



INTERNATIONAL SYMPOSIUM

Synergy in Plant Science and Sustainable Future - 2023



November 4th 6th, 2023











Organized by **Department of Botany** Sant Gadge Baba Amravati University, Amravati



VISION STATEMENT

Strive for understanding the diversified facets of plant science motivating young talents and society to unravel the prime role of plants in evolution and synergy of nature.

MISSION STATEMENT

Committed to achieve the academic excellence and promote research towards strengthening the students' competence to fetch more and more opportunities in the field of plant science for better understanding of biodiversity and conservation strategies to sustain the life on mother earth.

AIMS OF THE DEPARTMENT

- 1. To achieve academic excellence in basic and applied aspects of plant sciences.
- To impart basic and advanced education to students through teaching, learning, research and evaluation.
- To motivate the students to undertake research in basic and applied thrust areasof plant sciences.
- To inculcate scientific awareness towards protecting diversity and eco-environmental management of plant resources for sustainable development.
- To inspire the students towards better understanding and use of IT/Computer oriented interphase.





and
INTERNATIONAL SYMPOSIUM
On

Synergy in Plant Science and Sustainable Future - 2023

November 4"- 6", 2023



Organized by

Department of Botany

Sant Gadge Baba Amravati University, Amravati

The Indian Botanical Society (Founded in 1920)
Registration No. 5446/1927-28 Renewal No. 3355-2015-2016/1-683
(Registerd under Act XXI of 1860)

(EXECUTIVE COUNCIL FOR 2023-2026)

President Prof. N. K. Dubey, Varanasi (2023-24)

Vice President Prof. Nalini Pandey, Lucknow (2023-24)

Immediate Past President Prof. S. R. Yadav, Kolhapur

Secretary Prof. Seshu Lavania Treasurer Dr. Alok Srivastava Chief Editor Prof. Y. Vimala

Associate Editors Dr. Rajesh Sharma, Hapur

Prof. Nalini Pandey, Lucknow

COUNCILLORS

- · Prof. R. K. Kohli, Mohali
- · Prof. Manoj Kumar Dhar, Jammu
- · Prof. Manoj Prasad, New Delhi
- · Prof. S. K. Garg, Bareilly
- Prof. Manoj M. Lekhak, Kolhapur
- Prof. Varsha N. Nathar, Amravati
- Prof. Santhosh Nampy, Calicut
- Prof. P. Giridhar, Mysore
- · Dr. Sandeep Kumar, Haridwar
- Dr. Yogesh Joshi, Jaipur
- · Prof. H. K. Goswami, Bhopal
- · Prof. Prasenjit Mukherji, Ranchi
- · Prof. Shanti S Sharma, Sikkim
- · Dr. A. A. Mao, Kolkata
- · Prof. S. K. Barik, Shillong
- Dr. Sarita Srivastava, Prayagraj
- · Prof. Vishwambhar Puri

PATRONS

Prof. Pramod Yeole

Prof. P. A. Wadegaonkar

Vice-Chancellor

Pro-Vice Chancellor

STEERING COMMITTEE

Prof. S.V. Dudul

Prof. S. S. Sherekar

Prof. S. A. Waghuley

Dean

Director

Dierctor

Faculty of Science & Technology

Innovation Incubation & Linkages

Dr. T. R. Deshmukh Registrar Dr. N. A. Koli Finance & Accounts Officer

ORGANIZERS

Prof. Varsha N. Nathar Organizing Secretary Mr. K. C. More

Prof. P. A. Gawande

Joint Secretary

Treasurer

NATIONAL ADVISORY COMMITTEE

Prof. C. Manoharachary, Hyderabad Prof. A. K. Pandey, Bhopal Prof. Avinash Tiwari, Gwalior Dr. M. Sanjappa, Bangalore Prof. R. R. Rao, Bangalore Dr. Sangeeta Gupta, Dehradun Dr. U. C. Lavania, Lucknow Dr. A. Benniamin, Pune Dr. Shanti S. Sharma, Gangtok Dr. A. A. Mao, Kolkata

Prof. Milind Sardesai, Pune

Prof. S. M. Reddy

Prof. S.K. Sopory, New Delhi Prof. V. P. Singh, Bareilly Prof. V. L. Maheshwari, Jalgaon Prof. M. Sabu, Calicut Prof. M. K. Janarthanam, Goa Prof. S. K. Barik, Shillong Prof. R. K. Kohli, Mohali Prof. Ashwani Kumar, Jaipur Prof. Manoj K. Dhar, Ghaziabad Prof. M. V. Rajam, Delhi Prof. N. M Dongarwar, Naggur Prof. H. K. Goswami, Bhopal Prof. S.R. Yadav, Kolhapur Prof. S.R. Yadav, Kolhapur Prof. P.C. Trivedi, Jaipur Prof. Ramaswamy Nana, Warangal Prof. Pramod Tandon, Lucknow Prof. D.K. Maheshwari, Haridwar Prof. Manoj Prasad, New Delhi Prof. Amita Pal, Kolkatta Prof. Meenu Saraf, Ahmedabad Dr. R. D. Tripathi, Lucknow Prof. Ashok Chavan, Aurangabad

LOCAL ADVISORY COMMITTEE

Dr. G. V.Patil. Dr. S. N. Patil Prof. U.S. Chaudhari Dr. P. Y.Bhogaonkar Prof. S. R. Manik Prof. J.A.Tidke Dr. P. W.Deotare Dr. Aarti Saoji Prof. S. V. Dudul Prof. Vaishali Gudadhe Dr. D. W. Nichit. Prof. S. S. Sherekar Dr. J. M. Barabde Prof. S. D. Pachpande Prof. T. Srinivasu Dr. V. R. Deshmukh Dr. Sulbha Patil Dr. S. P.Rothe Mr. S. R. Rode Dr.V. R. Nandurkar

Prof. A. D. Chaudhari Prof. Alka Chaturvedi Prof. Mona Chimote Dr. M. M. Kodape Dr. A. U. Pachkhode Mr. M. K. Warkhode

LOCAL ORGANIZING COMMITTEE

Dr. Gauri R. Rane Dr. H. P. Nandurkar Dr. G. G. Muley Dr. Mohd, Atique Dr. Y. W. Mawale Dr. A. L. Rathod Dr. T. B. Wankhade Dr. B. K. Dorkar Dr. G. B. Hedau Dr. P. S. Kokate Dr. P. S. Jukhi Dr. S. S. Jadhao Dr. S. S. Deore Dr. Pratiksha Kokate Dr. D. V. Hande Dr. Dipak Koche Dr. Sochita Khodke Dr. S. S. Kanherkar Dr. M. R. Wath Dr. Meenal Keche Dr. M. A. Shahezad Dr. V. P. Deshmukh. Dr. P. J. Kale Dr. Pravin Sadar Dr. Smita Gudadhe Dr. Prashant Gadge

Dr. N. V. Phirke
Dr. A. B. Naik
Dr. S. N. Malode
Dr. D. D. Khedkar
Dr. R. C. Maggirwar
Dr. P. G. Barssod
Dr. Vinita Pocchi
Dr. Mrunal Kale
Dr. S. V. Satpute
Dr. Manik Bharsakle
Dr. Seemit Rokade
Dr. S. S. Kanerkar
Dr. Gajanan Wadankar

Dr. Rajendra Prasad Dr. V. P. Dhanvijay Dr. M. M. Dhore Mr. G. D. Muratkar Dr. P. N. Pawade Dr. Ashok Padghan Dr. S. R. Kadu Dr. N. H. Shahare Dr. V. D. Hutke Dr. S. V. Borle Dr. S. S. Nagarkar Dr. Kulbhushan Pawar Dr. Ujwala Murtkar

