is a small, crooked, bushy, deciduous tree that can grow in difficult climatic environments with drooping branches. It can be found across India and grows up to 1650 meters above sea level in the western Himalayas, Ceylon, China, and Timor. Many uses of plant organs in folk medicine were reported. The study was conducted to estimate the total phenolic, flavonoids, tannins, and alkaloids in *Bauhinia racemosa*. The Folin Ciocalteu reagent method estimated the total phenolic content, followed by flavonoids by the aluminum chloride colorimetric method. Tannic acid was used as the standard for the estimation of tannin content. Harborne (1973) method was used to estimate alkaloids. The results showed the presence of alkaloids >tannins >phenolics > flavonoids by dry weight. As a promising source of bioactive chemicals, it has the potential to produce important and nourishing medications and be used to treat a variety of ailments.

Keywords: *Bauhinia racemosa* Lam., phenolic, flavonoids, tannins, and alkaloids.

OP-VII-04

IN-VITRO ANTIOXIDANT ACTIVITY OF HYDROALCOHOLIC EXTRACT OF LEAVES OF *HYDNOCARPUS PENTANDRUS* (BUCH. - HAM) OKEN

Darshika Acharya and Meenakshi Vaidya

S.V. K. M's Mithibai College of Arts, Chauhan Institute of Science and Amrutben Jivanlal College of Commerce and Economics (Autonomous)
Affiliated to University of Mumbai, Vile Parle - West Mumbai 400056, India.
Email: darshikaacharya31@gmail.com; meenakshi.vaidya@mithibai.ac.in

Cellular damage can arise from the reactions of free radicals with membrane lipids, nucleic acids, proteins, enzymes, and other micro molecules. Naturally, the body produces free radicals, and antioxidants scavenge them to shield the body from harmful consequences. This dynamic equilibrium exists between the two. It's possible that there aren't enough antioxidants in the body under typical physiological circumstances to offset the production of free radicals. The creation of "natural antioxidants" from plant material has drawn more attention from the food business and preventative medicine. Given the importance of antioxidant activity, a hydroalcoholic crude extract from the leaves of the Achariaceae family plant *Hydnocarpus pentandrus* (Buch. - Ham) Oken was made, the 1,1-diphenyl-2-picrylhydrazyl (DPPH) Radical Scavenging Assay, the Ferric Ion Reducing Assay (FRAP), the Nitric Oxide Assay, the Phosphomolybdate Assay, and the H₂O₂

Radical Scavenging Assays were used to measure the radical scavenging activity. The antioxidant activity of the hydroalcoholic extract was examined in comparison to the reference; in all five methods, solvent-based findings were observed. Higher antioxidant activity is shown by the FRAP and DPPH assays, which are followed by the nitric oxide, phosphomolybdate, and H₂O₂ radical assays. DPPH > FRAP > H₂O₂ > Nitric oxide > Phosphomolybdate.

OP-VII-05

METABOLIC RESPONSES OF SUNFLOWER SEEDLINGS UNDER DIFFERENTIAL PAR CONDITIONING AND ARSENIC STRESS

Geeta Yadav¹ and S. M. Prasad²

¹Kashi Naresh Government Post Graduate College, Gyanpur, Bhadohi – 221304, U. P. India

²Professor, Ranjan Plant Physiology and Biochemistry Laboratory. Department of Botany
University of Allahabad, Allahabad- 211002, India

[Email: geetayadav.au@gmail.com](mailto:geetayadav.au@gmail.com); profsmprasad@gmail.com

The amount of sunlight that reaches the surface of our planet is not constant, but varies according to different factors such as time of day, season, altitude, latitude and atmospheric composition. Plants have evolved different mechanisms to cope with natural fluctuations in light intensity and protect themselves from excess light. During the last century, the biosphere has been contaminated with heavy metals due to smelting, mining and waste disposal practices. Arsenic in the environment leaches into the soil is absorbed by plants and further enters the food chain and affects food safety. It severely affects the growth and development of plants, and causes toxicity resulting in various biochemical and physiological disorders. Keeping above facts into consideration the present study was aimed to see the effect of arsenic on physiological activities (plant fresh mass, chlorophyll content, photosynthesis, oxidative stress and the antioxidant defence system) of different light acclimated sunflower seedlings.

Key words: Light intensity, Heavy metal, Arsenic, Oxidative stress, Antioxidants

OP-VII-06

PHYSICO-CHEMICAL ANALYSIS OF *PIPER CUBEBA* L.F. AND *ZANTHOXYLUM RHETSA* (ROXB.) DC FRUITS

Farzan Afkham and Meenakshi Sudhir Vaidya

S.V. K. M's Mithibai College of Arts, Chauhan Institute of Science and Amrutben Jivanlal College of Commerce and Economics (Autonomous)

Affiliated to University of Mumbai, Vile Parle - West Mumbai 400056, India.

Email: fafkham786@gmail.com

Fruits like *Piper cubeba* L.f. and *Zanthoxylum rhetsa* (Roxb.) DC have been valued for centuries for their health benefits. *Piper cubeba* L.f. is renowned for its anti-inflammatory, antimicrobial, and digestive properties. *Zanthoxylum rhetsa* (Roxb.) DC is celebrated for its analgesic, anti-inflammatory, and digestive benefits. These spices contain bioactive compounds such as essential oils, alkaloids, and flavonoids, which contribute to their medicinal effects. Physicochemical analysis examines the intrinsic physical and chemical properties of substances, elucidating their composition, stability, and interactions. The present study includes physicochemical parameters like total ash, acid insoluble ash, water soluble ash, extractive values and moisture content. This study will provide the standard values of the parameters of these plants which are of significance as per pharmacopoeial standards.

OP-VII-07

SALINITY/CD INDUCED OXIDATIVE STRESS IN PLANTS: AN INSIGHT IN THE CYTO-PROTECTIVE ROLE OF HO-1 IN THE CHANGING SCENARIO OF CLIMATE CHANGE

G. S. Shekhawat

Centre for Advance Study, Department of Botany, Jai Narain Vyas University, Jodhpur-342001, Rajasthan, Email: gyans.shekhawat@gmail.com

Hemeoxygenase is originally identified as Heme degradation regulator in animals and subsequently characterized as a distinct protein entity in photosynthetic organisms. Hemeoxygenase has recently been identified as a molecule involved in ROS scavenging mechanism in plants. It has been established that HO is induced in plants by several environmental and chemical factors including salinity, heavy metals, UV- radiation and ROS, however, precise mechanisms of these responses still needs to get established.

The study is an attempt to know salt/metal induced changes in metabolism of *Cyamopsis tetragonoloba* and *Vigna radiata*, with special emphasis on various defence mechanisms involved in oxidative stress adaptations and to find the role of HO in oxidative stress tolerance. Hemeoxygenase-1 (HO-1) degrades free heme released from heme proteins with the generation of ferrous iron (Fe²⁺), biliverdin-IXa (BV-IXa), and carbon monoxide (CO). The mechanism of heme cleavage has been conserved between plants and other organisms even though the function, sub-cellular localization, and cofactor requirements of HO-1 differ substantially.

Study confirms the cytoprotective role of HO-1 in salt/Cd induced stress. Activity of HO-1 appeared to be located within chloroplast due to its role in phytochrome synthesis but mitochondria also share its localization. Mitochondrial location of HO might be on its inner membranous space due to its role in the synthesis of electron donor species which facilitates HO catalyzed reaction. Study reports the co-localization of HO-1 in chloroplast and mitochondria.

OP-VII-08

GCMS ANALYSIS AND PHYTOCHEMICAL SCREENING OF WILD UNDERUTILIZED MEDICINALLY IMPORTANT LEGUME *MUCUNA NIVEA* (ROXB). DC.

Kamlakar C. More^{1*}, Sunil Tayade¹, Prashant Gawande¹, and Surendra Manik¹

Department of Botany, Sant Gadge Baba Amravati University, Amravati (M.S.) India;

*Email: kamlakarmore@sgbau.ac.in;

Mucuna nivea (Roxb). DC. is a promising, rare, and wild underutilized medicinal and nutritionally important legume climber (family- Fabaceae). It is used in many ancient health practices, including Ayurveda. This plant is frequently used to treat a wide range of diseases and ailments. Furthermore, *Mucuna nivea* considered as an excellent source of nutrients and utilized in the baking industry as a flavoring agent. The present work aims to carry out qualitative phytochemical tests and Gas Chromatography-Mass Spectrometry (GC-MS) investigation of *Mucuna nivea* leaves and seeds in five different solvents. Alkaloids, flavonoids, tannins, phenols, saponins, glycosides, steroids, and terpenoids are among phytochemicals that tested positive in the preliminary screening. Twenty and twenty-two bioactive metabolites were identified in leaves and seeds by GC-MS analysis, respectively, and they were found to be solvent-specific. Antioxidant, antifungal, antimicrobial, anti-malarial, anti-diabetic, anti-cancer, and hypocholesterolemic attributes are present in *Mucuna nivea* which were reported by the previous researchers. These documented bioactive compounds demonstrate the plant's nutritional significance and support traditional healers' and tribespeople's claims that many illnesses can be cured by using plant parts, particularly leaves and seeds. In conclusion, research on phytochemical screening and GC-MS screened metabolites will direct their future application and use as a medicine and nutraceutical. The existence of these secondary metabolites could support the scientific evidence for many of the *Mucuna nivea* leaves and seeds claimed therapeutic benefits.

Keywords: *Mucuna nivea*, Solvent-based extraction, Phytochemicals, GC-MS analysis

OP-VII-09

IDENTIFICATION OF BIOACTIVE COMPOUNDS IN SEEDS OF *HOLOPTELEA INTEGRIFOLIA* THROUGH GC-MS ANALYSIS AND ASSESSMENT OF ITS UTILITY IN SPORTS NUTRITION

Kana Ram Kumawat and Neha Singh

Department of Sports Bioscience, Central University of Rajasthan, Bandarsindari, Ajmer

Kanaramkumawat2561998@gmail.com

Holoptelea integrifolia (Elm tree) of the family Ulmaceae is being used to treat various human ailments from the ancient period. The present study aimed to report the phytoconstituents of the seeds and their possible use for future reference. The maximum quantity of seed extract was found to be 45.506 % in petroleum ether solvent, 10.35% in methanol, 8.655% in distilled water, and 1.848% in ethyl acetate solvent. GC-MS was performed to identify the phytoconstituents of each extract. The number of peaks of different phytoconstituents was found to be 41, 42, 30, and 15 for petroleum ether, ethyl acetate, methanol, and distilled water extract, respectively. The *In-vivo* and *In-vitro* antioxidant activity of each extract and its effect on lifespan was carried out, further assessing its nutritional profile as potential ingredients of athlete's diets.

OP-VII-10

EFFECT OF IMBIBITION (GA AND LIKE COMPOUND) ON ENZYMATIC ACTIVITY ON *PHASEOLUS VULGARIS* SEEDS

Renu Rani

Assistant Professor, Government Model Degree College, Kapoori Govindpur, Saharanpur

Email-renu31panar@gmail.com

Calliterpenone, a phyllocladane diterpenoid isolated from *Callicarpa macrophylla*, has recently been reported to not only enhance seed germination and biomass production of roots, shoots, and flowers in Angiosperms but also to increase the population of beneficial microorganisms. The current study investigates the effect of calliterpenone on protein content and enzymatic activity in *Phaseolus vulgaris* seeds, comparing the results with those produced by gibberellic acid and distilled water. The maximum protein content and α -amylase activity were observed in seeds treated with 0.01 mM calliterpenone. However, the highest catalase and ascorbate peroxidase activities were recorded in seeds treated with 0.001 mM calliterpenone.