CONFERENCE COMMITTEE

Abstract Scrutiny Committee

Dr. S. R. Manik

Dr. J. A. Tidke

Dr. V. R. Deshmukh

Dr. A. U. Pachkhade

Dr. D. V. Hande

Dr. T. B. Wankhade

Dr. G. B. Hedau

Dr. V. S. Dhoran

Dr. Y. B. Gawande

Registration Committee

Dr. Jagruti Dhore

Dr. V. S. Dhoran

Dr. M. R. Kapil

Dr. Yogita Mirge

Anirudha Deshpunde

Ms. Mrunmai Landge

Mr. Kiran Nandane

Ms. Saloni Chaudhari

Ms. Pratiksha Rathod

Ms. Jyoti Ambhore

Inauguration and Valedictory Committee

Dr. Sujata Kale

Dr. Manisha Kodape

Dr. Ravi Sarode

Dr. Neeraj Ghanwate

Ms. Mayuri Kathalkar

Ms. Astha Wasnik

Ms. Vishalakshi Joshi

Ms. Jayshree Jadhao

Ms. Sakshi Katole

Ms. Trushali Bobade

Ms. Sakshi Pantawane

Transportation Committee

Mr. K. C. More

Dr. P. B. Shingwekar

Dr. Pankaj Pulate

Dr. S. A Saudagar

Dr. Pravin Sardar

Dr. Vivek Narkhedkar

Mr. Avinash Darsimbhe

Mr. Chetan Bawane

Mr. Siddanth Dhokne

Technical Committee

A. Oral Presentations

Dr. Prashant Thakre

Dr. Rupesh Badere

Dr. Deepak Koche

Dr. Mukund Dhore

Dr. Manju Wath

Dr. V. S. Dhoran

Dr. Smita Gudadhe

Dr. Yogita Gawande

Ms. Mayuri Kathalkar

Ms. Shradha Deshmukh

Ms. Sonal Panchariya

Ms Aastha Wasnik

Mr. Kabir Ekapure

Ms. Jyoti Muneshwar

Mr. Saurabh Deshmukh

Ms. Rani Kangda

Ms. Priyanka Bhagat

Ms. Shoaiba T. Kazi

Accommodation Committee

Dr. Manisha Kodape

Dr. A. L. Rathod

Dr. Sandip Waghuley

Dr. Hemlata Nandurkar

Dr. Ajay Rajurkar

Ms. Pratiksha Hirnane

Ms. Rajeshwari Chavan

Mr. Hrishikesh Gawande

Ms. Sakshi Katole

Ms. Jayashri Jadhao

Ms. Shiyani Sharma

Ms. Palak Raut

Ms. Vaishnavi Kharate

Ms. Vaishnavi Tayade

Mr. Nikhil Praghane

Mr. Pranay Kondulkar

Cultural Programme Committee

Dr. Mona Chimote

Dr. Avinash Asnare

Prof. K. C. More

Mr. R. M. Jadhao

Dr. Yogita Mirge

Ms. Vishalakshi Joshi

Ms. Trushali Bobade

B. Poster Presentations

Prof. V. K. Nagle

Dr. V. P. Deshmukh

Dr. S. V. Satpute

Dr. Prashant Gadge

Dr. Seemit Rokade

Dr. Ajay Rajurkar

Mr. Siddhanth Dhokne

Mr. Narendra Chavan

Mr. Pranav Kondulkar

Publicity and Press Note Committee

Dr. Pranav Kolte

Dr. Sandeep Joshi

Dr. Hemant Khadke

Dr. Vilas Nandurkar, PRO

Hospitality and Catering Committee

Dr. Sanyogita Deshmukh

Dr. Anuradha Deshmukh

Dr. N. B. Selukar

Dr. Suchita Khodke

Dr. Sarika Kukde

Ms. Nikita Sontakke

Ms. Vaishnavi Dihiye Ms. Shruti Sakhare

Ms. Sakshi Pantavne

Ms. Jyoti Muneshwar

Ms. Shrutika Akotkar

Ms. Chanchal Belsare Ms. Anuksha Londhe

Ms. Aarti Madhavi

Ms. Gauri Chavan

Ms. Tejaswani Gawarkar

Venue Management Committee

Dr. A. B. Naik

Prof. Suhas Pachpande

Dr. A. B. Mariwar

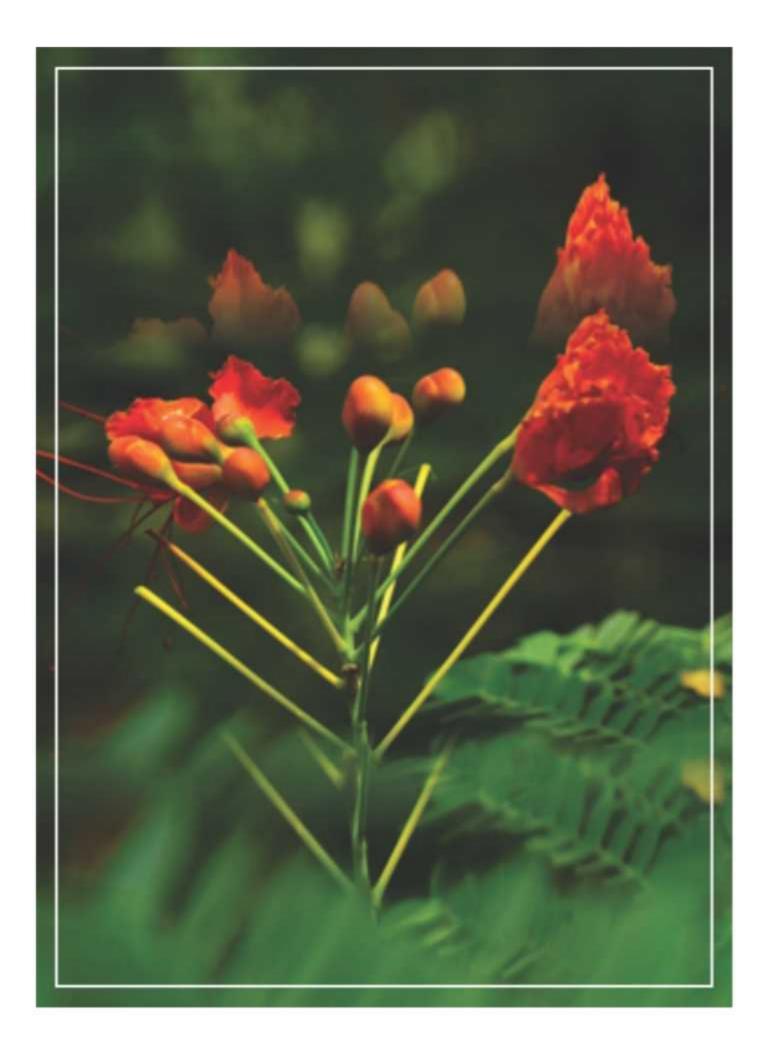
Prof. Rajesh Bhoyar

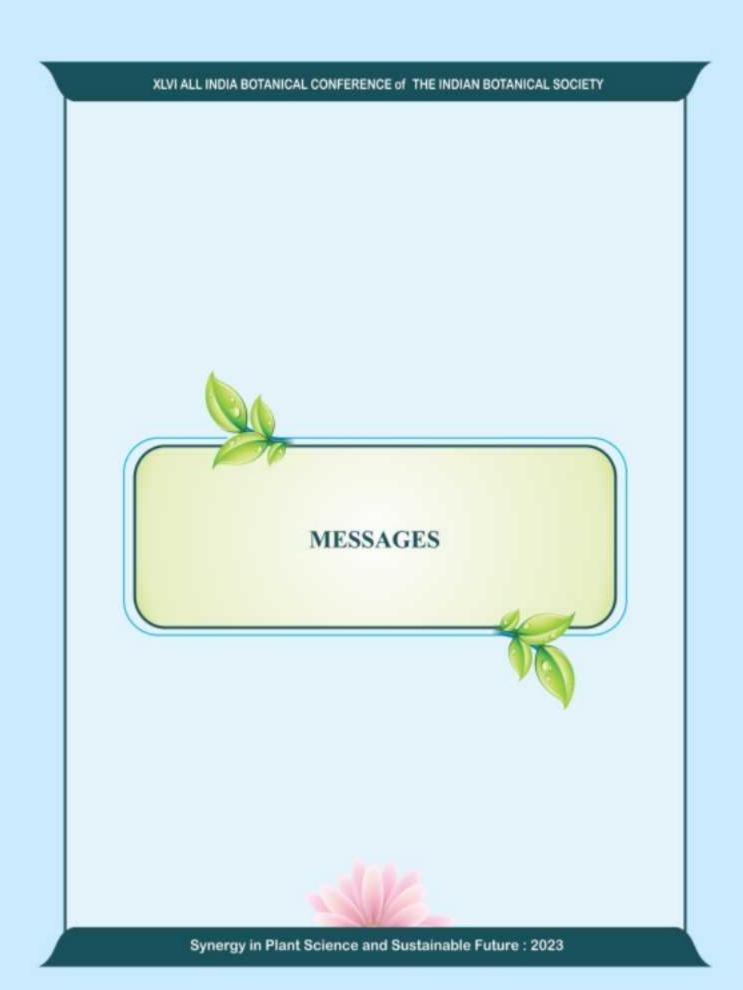
Mr. Sandeep Tripathi

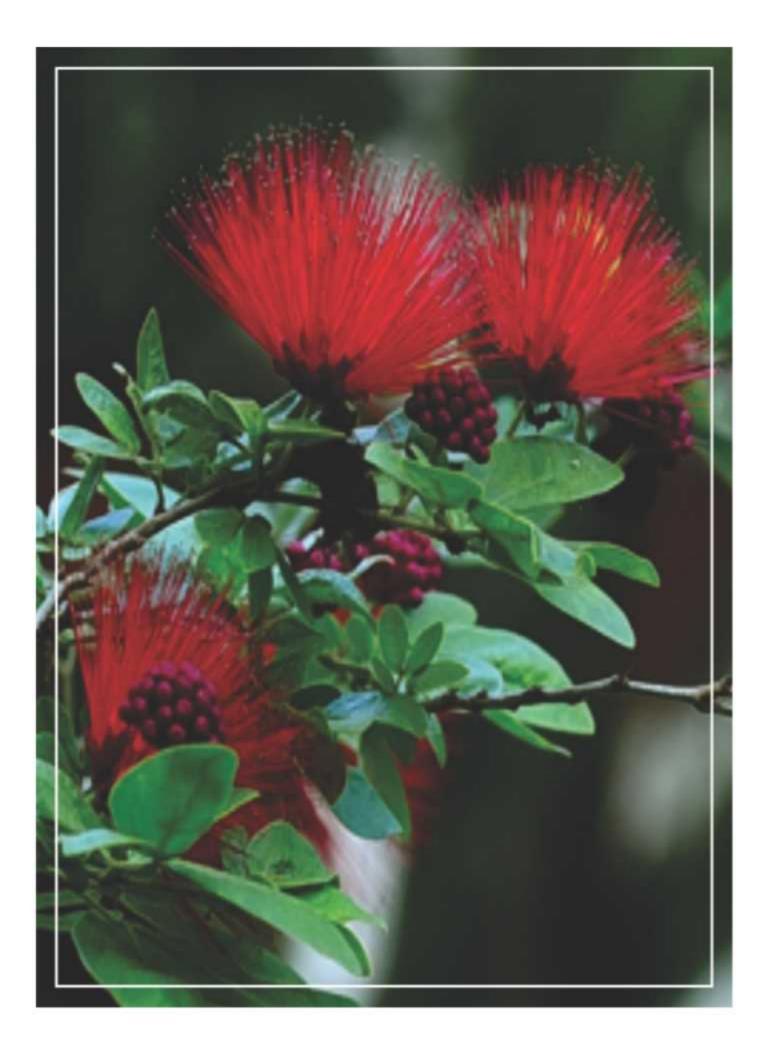
Mr. Kishor Nage Mr. Ankit Thakur

CONTENTS

Messages	
Articles	01 - 11
Presidential Address	13
Award Lectures	15 - 22
Memorial Lectures	23 - 26
Invited Lectures	27 - 41
Woman Botanist Award Contest	43 - 44
Young Botanist Award Contest	45 - 46
S. N. Dixit Poster Award Contest	47 - 49
K. S. Bilgrami Poster Award Contest	51 - 53
Index to Presentations	55 - 71
Oral and Poster Presentations	73 - 194
Past Office Bearers of the Society	195 - 198
Author's Index	199 - 204









Dr. Pramod Yeole M.Pharm., Ph.D., D.B.M Vice-Chancellor



Sant Gadge Baba Amravati University, Amravati -444 602, Maharashtra (India)

MESSAGE

I am happy to know that Department of Botany, Sant Gadge Baba Amravati University Amravati is organizing the XLVI All India Botanical Conference during 4 to 6th November, 2023. It assumes great significance so as to host this national scientific event by one of our departments.

It would be an enriching experience to bring the young budding minds and senior botanists on one platform for exchange of ideas and interactive discussions. The deliberation would set high standards for future research, teaching and extension of the discipline of Botany. This will surely ensure an opportunity in exploring the frontiers of Plant Sciences.

I compliment the Indian Botanical Society for choosing Amravati as the venue, and congratulate the organisers for choosing a topical theme 'Synergy in Plant Science and Sustainable future' for the prestigious event. I am too confident that the deliberations at the Conference would truly be vibrant, scientifically challenging, and fruitful.

I welcome all the delegates & participants and assure them a happy stay as well as extend my best wishes for the grand success of the event.

(Dr. Pramod Yeole)

Dr. V. N. Nathar Head, Deptt. of Botany, Sant Gadge Baba Amravati University, Amravati.







Higher and Technical Education, Textile Industry, **Parliamentary Atfairs**

Chandrakant (Dada) Patil

Office: 302, Mantralaya (Annexe), Madam Kama Road, Mumbai - 400 032. ☑: chpatil.minister@gmail.com

含 + 91 22 2202 4751 / 2202 5398

1 8 OCT 2023

Message

I am glad to know that Department of Botany, Sant Gadge Baba Amravati University Amravati is organizing the XLVI All India Botanical Conference during 4th to 6th November, 2023.

The hard work and determination shown by your organisation towards organisation of this grand academic event is appreciable. The theme is most appropriate and relevant to the present issues. The All-Botanical Conference will kindle the minds of young botanist where all the seniors and juniors will come together on one platform with interactions

I hope the deliberation in the conference by various participants will be fruitful in sharing and understanding the innovations and developments in plant Sciences.

I wish the Department and Indian Botanical society a very successful event.

> C.B.Patil Chandrakant (Dada) Patil

Dr. V. N. Nathar Head, Deptt. of Botany, Sant Gadge Baba Amravati University, Amravati.





॥ अंतरी पेट्यू सानज्यीत ॥

Kavayitri Bahinabai Chaudhari North Maharashtra University, Jalgaon

Umovinogor, Jalgoon - 425 001 (Maharashtra) INDIA (formerly North Maharashtra University, Jalgaon)

Prof. Vijay L. Maheshwari M.Sc., Ph.D. VICE-CHANCELLOR

Message

I am happy to know that the Dept. of Botany, Sant Gadge Baba Amravati University, Amravati is organizing the 46th All India Botanical Society Conference on the theme, "Synergy in Plant Science and sustainable development SPSSF-2023" during November 4-6, 2023.

I am aware that the congregation will be advantageous to explore the intersection of plant science and its sustainability. The interactions during the Conference for innovative solutions and collaborative efforts will foster more green future. The upcoming plant science and sustainable development is the powerful source for making a better society.

I wish the Conference a grand success.

(Prof. Vijay-L. Maheshwari) Vice Chancellor

Ph.: (O) +91- 257 - 2258401, 2258402 (R) +91- 257 - 2258404 Fax:(O) +91- 257 - 2258403 E-malti voolinmuloolin Web : www.nmuloolin





I am pleased to note that the 46th All India Botanical Society Conference is scheduled to take place during November 4 – 6, 2023 at the Department of Botany, Sant Gadge Baba Amravati University, Amravati.

The theme selected for the conference "Synergy in Plant Science and Sustainable Development" is very unique as it identifies role of plant Ecosystem in sustainable development. The conservation and propogation of plant, resources is going to influence, biodiversity and climate change as well. It is also to please note that Young Botanist award contest would be held alongwith Poster award contest during the conference. The scientific sections of the conference is well planned to include diverse fields in integrated manner. The participants would be immensely benefited from experts lecturers by prominent persons through Commemorative Medal Lecturers. Number of memorial Gold Medal and cash prizes to be given in the conference would strengthen collaboration and competition among the participants.

I wish meaningful interaction and fruitful outcome of the conference.

WEAREN 14.10-2023

Prof. Dr. Vilas Sapkal Vice-Chancellor MGM University Chhatrapati Sambhajinagar

SELF-PHARKED STATE UNIVERSITY ESTABLISHED BY MAHAMAR/THA.ACT NO XXVIT OF 3319.

MOM UNIVERSITY, MON CAMPUS, N-I, CIDCO, AURANGARAD - 431 002 P.C.IA. Tul. No. (91)-240-0401000. Exual - repress@regres.ac.in. Website - www - regres ac.in.





सी.एस.आई.आर. - राष्ट्रीय पर्यावरण अभियांत्रिकी अनुसंघान संस्थान CSIR-National Environmental Engineering Research Institute वैज्ञानिक तथा औद्योगिक अनुसंघान परिषद् / Council of Scientific & Industrial Research)



(विकाशिक तथा औद्योगिक अनुसर्वतान विभाग, विकास एवं अधियोगिकी संजादस्य, मास्ता सरकार के आंतर्गत तथापरा संभावन्। mornous Organication under the Dage of Scientific and industrial finance), Ministry of Science & Tachteology, Good, of Suday

डॉ. अनुल एन. वैद्य निवेशक Dr. Atul N. Vaidya

Message

It gives me immense pleasure that Department of Botany, Sant Gadge Baba Amravati University is going to organize XLVI All India Botanical Conference of the Indian Botanical Society and International Symposium on "Synergy in Plant Science and Sustainable Future-2023 during November 4th-6th, 2023.

With the objectives of exchanging the views and innovative ideas amongst the research scholars in their respective field, and thinking in an innovative and new way is significant to cope with technological challenges. I hope that this conference will provide a forum for scholarly discussion on synergy in plant Sciences and Sustainable future and also relevant for exploring and searching various aspects of plant sciences through the appropriate application of information technology.

On behalf of CSIR-NEERI, I sincerely offer my earnest gratitude to those who have contributed through their research papers at the conference and congratulate the dedicated and committed team for organizing such conferences and express my best wishes for the grand success of the conference.

With regards,

KW 15/pins (Atul N. Vaidya)

नेहरू मार्ग, नागपुर 440 020 भारत-Nehru Marg, Nagpur 440 020 INDIA

Ph(O) 91-712-2249999 Fax: 2249900 Email: directoria neeri res in URL: www.neeri.res.in सरात विकास की और - Towards Strataviable Development



डॉ. आशुतोष अ. मुरकुटे Dr. Ashutosh A. Murkute

निदेशक Director



महात्मा गाँधी प्रामीण औद्योगीकरण संस्थान Mahatma Gandhi Institute for Rural Industrialization मणनवाडी, वर्षा 442001 - महाराष्ट्र, भारत Maganwadi, Wardha, 442001, Maharashura, India

Message

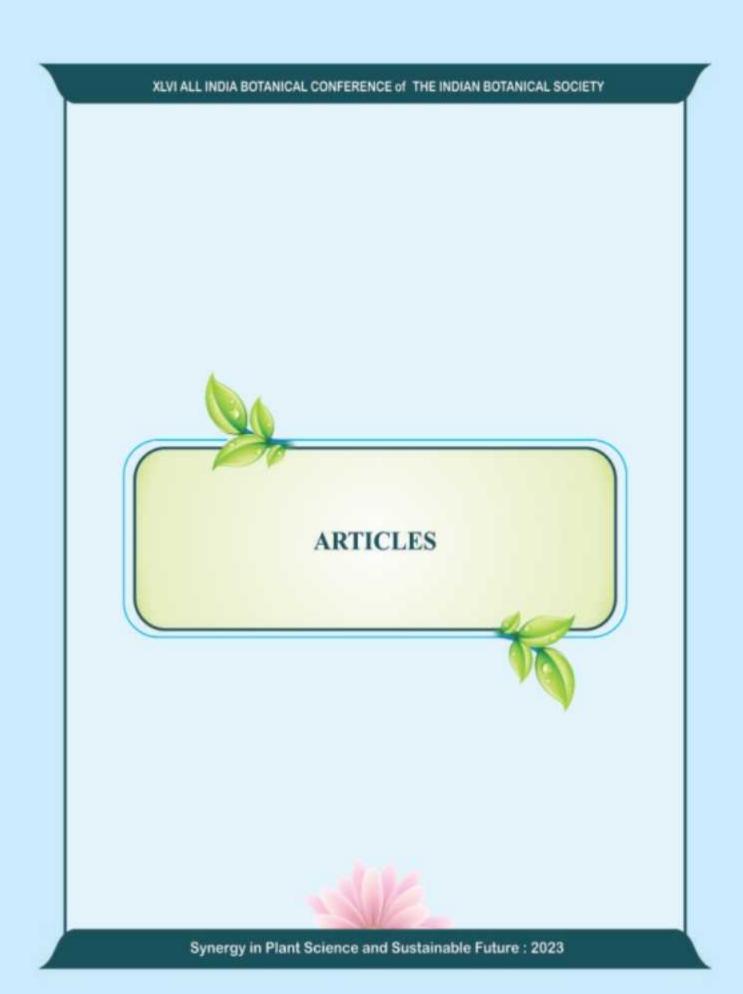
It gives me immense pleasure and satisfaction to note that the department of Botany Sant Gadge Baba Amravati University, Amravati, Maharashtra is organizing the 46th All India Botanical Conference of The Indian Botanical Society and an international symposium on Synergy in Plant Science and Sustainable Future (SPSSF) - 2023 from November 4th to 6th, 2023.

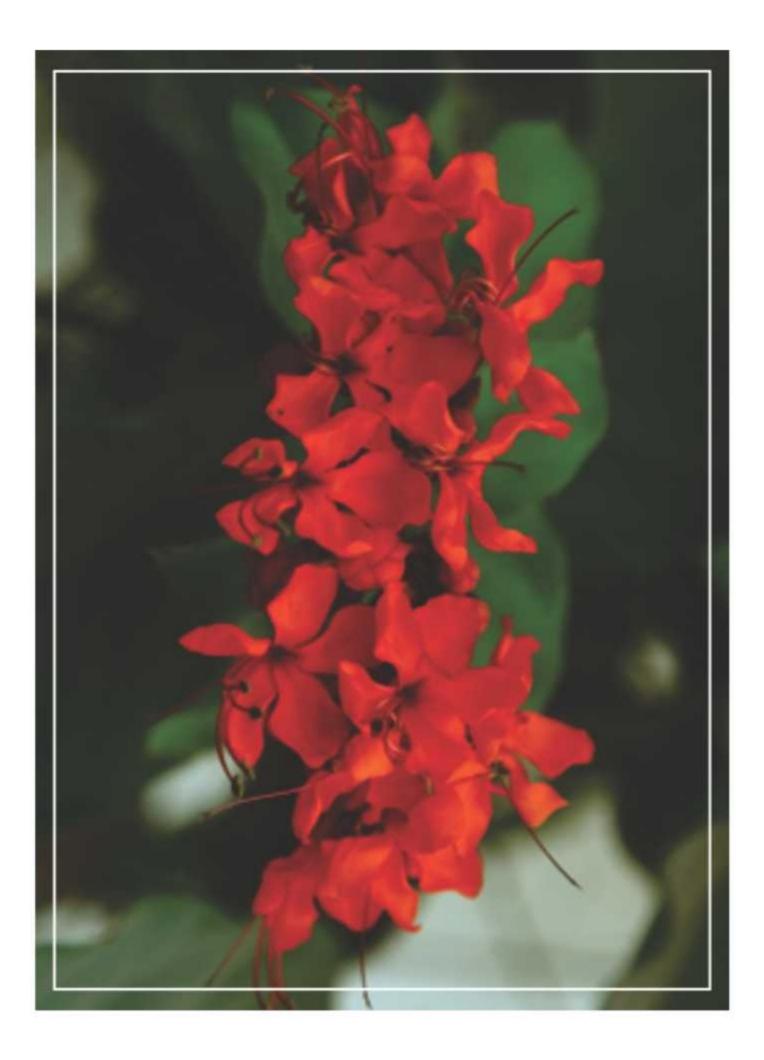
Plants hold a special place as the main pillar of life in the development of human civilization where they have always been relevant and imperative to life on Earth, whether they are used as food for nourishment, medicines to protect against diseases or to deal with environmental imbalances caused by excessive deforestation and emissions of greenhouse gases. When such natural resource, which is absolutely essential for life, is being indiscriminately exploited all over the world, then this issue definitely raises concerns. Today, due to excessive exploitation by human, not only have many plant species become extinct, but many plant species are in unprecedented danger of extinction. At such times, the relevance and importance of such national and international events increase even more. In today's circumstances, there is a great need to promote research and development activities in the area of plant science. In the present circumstances, through science and technology intervention, not only important natural habitats of plants can be protected, but new sites can also be selected to develop as man-made hotspots of biodiversity.

This conference will definitely enlighten scholars, students, researchers, policymakers, and other stakeholders on the subject. I am sure that the conference will create a milestone in the future path of research and development activities in the field of plant sciences. I am reassured that the proposed conference and international symposium are bound to attract great experts and intellectuals from far and wide, and deliberations will definitely focus on the various aspects of the subject and provide an ideal platform for participants to interact, debate, and disseminate new ideas for future endeavors.