Key Words: Ascorbate peroxidase activity, Calliterpenone, Catalase activity, Protein content, etc

OP-VII-11

EXOGENOUS APPLICATION OF METHYL-JASMONATE CONFERS SALT STRESS TOLERANCE IN *TRITICUM AESTIVUM* L. BY ORCHESTRATED REGULATION OF ANTIOXIDANTS, ROS DETOXIFICATION AND NUTRIENTS BALANCE

Sandeep Kumar Barwal^{1,2}, Sajad Hussain Shah³, Salim¹, Yerramilli Vimala¹

¹Pant Physiology and Tissue Culture Laboratory, Department of Botany, Chaudhary Charan Singh University Meerut- 250004, India

²Department of Botany, NREC College, Khurja, Bulandshahr, Chaudhry Charan Singh University, Meerut - 250004, India

³Advanced Plant Physiology and Biochemistry Section, Department of Botany, Aligarh Muslim University, Aligarh-202002, India

*Email: barwal.sk18@gmail.com

Abiotic stresses severely impact agricultural output worldwide; specifically, salt (NaCl) is very harmful to plant life and harvest success. However, by inducing the plant immune system to resist against abiotic stressors, methyl jasmonate (MeJa) is a newly-emerging signaling molecule in the realm of plant growth regulators that ameliorates the detrimental effects of salt stress in crop plants. The present study was planned to examine the role of exogenous application of MeJa (20 μ M, 30 μ M, and 40 μ M) under different NaCl treatments (0, 50, 75, 100, and 150 mM) on the growth and physico-chemical characteristics of wheat (*Triticum aestivum* L.). Results revealed that growth biomarkers, chlorophyll content, nitrate reductase (NR) and carbonic anhydrase (CA) activity, and N, P, and K concentrations are all substantially reduced when exposed to increasing levels of NaCl. On the other hand, the levels of enzymatic antioxidants (SOD, CAT, POX, APX, GR, GST and GPX), non-enzymatic antioxidant (AsA, carotenoids, glycine betaine, proline, phenolic, and protein contents) and stress indicators malondialdehyde (MDA) and hydrogen peroxide (H₂O₂) are all significantly increased under NaCl stress. The growth characteristics, chlorophyll content, NR and CA activities, and N, P, and K levels of both control and NaCl-stressed plants were dramatically enhanced by the foliar application of MeJa. H₂O₂ and MDA concentration were all decreased, whereas enzymatic and non-enzymatic antioxidants were increased under MeJa treatment. Moreover, confocal microscopy verified that the seedlings exposed to NaCl stress suffered damage to the DNA and lipoprotein membranes of their root cells. However, by the application of MeJa, these harmful effects may be reversed and root cell viability have been improved. In summary, the application of 30 μ M MeJa proved to be superior to lessen the negative impact of NaCl stress.

Keywords: Antioxidants, Cellular viability, Methyl jasmonate, NaCl toxicity, Salt stress, *Triticum aestivum* L.

OP-VII-12

GC-MS PROFILING OF *MARTYNIA ANNUA* L. FRUIT EXTRACTS: ANTIOXIDANT ACTIVITY AND TOXICITY ASSESSMENT USING *CAENORHABDITIS ELEGANS*

Sanjay Saini

Department of Botany, Maharshi Dayanand Saraswati University, Ajmer, India

Email: Sanjay.manidayal@gmail.com

This study aimed to identify the phytochemical components in fruit extracts of *Martynia annua* L. in various solvents and to evaluate the toxicity & antioxidant activity using the model *Caenorhabditis elegans*. The extraction process involved 100 grams of powdered *M. annua* L. fruits and using solvents such as petroleum ether, ethyl acetate, methanol, and water in a Soxhlet apparatus. The GC-MS analysis performed, identified peaks corresponding to seventeen, twenty, twenty-seven, and twenty-two distinct phytochemical compounds in the petroleum ether, ethyl acetate, methanol, and water extracts, respectively. These extracts were found to be non-toxic in in-vivo toxicity test on *C. elegans* and showing anti-oxidant activity in in-vitro and in-vivo tests. These findings underscore the industrial relevance of *M. annua* L. fruits and their potential for various applications will be discussed in detail.

OP-VII-13

EFFECT OF SALICYLIC ACID TREATMENT ON MORPHOLOGICAL BIOCHEMICAL AND PHYSIOLOGICAL PARAMETERS OF *PLUMBAGO ZEYLANICA*

Shachi Singh

Department of Botany, MMV
Banaras Hindu University, Varanasi

Salicylic acid (SA) is a phytohormone, known to regulate various developmental and defense related processes in plants. Exogenous application of this molecule has revealed its elicitor potential by modulating growth and metabolic changes in several plant species. It was observed in our experiments that soil treatment of SA increased growth parameters and enhanced abiotic stress tolerance in *Plumbago zeylanica*. Biological activities; antioxidant, antibacterial and antifungal were also found to be elevated after the treatment. Metabolite profile of the samples were studied by analysing UHPLC-HRMS data. A change in the ion intensity peak of the important naphthoquinones of *P. zeylanica*, including plumbagin, as well as various phenolic acids, polyphenols, flavonoids and fatty acids were observed.

OP-VII-14

PHARMACOGNOSTICAL AND PRELIMINARY PHYTOCHEMICAL CHARACTERIZATION OF STEM OF *CAJANUS SCARABAEOIDES* (L.) THOUARS.

Siddharth K. Katkole and Prof. Varsha D. Jadhav.

Department of Botany, Shivaji University Kolhapur.

E-Mail id- sidkatkole@gmail.com and vdj_botany@unishivaji.ac.in

Cajanus scarabaeoides is a wild underutilized species of the genus *Cajanus*. It belongs to family Fabaceae. Stem is covered with rusty reddish pubescence. Trichomes are present on surface of stem. The present study was aimed for phytochemical screening of the stem of *Cajanus scarabaeoides*. The study has shown the presence of bioactive compounds in stem. The preliminary phytochemical analysis was done using different solvents like methanol, acetone, chloroform, petroleum ether, ethyl acetate, ethanol, toluene, and aqueous. The result showed the detection of alkaloids, phenols, flavonoids, tannins, carbohydrates, and proteins. Methanol, acetone and ethanol are potential solvents. In contrast, proximate analysis reflected the composition of crude fat (0.89%), crude fiber (40.70%), moisture content (58.25%), dry matter (41.75%), crude protein (3.76%), and total ash (4%). Fluorescence analysis showed characteristic coloration when treated with different chemical reagents. The microscopic study revealed the structural and anatomical investigation of stem which showed the epidermis, trichomes, cortex, cambium, pith, xylem and phloem. The present study will provide referential information to better understand the plant to be used as medicine for the treatment of various diseases.

Keywords- *Cajanus scarabaeoides*, phytochemical, bioactive, proximate, Fluorescence microscopic.

OP-VII-15

EFFECTS OF ARSENIC ON GAMETOPHYTE DEVELOPMENT IN *PTERIS VITTATA*

Ritu Jain

Associate Professor, G.M. Momin Women College Bhiwandi, University of Mumbai

Arsenic contamination is a widespread environmental issue with known adverse effects on plant health. This study investigates the impact of arsenic on the development and physiological responses of *Pteris vittata* gametophytes. Mature sporangia were collected from natural populations, and spores were extracted, surface-sterilized, and germinated in Knop & media under controlled conditions. Gametophytes were exposed to arsenic concentrations of 10, 20, 30, and 40 ppm for 30 days. Key parameters including fresh and dry weights, chlorophyll content, and arsenic accumulation were measured. Biomass changes were assessed through weight measurements, photosynthetic activity was evaluated by chlorophyll content, and arsenic uptake was quantified using atomic absorption spectrophotometry. The results reveal how varying arsenic levels affect

gametophyte growth, photosynthesis, and arsenic accumulation, enhancing our understanding of phytoremediation potential and arsenic toxicity in ferns. This study investigates the impact of arsenic on the development of gametophytes in *Pteris vittata*, a hyperaccumulator fern known for its ability to tolerate high levels of arsenic. The research aims to determine the effects of different arsenic concentrations on gametophyte growth and development and identify optimal levels that balance toxicity and developmental success. Our findings reveal concentration-dependent effects on gametophyte morphology, growth rates, and reproductive success, with implications for understanding arsenic tolerance mechanisms in plants. This research provides valuable insights into the mechanisms of arsenic tolerance in plants and highlights the potential of *Pteris vittata* for arsenic remediation.

Key Words- gametophytes, fresh weight, chlorophyll, arsenic

OP-VII-16

Medicinal Activity of *Oxalis corniculata* L. (Family- Oxalidaceae): Assessment of Phytochemical and Pharmacological Properties

¹Rima Julie Bhaunra and ²Ajay Kumar Srivastava

¹Department of Botany, Ranchi University, Ranchi, Jharkhand, India

² Head, Department of Botany, St. Xavier's College, Ranchi, Jharkhand, India

Reports on ethnobotanical survey in Ranchi district of Jharkhand reveal that a total of 18 plant species belonging to 16 families used for the treatment of typhoid disease. The dominant family having highest number of species were Acanthaceae and Verbenaceae (2 species). Decoction and tablets were commonly used for the remedies. *Oxalis corniculata* L. is one of the plant used by tribal communities to cure typhoid disease and the use value (UV) of plant is 0.8. The objective of this research is to conduct the proximate analysis, preliminary phytochemical screening, total phenol and flavonoid contents of plant. *O. corniculata* L. revealed the presence of important phytochemicals, such as Alkaloids, Flavonoids, Saponins, Steroids, Phenols, Tannins, Carbohydrate, Glycosides, Terpenoids and Phlobatannins. Total phenolic content of methanolic extract was 1.981 mg GAE/g and that of aqueous extract was 0.131 mg GAE/g. The total flavonoids content in methanolic extract was 17.6 mg QE/g and that of aqueous extract was 9.6 mg QE/g. This information encourages further pharmacological research which may be the lead to new drug discovery.

Keywords: *Oxalis corniculata*, Phytochemical, Flavonoid, Phenolics,

PP-VII-01

INVESTIGATION OF REGULATORY MECHANISM OF SALINITY TOLERANCE OF *ATRIPLEX GRIFFITHII* AT MORPHO-PHYSIOLOGICAL LEVEL

Deepak Choudhary*¹ and Shweta Jha¹

¹Plant Functional Genomics Lab, Biotechnology Unit, Department of Botany (UGC-Centre of Advanced Study), Jai Narain Vyas University, Jodhpur (Rajasthan)-342001, India.

*Email: jattdeepak086@gmail.com

In many parts of the world, agricultural productivity is restricted by salt stress. *Atriplex* spp. well, suited to the saline and alkaline soils of the desert. It is a Xero-halophyte belonging to the Amaranthaceae family. In the present study, we examined the morphological responses of *A. griffithii* at various concentrations of NaCl ranging from 0-1000 mM NaCl, and employed a range of physio-biochemical assays to assess the accumulation of distinct osmo-protectants, such as proline and glycine betaine, as well as various enzymatic anti-oxidants. This study may provide insight into regulatory mechanism of salinity stress tolerance of *A. griffithii* at the physiological level.

PP-VII-02

IN VITRO CALLUS PROPAGATION AND BIOACTIVE METABOLITES ESTIMATION UNDER SALT STRESS IN *CISSUS QUADRANGULARIS* L. USING HPLC

Juhi Dhillon, Laxman Nagar, and Vimala Y.

Plant Physiology and Tissue Culture Lab, Department of Botany, C.C.S University, Meerut (250004) E-mail: dhillonjuhi1@gmail.com

Higher plants produce diverse bioactive metabolites with different biological activities. These bioactive metabolites are found to be effective against treatment of many diseases. HPLC is an established way to quantify and identify these bioactive metabolites. The aim of current investigation was to develop callus in *Cissus quadrangularis* L. using nodal, internodal and leaf explants on MS medium supplemented with 2mg/L NAA+ 0.5mg/L BA and to check the effect of salt (50mM and 100mM) on the accumulation of these bioactive compounds. The results of the HPLC estimation confirmed the presence of flavonoids (quercetin and kaempferol) and phytosterol (β -sitosterol) in *Cissus quadrangularis* L. callus cultures.

Keywords: BA (Benzyl adenine), *Cissus quadrangularis* L., HPLC (High Performance Liquid Chromatography), NAA (Naphthalene Acetic Acid), salt stress

PP-VII-03

EVALUATION OF SALT-INDUCED OXIDATIVE STRESS AND ITS IMPACT ON VARIOUS GROWTH FACTORS IN *SORGHUM BICOLOUR* L.: AN IMPORTANT CROP OF ARID AND SEMIARID AREA

Nihar Mathur and G.S. Shekhawat

Plant Biotechnology and Molecular Biology Laboratory, Department of Botany,

Jai Narain Vyas University, Jodhpur-342001, Rajasthan, India

E-mail id – niharmathur15@gmail.com

One of the primary and prevalent limitations to the production of crops worldwide is salinity, which has a detrimental effect on the productivity of crop species that are sensitive to salt, particularly in arid and semi-arid regions. Sorghum (*Sorghum bicolor* L.) is the fifth most significant cereal crop, following rice, maize, wheat, and barley. It serves as a basic food for human consumption and cattle feed. It is optimal to semi-arid desert environments due to its drought and salinity resistance. It adapts by maintaining ion balance, activating antioxidant enzymes, osmotic regulatory mechanisms, and cell detoxification. The effects of salinity are best evaluated during the germination and early development stages in sorghum. NaCl concentrations of 10, 25, 50, 75, 100, 125, and 150 mM were applied to *Sorghum* seedlings in Hoagland medium, and growth characteristics such as length, dry weight, fresh weight, leaf water content, and tolerance index were measured after 96 and 120 hrs. of treatment. It has been noted that growth is retarded at higher concentrations (125 & 150 mM) because of an increase in toxicity. In comparison to the control condition (without salt), the leaf water content and tolerance index are significantly lower at higher concentration. The findings will help to create methods for increasing plant resistance to salinity stress, ultimately improving agricultural production in salt-affected soils.

Key Words: - Sorghum, salinity, oxidative stress, ROS, antioxidants, ion balance.

PP-VII-04

INVESTIGATING THE ANTIOXIDANT PROPERTIES AND CHEMICAL COMPOSITION OF *LINUM USITATISSIMUM* L. (FLAXSEED) EXTRACT USING LC-MS ANALYSIS

Sanghadeep S. Ukey

Department of Botany, Lokmanya Tilak Mahavidyalaya, Wani, Yavatmal-445 304
Sant Gadge Baba Amravati University, Amravati
(Email: sanghadeep.ukey92@gmail.com)

This study investigates the antioxidant properties and chemical composition of *Linum usitatissimum* L. (flaxseed) extract using Liquid Chromatography-Mass Spectrometry (LC-MS) analysis. The primary objective is to identify the bioactive compounds responsible for the antioxidant activity and evaluate the efficacy of flaxseed extracts prepared with different solvents. Methodologically, the study employs various antioxidant assays such as DPPH, ABTS, FRAP, and Total Antioxidant Activity (TAA), in conjunction with LC-MS analysis for comprehensive chemical profiling. Key findings reveal that methanolic and ethanolic extracts exhibit the highest antioxidant activities, with significant amounts of phenolic and flavonoid compounds identified. The LC-MS analysis further elucidates the presence of metabolites such as adenosine, abscisic acid glucose ester, and kaempferol 7-O-glucoside, which contribute to the observed bioactivity. The study concludes that flaxseed extracts, particularly those obtained with methanol and ethanol, possess substantial antioxidant potential, underscoring their potential application in nutraceuticals and functional foods.

Keywords: *Linum usitatissimum*, flaxseed, antioxidant, LC-MS analysis, phenolic compounds, flavonoids, bioactive metabolites.

PP-VII-05

APPRAISING THE PHYTOCHEMICAL DIVERSITY, BIO-ACTIVITIES AND CHARACTERIZATION OF COMMERCIAL *W. SOMNIFERA* L. DUNAL VARIETIES

Sarika Sharma

Ashwagandha is a wonder plant having a diverse group of phytochemicals related to medicinal properties. Varieties (Pushti, Poshita, Pratap, Chetak, NIM-118, NIM-101) were analysed for phytochemicals (phenols and flavonoids) in different tissues using ethanolic-water extract and withanolides-extract. The higher phytochemicals were found in the Poshita, Chetak and NIM101 respectively. In addition, the maximum *in-vitro* antioxidant activity was found by withanolides-extract in NIM118-roots, Chetak-leaves and NIM-101-seeds contrasted to ethanolic-water extract. These phytochemicals have anti-bacterial activity against gram-positive bacteria such as *Bacillus subtilis* and *Staphylococcus aureus* subsp. *aureus*. HRMS analysis was employed to elucidate and characterize the specific bioactive compounds for various activities.

PP-VII-06

POLLUTION-INDUCED ALTERATIONS IN STOMATAL BEHAVIOR AND CARBON CONCENTRATING ABILITY ACROSS PLANT TYPES

Tushar D. Mhashakhetri and Shravan D. Kumbhare

Post Graduate Teaching Department of Botany, Rashtrasant Tukadoji Maharaj Nagpur University, Nagpur – 440033, Maharashtra State, India.

The Titratable Acid Number (TAN) measures the carbon concentrating ability (CCA) of plants, influencing their evolution, adaptability, and productivity. We assessed TAN and stomatal properties of herbs, shrubs, and trees in non-polluted and thermal power plant-polluted areas. Herbaceous annual plants showed the least diurnal TAN fluctuation (10.81%), followed by trees (28.31%) and shrubs (31.31%), indicating variations in CCA. Pollution caused significant reductions in TAN, particularly in shrubs (10.85%), and adversely affected stomatal density and index. Correlational analysis revealed that environmental contaminants notably impact stomatal properties, influencing the overall CCA of plants.

PP-VII-07

COMPREHENSIVE PHYTOCHEMICAL AND ESSENTIAL OIL PROFILING OF *POGOSTEMON* SPECIES

S. A. Momin, and R.V. Gurav*

Department of Botany, Shivaji University, Vidyanagar, Kolhapur – 416004.
sam.rs.botany@unishivaji.ac.in , *rvg_botany@unishivaji.ac.in

The study investigated the antioxidant activity, LC-MS Profiling of various secondary metabolites, Essential oil profiling, and quantitative analysis of phytochemicals in different plant parts of five *Pogostemon* species with three different solvent system, commercially known genus *Pogostemon* is also having crucial medicinal properties with aromatic oils and its derivatives which is used in folk medicine in India. The research suggested that specific plant parts can be used instead of the whole plant for the sustainable management of medicinal plants. Phytochemical analysis revealed the presence of diverse bioactive components, with varied quantitative analysis of flavonoids, alkaloids, and total phenolic content in different extracts. Total phenolic content ranged from 73.5–218.24 mg/g as gallic acid equivalent (GAE), and total flavonoid content ranged from 22.1–115.34 mg/g Rutin equivalent (RE). The extracts were also assessed for DPPH, ABTS scavenging radical, and FRAP activity. Additionally, the methanolic extract of *Pogostemon* was subjected to LCMS, confirming the presence of various therapeutic secondary metabolites. Furthermore, The methanolic extract of *Pogostemon* was subject to LCMS, which confirmed the presence of important therapeutic secondary metabolites including alkaloids (Hypaphorine, Lupinate, Iridin), flavonoids (Baptifoline), toxins (Anatoxin a(s)), terpenoids (Allamandin, Coumarin), carboxylic acid (hydroxydecanedioic acid, decenedioic acid, carboxycyclohexyl acetic acid),

peptides (Melanostatin), antibiotics (Nitrovin, Ethambutol), phenolic compounds (5-O-Feruloylquinic acid), and antiviral drugs (Famciclovir, Valganciclovir, Daunorubicin) in the *Pogostemon* species. The GCMS analysis of *Pogostemon* essential oil revealed the presence of several compounds including Germacrene D, Caryophyllene, Ylangene, Levomenol, beta-Ocimene, Alloaromadendrene, Linalool, Spathulenol, tau-Cadinol, L-camphor, Linalyl acetate, Isoitalicene, alpha. -Bisabolol, β -Maaliene, Epicubenol, and Tetrapentacontane.

Keywords- Phytochemical, LCMS, *Pogostemon*, Aromatic Oil

PP-VII-08

**BIOCHEMICAL TOLL OF LEAF COLOUR VARIATIONS IN SAFFLOWER
(*CARTHAMUS TINCTORIUS* L.): A TALE OF LIGHT AND DARK GREEN MUTANTS**

Chaitanya A. Borkar

Department of Botany, RTM Nagpur University, MJP Educational Campus, Amravati Road,
Nagpur- 440033

The penalty of abiotic stresses on plants is increasing under changing climatic condition. Our current knowledge on genetic and molecular mechanisms governing pigment metabolism in plants suggests a more diverse role of chlorophylls on the development of plants. A deeper insight on the altered chlorophyll metabolism under extreme environmental changes, therefore, is needed. Thus, a biochemical study on the two contrasting EMS-induced chlorophyll mutants (dark green and light green) in safflower was undertaken at different developmental stages. These assays include leaf pigments, primary metabolites, respiratory enzymes, and enzymatic antioxidants. Both the chlorophyll variations ultimately resulted in a stressed phenotype in one way or another. A more detailed investigation will ascertain the interplay of chlorophyll metabolism with the changing environmental cues on plant development.

Keywords: abiotic stress, chlorophyll metabolism, leaf-colour mutants, photosynthetic efficiency, stress biology

PP-VII-09

**STUDY OF *IN-VITRO* ANTIUROLITHIATIC ACTIVITY OF AQUEOUS EXTRACT
OF CORN SILK**

Aishwarya Parab, Himanshu Dawda, Usha Mukundan

Department of Biological Sciences, Ramniranjan Jhunjhunwala College, Ghatkopar, Mumbai,
Maharashtra, India.

Corn silk (CS) has been used in traditional Chinese medicine as diuretic and by Native Americans for kidney disorders and urinary tract infections (UTIs). It is known to promote diuresis which can be used in treatment of kidney stones. **Aim:** The aim of present study is to evaluate Corn silk for its antiurolithiatic activity *in-vitro*. **Method:** Aqueous extract of two types of CS were used for the study, American yellow sweet corn silk (YCS) and native white corn silk (WCS). Experimental calcium oxalate (CaOx) crystals were prepared and used for nucleation, aggregation and growth assay. Cystone was used as standard. The effect of cystone and aqueous

extract of CS on *in-vitro* crystallization of CaOx crystals was determined spectrophotometrically. Microscopic evaluation of crystals was performed to visualize changes in their size, shape and arrangement due to cystone and CS extract. **Result:** Aqueous extract of CS showed significant inhibition of nucleation, aggregation and growth of CaOx crystals. Reduction in size, number as well as aggregates of crystals was observed in microscopic study. Aqueous extract of YCS particularly produced morphological change from monohydrate to dihydrate crystals. **Conclusion:** Aqueous extract of corn silk possesses antiurolithiatic activity against crystallization, agglomeration and growth of CaOx crystals. Instability of dihydrate crystals and their shape make it difficult to form aggregates. Therefore, YCS extract shown to be more effective than WCS in inhibiting nucleation, aggregation and growth assay.

Keywords: corn silk, antiurolithiatic, calcium oxalate crystals, kidney stones

PP-VII-10

UNVEILING THE ANTIOXIDANT POTENTIAL OF FLEMINGIA PRECOX VAR. ROBUSTA: A PHYTOCHEMICAL INVESTIGATION

¹Namdev M Sindhikar, ¹Manoj Lekhak, ²Sushamita Patil and ¹Umesh B Jagtap*

¹, *Department of Botany, Rajaram College, Kolhapur-416004

²Department of Biotechnology, Shivaji University, Kolapur-416004

Email*: umeshjagtap93@gmail.com

Flemingia precox var robusta . belongs Fabaceae family and traditionally used to improve male fertility. Qualitative, quantitative and antioxidant properties of leaf and stem extracts is investigated in the present study. Sonication has been used for the preparation of extract by utilizing two solvents acetone and methanol. Phytochemical screening revealed the presence of phenolics, flavonoids and alkaloids steroids based on initial tests The contents of these compounds were assayed by total phenolic content (TPC) and total flavonoid content (TFC), and the antioxidant activity was determined using DPPH. The TPC and DPPH shows strong correlation. This presents potential benefits in reducing risk of various diseases as a result of the antioxidative properties associated with this *Flemingia precox var robusta*.

Keywords: *Flemingia precox var. robusta*, DPPH assay, male fertility and preliminary analysis of total antioxidant activity.

PP-VII-11

IDENTIFICATION OF BIOACTIVE COMPOUNDS AND QUANTIFICATION OF NAPHTHALENE IN *NARDOSTYCHUS JATAMANSI* DC

Piyali Paul¹ Dara Singh Gupta²

¹Research Scholar, University Department of Botany, Kolhan University Chaibasa., 833202. Jharkhand. Corresponding author, E-mail: piyalipauljampot@gmail.com

²Assistant Professor, University Department of Botany, Kolhan University Chaibasa 833202 Jharkhand, E-mail: darasgupta.jcc@gmail.com

Plants with medicinal value play a very significant role in human culture. *Nardostachys jatamansi* DC is a medicinal plant and traditionally rhizomes of *Nardostachys jatamansi* are used for therapeutic ailments. It is used in Ayurvedic medicine system for thousands of years. It has useful bio active properties which is used in indigenous medicines for centuries in India. The Phytoconstituents individually or in the combination determine the therapeutic value of medicinal plant. It belongs to family Caprifoliaceae. It has useful Phytochemicals like Alkaloids, flavonoids, phenolics, tannins, saponins, steroids, glycosides, terpenes etc. with diverse medicinal properties. A Gas Chromatography Mass-Spectroscopy analysis was carried out to identify the biochemical components present in the hexane, ethyl acetate and methanolic extract of *Nardostachys jatamansi* rhizomes suggested presence of Valerenic Acid, Valerenol, Naphthalene, Stigmasterol and Caryophyllenyl alcohol and many more have been reported to be responsible for treating various diseases and neurological disorders. In this study, we have aimed to analyze the phytochemical composition of this plant by GCMS and quantification of Naphthalene was done by HPLC against Naphthalene standard. The plant has wide applications as a herbal medicine. It is widely used to treat epilepsy, hysteria, convulsions, mental weakness, anxiety and insomnia

Key Words: *Nardostachys jatamansi*, phytochemical, medicine, GCMS, HPLC

PP-VII-12

INVESTIGATION OF ANTIULCER EFFECTS OF *SCHLEICHERA OLEOSA* (LOUR.) OKEN. BARK AND LEAVES USING ETHANOL GASTRIC ULCER INDUCTION MODEL IN RATS.