On this occasion, I extend my heartfelt felicitations to the organizers and wish them great success for this gala event.

(Ashutosh A. Murkute)





GLIMPSES OF UNIVERSITY

Prof. Varsha N. Nathar

Professor and Head, Department of Botany, Sant Gadge Baba Amravati University, Amravati.

Sant Gadge Baba Amravati University Amravati then Amravati University was established on the auspicious Maharashtra Day, covering five districts Amravati, Akola, Buldhana, Washim and Yavatmal separating from Nagpur University. It has grown progressively with 413 affiliated colleges, 33 Post Graduate Departments, 5,14,000 enrolled students, 5204 approved teaching faculty from colleges and 111 from university departments. The University has establishment of thought-provoking centers such as Gadge Baba Adhyasan Kendra, Dr. Ambedkar Study Centre, Swami Vivekananda Study Centre and Dr. Shrikant Jichkar Center etc. As, India is poised to emerge as economic super power, knowledge economy is going to play a pivotal role in India's economic growth. The University pays special attention towards educational upliftment of the backwards and the downtrodden.

The University campus is spread over an area of 470.63 acres having 33 teaching Departments. It has good recreational and sports facilities such as international standard swimming pool, playfields for various games. It has beautiful, lush green and picturesque campus. It provides shade, beauty and aesthetic look to the campus with all types of flowering plant. The nature gifted vast vegetation of the campus reflects our dedication towards balanced conserved and condusive environment that has been acknowledged at national level by conferment of prestigious environmental awards. The peaceful surrounding with two big water reservoirs creates a very invigorating environment for study and research. The visitors and the inmates enjoy the clean and green environment as well as the flora and fauna.

Sant Gadge Baba Amravati University has been established with a noble vision and mission of catering to the needs of the poor, socially and economically backward sections of the society in the field of higher education. The University is sensitive enough to build and shape the character of its learners by a perfect blend of ancient and the modern teaching learning methods, use of advanced technology in teaching, learning and research and imbibing among themselves, the sense of self respect, esteem and the spirit of nationalism and global integration by way of value education. The University has been determined and committed to create a human resource capable of converting challenges

into opportunities. The greatest objective of the University education is to instill into its learners, the quality of humility and an ever-ready willingness to listen and learn. The University has adopted learner-centric experience-based practical approaches to education, coupled with continuous evaluation. The equitable distribution of knowledge has always been ensured by admitting students of different castes, creeds and religions; the privileged and the under privileged men and women towards fulfilment of the basic objective of the University. Essentially, the University takes care of the shaping of the learners through well-defined yet lucid strategies. It is not only the academics but also the co-curricular and extra-curricular activities has been given prime importance in developing student's personality and character.

Sant Gadge Baba Amravati University is one of the top leading universities in western Vidarbha region for implementation of National Education Policy-2020 by adapting and aligning its policies, programs, and practices with the NEP guidelines. The University has revised its curricula and made pedagogical changes as per the policy document in all its faculties depending on its priorities of the regional students.

The University Library is a fundamental source of depository knowledge that helps students from different corners in their endeavor of learning. The library is almost computerized and the students can access the desired information from home. The library has voluminous online journals facilitating the researchers across the nation

The University administration and authorities are sensible to design and upgrade the curricula with respect to the rapidly changing world and to represent India in 21st Century. The vocational, employment oriented, skill based, research centric, innovation driven and pro-industry programmes have been introduced to ensure multifaceted development of the learners amidst global competition. The University is getting equipped to face the emerging challenges in the 21st century. The canvas of academics encompasses most of the basic and applied skills. Doctoral research is conducted in wide range of fields catering to the day to day need of the society. Quest of academic enrichment and pursuit of excellence of the University are facilitated by efficient and proactive administration.

Universities have critical place to impart not only quality but also to provide cutting edge technological solutions through quality research. University's efforts towards excellence are supplemented by substantial grants from various funding agencies like UGC, DST, DBT, AICTE, DRDO, DAE, RGSTC, etc. The University has a special recognition by way of collaborations with the premier institutes in and outside the country.

In tune with the principle, evaluation leads to revolution; great emphasis has been laid on continuous evaluation of the learners and implementation of required remedial measures. The dedicated and learned teachers are self-sufficient to promote quality and excellence in the higher education towards student progression. Research, Consultancy and Extension essentially mark the significant aspects in the higher learning. Over a period of time, as one can easily witness, the research and extension have gained impetus. The rapidly growing technological advances in the field of research and innovation, made universities to intervene and interact for acceleration of research, consultancy and extension. The establishment of Research Cell, the introduction of Patent Cell, essentially reflects the insight of the University towards modern research trends. It can be said that research, on consultancy and extension are the three angles of an integrated triangle in the form of university, contributing a lot for socio-economic development of the University in particular and the society in general and Sant Gadge Baba Amravati University is not away from the integrated approach.

Well planned and rightly erected administrative and academic buildings, residential buildings for the boys and girls and for support staff are in tune with the simple yet significant principle; maximum from minimum. The University is sensitive towards its library and laboratories as its learning resources. The University has strong ICT infrastructure with secured network facilities to ensure the accelerated growth of learning. The well-equipped laboratories satisfy the practical learning of the students. The learners should be developed physically, morally and spiritually because youth who are intellectually aware, physically strong, morally upright and socially sensitive can only contribute to the building of the nation. Formulation of policies and strategies conducive to the multidimensional development of the University in general and the students in particular has essentially been the vision and mission of the leadership of the University. The dynamic leadership is capable of administering and managing the things in the most harmonious and amicable manner.

The universities are expected to evolve an inclusive system of dissemination of knowledge and its other resources by introducing some innovations and best practices amidst rapidly changing academia. SANT GADGE BABA AMRAVATI UNIVERSITY, AMRAVATI moves forward with some innovations towards fulfilment of social responsibilities ever mark University's commitment for the creation of academically strong,

socially responsible, morally upright, technically fit and competent enough youth to counter global challenges for nation building in the 21st Century.

The University has major challenges and as such we have to work together, in joint partnership, in order to achieve the goal of the quality and excellence in higher education. There has always been a little scope for furtherance of quality of teaching learning. We do have our proven strengths leading us on the path of progression, at the same time the weaknesses need to be countered efficiently. To serve the very purpose of establishment of the universities, the leadership, administration, faculty and staff of the University. University as a whole is committed to achieve the goals and fulfil the dreams of Sant Gadge Baba, the great social reformer of this land. We surely strive hard to acquire distinct position as academic leaders on the global horizon because quality is a journey and never a destination.

VOYAGE OF THE DEPARTMENT

Prof. Prashant A. Gawande

Professor, Department of Botany, Sant Gadge Baba Amravati University, Amravati.

Sant Gadge Baba Amravati University, Amravati was established on the auspicious "International Worker's Day' for dignity of labour and 'Maharashtra Day' on 1" May, 1983. with mainly three academic programmes in departments of Applied Electronics, Home Science and Master of Business Administration. It was the vision of first Vice-Chancellor of this University, Hon'ble late Dr. K.G. Deshmukh, first Dean late Dr. M. A. Dhore, late Dr. J. L. Shreemali and Dr. V. R. Ghurde to open the arena of higher education for post-graduation in the subject Botany for the students of rural background in five districts under the jurisdiction of Amravati University. The Department of Botany established in the year 1990 and was housed in Brijlal Biyani Science College with meager infrastructure and facilities, and it was managed by late Dr. J. L. Shreemali, then Principal of the college with the visiting faculty from local colleges. The Department was shifted to University Campus after the first regular appointment of Dr. S. R. Manik as lecturer in January 1992. Initially the Department was provided with minimum facilities to accommodate the 15 students only with the specializations like Taxonomy of Angiosperms and Cytology and Genetics that were looked after by late Dr. M. A. Dhore and Dr. U. S. Chaudhari, who used to take keen interest in teaching the students of M. Sc. I and II along with the senior teachers. Most of the teaching assignments were shared by visiting faculty, under the leadership of Dr. S. R. Manik as Head of the Department who was also looking after the administrative responsibilities of the Department. The Amravati University was progressing gradually under the stewardship of Dr. G. V. Patil then Vice-Chancellor of the University. It was in his regime, that the foundation stone of the new building was laid down, after the appointment of Dr. U. S. Chaudhari as Professor in year 1995. The Department started research activities, with the advent of Ph. D. programmes and registered the students for Ph. D. under the supervision of regular faculty. At that time, the Department also provided the facilities for M. Phil. to all the aspirants in the subject Botany. The interest in the research and teaching was nurtured by regular faculty members in the subject. The research students used to work in the laboratory on the various aspects of cytogenetics, mutation, floristic diversity and ecological studies of the vegetation.

The infra-structure facilities of the Department were strengthened after the shifting of Department in new building, that was inaugurated at the hands of Hon'ble late Shri. P. R. Kumarmangalam and Hon'ble Shri. Suresh Prabhu, on 8th January, 1999 under the stewardship of Dr. S. T. Deshmukh, Hon'ble Vice-Chancellor at that time. Thus, it was the sincere efforts of Dr. G. V. Patil for the construction of new building and further continuation by Dr. S. T. Deshmukh. The real impetus for research was then taking the shape on diversified areas of plant science.

During the session 1999-2000 two more appointments were made of Dr. J. A. Tidke as Reader and Dr. V. N. Nathar as lecturer, strengthening the faculty position to four. The teaching, research and the extension programmes were then diversified in different areas like pollen biology, cytogenetics, paleobotany, vegetation diversity, with the help of regular faculty, still sharing the teaching workload by visiting faculty members. The important extension activity that was initiated by late Shri. D. M. Kaley was on cultivation of potato in the tribal areas of Melghat is noteworthy. He shared his expertise for exploring the experimental work on potato cultivation in the Department and agricultural fields in Kolupur village of Melghat District Amravati, in association with Dr. Ravi Kolhe, a socialist and reformer in the tribal areas of Melghat. The extension activity was successfully undertaken and proved that the cultivation of potato is possible in the fields of tropical regions of Melghat. During this period the syllabus of M. Sc. was also revised on the model curriculum of UGC with new specializations as 1. Bioinformatics 2. Plant Tissue Culture and 3, Reproductive Biology of Angiosperms. The laboratory setup of all the three specializations were enhanced with new instruments essential for molecular biology, consequently, more emphasis was given to researches in the field of molecular markers, pollen-pistil interactions, plant data bases, protein profiling, ethno-botany along with evolutionary sciences with the help of Ph. D. students under the supervision of all the four faculty members. In the Department, the facilities were improvised to accommodate the research students and the Department was progressing rapidly in all the diversified fields of Plant Science. Subsequently Dr. S. R. Manik and Dr. P. A. Gawande were appointed as Professor and Assistant Professor respectively from 2008 onwards.

The Department of Botany continued the teaching and research activities, more and more research fellows joined the Department as FIP fellows and CSIR fellow. It is noteworthy that the department has produced NET/SET 200 students till date. The Department feels proud and greatly honored to the genius donor, Shri. T. G Kawalakar for his endowment of Rs 5,00,000 to support the research scholars of the Department with financial assistance of Rs 25,000 per annum. He also instituted a gold medal for acquiring highest marks in subject Botany at M. Sc. level among the students of Department of Botany. He has been kind enough to start the lecture series in the Department by his donation of Rs. 3,00,000. The Department gratefully acknowledge the generous donation of Rs 9,00,000 to the University for fostering the research and post-graduate students that shows his love and affection towards the life science.

During the span of 33 years the Department organized two international and five national conferences of which two are in collaboration with highly reputed academic organizations like Mycological Society of India, Indian Association for Plant Taxonomy and Indian Aerobiological Society. It also organized several workshops and extension activities in collaboration with differ academic organizations.

To keep pace with reforms in higher education the syllabus of the subject Botany s revised as per the national policy of Choice Based Credit System. The recent developments in the subject were incorporated in the syllabus. New policies regarding project at the P. G level were introduced, framed Ph. D. ordinances as per new guidelines for promoting the novel ideas in the subject. So far, as many as 90 students have completed their Ph. D. under the supervision of faculty members of the Department. The faculty members also published more than 400 research papers in nationally and internationally reputed journals. They also addressed various conferences, symposia, seminars as invited speakers, delegates, chair persons and presented their research contributions. The faculty members also handled number of research projects and mobilized the grants received from UGC, DST, MOEF, NSTMIS and RGSTC. The results of the Department have been consistently maintained over 80% throughout the 33 years of its existence.

It is proud to note that Department is also involved in extension programmes related to environmental awareness. The project report regarding the assessment of environmental factors responsible for tree felling due to natural disasters was accomplished with the team of experts involving Dr. P. A. Gawande, Dr. G. B. Hadawoo, Dr. V. R. Deshmukh, Dr. C. M. Deshmukh, Shri Madhubhau Gharad and Dr. S. R. Manik and has been submitted to Hon'ble Governor, Maharashtra state.

Subsequently Mr. K. C. More joined the Department in 2014 as Assistant Professor, who has been taking interest in teaching, research and extension activities. The Department faculty is also involved in sharing the administrative responsibilities. We feel proud to recognize the valuable contribution of Dr. J. A. Tidke as Pro Vice- Chancellor from 2012-2016. The notable contribution of Dr. S. R. Manik as well as Dr. J. A. Tidke as Director, BCUD is also recognized. Dr. J. A. Tidke in his regime as Pro Vice- Chancellor was instrumental in framing the policies of Ph. D. and examination reforms and also enjoyed in various capacities of University Authorities.

The teaching faculty of the Department contributed and visited foreign countries as an academician and expert in the field of Cytogenetics and Pollen biology. Dr. U. S. Chaudhari was invited as a guest faculty at University of Valencia, Spain. Dr. J. A. Tidke was invited as a Post- doc fellow at Institute of Evolution, Haifa University, Israel and also presented his contribution at Vienna, Austria and University of Valencia, Spain. The research students of the department are always encouraged to participate and present their findings in national and international conferences. They also bring laurel to the department by receiving various awards for best paper presentations in conferences. Notable among these are Mr. V. R. Narkhedkar, Dr. Varsha Dhoran, Mr. Avinash Darsimbe, Mr. Pravin Sardar, Ms. Chetana Ugale, Mr. Simit Rokade, etc.

The Department of Botany is always involved in sharing and accomplishing University events like Avishkar, National Science Day. Very recently, all the faculty members were involved in IQAC and NAAC committee presentations particularly through Documentation Committee of University level, in the Department during NAAC peer team visit. So far, 33 batches of the post-graduate students have completed their higher education and alumni of the Department are rendering their services to academic and research institutes at national level.

The Department is progressing rapidly in teaching and research in diversified areas of Plant Science and has also acquired all the essential instruments and facilities for molecular biology, bioinformatics, Plant Tissue Culture, wet-lab and Dry lab experimentations, phyto-chemical profiling etc.

Once again, we are organizing an International Symposium in collaboration with academic organization of national repute "The Indian Botanical Society" during $04^{th} - 06^{th}$ November, 2023.

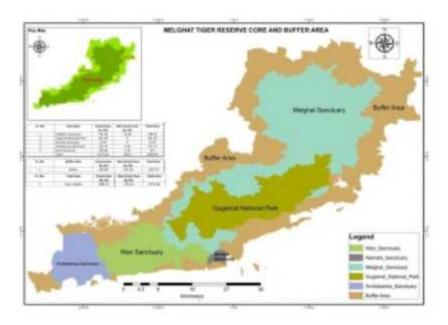
We wish to accord a warm welcome to all the senior Botanists, Executive Council Members of IBS, invited speakers and delegates of the All-India Conference-SPSSF 2023, at the Department of Botany, Sant Gadge Baba Amravati University.

BIODIVERSITY OF MELGHAT TIGER RESERVE

Shri. Manojkumar Khairnar

Division Forest Officer (Research & Wildlife), Melghat Tiger Reserve, Amravati.

Nestling in the Satpuda hill ranges of Central India; Melghat Tiger Reserve is one of the earliest Tiger Reserves established in India under Project Tiger. It came into being in 1974 and is also the first Tiger Reserve to be declared in the State of Maharashtra. Located in Maharashtra in the northern part of Amravati District, it comes under the central highland province of Deccan Peninsula Bio-geographic region. Its critical tiger habitat extends over 1500.49 sq km. consisting of 5 protected areas namely, Gugamal National Park, Melghat Sanctuary, Narnala, Ambabarwa and Wan Sanctuaries. The area of Critical Tiger Habitat of the Melghat Tiger Reserve lies in Melghat forests of Amravati, Akola and Buldhana Districts of Vidarbha region of Maharashtra, bordering Madhya Pradesh in the north & east



Melghat is a huge forest in terms of area. Its vastness not only adds to the intrigues of the wilderness but also opens up many avenues to the researchers and naturalists. To a wildlife and nature lover Melghat is a paradise. It is history mingled with the mysteries of nature. It has a unique species which may be found only in few other places. Added to the

above factors, the geography of Melghat landscape creates new fascination for the visitors.

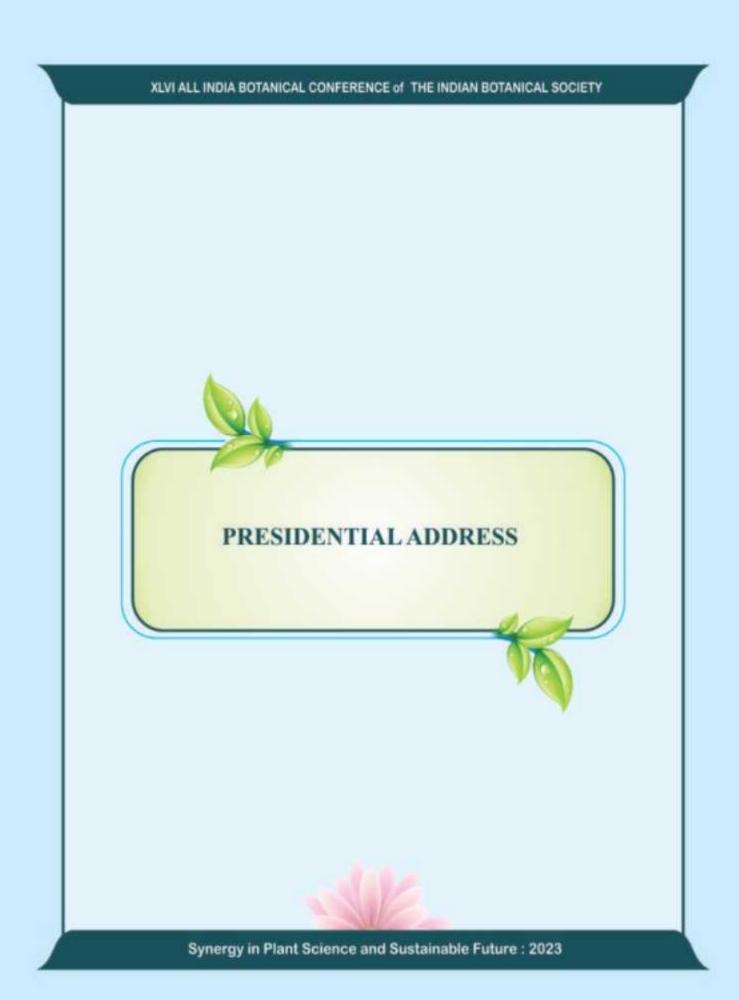
At times it seems impossible to understand this huge landscape in a small time.

The habitat is a typical representative of the Central Indian Highland, forming a part of the 6E- Deccan Peninsula- Central Indian Highland biogeographically. The floral composition is varied and representative of the Southern Tropical dry deciduous forest, under the sub group 5A (Southern Tropical Dry Deciduous Forest) of Champion and Seth's (1968). Melghat Tiger Reserve has nearly about 32 species of mammals, 340 species of birds, 34 species of snakes & reptiles, nearly 132 species of butterflies, nearly 50 species of odonates & over 50 species of spiders. The forests of Melghat Tiger Reserve also have history hidden in it. These jungles are witness to lot of power changes over the centuries dating back to over 1000 years. The fort of Narnala near Shahanur is one of the oldest fort of Vidarbha and an important symbol of domination for the whole of Central Indian Region. The Gavilgad fort near Chikhaldara has seen action in the early 19th century and both of these forts are important and interesting landmarks of Melghat. The forests and the wildlife now rule these forts.

More than 769 naturalized species are listed in the flora of Melghat belonging to about 400 genera representing 97 families. It includes 90 tree species, 66 shrub species, 316 herb species, 56 climbers, 23 sedges and 99 grass species. The flora shows a combination of floristic elements from the Western Ghats and Satpuda, with many endemic species. Key vegetation complexes of MTR include Vad-Umbar Arjun Plant Community which is a typical riparian habitat found along the perennial water source near Pure historical temple. The vegetation is lushgreen and quite distinct from the drydeciduous vegetation existing all around. Another is the Teak-Ain-Dhavda Plant Community which represents the majority of the vegetation of MTR. The third is the Teak-Bherra-Movai Plant Community which common occurrence in the fire- prone areas. The fourth is the Palas-Salai-Khair Plant Community. Melghat region is a unique ecological niche and is enriched with huge medicinal flora. Melghat Tiger Reserve has a rich repository of medicinal plants, as per Ethnobotanical account by Khaire and Giri (1992). Melghat Tiger Reserve contains information on 215 plants being used as medicine by local people. These contain 64 trees, 27 shrubs, 29 climbers, 2 grasses and one bamboo. Some of the medicinal plants found here are safed musli, and shatawari. Apart from this, MTR also has stores of wild-cultivars of many crops like Ran Soyabin, Ran Mug, Ran Jwar, and Ran Tur. The reserve is also very rich in avifauna with 265 species of birds including the recently rediscovered Forest Spotted Owlet (Athene blewitii). Tribal communities in Melghat has huge knowledge about medicinal plans present in area, also they use these herbal medicines to cure diseases. Forest department is working to preserve medicinal plant species through establishing medicinal species garden, preservation plots etc. Village Biodiversity committees are established in villages and public biodiversity registers (PBR) are being prepared to record the biodiversity in every corner of forest area.

The rare plants include Convolvulus flavus, Utricularia striatula, Drosera indica and many species of orchids like Vanda tessellata and Aerides maculosum. Some templerate flora is also present here Peristylus constrictus, Apium graveolens, Morchella conica, Geranium mascatense, Senecio chryanthemoides are such examples. Species with extremely restricted distribution, Achyranthes coynei or the species Ceropegia oculata which is endemic to Maharashtra and is also endangered are speaking examples of the rich and varied habitat this reserve provides to various plant species. The forests also provide a niche to insectivorous plant species like Drosera indica, rare species like Sruithia bigemia, medicinally important plants like Habenaria and Senecio spp. A varied and interesting orchid flora also inhabits forests of this reserve like Vanda tessellata, Aerides Macculosum, Habenaria grandifloriformis, H. roxburghii, H. plantaginea.

If we talk in terms of economic value of Melghat tiger Reserve, according to IIFM report he tiger reserve provides flow benefits worth Rs. 123.49 billion per year (Rs. 0.61 million per hectare) and stock benefits of Rs. 750.43 billion per year. Important ecosystem services that arise from this reserve include provisioning of water (Rs. 34.48 billion per year), carbon sequestration (Rs. 41.20 billion per year) and gene pool protection (Rs. 19.84 billion per year).



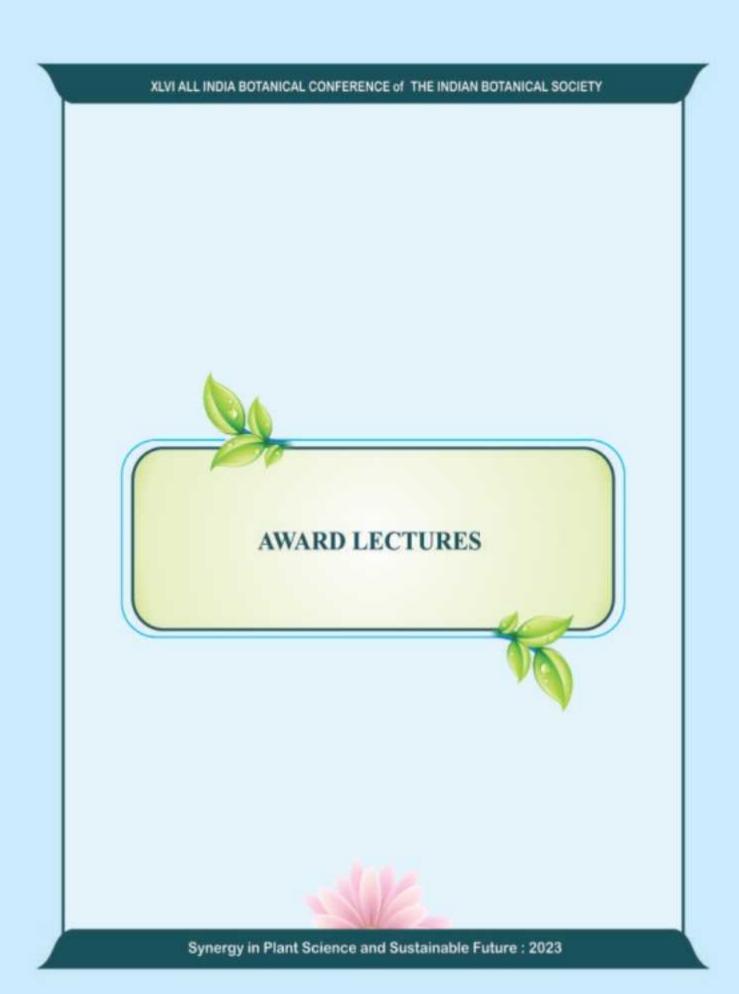


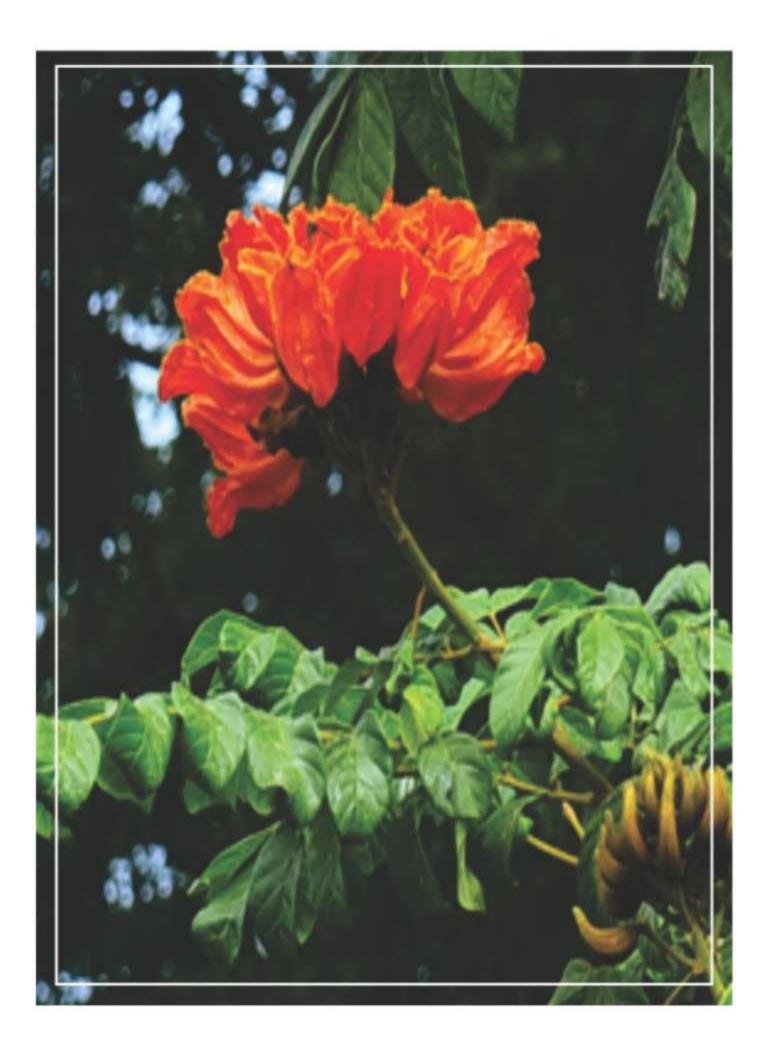
INDIAN ETHNOMEDICINAL PLANTS: SUSTAINABLE APPROACH TOWARDS HEALTH SECURITY

Prof. Nawal Kishore Dubey

Laboratory of Herbal Pesticides, Centre of Advanced study (CAS) in Botany, Institute of Science, Banaras Hindu University, Varanasi-221005, India nkdubeybhu@gmail.com

All life forms depend on nature for their crucial requirements like shelter, food and cloth, besides nature also provided beautiful surprise of medicinal wealth that not only support sustainability of man but also assist to grow, develop and survive against several diseases and sufferings. People use ethnomedicines since antiquity. Therapeutic potency of ethnomedicines is due to its phytochemical composition that strongly suggests them as future promising candidate for novel drug formulation. Further, in present time due to resurgence of prime attention of medicos towards ethnotherapeutant there is tremendous requirement for bioprospection of medicinal plants at global level in order to discover efficient drug against various chronic diseases owing to their easy availability and safety paradigm. Ethnomedicinal plants are boon of nature to mankind as its diverse bioactive component's composition along with their broad therapeutic actions provide extensive opportunity to discover novel lead drug molecule against many deadly diseases. Due to lack of knowledge regarding trading potential of medicinal plants they are not properly utilized by governmental entrepreneurs and only restricted to the tribal healers. Therefore, proper scientific validation and documentation are needed in order to properly utilize and discover botanical drugs against several chronic diseases. Amalgamation of ethnomedicinal system with western medicinal system along with incorporation of nanotechnology leads to the future era of medicinal system to effectively combat health problems. In addition, efficacy, economical viability and safety dimension ensure it as crucial strategy to meet sustainable development goal -3.





BIRBAL SAHNI MEDAL AWARD LECTURE

JOURNEY IN BAMBOO RESEARCH: IDENTIFICATION TO GENETIC ENHANCEMENT OF FIBER RESOURCES

Prof. Amita Pal

Former Senior Professor, Division of Plant Biology Bose Institute, Kolkata 700091

The pursuit of exploring alternative fiber resources has centered on bamboos due to their potential contributions in climate mitigation and forest restoration efforts. Although these woody perennial grasses demonstrate wide ecological adaptability, spanning the tropical, sub-tropical, and cold temperate regions, yet their extended sexual cycle and monocarpic nature poses severe identification challenge due to environmentally-influenced phenotypic traits. Addressing this problem, a combined approach utilizing molecular markers and phenotypic traits was adopted to identify and phylogenetically categorize 25 tropical bamboo species. The study demonstrates the efficacy of Internal Transcribed Spacers (ITS 1 and ITS 2) as a reliable alternative to conventional phenotypic methods for bamboo species identification and phylogenetic relationship assessment. Among the tropical bamboos, Bambusa balcooa and B. tulda have emerged as preferred industrial choices due to their rapid growth, exceptional flexibility, and tensile strength. Species-specific SCAR markers were developed for these industrially valuable species to safeguard against unintentional adulterations. Additionally, a Confocal Laser Scanning Microscopy (CLSM)based approach was adapted to discern fiber developmental stages, exploiting on the inherent fluorescence properties of lignin and chlorophyll. This study introduces a novel, non-invasive, semi-quantitative in situ estimation method for cellulose and lignin content within the fiber bundles. Furthermore, the isolation of the receptor-like cytoplasmic kinase gene, BbKst, revealed its pivotal role in conferring high cellulose content and superior fiber quality. Molecular characterization of the BbKst gene unveiled its membership in the serine-threonine kinase family, featuring four leucine-rich repeats (LRRs). The qRT-PCR analyses demonstrated its varying expression patterns across different tissues, with abundant transcript levels in the stem, internodes of secondary branches particularly during thefiber initiation and elongation stages. Subsequent isolation, expression and purification of the BbKst protein revealed its physicochemical properties. Biochemical analyses revealed the optimal pH and temperature range for BbKst activity, as well as its substrate preferences. Interestingly, radio-labeled phosphorylation revealed a preference for serine

and threonine over tyrosine. Subcellular localization studies indicated its cytoplasmic localization in onion peel and tobacco leaf protoplasts. Furthermore, transgenic tobacco plants expressing *BbKst* exhibited enhanced cellulose deposition, increased xylem fiber density and an upright growth phenotype, highlighting the pivotal role of *BbKst* in improving bamboo fiber quality. These findings collectively emphasize the significance of molecular markers and the newly identified *BbKst* gene in advancing bamboo fiber resources for sustainable industrial applications.

PANCHANAN MAHESHWARI MEDAL AWARD LECTURE

NOVEL APPROACHES FOR LOW GRAIN ARSENIC RICE CROP FOR SUSTAINABLE ENVIRONMENT AND AGRICULTURE

Pror. Tripathi R. D.