Meenakshi Sudhir Vaidya

S.V. K. M's Mithibai College of Arts, Chauhan Institute of Science and Amrutben Jivanlal College of Commerce and Economics (Autonomous) Affiliated to University of Mumbai, Vile Parle – West, Mumbai 400056, India.

Email: meenakshi.vaidya@mithibai.ac.in

Man from the very beginning has been aware of the problems of life and for a very long time has been taking care of the health through diet and drugs. Plants were used extensively for

cures and general well-being. But it was only in the period of Ayurvedic Samhitas that there were serious attempts in studying the plants scientifically. *Schleichera oleosa* (Lour.) Oken is one such plant which was used and it belongs to family Sapindaceae. It has numerous medicinal properties. For the present study the bark and leaves of *Schleichera* were used to study its anti-ulcer properties. The effect was tested on wistar rats. As compared to 100 mg/kg bark extract, the treatment dose of 200 mg/kg leaves and bark extract were found to be more significant for controlling the ulcerative lesions and restoration of mucosa of stomach with respect to histological observations showing minimal degenerative changes in mucosal lining of stomach of the test animals used.

PP-VII-13

ECOLOGY AND ENVIRONMENT EVOLUTION OF WATER QUALITY INDICES (WQIS) FOR SURFACE AND GROUNDWATER

***Manish Kushwaha and Dr. R.L.S. Sikarwar**

Department of Environmental Science, AKS University, Satna-485001

The majority of Earth's water is mostly found in the hydrosphere, which is not a continuous water covering of the planet. The findings indicate that the water in the studied area is not severely contaminated, but the levels of various parameters are increasing, suggesting a rise in water pollution. This could be attributed to the discharge of industrial effluents into the land and surface water bodies. Therefore, it is crucial to implement protective measures to mitigate water pollution. The quality of groundwater is largely influenced by its chemical composition. Groundwater is widely used as a primary drinking water source in both rural and urban regions worldwide. The current study focused on assessing the quality of underground water in specific regions of Satna district. The analysis was based on various parameters including pH, temperature, electrical conductivity, total hardness, total dissolved solids (TDS), biochemical oxygen demand (BOD), nitrate (NO₃⁻), sulfate (SO₄⁻²), phosphate (PO₄⁻³), chloride (Cl⁻), fluoride (F⁻), bicarbonate (HCO₃⁻), magnesium (Mg⁺⁺), potassium (K⁺), alkalinity, presence of *E. coli* bacteria, and algae. The measurements were conducted in March 2021 using standardized methods. The analysis revealed that the subterranean water quality in the chosen region is suitable for drinking, household, and agricultural uses. This research also demonstrates the seasonal change in water quality, with a modest increase in some chosen metrics detected when comparing data from the pre-monsoon and post-monsoon periods. It suggests that some parameter may exceed the allowable contamination level in the next years.

Key words: Underground water, all chemical, electrical conductivity, total hardness, Alkalinity.

PP-VII-14

IMPACT OF PLANT GROWTH REGULATORS ON THE GROWTH AND YIELD OF CHILLI (*CAPSICUM ANNUUM* L.)

Parshuram V. Pawar

Department of Botany, Madhavrao Patil Mahavidyalaya, Palam Dist Parbhani

Email: drpvpawar74@gmail.com

This study was conducted in an agricultural area in Dharmabad, Nanded district, Maharashtra. The experiment followed a randomized design with three replications and included ten different treatments of plant growth regulators. The findings indicated that foliar treatments positively influenced the vigour and yield-contributing traits of chilli plants compared to the controls. Specifically, Tricentanol and Gibberellic acid, applied as foliar sprays during the flowering and bud stages, significantly enhanced plant height, plant spread, the number of branches, and the number of fruits per plant. These treatments also improved yield-related characteristics such as the time to 25% flowering, fruit set, fruit length, and fruit diameter.

Keywords: Growth regulators, Flowering, Plant height, Plant spread.

PP-VII-15

IMPACT OF MYCORRHIZAE ON BANANA GROWTH ACROSS VARIOUS CULTIVATION SYSTEMS IN NANDED DISTRICT, MAHARASHTRA, INDIA

Hanumnat R Aglave

Department of Botany, Lokmanya Mahavidyalaya, Sonkhed Dist Nanded

Email: dr.hanmantaglave@gmail.com

Nanded district boasts the largest area of banana cultivation in Maharashtra, followed by Jalgaon district. Arbuscular mycorrhizal fungi (AMF) play a beneficial role in enhancing the growth vigour of banana plants. Soil samples from various fields in Nanded revealed a high mycorrhizal frequency of 82.5% and an overall mycorrhizal rate of 27.33%. Vigorous banana plants were found in soils with higher AMF spore counts, while less vigorous plants were associated with soils containing fewer spores. Significant differences were observed in spore quantity among different cultivars. The most prevalent AMF genera identified were *Glomus*, *Acaulospora*, *Scutellospora*, *Gigaspora*, *Diversispora*, *Enterophora*, and *Pascispora*. However, the field data showed no distinct differences in diversity indices, including richness, abundance, and Shannon H.

Keywords: Mycorrhizae, Banana, Vigor.

PP-VII-16

GC-MS METABOLITE ANALYSIS AND ANTIBACTERIAL ACTIVITY OF EUCALYPTUS GLOBULUS EXTRACT

M. M. V. Baig

Department of Botany and Department of Biotechnology, Yeshwant Mahavidyalaya, Nanded 431602, e-mail: mmvbaig@gmail.com

The essential oil from the leaves of *Eucalyptus globulus* was extracted through steam distillation and characterized using GC-MS. This analysis confirmed the presence of thirty-two compounds, accounting for 100% of the oil. The major constituents identified were 1,8-Cineole (80.20%), α -Pinene (8.5%), β -Eudesmol (3.44%), and α -Phellandrene (1.09%). The antibacterial properties of the oil were evaluated using disc diffusion and micro-broth dilution methods against two bacterial isolates. The oil demonstrated moderate antibacterial activity against both Gram negative bacteria, with inhibition zones ranging from 16 to 19 mm and minimum inhibitory concentration (MIC) values between 125 and 500 $\mu\text{g/mL}$. Among the components, 1,8-Cineole and β -Eudesmol were identified as the primary active antibacterial agents.

Keywords: *Eucalyptus globulus*, GC-MS, Antibacterial activity

SECTION- 8
**Plant Biotechnology, Bioinformatics and
Nanobiotechnology**

OP-VIII-01

CHARACTERIZATION AND ANTIMICROBIAL PROPERTIES OF GREEN SYNTHESIZED AGNPS USING *LANTANA CAMARA*

Anamika Ratan¹, Manjul Mungali¹, Sarvesh Singh², Ashwani Kumar¹

¹ Department of Biotechnology, Keraval Verma Subharti College of Science, Swami Vivekanand Subharti University, Meerut, UP.

² Department Of Pharmacology King George's Medical University, Lucknow, UP.

Email: au.gauri@gmail.com

The chemically synthesized silver nanoparticles may produce nanotoxicity. So, green synthesis method is the remedy for nanotoxicity. In the present investigation we use *Lantana camara* for the extracellular synthesis of silver nanoparticles. Extraction of *Lantana camara* was done by hydrothermal method. The beauty of *Lantana camara* is that it act as reducing as well as stabilizing agent for the synthesis of nanoparticles hence here we have no need to add other reagents. The observation indicates the excellent antimicrobial properties of synthesized herbal silver nano particles solution. The formulated gel also has excellent antimicrobial properties with pH of 6.9. This is very near to biological pH. Again the viscosity of the gel was 6305 cps which is excellent to human skin. This makes it a very good candidate for several skin microbial diseases. The formulated herbal antimicrobial gel has significant activity and efficacy under experimental conditions.

OP-VIII-02

GREEN SYNTHESIS AND CHARACTERIZATION OF CALCIUM HYDROXIDE NANOPARTICLES USING COMMELINA BENGHALENSIS L. LEAF EXTRACT

A.V.P. Karthikeyan*¹, C.M. Kiruthika¹ and M. Jay Chithra²

¹ Department of Botany, Government Arts College (A), Thanthonimalai, Karur 639005

² Department of Physics, Government Arts College (A), Thanthonimalai, Karur 639005.

Commelina benghalensis L., also known as the Bengal dayflower. It belongs to the family Commelinaceae. It is traditionally used to treat infertility in women, gonorrhoea, conjunctivitis, malaria and jaundice. In this paper, we discussed on the synthesis and characterization of calcium hydroxide Nanoparticles (Ca(OH)₂NPs) by green synthesis method. Calcium chloride are used to synthesis the Ca(OH)₂NPs by using leaf extract of *Commelina benghalensis*. The structural characterization of synthesized Ca(OH)₂NPs was carried out using XRD, EDAX and SEM. The optical characterization was carried out using PL and UV-Vis absorption and the functional group analysis was performed by FTIR analysis. The XRD pattern indicates that the Ca(OH)₂NPs had a spherical structure. The average crystalline size found to be 44.13 nm. SEM study showed that the powder consists of highly agglomerated nanoparticles resulting from overlapping of small particles. The EDAX analysis spectrum show the formation of Ca(OH)₂NPs. The FT-IR analysis also confirmed the presence of Ca(OH)₂NPs. The UV-Vis absorption peak observed at 225 nm is the characteristics peak of zinc oxide Nanoparticles. The energy gap (E_g) of this peak value is

5.52 eV. The PL spectra of the sample show well defined sharp peaks in UV region. The peaks were excited at 370 nm. The energy gap of these spectrum is 3.35 eV. This is the characteristic peak of $\text{Ca}(\text{OH})_2\text{NPs}$. The green synthesized $\text{Ca}(\text{OH})_2\text{NPs}$ were tested against some pathogenic bacteria. It revealed that the maximum zone of inhibition (ZOI) values was observed as 0.9 mm in *Salmonella typhi* and *Proteus vulgaris* and 0.8 mm in *Bacillus subtilis* respectively.

Keywords: $\text{Ca}(\text{OH})_2\text{NPs}$, *Commelina benghalensis*, XRD, SEM, antibacterial activity.

OP-VIII-03

ANTI BACTERIAL AND ANTICANCER EFFICIENCY OF ZINC OXIDE AND SILVER NITRATE NANOCOMPOSITE BIOSYNTHESIS OF MARTYNIA ANNUA. L.

Bhuvaneshwari. M.

Periyar University

Email: bhuvanam17022000@gmail.com

The present study aims to investigate the potential of *Martynia annua* plant leaves in this context. Characterization studies have been conducted using a range of instruments for detection purposes. The formation of AgNO_3 and ZnO Nano composite from bioactive compounds in leaf extracts has been examined through UV-Vis spectrum, FTIR analysis, XRD, SEM with EDAX and Zeta potential analyses. The biological activities of these nanoparticles, including antibacterial, antioxidant, and anti-proliferative properties of A549 cell lines (Human lung adenocarcinoma cancer IC_{50} 47.86 $\mu\text{g/ml}$), have been assessed. The synthesized nanoparticles from plant sources exhibit promising pharmacological and environmental applications. The findings from this research offer insights into the development of novel drugs to address various human ailments.

OP-VIII-04

IDENTIFICATION OF NATURAL INHIBITORS OF *ALLIUM HOOKERI* THWAITES AGAINST EGFR-KINASE USING MOLECULAR DOCKING, MOLECULAR DYNAMICS SIMULATION AND MMPBSA APPROACHES

Deepti Teotia and Vijai Malik

Department of Botany, CCS University Meerut

Email: teotiadeepti7@gmail.com & vijaimalik1973@gmail.com

This study aims to identify natural inhibitors of the epidermal growth factor receptor kinase (EGFR-K) using a comprehensive in silico approach. The current study has been carried out to predict compounds of *Allium hookeri* Thwaites with potent anticancer activity against EGFR-kinase, by means of docking-based virtual screening process carried out by using Autodock 4.2 and Vina software. Natural compounds of the aforementioned species were screened through molecular docking to evaluate their binding affinities to the EGFR-K active site. Top candidates exhibiting strong binding were further analyzed using molecular dynamics (MD) simulations to assess the stability and conformational dynamics of the protein-ligand complexes. Additionally,

the molecular mechanics Poisson-Boltzmann surface area (MMPBSA) method was employed to calculate the binding free energies, providing insights into the interaction energetics. The integrated approach identified several natural compounds with high binding affinities, stable interactions, and favorable binding free energies. These findings suggest that these natural inhibitors have the potential to effectively inhibit EGFR-K, laying the groundwork for future experimental validation and development of new therapeutic agents for conditions driven by EGFR-K activity.