CSIR-National Botanical Research Institute, Lucknow-226001, India. Email: tripathird@gmail.com

Arsenic is a widely recognized pollutant and declared a non-threshold carcinogen pollutant worldwide. The most common routes of arsenic exposure to humans are the usage of contaminated water for drinking and irrigation in agricultural fields. This leads to arsenic contamination in rice crops and vegetables grown on such soil eventually contaminating the food chain. Rice, being a cereal consumed by half of the world's population, accumulates more arsenic due to wet land growing conditions. Through breeding and selection, a rice cultivar CN1794-2-CSIR-NBRI was developed. This rice cultivar, while accumulating low As, maintains higher levels of micronutrients such as Fe, Cu, Zn, Se, and Ni. Selenium and Sulphur including nano sulphur supplementation reduced As level in rice plants. In order to restrict As in the rice roots, a transgenic approach has been followed through the expression of phytochelatin synthase PCS, CdPCSI, from Ceratophyllum demersum, an aquatic As accumulator plant. Rice transgenic lines showed enhanced accumulation of As in root. However, all the transgenic lines accumulated significantly reduced As in grain and husk in comparison to non transgenic plants. The higher level of PCs in transgenic plants relative to non-transgenic presumably allowed sequestering and detoxification of higher amounts of As in roots thereby restricting its accumulation in grain. approach involved As volatilization through engineered Arabidopsis thaliana with arsenic methyltransferase (WaarsM) gene from one of the fungal strains, Westerdy kellaauantiaca (MTCC10845), isolated from arseniccontaminated sites. The WaarsM transgenic A. thaliana plant showed enhanced tolerance to AsV and AsIII, compared to wild-type (WT) plants. WaarsM expressing transgenic paddy evolved a significantly amount of volatile arsenicals as WaarsM gene expressed in rice was able to convert toxic inorganic arsenicals to methylated volatile arsenic species, reducing arsenic accumulation in rice grains. Transgenic line I, grown in soil irrigated with arsenic-tainted water accumulates about 50% and 52% lower arsenic than the NT in shoot and root, respectively, while the Arsenic concentration in polished seeds and husk of the transgenic rice line was reduced by 52% compared to NT. Selenium application lead to

reduced Arsenic accumulation in rice plants. Thus, the present study demonstrates that the expression of WaarsM in rice induces arsenic methylation and volatilization, and provides a potential strategy to reduce arsenic accumulation in rice grains. Transgenic plants expressing PC synthase and WaarsM appear suitable for phytoremediation of As. Suitable combined biotechnological and microbe plant interaction approaches may lead to safer levels of arsenic in the food crop.

VISHWAMBHAR PURI MEDAL AWARD LECTURE

PLANT WEALTH OF INDIA AND BIO-ECONOMY

Prof. Mao Ashiho A.

Director, Botanical Survey of India, Kolkata -700064 aamao 2008@gmail.com

India is one of the 17th mega biodiversity countries in the world, occupies 2% of world's geographical area and contributes to about 11% of world's known flora. India also has 4 hotspot regions, viz. Himalaya, Indo-Burma, Western Ghats & Sri Lanka and Sunda Land. The benefit from biodiversity is in so many ways - it affects the food we eat and our health and provides protection from natural disasters. The rich bio-resources are critical for country's economic growth and well-being of the people. Yet, biodiversity science and its links to human well-being in India largely remain unexplored and neglected. Only a small portion of India's human population knows about the role and importance of biodiversity in its lives. India's rich biodiversity has tremendous potential and we need to realize this potential. However, the biggest challenge today is how to conserve our rich biodiversity and at the same time taking care of the people living in the vicinity of biodiversity rich areas, as we all know that a hungry man cannot be ask to conserve biodiversity. The Indian botanical fraternity have a great responsibility and role to contribute in shaping the bioeconomy of this country. It is our duty that the Biodiversity and Bio-economy programme must benefit the people of this country; explore ways to reduce ecosystem stress caused by economic drivers. In addition to the rich biodiversity, Indian civilization has rich knowledge of traditional knowledge of utilizing indigenous plants. Over 7000 medicinal plant species alone have been recorded as of today. India is fairly strong in science and technology and itis time that science and biodiversity meet and come to the forefront - they must attract the attention of society, the economy, the policy makers, and the people of this country. It is time that we must look for ways to reduce carbon emissions, and the effective use of bio-resources for renewable and sustainable livelihoods for people. National effort should aims to transform biodiversity science by linking it to the peoples' economic prosperity. This will help India realize the United Nation's Sustainable Development Goals by using India's rich biodiversity to create solutions for challenges in agriculture, health, and climate change.

Therefore, the talk is intended to highlight the rich biodiversity especially floristic wealth of India and bio-economic potential for country's economic growth and well-being of the people.

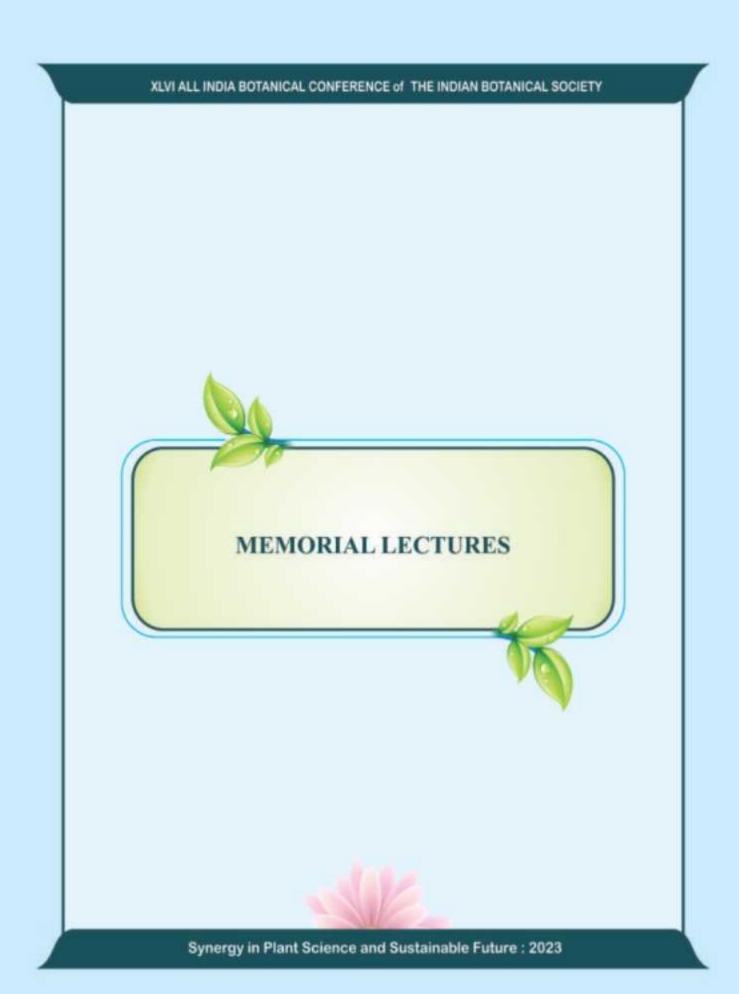
Y. S. MURTY MEDAL AWARD LECTURE

INFLUENCE OF ABIOTIC STRESS SIGNALS ON SECONDARY METABOLITES OF MEDICINAL PLANTS: FROM TRANSCRIPTOMICS TO EPIGENETICS

Prof. Neha Pandey

Department of Botany, CMP - PG College, DBT-Star College of the University of Allahabad, Prayagraj) nehapandey87@gmail.com

Due to defensive nature of plant secondary metabolites, they are greatly influenced by various biotic and abiotic stress signals. Our investigation includes important medicinal plants such as Artemisia annua, Withania somnifera, Withania coagulans and Andrographis paniculata. All of them are known for their highly valuable secondary metabolites. This presentation compiles all the conventional and modern approaches used for greater production of secondary metabolites in-planta as well as in other expression systems. The studies have found short-term UV-B treatment as one of the efficient methods for many folds higher in-planta production of artemisinin in Artemisia annua and withanolides in both the species of Withania. These findings were validated on physiological and molecular basis. With the help of epigenetic analysis including bisulfite sequencing, DNA methylation dynamics was found to be one of the reasons behind higher expression / activity of genes / promotors from the biosynthetic pathway. Perception of UV-B radiation in plants happens through a highly conserved UVR8 pathway and the same has been studied in both the species of Withania. In addition to the UV-B radiation, salt stress signals also acted as a potential elicitor for artemisinin biosynthesis and a SCAR marker was developed to identify the high artemisinin producing salt tolerant variety of A. annua. Besides greater in-planta production, higher artemisinin production was also achieved in hairy root expression system by heterologous expression of cyanobacterial PCS gene in A. annua hairy roots. To sum up our studies, we have found abiotic stress signals as a potential tool to improve secondary metabolite production either in-planta or in an external expression system.





PROF. A. K. SHARMA MEMORIAL AWARD LECTURE

A TALE ABOUT TAILS: COMET ASSAY AS A NEW APPROACH TO PREDICT DNA DAMAGE

Prof. Anita Mukherjee

Former Professor Department of Botany, University of Calcutta, Kolkata 700019 ambot@caluniv.ac.in

The tale begins with the first paper published on single-cell gel electrophoresis assay by O. Ostling and K.J. Johanson in 1984 (Biochem. Biophys. Res. Commun. Vol.123: 291-298). In this assay when a damaged DNA-containing single cell suspension embedded in low melting agarose is electrophoresed, the damaged DNA migrates away from the undamaged DNA-containing nucleoid body, resembling the structure of a comet tail. Hence it is popularly known as comet assay. We will be celebrating 40 years of the Comet Assay next year (2024). Primarily the comet assay began as a versatile and sensitive method for measuring single- and double-strand breaks in DNA and then increasingly used to assess the capacity of cells for DNA repair. The assay is widely used as a biomarker assay not only in human population studies but also has been applied as an interesting technique in monitoring the ecogenotoxicity in plants and other eukaryotes.

Here we would like to focus our story on the tails. Considering the ubiquity of the species and its genome size, in our laboratory we have used a wide range of plants both aquatic (Ceratophyllum, Lemna) and terrestrial (Vicia faba, Nicotiana tabacum, Allium cepa, Pisum, Vigna, Saccharum munja, S. spontaneum, Chrysopogenzizaniodes and others) as new possibilities for the application and have extended in assessing an environment clean up tool for heavy metal contaminated iron ore mine soil, or phytoremediation of coal flyash soil/ leachate. In addition, we utilized the versatility of comet assay as a tool to define the role of genotoxicity and DNA methylation as vital regulators of nanotoxicology of nanoparticles in vivo in Allium cepa and in vitroin Tobacco BY-2 cells and in Physcomitrella patens. Modified nuclei isolation procedures were adapted for each test system for optimal yield; unwinding and electrophoresis times were adjusted for least DNA migration. Global DNA methylation pattern at the level of single cells was detected by comet assay in combination with the methylation sensitive isochizomeric restriction endonucleases HpaII (digests unmethylated and hemimethylated DNA) and MspI (digests 5'-CmCGG-3'). Our results suggest dose independent genotoxicity response in each test system. Significant DNA hypomethylation was noted at the genotoxic concentrations and

confirmed by colorimetric estimation and /or HPLC. To validate the tale of tails - gross morphological alterations and internalization were studied by TEM images supported by cytotoxicity, genotoxicity, deregulation of antioxidant defenses cell-cycle arrest, and cell death.

PROF. L. B. KAJALE MEMORIAL AWARD LECTURE BIOLOGICAL CONTROL OF PLANT NEMATODES

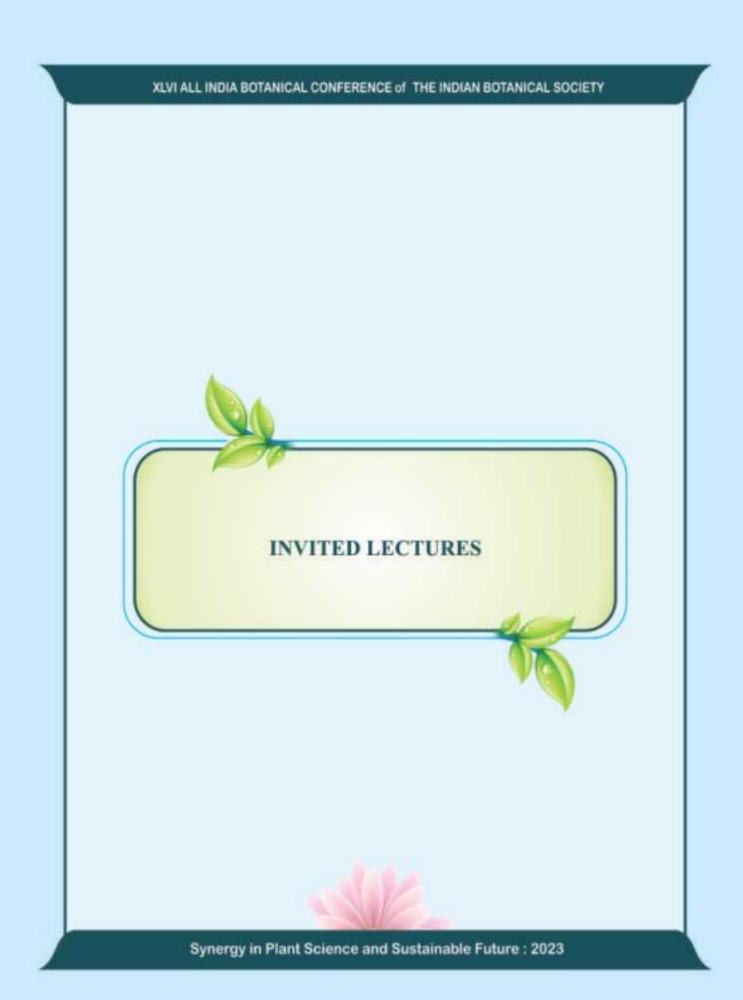
Prof. P. C. Trivedi

Ex-Vice Chancellor and Former Professor of Botany, University of Rajasthan, Jaipur-302018, India. E-mail: ptrivedi33@yahoo.com

Nematodes are perhaps the most abundant multicellular organisms existing on our planet, Though simple in body organisation, nematodes are highly diversified to adapt themselves to almost every niche. About 2,500 species are known to parasitize the lower as well as higher plants at global level. In India, so far, about 600 species belonging to about 85 genera have been either described or reported to be associated with more than 700 plant species growing in diverse agro climatic zones. Many of them have been proved to be highly pathogenic and cause considerable economic yield losses in cereals, pulses, vegetables, fruits, ornamentals and forest crops. Almost every crop is being parasitized by one or more phytonematode species. Despite this, their role as a limiting factor in agricultural production has not been duly recognised perhaps due to their microscopic size, subterranean habitat, slow rate of multiplication and above all, the symptoms produced by them are generally not clear-cut and easy to pinpoint. These are often confused with nutritional deficiency or some physiological disorders. In a world -wide survey, the 10 most important genera of plant parasitic nematodes revealed were Meloidogyne, Pratylenchus, Heterodera, Ditylenchus, Globodera, Tylenchulus, Xiphinema, Radopholus, Rotylenchulus and Helicotylenchus in order of their damage level.

Concern over chemical nematicides has led to an increased endeavour more environment friendly method of nematode management and microbial nematode management has got momentum to reduce population of important plant parasitic nematodes. Biological control of plant parasitic nematodes mainly deals with the application of biological agents for the reduction of plant parasitic nematode population, either by introduction or by stimulation of natural enemies of the nematodes in the soil environment. In most cases, the biological Management of plant parasitic nematodes have been very effective under laboratory conditions, but field results have shown varying degrees of success. It is widely accepted that use of microbial pesticides are broad spectrum, target specific and do not pose a threat of resistance development and environmental hazard.

Nematophagous fungi are potential biocontrol agents for plant parasitic nematodes. These fungi may be most readily divided into those that have extensive hyphal growth out side their hosts, such as the nematode trapping fungi: Arthrobotrysdactyloides uses constricting rings; Dactylella candida makes non-constricting rings and adhesive knobs, Monacrosporiumform adhesive branches. These fungi are mostly obligate parasite but generally have a broad nematode host range. Some zoosporic fungi, such as Catenariaanguillulae are believed to be opportunistic but others, such as Nematophthoragynophila and C. auxilliaries infect female cyst nematode and are obligate parasites. Endophytic fungi grow within plant tissue without causing disease, Arbuscular mycorrhizal fungi are the best known endophytes associated with plant roots and play important role in reducing nematode population. Parasitic fungi attacking sedentary stages of nematodes interrupting the reproductive cycle like Paecilomyceslilacinus. Different species of Trichoderma are under use to manage nematode population. Bacterial spores of Pasteuria penetrans parasitize root knot nematode and significantly reduced the nematode population. The major problem in utilising P.penetransas a biological control agent is the inability to culture the bacterium in vitro on any of the standard bacteriological media.





RELEVANCE OF GM/GE TECHNOLOGY TO FOOD AND ENVIRONMENTAL SECURITY OF INDIA

Prof. A. K. Bhatnagar

Former Professor and Head, Department of Botany, University of Delhi, Delhi 110007

Current agricultural situation in India is a paradox! We are self-sufficient in food production; but our farmers are an unhappy lot. Rising cost of farm inputs and diminishing returns on their produce have rendered farming unprofitable, they lament. India has plenty of sun, good soil, adequate water, high crop diversity, robust farming communities, sound research infrastructure and considerable government support for agriculture. There are serious aberrations too. More than half of our population is engaged in cultivation on over 50% of land resource (as against 12% global average). Productivity is low (a third of USA and Europe, and less than half of China). Our rural folks earn less than a sixth of their urban counterparts. Over 80% of water resource goes into agriculture, leaving little for other uses. We continue to be designated a hotspot of hunger and malnutrition. Farmers indiscriminately use large amounts of pesticides, endangering their own health and contaminating the entire food web. With 55% land under the plough and 12% built up area, it is not possible to have 33% forest cover, as recommended by experts. We also have plenty of wastelands that await appropriate technology for reclamation.

Judiciously planned introduction or editing of genes in our crops for drought and salinity tolerance, adaptation to changing climate, resistance to pests, and for higher productivity and superior nutritional traits can help alleviate pressing socio-economic, health and ecological issues. Stringent and transparent biosafety evaluation can build public confidence. The large botanical community in India, with expertise in all relevant disciplines, can play a fruitful role in guiding public perception and creating trust in proven procedures and products of GM/GE technology.

EX- SITU CONSERVATION OF TERRESTRIAL ORCHIDS

Prof. Nitin Dongarwar

Department of Botany, Rashtrasant Tukadoji Maharaj Nagpur University, Nagpur -440 033. dmnitin26@gmail.com

Orchidaceae is highly advanced family amongst angiosperms which has positive and negative impacts due to its advancement. The complexity and specificity of the family makes it isolated from others but at the same time its complex and specific nature makes it prone to the threats. Orchids need specific habitat, specific pollinator and specific symbiont for the completion of its life cycle. India is blessed with a wealth of 1300 species (Arora, 1983) and in Maharashtra; Orchidaceae is represented by 110 species which are distributed in 34 genera out of them, 11 species are endemic to Maharashtra State (Sharma et al., 1996).

Orchids are very specific about its habitat and growth conditions. To increase the survival percentage of the plants it was necessary to maintain the conditions similar to its habitat in the poly house / shade houses as per plant's need. In nature light, temperature, humidity and aeration are important environmental factors which regulate the growth and development of the plants. Orchids are generally shade loving plants; they need less intensity light for their growth. In the present investigation, collected plants were potted on suitable medium and transferred to shade house, where sunlight was controlled by using 70% green mat. Terrestrials were established in mixture of soil, briquette powder and sand in 1:1:1 ratio. To maintain humidity, morning time was preferred for watering. For proper growth as well as for flowering, sunlight and ventilation was maintained in shade house. After transplantation, plants were transferred to shade house. All the acclimatizing conditions were manipulated according to the particular species needs. The main aim while acclimatizing the plants was to give natural conditions in shade houses. For the present investigation, terrestrial orchid taxa viz., Eulophia, Geodorum, Habenaria, Peristylus, Zeuxine were selected. With evolutionary events, orchids had made its pollination very specific for a particular pollinator. Nowadays because of increase in anthropogenic activity, the population of pollinators has been affected a lot. As a result, the pollination rate in orchids has also affected. Therefore in present scenario, pollinator specific orchids are prone to threat and artificial pollination is an alternative to increase the seed set in such orchids. The major obstacles in the production of native orchid seedlings for use in conservation have been (1) Development of efficient and reliable seed germination protocols and (2) An understanding of early seedling growth and development. A single orchid capsule contains thosands of seeds. In spite of very large number of seeds produced, only few seeds germinate in nature because orchid seeds are very small and have a poor level of differentiation.

For standardization of media, six different orchid media were investigated which were VW, KC, BM-1, MM, LM and ½ MS. As there was change in the components, concentration and composition of all the media, there was change in response and germination of the species. Light is an important factor in the growth of plants. Five light treatments were used in the present investigation. Three light treatments (0/24, 16/8, 24/0 h L/D) were used for the asymbiotic germination and three light treatments were used for seedling development (8/16, 16/8, 12/12 h L/D). It was observed that light requirement for the seed germination is different than seedling development. A fruitful mycobiont association with the orchids plays a prime role in nutrient solubilization for its host throughout the life span. There was a wide range of fungal isolates reported in this entire study of Rhizosphere, Rhizoplane, Phyllosphere, and Phylloplane isolation methods. Mycobiota associated with these terrestrial orchids was also studied.

MICROCHROMOSOMES IN NATURAL POPULATIONS OF PLANTS

Prof. Hitesh Kishore Goswami

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

This short presentation is based on my field and laboratory work on population cytogenetics in natural populations of some plants, lower animals and also on human materials based on lymphocyte cultures and direct tumour tissues since 1970. We already know that lower animals in particular amphibians, reptiles and birds always possess lot many microchromosomes but it was intriguing to find that these small chromatin structures are also frequently found in natural populations of some, not all plants of the same species. Among observed ones, many of these have already been published. Small chromatin dots (1-3) have been found in Cyathodium, an unidentified moss sp, in several species of Isoetes, in Osmunda regalis, Osmunda sp. Pteris species, Pteris vitata etc. This presentation will show several species of Ophioglossum and Goswamia which exhibit regular presence of 1 to 7 microchromosomes in some of the mitotic and meiotic cell divisions. These appear to have adaptive significance. There are few more ferns inhabiting middle Himalayas which are shown to possess, but not identified by various authors. Amonng angiosperms, I have worked mainly with Phaseolous vulgaris, Pisum sativum but only Allium, sativum sometimes possess a larger extra chromatin structure (3-4 micron) with perfect 2n=16 chromosomes. Ejection of chromatin dots from chromosomes is an inherent epigenetic phenomenon which is associated with DNA hypomethylation, heterochromatinization, and also sometimes with chromosome translocation. Since these dots persist in the cell populations, these are designated as microchromosomes. These are G-C rich chromatin bodies and do have genes. Such released dots of chromatin are mostly lost but quite often some of these survive either by attaching with some moving chromosomes or a few which also have heterochromatin at the end, do move to opposite poles during cell divisions. In other words, while excretion of chromatin by the process of attenuation from the chromosome is an inherent epigenetic phenomenon, the survival and maintenance of the microchromosomes is dependent on the screening by meiotic barriers.

TOWARD ABIOTIC STRESS MITIGATION: AN EXPLORATION OF MIRNA-REGULATED TRANSCRIPTION IN BANANA ROOTS

Jennifer Ann Harikrishna*, Purabi Mazumdar, Sarah Loo, and Gwo Rong Wong *University of Malaya, Kuala Lumpur, Malaysia.Tel: +603-79676990 and Honorary Visiting Fellow, Department of Genetics and Genome Biology, University of Leicester, UK

One of the most challenging and urgent global issues are ensuring food security in the face of climate change. Agricultural production is already impacted by new extremes of temperature and water stress. Another major issue is the salinization of soils through increased incidences of coastal flooding and from agricultural practices. Bananas are one of the most productive food crops in terms of starch yield per hectare, and are a food security crop, notably in many of the low and middle income countries that will be most impacted by climate change. However, banana plants are highly sensitive to the abiotic stresses of salinity and drought that accompany climate change. The analysis of stress response transcriptomes is a powerful approach for the identification of novel genes and their regulators, including microRNA (miRNA), that have potential applications for crop stress relief. Through the analysis of banana root mRNA, sRNA and degradome data, miRNAregulated transcripts were identified as candidate abiotic stress-relieving genes. A functional genetic approach was used to validate two of these candidate banana abiotic stress genes in the model plant Arabidopsis. It was shown that the constitutive expression of a banana cytoplasmic G protein cDNA in Arabidopsis can trigger stress responsive root adaptation that improves ability of the plants to adapt to drought conditions. Similarly, a banana ZFP that is located in the plant nucleus, was demonstrated to relieve salinity stress when ectopically expressed in Arabidopsis. In both studies, the plants had low levels of ROS, high biomass and healthy roots, showing this to be a promising approach towards the development of climate resilient bananas. These studies demonstrate the usefulness of exploring miRNA regulatory networks for candidate stress genes in less studied crops.

NET ZERO ROADMAP: A GLOBAL PATHWAY TO KEEP THE 1.5 °C: GLOBAL BIOFUELS ALLIANCE LED BY INDIA AT G20

Prof. Ashwani Kumar

Alexander von Humboldt Fellow (Germany), Former Head of the Department of Botany and Biotechnology, University of Rajasthan, Jaipur 302004. India Email: ashwanikumar214@gmail.com Mobile 8209237459
https://www.researchgate.net/profile/Ashwani Kumar1

Climate change is long term fluctuation in temperature, precipitation, wind and all other aspects of Earth's climate. The Intergovernmental Panel on Climate Change (IPCC), a UNEP body formed under WMO is the leading international body for the assessment of climate change. For the first time in human history, concentrations of carbon dioxide (CO2), the primary global warming pollutant, hit 400 parts per million (ppm) in our planet's atmosphere. IPCC has prepared a report on climate change, land degradation, sustainable land management, food security and greenhouse gas fluxes in terrestrial ecosystem. Humanity will overshoot the Paris climate agreement's 1.5 °C 'safe' guardrail on average global temperature rise. The report suggests that if no significant policy changes are undertaken the world will be warm by 4 degrees Celsius, which is what scientists are nearly unanimously predicting will happen by the end of the century. United Nations SDG summit in New York City on 18 and 19 September 2023 reported that "None of the United Nations' 17 Sustainable Development Goals (SDGs), outlined in 2015, will be met by the self-imposed 2030 deadline" (United Nations 2023 and https://www.nature.com/articles/d41586-023-02970-2). However positive developments over the past two years include solar PV installations and electric car sales tracking in line with the milestones set out for them in 2021 "Net Zero by 2050" report. Skepticism about biofuels and their value in tackling global warming abounds in the scientific community, but a new report commissioned by the California Energy Commission says the state won't be able to do without them if it is to meet aggressive 2050 emissions goals. Recently during G20 held in India a Global Biofuels Alliance (GBA), an India-led 'field-to-fuel' initiative to develop and deploy biofuels as a green pathway for energy transition, job creation and economic growth was initiated. Recent efforts have focused on the development of renewable alternatives to fossil fuels, and cellulosic biomass has great potential to contribute to the demand for liquid fuel. Algal biofuels are in the nascent stage of development. We started work on biofuels after a meeting with Professor Melvin Calvin during a Photobiology conference in USA and our first presentation was at 2 nd EU

Biomass conference in Berlin. Subsequently with support from Department of Non Conventional Energy Sources, Govt of India and subsequently under Department of Biotechnology, Govt of India conducted researches and developed agrotechnology for hydrocarbon yielding plants Calotropis procera and Euphorbia antisyphylitica. Subsequently work was extended to Jatropha curcas and high yielding strains were deposited in NBPGR. Details of work have been published on two of our books focused on biofuels (Kumar et al. 2018; Kumar et al. 2020). Details shall be presented.

SYNERGIES IN PLANTS – RHIZOMICROBIOME

Prof. C. Manoharachary

Mycology and Molecular Plant Pathology Laboratory, Department of Botany, Osmania University, Hyderabad 500 007, Telangana, India, Email: emchary@gmail.com

Synergy is a process in which some substances cooperate to reach combined effect that is greater than the sum of their separate effects. Synergistic effects can be observed in the interaction between plants and microbes, herbal products and during biochemical compounds formation. Plant microbe communication comprises intricate systems that modulate local and systemic defense mechanisms to mitigate environmental stresses. Rhizomicrobiome is composed of diversified microbial and fungal communities which act like a gut to plant genome as ascribed to microbial community in the human gut. Rhizomicrobial communities are highly diversified and play an important role towards soil food web, energy and such acts are dependent on rhizodeposites. Rhizomicrobiome enhances the soil health, plant growth and health by releasing nutrients. In order to develop new technologies such as bioferetilizers, biopesticides and biostimulants: rhizomicrobiome studies are essential such studies will also help in the crop management and sustainable agriculture. Rhizosphere studies are very important for maintaining plant and soil health due to interaction of microbes with the plants have been proved to be beneficial to the plant growth and also in providing pathogenic resistance to plants. Rhizosphere signaling focuses on the interaction between plants and the surrounding microbes that facilitates the development of rhizobiome diversity which is beneficial to the plant productivity. In this presentation a brief account of synergies in plants and a comprehensive account on rhizomicrobiome with reference to rhizosphere as an ecological niche, influence of root exudates on microflora, role of beneficial microbes such as PGPR, Trichoderma and Mycorrhizae and other related aspects in relation to rhizosphere and also keeping in view the soil and plant health will be discussed.

FOSSIL FRUITS FROM THE DECCAN INTERTRAPPEAN BEDS—NEW DISCOVERIES FACILITATED BY MICRO-CT SCANNING

¹ Steven R. Manchester, ² Dashrath K. Kapgate, ³ Deepak D. Ramteke, ⁴ Sharadkumar P. Patil and ⁵ Selena Y. Smith

1 Florida Museum of Natural History, University of Florida, Gainesville Florida, 32611 USA

2 P.G. Department of Botany, J. M. Patel College, Bhandara (M.S.)

- 3 Gondia Education Society High School and Junior College, Mohadi. Gondia, 4416014
- 4 Department of Botany, Bhagwantrao Arts and Science College, Etapalli, MS, India
- 5 Department of Earth & Department & Department

The Deccan Intertrappean beds have attracted considerable interest since the pioneering work of Birbal Sahni beginning in the 1940s because of the diversity of well preserved silicified plant remains, which provide important clues to the flora that existed in this volcanically active region shortly before

and after the Cretaceous-Cenozoic boundary. Despite excellent preservation down to the cellular level, the fossils preserved in opaque chert provide challenges to investigation. Typically, the fruits and seeds are discovered by breaking the chert in the field which exposes them in various planes of

section, but the full three-dimensional morphology and features of internal morphology can be difficult to interpret from oblique planes of view. Successive physical sectioning and/or successive acid etching and peeling was often required to facilitate hand-drawn artistic reconstructions of the original fruit or seed in three-dimensions. X-ray vision, facilitated by microcomputed tomography (micro-CT scanning), combined with traditional methods of optical microscopy and acetate peel preparation, has resulted in improved understanding of many components of the Deccan flora from the classic Mohgaonkalan beds in Chhindwara. In some instances, micro-CT scanning has been employed to reveal morphological features hidden within the chert for fruits previously discovered by optical examination of fracture surfaces. In other cases, the same method was used to reveal fruits and

seeds completely hidden within chert pieces. Disseminules of extant genera, borrowed from herbaria, or freshly collected in the field, were similarly investigated by micro-CT scanning to evaluate similarities and differences with the fossils. Combined physical sectioning and virtual sectioning of fruits, has led to the confirmation of several angiosperm families that were prominent in the Mohgaonkalan fossil flora: Burseraceae (two genera), Euphorbiaceae (two genera), Lamiaceae (work in progress), Lythraceae,

Malvaceae (two genera), Montiaceae, Palmae (five genera), Vitaceae, and Zingiberaceae (three genera). In addition, the flora includes many genera with distinctive fruits that do not conform precisely to modern families, such as Baccatocarpon, Pantocarpon, Sahnipushpam, Sausarospermum, and Surangea. These may represent extinct plant groups that were endemic to the Indian subcontinent which did not survive subsequent climate change and/or competition from other plants introduced following the tectonic merger with Eurasia.

DIVERSITY AND STRATEGY FOR CONSERVATION OF HIMALAYAN FLOWERING PLANTS

Prof. Arun K. Pandey

Vice-Chancellor, Mansarovar Global University Bhopal-462042, Madhya Pradesh arunpandey79@gmail.com

The Indian Himalayan Region (IHR) is immensely rich in biological diversity which may be attributed to its vast expanse of geographical area having extremely diverse topography, climatic conditions and soil types. The Indian Himalayan Region supports world's richest alpine flora, India has ca. 147 endemic genera and of these 71 are endemic to the Himalayan region. The angiosperms are represented by approximately 21849 taxa out of which 4303 species belonging to 58 genera are endemic to India. Eastern Himalaya is the richest of the phytogeographic regions of India affording the highest plant diversity. Western Himalayan region has the distinction of having a greater diversity of high-altitude Gentianas, Primulas, Saussureas, and Saxifragas. Due to destruction of habitats and fragile ecosystems natural vegetation in Himalayan region is decreasing very fast and numerous species have become rare, threatened and endangered. Floristic studies have become an urgent necessity not only because of the taxonomical importance of biodiversity but also because of accelerated genetic erosion. Efforts are to be made to conserve and maintain ecosystems for the sustainable use and management of the biological resources. Recent major scientific and technical advances in molecular biology and bioinformatics have made taxonomy a useful tool for conservation

of biodiversity. Besides floristic studies, new comparative data such as DNA sequences and DNA barcoding are to be incorporated in future systematic studies on Himalayan flora. There is need for establishing Biodiversity Cyberbank to maintain repository of different types of data in order to ensure the long-term sustainability of the vast and growing amount of systematic data.