Key words: *Allium hookeri*, anticancer activity, EGFR-kinase, Molecular docking, MD Simulation, MMPBSA

OP-VIII-05

ENHANCED DYE PRODUCTION IN *LAWSONIA INERMIS* (L.) USING IN VITRO AEROPONIC REGENERATION TECHNIQUES

Kishor Joshi and Kheta Ram

Molecular Biology and Plant Systematics Laboratory, Department of Botany, Jai Narain Vyas University, Jodhpur – 342005, Rajasthan (India)

* Email: ramkheta@gmail.com, joshikrish08@gmail.com

Lawsonia inermis (L.), known as Mehndi or Henna, is a monotypic species in the Lythraceae family with significant medicinal and commercial value. It is widely used as an ornamental plant and a source of natural dye, with its various parts being historically employed in traditional remedies for numerous human diseases. This study explores the application of aeroponic techniques for the vegetative propagation of *L. inermis*. We investigated the effects of different concentrations of Indole-3-butyric acid (IBA) (100, 200, 300, 400, 500 ppm) on root induction and morphological characteristics. The optimal rooting response was achieved with 200 ppm IBA treatment for 20 minutes. Furthermore, stem cuttings treated with 100 ppm IBA for 5 minutes exhibited an 88% rooting response when grown in soilrite. Mature stem cuttings showed the highest rooting efficiency. Compared to soil-grown cuttings, those rooted aeroponically developed a greater number of roots and longer root lengths. These findings suggest that aeroponic techniques combined with IBA treatment can significantly enhance the rooting and growth of *L. inermis*, thereby improving its mass production for dye extraction and other uses.

Keywords: Adventitious root, Aeroponics, Stem cutting, *Lawsonia inermis*

OP-VIII-06

BIOACTIVE POTENTIAL OF METHANOLIC LEAF EXTRACT OF *SECAMONE EMETICA* FOR ANTIOXIDANT, ANTI-INFLAMMATORY AND ANTICANCER ACTIVITIES: INTEGRATING MOLECULAR DOCKING AND DYNAMICS SIMULATION AGAINST COX ENZYME

Madhavan Sowmiya and Kuppusamy Selvam*

Inflammatory process and its associated illnesses pose the greatest threat to public health. *Secamone emetica* is an important medicinal plant used in traditional medicine. But still that has not been studied much for its pharmacological properties. Primary aim of this study was to investigate the phytochemical composition and biological effectiveness of *S. emetica* as anti-inflammatory and antiproliferative agent. The methanolic leaf extract of *S. emetica* was prepared using soxhlet extraction and the biochemical characterization was done by GC-MS and FTIR analysis. *In-vitro* anti-inflammatory activity was done by HRBC membrane stabilization (62.78 %) and albumin stabilization (56.87 %) assay with the IC₅₀ value of 81.48 µg/mL and 91.18 µg/mL respectively. Methanolic leaf extract demonstrated prominent inhibitory activity against A549 lung cancer cells with 38.10 % of cell viability and the IC₅₀ value is 74.13 µg/mL. Compounds identified in GC-MS analysis were assessed for their interactions with the active sites of Cyclooxygenase enzymes (COX-1 and COX-2) in *in-silico* study. SwissADME, pkCSM and PROTOX-II online tools were used to predict the pharmacokinetic and toxicity properties of selected compounds. For *in-silico* analysis three compounds showed the strong binding affinity against both COX-1 and 2 enzymes. This study shows that Pyrrolo[2,3-b] indole, 1,2,3,3a,8,8a-hexahydro-3a-methyl-, (3aS-cis)-, Isosorbide, diacetate and 2-(1,3-benzothiazol-2-ylsulfanyl) ethanol molecules from *S. emetica* leaf extract has the ability to bind with COX-2 and indirectly contribute to anticancer property. The results of this work will encourage additional *in-vivo* investigation into the use of *S. emetica* as potential therapeutic agent against inflammation and cancer related diseases.

Keywords Anti-Inflammatory; Cytotoxicity; NSAIDs; Cyclooxygenase; *In-silico* studies

OP-VIII-07

SYNTHESIS AND CHARACTERIZATION OF CHITOSAN-ENCAPSULATED ZINC OXIDE NANOCOMPOSITE FOR ANTIBACTERIAL AND ANTIDIABETIC ACTIVITY USING *BREYNIA VITIS-IDAEA*

Mathiazhagan Lavanya*, Kuppusamy Selvam

Department of Botany, Periyar University, Periyar Palkalai Nagar, Salem-636 011, Tamil Nadu, India. Email: selsarat@yahoo.com

Polymer-functionalized metal oxide nanocomposites have garnered significant interest due to their wide range of applications, particularly in the field of nanomedicine. The present study reports a composite of chitosan-supported ZnO nanoparticles (CS/ZnO) was green-synthesized via an easy and cost-effective method using *Breynia vitis-idaea* leaf extract. The nanocomposites were characterized using UV-Vis spectroscopy, FT-IR, XRD, FE-SEM with EDaX and the crystalline structure were analysed through zeta potential. Antibacterial activity and minimum inhibitory concentration of the synthesized nanocomposite were assessed against pathogenic bacteria such as, *Staphylococcus aureus*, *Escherichia coli*, *Enterococcus faecalis* and *Klebsiella pneumoniae*. The antioxidant activity was analysed using DPPH, ABTS, phosphomolybdenum and metal chelation assays. CS/ZnO nanocomposite showed strong inhibition activity on α -amylase and α -glucosidase having a % of inhibition is 65% and 58% respectively at the concentration 500 μ g/mL.

OP-VIII-08

IN-VITRO MASS MULTIPLICATION OF ORNAMENTALLY POTENTIAL WILD ORCHID *EULOPHIA NUDA* LINDL. AND *EULOPHIA ANDAMANENSIS* RCHB.F.

M.S. Jadhav, R.V. Gurav*

Department of Botany, Shivaji University,
Vidyanagar, Kolhapur – 416004.

jadhavm790@gmail.com , *rvg_botany@unishivaji.ac.in

The aim of the study is to conserve the ornamentally valuable and endangered species *Eulophia nuda* and *Eulophia andamanensis* by mass producing and commercializing them. The floriculture industry constantly seeks new varieties of flowering plants that can adapt to changing environments, thrive in different locations, and boast attractive flowers or inflorescence, while maintaining their original characteristics and having a long shelf life after cutting. Mass multiplication of such species is carried out for commercial purposes using tissue culture techniques. This study involves a comprehensive analysis of existing literature and research on the genus *Eulophia*, focusing on taxonomy and mass multiplication through various methods. By delving into these areas, the study aims to uncover the untapped potential of *Eulophia* and its possible contributions to conservation through plant biotechnology. Two species from the genus *Eulophia* were specifically studied, with 24 quantitative characteristics selected for ornamental potential studies as potted plants. In addition, in vitro asymbiotic seed germination studies were

conducted using four different semi-solid media at 16 different concentrations, and the growth performance was assessed with two plant growth regulators, IBA and BAP, ranging from 0.5 mg/l to 2.0mg/l for each PGR. The study found that full strength of Kn. C showed the highest germination at $93.76 \pm 0.65\%$ for *Eulophia nuda* and $92.32 \pm 1.11\%$ for *Eulophia andamanensis* after 40 days of inoculation on solid media, which were further fortified with the same concentration of liquid media. No growth regulators were used during seed germination for any concentration. For the proliferation of the protocorms, adding MS medium with 1.5mg/l IAA produced effective results in both species. Shoot numbers further increased with each successive transfer onto the same medium. The rooted plantlets were gradually acclimatized to the greenhouse (with 80% survival rate) and exhibited normal morphology and growth characteristics.

OP-VIII-09

***ILLICIUM VERUM* HOOK. F. ESSENTIAL OIL INFUSED CHITOSAN NANOEMULSION AS SHELF-LIFE ENHANCER OF CUSTARD APPLES**

Monisha Soni* and Abhishek Kumar Dwivedy

Laboratory of Herbal Pesticides, Centre of Advanced Study (CAS) in Botany, Banaras Hindu University, Varanasi-221005

Email: monishasoni1@gmail.com

The present investigation deals with the encapsulation of *Illicium verum* Hook. f. essential oil into chitosan nanoemulsion (IVNPs) and evaluating its effectiveness as a coating agent with controlled release behavior for protection of custard apples against post-harvest deterioration. The IVNPs were characterized through SEM, AFM, XRD and FTIR analysis. During *in vivo* investigation, coating custard apples with IVNPs inhibited fungal contamination and maintained the quality attributes such as, weight, pH, total soluble solids, phenolic content, antioxidant activity, and sensorial qualities. Based on above findings, the IVNPs can act as novel, nano-smart coating agent to extend the shelf-life of custard apples.

Keyword: *Illicium verum* essential oil; Chitosan nanoemulsion; Antifungal; Post-harvest loss; Custard apple shelf-life; Coating agent

OP-VIII-10

***CENTRATHERUM PUNCATUM* MEDIATED GREEN SYNTHESIS OF GOLD NANOPARTICLES AND ITS ANTIOXIDANT, TOXICITY AND ANTICANCER ACTIVITY**

***N Ahamed Sherif and A Nizar Ahamed**

PG and Research Department of Botany, Jamal Mohamed College (*Autonomous*), Bharathidasan University, Tiruchirappalli – 620 020, Tamil Nadu, India

*Corresponding Author: nahamedsherif@gmail.com

The present study revealed the green synthesis, characterization, antioxidant, toxicity and *in vitro* anticancer activities of gold nanoparticles (AuNPs) derived from aqueous leaf extracts of *C. punctatum*. The green synthesized AuNPs morphological, physical and chemical properties were characterized through different instrumentation facilities. Further, the AuNPs toxicity analysis was carried out using *Artemia salina* as an animal model. The AuNPs showed potent antioxidant activity and exhibited significant cytotoxicity against human lung cancer cell line (A549). This study suggests that the green synthesized AuNPs from *C. punctatum* could be used effectively in biomedical engineering.

OP-VIII-11

ANTI MICROBIAL AND ANTIPROLIFERATIVE EFFICIENCY OF ZINC OXIDE NANOPARTICLE BIOSYNTHESIS OF ECBOLIUM VIRIDE (FORSK)

Nandhini. S. and K. Selvam

Periyar University

Email: nandhinism2000@gmail.com

The present study aims to investigate the potential of *Ecbolium viride* plant leaves for developing green medicine. Characterization studies have been conducted using a range of instruments for detection purposes. The formation of zinc oxide nanoparticles from bioactive compounds in leaf extracts has been examined through UV–Vis. spectrum, FTIR analysis, XRD, SEM with EDAX and Zeta potential analyses. The biological activities of these nanoparticles, including antibacterial, anti-inflammatory against HeLa cell line (IC₅₀ value 287.7 µg/ml), antioxidant (IC₅₀ value 199.261 µg/ml), and anti-proliferative properties (cervical cancer IC₅₀ 97.6 µg/ml), have been assessed. The synthesized nanoparticles from plant sources exhibit promising pharmacological and environmental applications. The findings from this research offer insights into the development of novel drugs to address various human ailments

PRIMARY METABOLITE CONTENTS, PROTEOMIC AND ANTIOXIDANT ANALYSIS OF *SPIRULINA PLATENSIS*

Neelam Solanki* and Suman Parihar

Plant Biotechnology & Molecular Biology Laboratory,
Department of Botany, JNV University, Jodhpur-342005, Rajasthan
Email id-neelam606061@gmail.com

Spirulina is a multicellular, filamentous cyanobacterium, belonging to the *Spirulinaceae* family. It contains a wide spectrum of nutrients that include proteins with all essential amino acids, carbohydrates, vitamins, minerals, pigments, carotenoids and antioxidants apart from trace elements. It also consists of different phytochemicals which are biologically significant and play an important role in treatment of cancer, tuberculosis, inflammation and many other blood-related diseases. When cultured and grown in different media highest content of protein, carbohydrate and lipid was 59.87%, 21.03% and 10.58% respectively as detected in the *S. plantensis* cultured in the modified ZM. Lower MDA level 0.97 $\mu\text{mol/g}$ was observed in modified ZM compared to other media. In SDS-PAGE different concentrations of the metal ratio gave variation in the protein expression of the *Spirulina* cultured in modified ZM and expression of some novel proteins was also observed. The enzymatic activities via LPO and SOD were also increased with increased level of elicitor as compared to control. The resulting data showed that the nutrient concentration in the *S. plantensis* cultures have increased after elicitation. It was also observed that metal stress stimulates *Spirulina* to express stress proteins along with some novel proteins as well as higher antioxidant activity to mitigate the adverse conditions.