THE NEXUS BETWEEN ENDEMISM AND CLIMATE CHANGE AND THE CHALLENGE OF CONSERVING ENDEMICS IN THE WESTERN GHATS-SRI LANKA BIODIVERSITY HOTSPOT

Prof. Anoma Perera

Department of Botany, University of Peradeniya, Peradeniya, Sri Lanka

Climate change is an undeniable reality. In March 2003, the International Panel for Climate Change (IPCC) announced that the mean land surface air temperature for the period from 2006-2015 was substantially higher compared to that of the pre-industrial period (1850-1900). Global warming has resulted in an increase in the frequency, intensity, and duration of heat waves, as well as the intensity of precipitation events in most land regions worldwide. It has also increased the frequency and intensity of droughts in some regions such as Africa, and north- eastern Asia. In the South Asian region, heavy precipitation, reduced wind speeds, decline of glaciers, and rise of sea levels are predicted. The changing climate may severely impact biodiversity by accelerating species extinctions and degrading vulnerable habitats. Climate change is known to affect nearly 11,000 species on the Red List of Threatened Species, increasing the likelihood of their extinction. Western Ghats-Sri Lanka Biodiversity hotspot harbors many biotas that are endemic to the region. However, the natural habitats in this region are increasingly threatened primarily due to human actions. Both direct and indirect human activities contribute to habitat loss, decline in biodiversity, and species extinction. Furthermore, climate change accelerates this biodiversity loss, making it the third highest cause of biodiversity loss at present. The pace of current climate changes is more rapid than anticipated and it does not provide adequate time for species to adapt to the changing climate. Therefore, it is very unlikely that many threatened and endemic species will survive unless there is human intervention. Endemic species or taxa that are restricted to a defined geographical area (local, regional, or an island) appear to be more vulnerable to climate change. Of these, the survival of narrow endemic species may be critical, and therefore, more research should be focused on predicting their future under a changing climate. For example, we have examined the distribution of 11 endemic Stemonoporus species in the Sri Pada Sanctuary in Sri Lanka, and of these, 7 were found to be narrow endemics that are restricted to streambanks at particular elevational ranges. At present, some of these habitats are threatened due to frequent floods and selective logging. With the predicted increase in rainfall in the South Asian region, these habitats will be estroyed and as a result, some narrow endemic

Stemonopporus species may become extinct in the foreseeable future. Therefore, the conservation of such critically endangered narrow endemic species by developing appropriate conservation guidelines and subsequent conservation actions is crucial. There are many such narrow endemic plant species in the Western Ghats - Sri Lanka Biodiversity hot spot and it is timely to identify these species and take conservation actions. There are still many gaps in our knowledge of the conservation of critically endangered endemic species. It is essential to understand population distribution, phenological events in relation to existing climate, germination and propagation protocols, and more. Therefore, additional field research is required. Understanding adaptations of narrow endemics to climate change through trait-based studies, generating scenarios of projected climate change, developing scientific tools and methods for analyzing current and future vulnerability, and conducting integrated analyses of climate change impacts and adaptation of narrow endemic species are imperative. In the future, ecological knowledge will be pivotal in guiding both shortterm and long-term policy decisions across various sectors. As botanists, we should devote more attention to gaining the knowledge that other sectors expect from us. Furthermore, maintaining the global temperature increase below 1.5°C is vital in tackling biodiversity loss because adaptation becomes more challenging beyond this temperature. Thus, reducing emissions and cutting carbon footprint are persistently important for mitigating the climate crisis. However, these efforts should be address in conjunction with promoting ecosystem sustainability and curtailing biodiversity losses. It is evident that loss of biodiversity is a significant risk factor closely linked to climate issues. Therefore, IPCC recommends that risks to both climate and biodiversity should be equally considered in any policy level actions. Risks due to the loss in biodiversity are rather difficult to calculate and manage than climate risks, because the destruction of ecosystems and the extinction of species cannot be attributed to a single cause. These often result due to a complex and multidimensional network of risk drivers. Therefore, tackling biodiversity loss requires multidisciplinary, coordinated and participatory approaches. There has never been a more opportune time to raise our voices and influence global actions to reverse some of the devastating effects of the past few decades, which have accelerated climate change and biodiversity loss. Our immediate yet sound actions will have a profound impact on the next few thousand years.

HEME OXYGENASE-1 (HO-1): A FUNCTIONALLY DIVERSE ENZYME AND ITS ROLE IN PHYTOCHROME CHROMOPHORE SYNTHESIS, CELLULAR SIGNALLING AND DEFENCE MECHANISMS

Prof. (Dr.) G. S. Shekhawat

Centre for Advance Study, Department of Botany, Jai Narain Vyas University, Jodhpur-342001, Rajasthanm Email: gyans.shekhawat@gmail.com

Hemeoxygenase originally identified as Heme degradation regulator in animals and subsequently characterized as a distinct protein entity in photosynthetic organism. 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, but precise mechanisms of these responses are in need to be establish. Beside haem degradation, it has important functions in plants that include cellular defence, stomatal regulation, iron mobilization, phytochrome chromophore synthesis, and lateral root formation. 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 is an attempt to know abiotic stress induced changes in metabolism of crop plants paying special emphasis on various defence mechanisms involved in oxidative stress adaptations and finding the role of HO in salt/metal induced oxidative stress tolerance. Study confirms the cyto-protective role of HO-1 during abiotic 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.

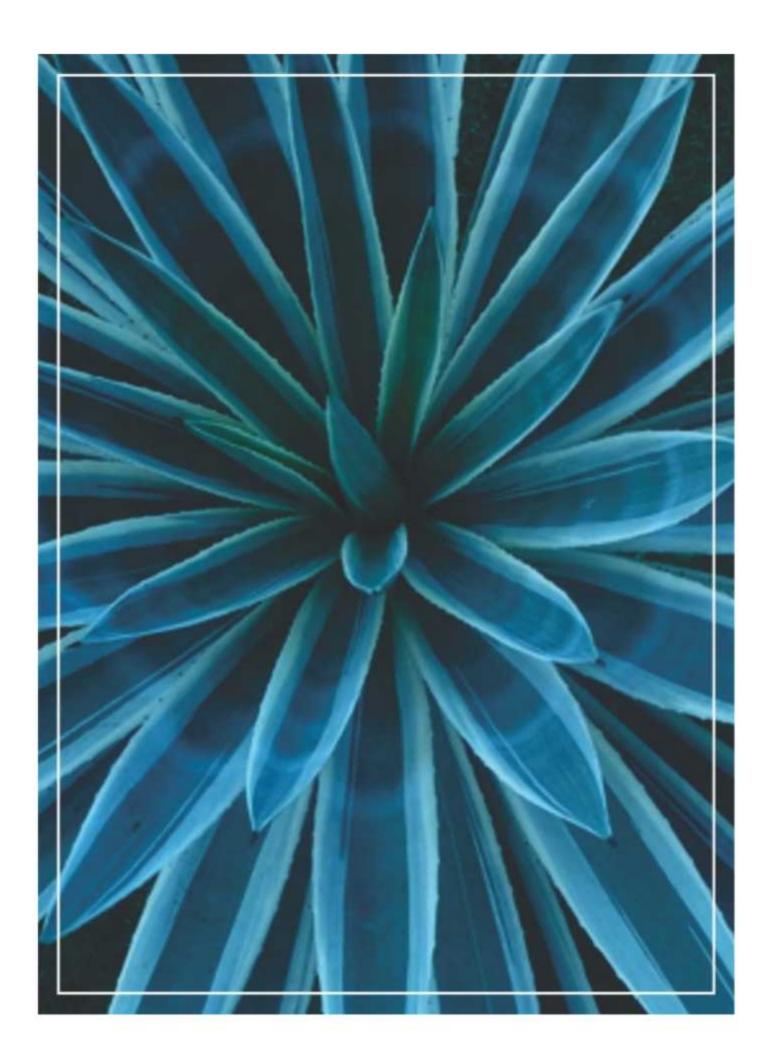
F1 and BC1 HYBRIDS IN APONOGETON (APONOGETONACEAE) EXHIBIT MEIOTIC CHAOS

Prof. S. R. Yadav

INSA Senior Scientist, Department of Botany, Shivaji University, Kolhapur-416 004. Emaikl: sryadavdu@rediffmail.com

Aponogeton decaryi, a polyploid (2n=52) Madagascar species, in the absence of male plants usually reproduces through apomixis (diplospory) while it's closest extant relative A. satarensis, a relict diploid (2n=26) and narrow paleoendemic from the Indian subcontinent reproduces sexually. Both the species have dioecious habit and biforked spikes indicative of their close genetic relationship. Hybridization between the apomictic A. decaryi (as female) and A. satarensis (as male) gave rise to three types of plants. Most of these turned out to be female apomicts with 2n=52 chromosomes but also in to some robust F1 hybrid male and female plants (2n=62-66). Apomicts produced biforked spikes and all the carpels developed into seeds. The meiotic analysis of F1 hybrid male showed that the microspore mother cells undergo asynaptic meiosis, the chromosomes diploidised but there was no reduction division resulting into unreduced gametes. Interestingly, a single microspore mother cell gave rise to polyads with 4-12 pollen grains (microspores) of mostly three size classes and exhibited meiotic chaos. When Aponogeton satarensis (female) was backcrossed with F1 male hybrid, the plants from the cross (BC1) turned out to be all males. These BC1 hybrids (2n=78) showed asynaptic meiosis and the microspore mother cells exhibited meiotic chaos and gave rise to 4-12 microspores of various sizes. Aponogeton can serve as an ideal material for understanding genetic and molecular mechanisms of meiosis which may open new opportunities to develop apomictic crops for better yield. Moreover, it provides insights into the changes in chromosome numbers during meiosis that lead to adaptive radiation and speciation.

XLVI ALL INDIA BOTANICAL CONFERENCE of THE INDIAN BOTANICAL SOCIETY WOMAN BOTANIST AWARD CONTEST Synergy in Plant Science and Sustainable Future: 2023



WB-01

BIOTECHNOLOGICAL STRATEGIES AND PROMOTION OF INDEGENOUS KNOWLEDGE FOR CONSERVATION OF ENDANGERED ETHNOMEDICINAL PLANTS IN HADOTI REGION OF RAJASTHAN WITH EVALUATION OF THEIR POSSIBLE THERAPEUTIC APPLICATIONS

Pareek Aparna

Department of Botany, University of Rajasthan, Jaipur 302004 (India) Email-aparna992000@gmail.com

An imperative demand imposed on all scientific investigations is that they should be reproducible, which calls for adequate documentation from the very beginning. In medicinal plant research, botanical documentation plays a significant key role since without correctly identified material and properly documented voucher specimens the results are at best suspect and at worst useless in the present scenario. Unrestricted collection of medicinal plants from the wild is resulting in an over-exploitation of natural resources. Therefore, the management of traditional medicinal plant resources has become a matter of urgency. Therefore, now a day's screening of medicinal herbs as potential sources of new bioactive compounds of therapeutic value has increased and is the need of hour. The pharmacological evaluation of substances from plants is an established method for the identification of compounds which leads to the development of novel compounds. Ethnopharmacological literature reveals several species of medicinal plants used in traditional medicine by indigenous people in Rajasthan and facing danger of extinction were subjected to in vitro cultures. Such facts make it imperative to document the factual position of conservation of medicinal plants bringing out the advance mode along with the short falls in this area of study. Antimicrobial assays were carried out in few selected ethnomedicinal plants facing threat for extinction. The present paper deals with the futuristic view on the said subject restricted to the important endangered ethnomedicinal plants around the Hadoti region of Rajasthan. Efforts are made to isolate the active constituents of these potent medicinal plants which are facing the danger of extinction and their biological activity will be further tested in vivo. Antimicrobial assays are carried out in few selected ethnomedicinal plants facing threat for extinction.

Keywords-Antimicrobial, Conservation, Endangered, Ethnomedicinal, therapeutic

WB-02

TAXONOMY AND DIVERSITY OF THE GENUS SONERILA ROXB. (MELASTOMATACEAE) IN WESTERN GHATS

Resmi S.

Department of Botany, University of Calicut, Malappuram, Kerala Email: resmi.sonerila@gmail.com

Sonerila Roxb., a species-rich taxonomically complex tropical Old World genus of the family Melastomataceae (tribe Sonerileae), is represented by around 180 taxa. The genus includes caulescent and acaulescent herbs, and is incredibly diverse, not surprisingly taxonomically difficult. It is distributed mainly across Sri Lanka, India, Nepal, Bhutan, South China, Taiwan, Indo-China and the Malay Archipelago. It is the largest genus in the tribe Sonerileae in India, with 49 species and one variety, and exhibits high percentage of endemism. The genus displays an array of morphological diversity and many species exhibit noteworthy case of adaptive radiation and explosive evolution. Following C.B. Clarke's treatment in Flora of British India, there has been no revision and the genus remained taxonomically neglected in India. As part of the ongoing studies, Sonerila in India is revisited based on field and herbarium data. Greater diversity of Sonerilaoccurs in the Western Ghats, where 43 species and one variety are found with 86 % of endemics. The present work highlighted the scenario of Sonerila in the Western Ghats with a revisionary account including key for the identification, detailed descriptions, notes on infraspecific variations, geographical distribution and conservation status assessment. Five species was found new to science. Nomenclatural issues relevant to the taxonomic study were also resolved resulting in subsequent synonymy, reinstatement of names and typifications.

Keywords: Diversity, Endemism, Paleotropics, Sonerileae, Taxonomy

XLVI ALL INDIA BOTANICAL CONFERENCE of THE INDIAN BOTANICAL SOCIETY YOUNG BOTANIST AWARD CONTEST Synergy in Plant Science and Sustainable Future: 2023



YB-01

ADVANCING THE ETHNOBOTANICAL RESEARCH WITH ADVANCE COMPUTING

Kumbhare Shravan D.

PG Teaching Department of Botany, RashtrasantTukadoji Maharaj Nagpur University, Amravati Road, Nagpur-440033

Ethnobotany comprises the relationship between the plants and indigenous communities. This relationship involves the knowledge of plant classification, cultivation, and its uses as food, medicine and shelter. However, many of the times this work remained unnoticed and it does not joins with the mainstream for its maximum application. Therefore, for the maximum output from this knowledge, the advancement is needed which can bring it to the notice of other researchers, conservationists, policymakers and general public. Advance computing like molecular docking, molecular dynamics simulations and ADME analysis can be used for the deep exploration of medicinal knowledge of plants which can reveal the active biomolecule(s), their possible mechanism of action, adverse effects and specificity. Advance computing for exploring the mechanism of action of two male fertility improving plants is used, the one with a well-established male fertility improving property, Mucuna pruriens and other which is unexplored and new to this list, Flemingia praecox. The study has revealed that M. pruriens improves male fertility not only by its major constituent levodopa and F. praecox by targeting the enzyme aromatase and by its ROS-borne-damage control activity. This is important to change the perception and to attract the attention of stakeholders.

Keywords: ethnomedicines, advance computing, molecular docking, molecular dynamics simulation.

YB-02

EXPLORING REVERSIBLE ANTI-FERTILITY IN MALE ALBINO RATS: ORAL ADMINISTRATION OF COMBINED CRUDE SEED EXTRACTS

¹ Mondal Manoshree Dilip and ² Chachad Devangi Parag

¹Botany Department, St. Xavier's College, 5, Fort, Mumbai - 400001 ²Botany Department, Jai Hind College (Autonomous), Churchgate, Mumbai - 400020

With rising population, there's a need of urgent attention to production and mass availability of newer and safer fertility regulation methods for both males and females. Based literature and previous work on individual extracts of *Carica papaya*, *Momordica charantia* and *Abrus precatorius*; a combination was prepared from the seeds of these plants and checked for its synergistic & reversibility efficacy as a herbal male contraceptive. Adult male Wistar Albino rats were fed the combination orally for 7 days and were found to exhibit total loss of fertility, reduction in semen fructose levels, total sperm count and percent sperm motility and no loss in libido while mating with female rats. Histopathological analysis of testis and epididymis revealed reduction in the no. of viable spermatozoa and cauda epididymal sperm density. Profiles of liver, kidney and Reproductive hormones showed little variation as against controls. These altered parameters showed complete reversal to control levels on the 7th day after withdrawal of dosage. Sub-acute toxicity was also checked for 28 days on the same animal model. It is concluded that this formulation was highly effective contraceptive which is reversible without any adverse side effects.