Keywords: *Spirulina platensis*, Cyanobacteria, Malondialdehyde, Elicitors.

Abbreviations: ZM (Zarrouk's Medium), MDA (Malondialdehyde), SDS-PAGE (Sodium dodecyl-sulphate polyacrylamide gel electrophoresis), LPO (Lipid peroxidase), SOD (Superoxide dismutase).

OP-VIII-13

INSIGHTS INTO MECHANISM OF SALINITY STRESS TOLERANCE FACTORS IN ATRIPLEX, AN IMPORTANT XERO-HALOPHYTIC SPECIES

Shweta Jha^{1*}, Sudipa Maity², Deepak Choudhary¹ and Kiran Ambatipudi²

¹Plant Functional Genomics Lab, Biotechnology Unit, Department of Botany (UGC-Centre of Advanced Study), Jai Narain Vyas University, Jodhpur (Rajasthan)-342001, India

²Department of Biotechnology, IIT-Roorkee, Roorkee (Uttarakhand)-247667, India

Email: jha.shweta80@gmail.com

Halophytic plants exhibit high tolerance for salinity by maintaining a high osmotic potential. In the present study, we have investigated salt-adaptation mechanism of an important xero-halophytic species- *Atriplex*. Results indicated that *Atriplex* spp. can tolerate upto 400 mM of NaCl. To elucidate the mechanism of salinity tolerance in the *Atriplex* spp., a 2-DE based proteomic approach combined with MS/MS was used. A total of 107 protein spots exhibited significant changes with at least 1.5-fold differences in abundance. We have identified a total of 29 differentially expressed proteins through MS/MS analysis, which were further analyzed in-silico. This study has provided new insights into molecular mechanism of salt-stress response in *Atriplex* spp. using proteomics-based approaches.

OP-VIII-14

ENHANCED PHENOLICS PRODUCTION IN CASSIA FISTULA THROUGH AUXIN AND CYTOKININ OPTIMIZATION

Sushil Kumar^{1*}, Vimala Y²

¹Department of Botany, Shaheed Mangal Pandey Govt. Girls PG College, Meerut

²Department of Microbiology, Chaudhary Charan Singh University, Meerut

Email: skg1979@gmail.com

This study explored the optimization of plant tissue culture for enhancing phenolic production in *Cassia fistula*. Callus cultures were established and subjected to various auxin and cytokinin combinations. Results indicated that auxins, particularly NAA and IBA, promoted phenolic accumulation, while cytokinins influenced this response. Optimal phenolic content was achieved with 2,4,5-T but at the expense of callus growth. A trade-off between biomass and phenolic production was observed. This research demonstrates the potential of tissue culture for sustainable phenolic production from *C. fistula* but highlights the need for a balanced approach to maximize both yield and biomass.

NANOPARTICLES BASED AMELIORATION OF ABIOTIC STRESS IN AGRICULTURE FOR ENHANCED CROP PRODUCTIVITY

Prof. Nilima Kumari

Dept. of Bioscience and Biotechnology, Banasthali Vidyapith, Rajasthan- 304022, India

Email: nilima_km@yahoo.com

Agricultural crops face significant yield losses due to abiotic stresses which affect biochemical, physiological, and molecular processes within plants, leading to diminished growth and productivity. Recent advancements in agri-biotechnology, particularly the use of nanoparticles (NPs), has emerged as a new and effective strategy to enhance crop resilience under adverse conditions. Zinc oxide, iron oxide, and silicon dioxide NPs were synthesized using different plant extracts, characterized and their effect was observed under abiotic stress in selected crops. The application of NPs alleviated the adverse effects of abiotic stress and led to increase in growth, yield, activity of antioxidative enzymes, photosynthetic efficiency, gene expression and decreased lipid peroxidation. Hence, the application of NPs can be considered as an effective approach to increase crop production in a dose dependent manner and may be used as nano fertilizers to enhance plant growth and protect them against abiotic stress.

PP-VIII-01

ENGINEERED NANOPARTICLES (ENPS) AS NANO-FERTILIZERS FOR SUSTAINABLE AGRICULTURE: IN CHANGING SCENARIO OF CLIMATE

Bhawana Palawat and G. S. Shekhawat

Plant Biotechnology and Molecular Biology Lab., Department of Botany, Jai Narain Vyas University, Jodhpur (Rajasthan) 342001
Email: palawatbhawana@gmail.com

The global climate change raised challenge for food security, and it demands efficient methods to improve quality of crops. Nanoparticles associated with fertilizers serve as Nano-fertilizers, which could be applied through seed treatment, foliar spraying, soil amendment, and integration into hydroponic systems in crops. Nano-fertilizers are of sub microscopic sizes, have a large surface area to volume ratio, can have nutrient encapsulation, and greater mobility hence they may increase plant nutrient access and crop yield. Moreover, nano fertilizers enhance photosynthetic efficiency, water use efficiency, and stress tolerance through non-enzymatic and enzymatic activity. Additionally, nano fertilizers increase antioxidant enzymes activity by reducing oxidative damage. The use of nano-fertilizers reduces toxicity of chemical fertilizers by improving nutritional quality and yield to produce climate resilient crop.

Key words: Nanoparticles, Nano-fertilizer, Nutrient uptake, Antioxidant, Stress tolerance.

PP-VIII-02

IN VITRO PROPAGATION OF *CYPERUS ARENARIUS* HANCE EX C.B. CLARKE: A SEDGE PLANT OF INDIAN THAR DESERT

Ishaka Sharma*¹ Ashok Kumar Patel¹

¹Biotechnology Unit, Department of Botany, UGC - Centre of Advanced Study (CAS), Jai Narain Vyas University, Jodhpur - 342 001, Rajasthan (India)

*Email: ishakasharma5@gmail.com

Cyperus arenarius Hance ex C.B. Clarke (Family – Cyperaceae) is a low stoloniferous perennial of sand dunes. This plant was one of the pioneer plants to emerge on sand dunes. This species endures hot summers by utilizing its sheathed stolons and rhizomes, and it produces new branches with the onset of rain. The sedge helps prevent soil erosion and serves as fodder for animals. Economically, *C. arenarius* is valuable for its essential oil components, such as cyperotundone and Cyperene. In vitro regeneration studies utilized nodal segments and leaf tissues as explants. The optimal results were achieved with MS medium supplemented with 1.0 mg l⁻¹ BAP and 0.1 mg l⁻¹ NAA, resulting in an average of 2.28±0.45 shoots per nodal segment. Additionally, callus regeneration was successfully induced using internodal explants on MS medium with varying concentrations of 2,4-D, with the best results obtained at 2.0 mg l⁻¹ 2,4-D. This study provides a foundation for large-scale propagation of this species.

PP-VIII-03

IN VITRO CALLOGENESIS OF *CONVOLVULUS PROSTRATUS* AND EVALUATION OF ITS PRIMARY METABOLITES

Gourav* and Suman Parihar

Biotechnology Laboratory, Department of Botany, JNV University, Jodhpur-342005, Rajasthan

Convolvulus prostratus Forssk. Commonly known as 'Shankhpushpi' belongs to *Convolvulaceae* family. It is an indigenous herb commonly found on sandy or rocky ground under xerophytic conditions in northern India. It has been used traditionally for improvement in memory and cognitive function in cases of dementia, epilepsy, depression, anxiety and CNS disorder. In the present study, leaf explants of *C. prostratus* were cultured on MS medium supplemented with different concentrations of 2,4-D and BAP. For optimum growth and proliferation of callus, 2,4-D (2 mg/L) with BAP (0.4 mg/L) were found suitable on MS medium. Primary metabolites assay was evaluated for carbohydrate, protein, lipid, phenol and chlorophyll content. The comparative analysis of *in vitro* and *in vivo* plant would help in understanding growth parameters and metabolite profile of the chosen plant and hence helpful in conservation of this important medicinal plant and also in improved metabolite production.

PP-VIII-04

SYNTHESIS, CHARACTERIZATION, AND APPLICATION OF CHITOSAN NANOPARTICLES FOR ENHANCING GROWTH, YIELD, ANTIOXIDANT ENZYME ACTIVITY, AND RESOURCE EFFICIENCY IN CHICKPEA CULTIVATION

Mohan Kapse and Dhiraj Naik

Department of Botany, Bajaj College of Science, Wardha

This study investigates the use of chitosan nanoparticles (CHNPs) to enhance chickpea (*Cicer arietinum*) cultivation. CHNPs were synthesized via ionic gelation and characterized, showing an average size of 150-200 nm. Higher chitosan concentrations positively impacted plant growth, yield, and antioxidant enzyme activity, vegetative growth, pod quality and resource efficiency compared to the control group. These findings suggest that CHNPs are an effective and environmentally friendly approach to increase chickpea productivity and promote sustainable agricultural practices.

PP-VIII-05

TYLOPHORA INDICA: A POTENTIAL MEDICINAL PLANT FOR ASTHMA AND BRONCHITIS

Krishna Pyare * and Suman Parihar

Plant Biotechnology and Molecular Biology Laboratory, Department of Botany, JNV University, Jodhpur-342005, Rajasthan

Tylophora indica (syn *T. asthmatica*), commonly known as 'Damabel' is a perennial woody climber of family *Apocynaceae*, widely distributed in Asia, Africa, Australia and Oceanic islands. It is used as a traditional folk medicine and as an ingredient in Ayurvedic and Unani medicine. It is used to treat asthma, inflammation, bronchitis, diarrhoea, allergies, rheumatism, dermatitis, syphilis, fever, eye diseases, urinary disorders. Apart from these medicinal properties, it also shows some pharmacological activities i.e., antitumor, antioxidant, anticonvulsant, antidiabetic, and hepatoprotective. The herb contains certain bioactive compounds like alkaloids, flavonoids, tannins and saponins. Some of the major alkaloids include *tylophorine*, *tylophorinine* and *tylophoridine*. Through *in vitro* cultivation, it would be possible to preserve and conserve this endangered medicinal plant.

Keywords: *Tylophora indica*, Medicinal plant, Pharmacological activities, *in vitro* cultivation.

PP-VIII-06

EFFECT OF CARBON SOURCE ON MULTIPLE SHOOT INDUCTION IN *BETA VULGARIS* SSP. *VULGARIS* L.

Sachita Meshram

Department of Botany, Rashtrasant Tukadoji Maharaj Nagpur University, MJP Education Campus, Amravati Road, Nagpur- 440033 Email: meshramsachita08@gmail.com

Red beet is a commercially important crop of India researched mainly for its red coloured betalain pigment. The earlier study in the laboratory proved that shoot-tip explant supports multiple shoot induction the most in red beet. Efficient multiple shoot induction was obtained over MS medium by culturing either 14d-old shoot-tip in presence of 0.5 μ M BAP or 8d-old shoot-tip in presence of 1.0 μ M BAP + 0.5 μ M NAA. The present study was carried-out to investigate the effect of carbon source on induction of multiple shoots in the shoot-tip explant of red beet. To achieve this goal various sugars viz., sucrose, maltose, glucose and fructose were evaluated for their efficiency to induce multiple shoots at 2.5, 3.0, and 3.5% concentration. Therefore, shoot-tip explant was cultured over the media containing varying amount and nature of carbon source. As far as concentration is concerned, 3.0% sugar supported the induction of multiple shoots followed by 3.5%. Similarly, among all sugar's sucrose promoted multiple shoot induction the most followed by maltose and fructose. Glucose, on the contrary inhibited shoot induction in the present study. **KEYWORDS:** culture medium, micropropagation, regeneration, shoot-tip explant, sugar

PP-VIII-07

ENHANCED DYE PRODUCTION IN *LAWSONIA INERMIS* (L.) USING *IN VITRO* AEROPONIC REGENERATION TECHNIQUES

Kishor Joshi and Kheta Ram

Molecular Biology and Plant Systematics Laboratory, Department of Botany
Jai Narain Vyas University, Jodhpur – 342005, Rajasthan (India)

* Email: ramkheta@gmail.com, joshikrish08@gmail.com

Lawsonia inermis (L.), known as Mehndi or Henna, is a monotypic species in the Lythraceae family with significant medicinal and commercial value. It is widely used as an ornamental plant and a source of natural dye, with its various parts being historically employed in traditional remedies for numerous human diseases. This study explores the application of aeroponic techniques for the vegetative propagation of *L. inermis*. We investigated the effects of different concentrations of Indole-3-butyric acid (IBA) (100, 200, 300, 400, 500 ppm) on root induction and morphological characteristics. The optimal rooting response was achieved with 200 ppm IBA treatment for 20 minutes. Furthermore, stem cuttings treated with 100 ppm IBA for 5 minutes exhibited an 88% rooting response when grown in soilrite. Mature stem cuttings showed the highest rooting efficiency. Compared to soil-grown cuttings, those rooted aeroponically developed a greater number of roots and longer root lengths. These findings suggest that aeroponic techniques combined with IBA treatment can significantly enhance the rooting and growth of *L. inermis*, thereby improving its mass production for dye extraction and other uses.

Keywords: Adventitious root, Aeroponics, Stem cutting, *Lawsonia inermis*

PP-VIII-08

ENHANCING SUGARCANE GROWTH AND RESILIENCE: THE ROLE OF PLANT GROWTH-PROMOTING RHIZOBACTERIA (PGPR)

Aditya Pathak¹, Pankaj Kumar¹, Himanshu Kumar¹, Malyaj R. Prajapati², Jitender Singh³, Rekha Dixit¹ and Kamal Khilari¹

¹College of Biotechnology, SVPUAT Meerut-250110

²ICAR- IARI- New Delhi

³Department of Microbiology, CCS University Meerut

Plant Growth-Promoting Rhizobacteria (PGPR) are beneficial microorganisms that colonize the rhizosphere and enhance plant growth and development through various mechanisms. This study explores the role of PGPR in sugarcane cultivation, focusing on their ability to improve nutrient uptake, enhance stress tolerance, and promote overall plant health. Key PGPR strains such as *Pseudomonas aeruginosa*, *Mesorhizobium loti*, *Bacillus* sp., *Bradyrhizobium* sp. BMP17, and *Sinorhizobium meliloti* and MSSP facilitate biological nitrogen fixation, phosphate solubilization, and the production of phytohormones such as indole-3-acetic acid (IAA), cytokinins, and gibberellins. These phytohormones collectively contribute to increased root length, surface area, and nutrient absorption. Additionally, PGPR secrete 1-aminocyclopropane-1-

carboxylase (ACC) deaminase, reducing ethylene levels and mitigating stress responses in plants. The application of PGPR in sugarcane not only reduces the dependency on chemical fertilizers and pesticides but also promotes sustainable agricultural practices by enhancing soil fertility and plant resilience. This review highlights the potential of PGPR as a sustainable alternative to conventional agricultural inputs, offering insights into their mechanisms of action and benefits for sugarcane productivity.

Keywords: PGPR, Indole-3-acetic acid (IAA), Cytokinins, Gibberellins, 1-aminocyclopropane-1-carboxylase (ACC) deaminase.

PP-VIII-09

CHARACTERISTICS OF MICROBIOME IN SUGARCANE RHIZOSPHERE USING HIGH-THROUGHPUT METAGENOMICS

¹Himanshu Kumar, ²Malyaj R. Prajapati, ¹Pankaj Kumar 1, ³Jitendra Singh, ¹Aditya Pathak 1, ¹Rekha dixit 1, ¹Satya Prakash 1, ¹Kamal Khilari

¹Sardar Vallabhbhai Patel University of Agriculture and Technology, Meerut, U.P. 250110

²ICAR - Indian Agricultural Research Institute, Pusa, New Delhi, Delhi 110012

³Chaudhary Charan Singh University, Meerut, Uttar Pradesh 250001

Sugarcane (*Saccharum officinarum* L.) is an important crop, vital to the economy of tropical and subtropical regions, including India, where Uttar Pradesh is a leading producer. Besides being a primary source of sugar, sugarcane provides bioenergy, ethanol, and other industrial products. However, its productivity varies, with some fields yielding more despite similar agronomic practices. A key factor in this disparity is the rhizospheric microbiome. The rhizosphere narrow region of soil, plays a crucial role in plant growth. By analysing the microbial communities associated with sugarcane rhizosphere, we aim to explain the interactions between plants and their microbial partners that contribute to growth and development. According to our findings, the microbial population is dominated and diversified, with bacterial phyla like Pseudomonadota, Bacillota, Bacteroidota, Candidatus, Saccharibacteria, Actinomycetota, Myxococcota, Acidobacteriota, and Planctomycetota predominating. Nitrogen-fixing bacteria, and plant growth-promoting rhizobacteria (PGPR), which are known to improve nutrient availability and promote plant growth, are some of the important functional groups found. Furthermore, we demonstrate that specific microbial taxa are consistently associated with high and low yielding sugarcane, suggesting their potential as bioindicators for crop health and productivity. This study highlights the significance of rhizosphere bacteria in the context of sustainable sugarcane farming. To increase sugarcane resilience and yield, this study lays the groundwork for future investigations into the advantageous characteristics of rhizosphere bacteria.

Keywords: Microbiome, Rhizosphere, *Saccharum officinarum*, 16S rRNA, High-throughput Sequencing.

Current status of epiphytic lichens diversity in Satna district, Madhya Pradesh

Shweta Tiwari¹, Gaurav K. Mishra^{2*}, Kanchan Awasthi¹, D.K. Upreti²

¹Maharishi University of Information Technology, Lucknow, Uttar Pradesh-226013

²CSIR–National Botanical Research Institute, Lucknow, Uttar Pradesh-226001

*Corresponding author email address: gmishrak@gmail.com

The district is situated in the eastern part of Madhya Pradesh between 23°58' to 25°12' N and 80°21' to 81°23' E (area 7502 sq. km.) and have scattered patchy forest. The trees *Acacia nilotica*, *Cassia fistula*, *Diospyros melanoxylon*, *Ficus bengalensis*, *Mangifera indica*, *Phoenix sylvestris*, *Syzygium cumini* and *Zyziphus nummularia* exhibit good growth of corticolous (bark inhabiting) lichens. The present study is based on published literature and listed 20 epiphytic lichens from the study area. The district showed maximum epiphytic diversity of crustose lichens represented by 14 species followed by six species of foliose lichens. Among the different genera in crustose lichens the genera *Pertusaria* shows maximum diversity with five species followed by *Lecanora* with four species. While the foliose lichen family Caliciaceae, Parmeliaceae and Physciaceae have two genera and two species in each family. Among the epiphytic foliose species *Phaeophyscia hispidula* (Ach.) Moberg., and *Pyxine cocoes* (Sw.) Nyl., are luxuriantly grows in the district. *Rinodina sophodes* a crustose lichen shows maximum dominance found growing on *Mangifera indica* and *Acacia nilotica* trees in all the localities while *Lecanora tropica* grow luxuriantly on different trees of *Mangifera indica*, *Feronia elephantum*, *Zyziphus nummularia*, *Diospyros melanoxylon* and *Zyziphus mauritiana*. *Parmotrema praesorediosum* is found growing on *Mangifera indica* tree in maximum locations in the district. Within the district Ramnagarghati and Chitrakoot area are showed maximum diversity of epiphytic lichens. The present epiphytic lichens diversity will be used as base line data to carrying out future biomonitoring studies in the area.

Keywords: Biodiversity, Taxonomy, Biomonitoring, Central India.

AUTHOR'S INDEX

XLVII ALL INDIA BOTANICAL CONFERENCE OF THE INDIAN BOTANICAL SOCIETY AND INTERNATIONAL SYMPOSIUM ON "BIOTIC CURIOSITIES AND FUNCTIONAL DIVERSITY ACROSS PLANT KINGDOM IN CLIMATE CHANGE REGIME"

Author Name	Page Number	Author Name	Page Number	Author Name	Page Number
A Nizar Ahamed	176	Aroma Aishwarya Barla	112	Dhiraj Naik	181
A. Benniamin	75	Arpita Chakraborty	110	Diksha Kumari	128
A. M. Patil	113	Arun Arya	59	Dilip Gena	103
A.V.P. Karthikeyan	170	Arunava Datta	134	Dinesh Panwar	71
Aanchal Verma	104	Arvind Pareek	29	Ekta Chhikara	71
Aarti Thakur	71	Ashiho Asosii Mao	15	Farzan Afkham	152
Abhishek Kumar Dwivedy	66, 103, 175	Ashish Kumar Mishra	128	G. S. Shekhawat	138, 149, 152, 180
Aditya Pathak	183	Ashok Kumar Patel	180	Gautam Anuj Ekka	134
Ahirrao, Y. A	104	Ashwani Kumar	16, 144, 170	Geeta Yadav	151
Aishwarya Parab	163	Atul Tiwari	99	Gourav	181
Ajay Kumar	34	Avanish Prajapati	66	Gulzar Malek	106
Ajay Kumar Mishra	90	Avshesh Kumar	113	Hanno Schaefer	20
Ajay Kumar Srivastava	112, 158	Basil Paul	114	Harshita Joshi	144
Ajit M. Vasava	72	Bhawana Palawat	180	Himanshu Dawda	163
Ajit Pratap Singh	76, 81	Bhuvaneshwari. M	171	Himanshu Kumar	183, 184
Akanksha S. Jeswani	121, 125	Bhagyashri Gharjale	147	Hukam S. Gehlot	61, 68
Akansha Garg	140	C. R. Patil	113	Hunmily Teronpi	77
Akesh G. Jadhav	117	C.M. Kiruthika	170	Ishaka Sharma	180
Akhil Sajan.	127	Chaitanya A. Borkar	163	J. N. Maurya	141
Akhilesh K. Tyagi,	14	Chandanshive Yugandhara S.	107	Jadhav Varsha D.	107
Alka Kumari	104	Chhaya Singh	72	Jaydeep J. Sharma	93
Alok Srivastava	140, 143	Chirag Tank	72	Jhinjha Sunil	69
Aman Agrawal	90	Chitra Arya	59	Jigyasa Prakash	110
Ameeta Sharma	74	D. A. Patil	12, 106, 113, 114	Jitender Singh	71, 183
Amrita Singh	134	D. K. Upreti	4, 146	Jitendra Prasad	103
Amrutha Sundaran	91	Daizy R. Batish	11	John. E. Thoppilb	117
Anamika Ratan	170	Dhiraj Naik	147	Joshitha Vijayan	120
Anil Chahar	74	Dara Singh Gupta	92, 139, 165	Juhi Dhillon	159
Anil Kumar Midigesi	134	Darshika Acharya	150	Jyoti Gupta	88, 137
Anishya	106	Deepak Choudhary	159, 178	Jyoti Kumar	110
Anita	149	Deepak Kumar Gond	145	K. A. Sujana	91, 127
Anjali Yadav	149	Deepti Teotia	171	K. Selvam	176

XLVII ALL INDIA BOTANICAL CONFERENCE OF THE INDIAN BOTANICAL SOCIETY AND INTERNATIONAL SYMPOSIUM ON "BIOTIC CURIOSITIES AND FUNCTIONAL DIVERSITY ACROSS PLANT KINGDOM IN CLIMATE CHANGE REGIME"

Ankita Khorwal	75	Devangi Chachad	92, 102	K.M. Manudev	98
Ankita Verma	145	Dhara Ramoliya G.	86	K.M. Prabhukumar	99, 128
Arati Yadav	66, 103	Dhara N. Zaveri	59	Kabiruddin Ahmed	109
Archana Kumari Singh	70	Mathiazhagan Lavanya	174	Kadale Anil S	127
Kamal Khilari	183, 184	Mayur Kalambe C.	121	Kana Ram Kumawat	154
Kamartaha I. Saiyed	105	Mahadeva kumar, S.	134	Kangana S.	108
Kamlakar C. More,	153	Md. Shamim Ahmad	147	Kheta Ram	172, 183
Khushaboo Soni	140	Meera Rami	85	Pankaj A. Dole	134
Khyati D. Thacker	87	Megha Sakshi	60	Pankaj Kumar	183, 184
Kiran Ambatipudi	178	Meha Mepani	60	Paromita Ghosh	130
Kishan Kumar Prajapati	102	Mishra Aanchal	69	Parth H. Rathava	106
Kishor Joshi	172	Mohan Kapse	181	Partha Pratim Baruah	77
Kishor Kumar Paul	103	Mohd Ajaz	69	Parshuram V Pawar	167
Hit Kishore Goswami	116	Mokhtar Alam	109	Patil, M.V.	104
Kishore S. Rajput	7, 72, 85, 86	Monisha Soni	103, 175	Peeyush Kumar	105
Km Payal Chaurasia	82	Moumita Chakraborty	110	Piyali Paul	165
Km Pooja	69	Murugeswaran	109	Pooja Jain	96
KM Prabhukumar	128	N Ahamed Sherif	176	Poonam Jodha	182
Krishna Pyare	64, 182	N. Zaheer Ahmed	109	Poonam Pandey	87
Kuppusamy Selvam	173, 174	N.B. Gaikwad	118, 119, 120, 121	Prachi Joshi	144
Lal Ji Singh	134	Namdev Sindhikar M	164	Pragya Dadhich	131
Laxman Nagar	71, 159	Namita Gupta	146	Pragya Sourabh	137
M. Jay Chithra	170	Namrata Shedbale	116	Pramila Prajapat	78
M. Kannan	93	Nandhini.S	176	Prasanjit Mukherjee	105
M. Sabu	100	Nandini Pandey	94	Prashant Gawande	153
M.S. Jadhav	174	Nandjee Kumar	120	Prashant Kumar	62
M.Z. Abdin	120	Naveen Kumar Arora	22	Prateek Srivastava	83
Madhavan Sowmiya	173	Navya S.	129	Pratibha Sharma	96
Madhoolika Agrawal	110	Neel Kamal Rathore	78	Pratima Shrivastava	131
Madhuri Sharma	138	Neelam Pandey	144	Preeti Gupta	88, 137
Mahendee M. Sameja	105	Neelam Solanki	177	Prerna Chauhan	143
Malyaj R Prajapati	27	Neerja Shrivastava	95	Prerna Chourasiya	78
Manish Kumar Jha	103	Neeta Kushwaha	123	Priyanka Balyan	123

XLVII ALL INDIA BOTANICAL CONFERENCE OF THE INDIAN BOTANICAL SOCIETY AND INTERNATIONAL SYMPOSIUM ON "BIOTIC CURIOSITIES AND FUNCTIONAL DIVERSITY ACROSS PLANT KINGDOM IN CLIMATE CHANGE REGIME"

Manish Kushwaha	166	Neetu Singh	99	Priyanka Prajapati	141
Manisha Pandey	129, 133	Neha Kumari Sonkar	61	Priyanka Shukla	107
Manju C.N	36	Neha Singh	112	Priyanka Singh	132
Manju Parihar	80	Hanumnat R Aglave	167	Priyanshi Singh	104
Manjul Mungali,	170	Nguyen Bao Quoc	18	Punam Ranjan	63
Manjula Gupta	92, 139	Nihar Mathur	160	Pushpa Salo Linda	64
Manjula K.M	36	Nilima Kumari	179	R. Murugeswaran	109
Manoharachary C	19	Nisha Tak	61, 68	R. N. Kharwar	141
Manoj M. Lekhak	121, 125, 164	Nivedita Mall	81	R. Prabakaran	97
Manoj Prasad	21	Om Parkash Dhankher	123	R.L.S. Sikarwar	23, 166
Manu Yadav	124	P. C. Misra	77	R.V. Gurav	162, 174
Meenakshi Sudhir Vaidya	60, 107, 150, 152, 165	P. P. Baruah	81	R.Vellaiyan	79
Meenaloshini P	94	Padamnabhi S. Nagar	93	Raghvendra Singh	99
Rajaram V. Gurav	85, 162, 174	Sajad Hussain Shah	155	Shweta Pandey	94
Rajesh Kumar Sharma	66, 132	Sakshi	71	Shweta Shekhar	88, 137
Rajkumar Yadav	113	Saleha Naz	83	Shyam Singh	64, 69
Rajkumari Sanayaima Devi	106	Pallavi Sharma	70	Siddharth K. Katkole	157
Rajpurohit Riya	67	Salim	155	Sonam Maurya	99
Rakesh Pandey	24, 102	Saloni Kothari	102	Soni Chowrasia	120
Ram Pratap Meena	109	Sandeep Kumar	62	Soniya Rani	111
Ramashray Singh	136	Sandeep Kumar Barwal	155	Sourav Panigrahi	123
Rameshi Meena	83	Sangeeta	141	Subhash Chandra	142
Ranjit K. Londhe	117	Sanghadeep S. Ukey	161	Subrat Sharma	144
Rawal Abhishek	67	Sangita Kumari	143	Sudhir K Sopory	26
Reena Mohanka	60	Sanjay Kumar Mishra	101	Sudipa Maity	178
Rekha C.	98	Sanjay Saini	156	Sujana K. A.	129
Rekha Dixit	183, 184	Sanjaykumar R. Rahangdale	133	Suman Parihar	177, 181, 18
Renu Jangid	68	Sanjeeva Nayaka	138	Sumit Kumar Pathak	143
Ritu Jain	157	Sanjulata	69	Sumitra Kumari Choudhary	91
Rima Julie Bhaunra	158	Sapana Pant	79	Sundip Kumar	123
Rizwana Perveen	147	Sapna Jain	80	Sunil Tayade	153
Roshan Kumar Yadav	25	Sarika sharma	161	Supriya Tiwari	128
Rupesh S. Badere	121	Sarvesh Singh	170	Surbhi Agarwal	103
S N Tyagi	136	Satish Chandra	35	Surendra Manik	153
S Ram Reddy	5	Satya Prakash	184	Suresh Kumar	99, 119

XLVII ALL INDIA BOTANICAL CONFERENCE OF THE INDIAN BOTANICAL SOCIETY AND INTERNATIONAL SYMPOSIUM ON "BIOTIC CURIOSITIES AND FUNCTIONAL DIVERSITY ACROSS PLANT KINGDOM IN CLIMATE CHANGE REGIME"

S. A. Momin	162	Savita Malik	108	Susheel Kumar Sharma	27
S. B. Khairnar	113	Savita S. Rahangdale	133	Sushil Kumar	178
S. K. Dwivedi	146	Senwar Ramesh	69	Sushma Mishra	32
S. K. Tayade	114	Seshu Lavania	138	Szymon Swiezewski	86
S. M. Prasad	151	Shachi Singh	149, 156	T. Senthil Kumar	93, 94, 97
S. N. Preethamol A	117	Shail Pande	61	Tahira Begum	68
S. S. Rahangdale	127, 133	Shashi Bhushan Agrawal	128	Tak Alkesh	69
S.D. Tewari	79	Shilpa Sharma	68	Tanmay Rohit	85
S.N. Prasad Sinha	142	Shitalkumar P. Desai	116, 119	Tapan Kumar Monda	120
S.P. Joshi	129	Shraddha Tiwari	77	Trideep Chetia	81
S.S. Lavate	118	Shravan D. Kumbhare	162	Tulika Mishra	70
Sachin Sharma	129,133	Shruti Kasana	106	Tushar D. Mhashakhetri	162
Sachita Meshram	182	Shruti Ojha	63	Umesh B Jagtap	164
Sadhana Kamble	118	Shweta Jha	31, 159, 178	Umesh Chandra Lavania	2
Upma Bhatt	37	Usha Mukundan	163	Upendra Kumar	123
Utkarsha Gupta	122	V.B. Sreekumar	100	V.N. Pandey	102
V.S. Hareesh	100	Varsha D. Jadhav	157	Vartika Gupta	138
Veena Halale Manjunath	86	Venkatesan K.	109	Vidhu A Sane	28
Vijai Malik	90,96,100,171	Vijay Kumar Yadav	95	Vijay V. Wagh	90, 96
Vijendra K Sharma	83	Vinay M. Raole	86, 87, 105	Vinay Oraon	64
Vinay Sharma	28	Vinod J. Dhole	117	Virendra K. Madhukar	134
Virendra Kumar Baranwal	27	Vishnu Shankar Sinha	60, 70, 120	Vishnu V.S.	122
Vishwas A. Bapat	117	Vivek Kumar	100	Yerramilli Vimala	155,159,178



MICROORGANISMS



BoS 1001 Reconstruction of a (Gram- Positive) Bacterial Cell

enlarged 310.000 :1, in SOMSO-
PLAST®. In co-operation with
Professor Dr. we Hoffeld, Biology
Education Re- sarch Group at the
Faculty of Biological Sciences,
Friedrich Schiller University of
Jena.

GERMINATION OF PLANTS



PLANT MORPHOLOGY



www.somso.de

Exclusive Sales & Servicing Agent in India

DELHI HOSPITAL SUPPLY PVT. LTD.

REGD. OFFICE: 101-103, Pal Mohan Sadan, 26/32, East Patel Nagar,

Rajinder Place, New Delhi – 110008

TEL NO. 011-25752167/ 25733417/ 25852242 FAX NO.: 011-25752167

EMAIL ID: info@dhsplgroup.in WEBSITE: www.dhsplgroup.com

OFFICES & BRANCHES : DELHI-MUMBAI-CHENNAI-JAIPUR-LUCKNOW-KOLKATA

LABINDIA

ANALYTICAL

WHERE COMMITMENT IS CULTURE

UV-Vis Spectrophotometer
UV 3200 Touch Screen with
built-in computer (D2 Lamp / Xenon Lamp)



UV-Vis Spectrophotometer
UV 3092 with PMT Detector



MAGRITEK - Spinsolve Cryogen Free
Benchtop NMR Spectrophotometer



Atomic Absorption
Spectrophotometer (AAS)



CEM Microwave Synthesis System
DISCOVER



CEM Microwave
Digestion System (Simultaneous)
MARS 6



Vibratory Sieve Shaker
VS 1100
(Touch Screen)

Planetary Ball
Mill BM 1100+
(1 Grinding Station)



Goel Scientific & Hospital Supplying Co.



Approved contractors / suppliers / dealers / traders for all types of scientific Instruments, Apparatuses / Chemicals / Glassware / Plasticware / Charts / Indigenous / Imported and technical teaching kits etc. to Engineering / Medical / University / Degree Colleges, Public Schools, and various Industries and research Institutions.



Bhanu
infusil india Pvt.Ltd.

HIMEDIA
FOR LIFE IS PRECIOUS



PolyLab®



AUTHORIZED DEALER

- HiMedia Laboratories Pvt. Ltd., Mumbai
- INFUSIL INDIA PVT. LTD. (BAHNU)
- TOP TEH BIOMEDICALS
- SISCO RESEARCH LABORATORIES PVT. LTD., MUMBAI
- JAIN SCIENTIFIC GLASS WORKS, AMBALA CANTT.
- POLYLAB Industries Pvt. Ltd.
- Central Drug House, N. Delhi
- Moxcare Products Inc., (Plasticware) Ambala Cantt.
- Coleparmer, Mumbai
- Fine Care Corporation, Gandhinagar (P' fact)

STOCKIEST :

Magnus Optic Systems India Pvt. Ltd., New Delhi

Remi Sales & Engineering Ltd., New Delhi

Systronics India Ltd. Ahmedabad

Glassco Laboratory Equipments Pvt. Ltd.

Accet Pvt Ltd. New Delhi

Omega Electronics, Jaipur

Toshniwal Process Inst. Pvt. Ltd. Ajmer

Tarsons Products Ltd., Kolkata



Gel Doc Systems



PCR



Anerobic Jar



Water Distillation



Muffle Furnace



Binocular Microscope



Digital Moisture Meter



Laminar Flow Horizontal



Magnetic Stirrer



Automatic Microtome



Visco Meter

240, South End Road, Meerut Cantt. - 250 002

Ph. : 09319163381, E-mail : goelscientific_2003@yahoo.com

**Genetix, A Leading Indian Enterprise,
 Serving Lifescience, Bioproduction &
 Healthcare for 3 Decades**

*(A Pioneer in Bridging Multi Disciplinary Research
 Approach with Innovation & Product Solutions)*

- Liquid Handling Tools (semi & fully automated workstations) for precise & accurate pipetting in Bioassays, DMPKS, Compound Management
- Spatial Transcriptomics & Oncology products for Drug Development & Biomarker Discovery.
- Proprietary oligonucleotide delivery for advanced gene & cell-based medicines (utilizing mRNA therapeutics & CRISPR/Cas modalities)
- Ultrasensitive nucleic acid detection & absolute quantification (using Droplet Digital PCR technology) for use in in-vitro diagnostics & multi-disciplinary research approaches.
- Safer products and practices for Disinfecting and Sanitizing Surface & Air.



Bringing Global Brands to you....
 to do your best **Science!**



HEAD OFFICE

GENETIX BIOTECH ASIA PVT. LTD.
 7/1/1, 1st floor, Shivaji Marg, Rajapgarh Road, New Delhi - 110 015
 Ph: 011-45027000
 Email: info@genetixbiotech.com Web: www.genetixbiotech.com

BRANCH OFFICES

BANGALORE HYDRABAD MUMBAI EDUKATA UUDKOVAR PUNE
 CHENNAI AHMEDABAD GUWAHATI BHOPAL CHANDIGARH

LABINDIA
 ANALYTICAL
 WHERE COMMITMENT IS CULTURE

SymBio
 Scientific Pvt Ltd.

SRL SISCO
 RESEARCH
 LABORATORIES
 PVT. LTD.

genetix
 Biotech Asia Pvt. Ltd.

Ambinova
 TECHNOLOGIES

HIMEDIA

MT



For Life is Precious

MSI

BR BIOCHEM
 LIFE SCIENCES PVT. LTD.