Keywords: Seed Extract, Antifertility, Wistar rats.

YB-03

A PANICOID SPECIFIC SISHSP21.9 FROM FOXTAIL MILLET PROVIDES THERMO TOLERANCE AND REDUCES YIELD LOSS IN RICE DURING HIGH TEMPERATURE

Singh Roshan Kumar and Prasad Manoj

National Institute of Plant Genome Research, New Delhi -110067, India

High temperature-induced crop failures are prominent nowadays in major staples, including rice, wheat, and maize; however, crops such as foxtail millet (Setariaitalica) are resilient to temperature stress. In this study, a novel small heat shock protein of foxtail millet, SisHSP21.9, is identified and characterized for its role in conferring tolerance to high-temperature stress. SisHSP21.9 is a panicoid-specific gene, which is highly upregulated during high-temperature in leaves, and the protein is localized in the chloroplast. Its expression is directly regulated by heat shock factor, SiHSFA2e, during temperature stress. Further, overexpression of SiHSP21.9 in rice enhanced the survival of transgenics during hightemperature stress (>80% survival frequency), and the transgenic lines showed improved plant architecture and overall grain yield. Compared to WT plants, transgenic lines maintained optimal photosynthesis rates with higher photosystem efficiencies at high temperatures, and this is conferred through protecting the components of photosystems, chlorophyll-binding proteins, and chloroplastlocalized functional proteins by SisHSP21.9. Prolonged high-temperature stress showed minimal damage to chloroplast proteins resulting in comparatively lower yield loss (35-37%) in transgenic lines. Altogether, the study suggests that SisHSP21.9 is a potential candidate for designing thermotolerant crops for climate-resilient agriculture; however, further research is needed because tolerance to abiotic stresses is polygenic.

Keywords: High-temperature stress, Small Heat Shock Protein, Chloroplast, Photosynthesis, Yield loss, Foxtail millet

XLVI ALL INDIA BOTANICAL CONFERENCE of THE INDIAN BOTANICAL SOCIETY S. N. DIXIT POSTER AWARD CONTEST Synergy in Plant Science and Sustainable Future: 2023





MORPHOMETRIC STUDIES OF SOME ORCHIDS

Dasgupta R.* and Dongarwar N. M.

Department of Botany, RTM Nagpur University, Nagpur, Maharashtra, India rituparnadasgupta002@gmail.com

Orchids of Maharashtra state due to continuous major threats being assessed and prioritized for conservational approach (BSI, 2015). An attempt made for morphometric characterization of blooming orchids in bio diversified Maharashtra clarifies the phenotypic variation amongst the taxa along with their regional distribution which signifies towards their endemicity. Terrestrial orchid corms possess huge medicinal properties like anticancerous, antioxidant, antidiabetic, antimicrobial, and phytotoxicity that signify the basic reason behind their threatened status along with endemic habitats. The morphometric parameters analysed throughout the study period represented into the statistical tabulated data. Detailed floral and corm morphometrics shows a wide range of significant differences amongst the observed taxa. These morphological variations make a robust view that each of the taxon has its own dimensional, shape, and size specificity in the wild.

Keywords: Morphometry, Flowers, Corms, Orchids.

SND-02

REARING OF TASAR COCOONS ON FEEDING OF GRAPHENE COATED LEAVES OF ZIZIPHUS JUJUBAMILL: A NEW HORIZON TO ENHANOOD THE PRODUCTIVITY OF QUALITY COCOONS

Gupta Manjula * and Dara Singh Gupta

Research Scholar, University Department of Botany, Kolhan University Chaibasa Pin: 833202 Jharkhand, Email: manjulagupta516@gmail.com, darasgupta.jcc@gmail.com

Graphene is a single layer of carbonic atoms, arranged in a hexagonal lattice nanostructure having mechanical strength, antimicrobial properties and conductive. Aim of the present investigation was to study the feeding activities of tasar larvae on non tasar silkworm food plant i.e., Ziziphus 50ujube Mill and another way was to study the fruitfulness of graphene coated leaves of Ziziphus on quality and quantity production of tasar cocoons. For the first time in India, graphene coated leaves of Ziziphus jujuba Mill (a non tasar silkworm food plant) fed by tasar silkworm and form the cocoons. Graphene was successfully fed and incorporated into the cocoons confirmed by graphene signature obtained by excrement of silkworm through Raman spectroscopy. The finding suggested that successful rearing of tasar cocoons on a non tasar silkworm food plant with and without graphene. Cocoons crop obtained from rearing on graphene coated leaves of Ziziphus 50ujube Mill had higher larval weight, cocoon weight, shells weight, cocoons volume as compared to rearing on Ziziphus Jujube Mill.

Keywords: Graphene, Larvae, Raman spectroscopy, Tasar Cocoons, Ziziphus 50ujube Mill.

SND-03

AN INDEGENOUS PERSPECTIVE OF BIOTECHNOLOGICAL STRATEGIES FOR CONSERVATION OF ENDANGERED ETHNOMEDICINAL PLANTS IN SOUTH- EAST REGION OF RAJASTHAN, INDIA

Pareek Aparna

Department of Botany, University of Rajasthan. Jaipur, E-mail aparna 992000@yahoo.com

In medicinal plant research area documentation plays key role since without correct identification the results are suspicious and useless in the present scenario. Ethnopharmacological literature reveals medicinal plants used in traditional medicine by indigenous people in Rajasthan are facing danger of extinction. The present study deals with the futuristic view on subject restricted to the important endangered ethnomedicinal plants around the rural areas of south east region of Rajasthan. Efforts were made for micropropagation and further isolation of active constituents of ethnomedicinal plants. Antimicrobial assays were carried out in few selected ethnomedicinal plants.

Keywords: Antimicrobial, Conservation, Endangered, Ethnomedicinal, Indegenous.

SND-04

EFFECT OF OLIGO-ALGINATE ON THE GROWTH, PHYSIOLOGY, METABOLISM IN RICE (ORYZA SATIVA L.)

Samdurkar Anish N.

Department of Botany, RTM Nagpur University, Nagpur- 440033 Email: anishsamdurkar@gmail.com

An investigation was carried out to demonstrate the bioactivity of oligo-alginate in rice. The gamma ray produced oligo-alginate displayed their size-dependent bioactivity in terms of enhanced seedling growth in the preliminary phase of the study. Later, in the first phase of field study, the oligos which stimulated the growth of plants were tested under field conditions. The oligos displayed stimulatory effect on the growth and development of plants in the field. The bioactivity of oligos, in field, was influenced by the treatment regimen. Recurrent sprays of oligos were necessary throughout the growth of plant to harness the maximum potential of the oligos. Oligo-alginate produced by the 500kGy dose of gamma ray at 200ppm concentration (A/500/200) enhanced the yield in rice by 13% when applied in form of foliar spray at seedling, pre-flowering and grain-filling stages. Therefore, the effect of A/500/200 was studied on the physiology and biochemical parameters in rice seedlings. The treatment stimulated the shoot length, relative water content, net photosynthesis rate, transpiration rate, total sugar & starch content, and activity of a few metabolic enzymes. These observations presumably explain, although partially, the growth and yield-enhancing activity of oligo-alginate.

Keywords: biopolymer, gamma ray, oligo-alginate, plant growth enhancer, polysaccharides

SND-05

STUDY ON COMPARATIVE EFFICACY OF GLOMUSHOI WITH ORGANIC AMENDMENTS IN BIOREMEDIATION OF METALS FROM ENGINEERING INDUSTRY EFFLUENT ON WHEAT

1 Sharma Ameeta * and 2 Trivedi P. C.

Department of Microbiology and Biotechnology, IIS (Deemed to be University), Jaipur, India

²Former Vice-Chancellor, JNV University, Jodhpur, India, Email: ameeta141@yahoo.com

This study is instigated from allure of a stratagem involving bioremediation of Fe and Cr from engineering industry effluent using Arbuscular Mycorrhizal Fungi- Glomus hoi via host Triticum aestivum var. Raj4238. AMF performance in bioremediation and in enhancing host plant growth was compared with Farmyard Manure, Oil seed cake and rhizobial inoculants on plants to study differences in their potential for the same. Morphological, biochemical and physiological parameters were also studied and was observed that AMF was most effective followed by Farmyard Manure, Oil seed cake and rhizobial applications in metal treated plants to a quite variable and distinct extent.

Keywords: AMF, Bioremediation, Metals, Wheat

XLVI ALL INDIA BOTANICAL CONFERENCE of THE INDIAN BOTANICAL SOCIETY K. S. BILIGRAMI POSTER AWARD CONTEST Synergy in Plant Science and Sustainable Future: 2023



PP-KSB-01

NANOENCAPSULATED FORMULATION OF APIUM GRAVEOLENS ESSENTIAL OIL AND ITS MAJOR COMPONENTS FOR PRESERVATION OF STORED FOODS AND FRUITS AGAINST FUNGI AND AFLATOXIN B₁ CONTAMINATION

Das Somenath

Department of Botany, Burdwan Raj College, PurbaBardhaman, West Bengal-713104, India E-mail: sndbhu@gmail.com, 91 7860372916

The aim of the present investigation was encapsulation of Apium graveolens essential oil (AGEO) and its major components linally acetate and geranyl acetate into chitosan nanobiopolymer to prevent fungi and Aflatoxin B₁ contamination in rice, citrus, and grape fruits. The characterization of AGEO nanoformulation was performed through SEM, FTIR, and XRD analyses. Inhibition of ergosterol and methylglyoxal biosynthesis suggested antifungal and anti aflatoxigenic mechanism of action. The in-situ efficacy was confirmed in rice, citrus, and grape fruits along with maintenance of nutritional components. Moreover, mammalian non-toxicity of AGEO nano formulation strengthens its application as eco-smart and safe-preservative in agriculture and food industries.

Keywords: Essential oil; Nanoencapsulation; Aflatoxin B1; Ergosterol; Antifungal

PP-KSB-02

LIVERWORTS OF NELLIYAMPATHY HILLS, SOUTHERN WESTERN GHATS-AN ECOLOGICAL PERSPECTIVE

Menon Sajitha S. and Manju C. N.

Bryology Division, Department of Botany, University of Calicut, Calicut University P.O,
Malappuram Dist., Kerala-679635, India
E-Mail: sajimenon.saradha@gmail.com, manjucali@gmail.com

Liverworts of Nelliyampathy Hills, Palakkad district, Kerala, India with its systematic positioning, Microhabitats and altitudinal ranges are discussed with diagrams, graphs and photo plates. The influence of Palakkad gap and as a part of Southern Western ghats enriches the species composition of the study area. Many new species of flora and fauna are discovered from Nelliyampathy hills, among bryophytes Fissidense nervisSim; Exormothe caceylonensis Meijer are new rediscoveries, Fissidense crispulus var. nelliampathiae K. M. Manjula and Manju and Plagiochila squamulose subsp. tamas-pocsii Sajitha, Manju and Rawat (in edit) are new var. and new subsp. respectively are discovered from Nelliyampathy hills. A total of 27 Liverworts coming under thalloid and leafy habits are discussed.

Keywords: Liverworts, Nelliyampathy Hills, Southern Western Ghats, Palakkad gap

PP-KSB-03

HEPATOPROTECTIVE POTENTIAL OF AMOMUM SUBULATUM ROXB. AGAINST CCL4-INDUCED HEPATOTOXICITY IN ALBINO WISTAR RATS

1 Singh Mahendra, 1 Y. Vimala* and 2 Lavania Seshu

Department of Botany, CCS University, Meerut and Department of Botany, Lucknow University, Lucknow Email: yvimala17@gmail.com

Amomum subulatum Roxb. (Commonly known as black cardamom) belongs to the family Zingiberacea. It is widely grown in moist tropical countries. The present study was carried out to assess the hepatoprotective potential of methanolic fraction of rhizome and rhizome callus of Amomum subulatumRoxb against CCl₄ (1.5ml/kg bw/day, for 14 days)-induced hepatic-injury in albino wistar rats. CCl₄ produced significant changes in biochemical parameters such as increase in the level of serum glutamate oxaloacetic transaminase (SGOT) and glutamate pyruvic transaminase (SGPT), alkaline phosphatase (ALP), total bilirubin (TB) and decrease level of total protein (TP) along with changes in histopathological study (damage hepatocytes). Treatment with methanolic extract of rhizome and rhizome callus (180mg/kg bw for 14 days) and silymarin (100mg/kg bw for 14 days) significantly (p<0.01) restored biological and histopathological changes as compared to normal untreated control. GC-MS profiling and phytochemical screening (total phenol, total flavonoid content, DPPH and FRAP) also confirmed the hepatoprotective potential of rhizome and rhizome callus of Amomum subulatum.

Keywords: Annonum subulatum, hepatoprotective potential, Wistar rats

PP-KSB-04

CHARACTERIZATION OF ELEMENTAL ACCUMULATION IN LICHENS THROUGH ICP-MS, SEM-EDX AND FTIR TECHNIQUES AND ASSESS THEIR POTENTIAL AS BIOMONITORING TOOLS

1 Vartika Gupta and 2 Sanjeeva Nayaka

 Department of Botany (Environmental Science), University of Lucknow-226007
 Lichenology Laboratory, CSIR-National Botanical Research Institute, Rana Pratap Marg, Lucknow-22600, Email: vartika1292@gmail.com

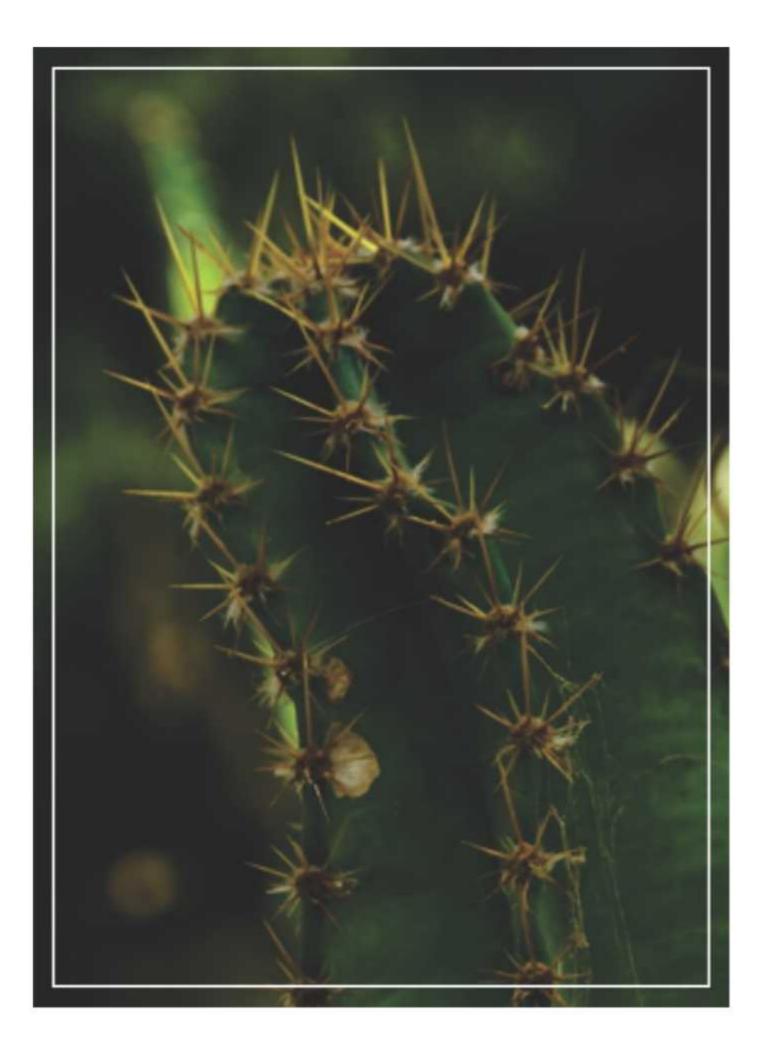
In the present study, elemental accumulation in two crustose lichen species, *Bacidiasubmedialis* and *B. convexula*are compared. The study aimed to explore the potential of lichens as biomonitoring tools and to assess the impact of anthropogenic activities on the environment. The advanced techniques such as ICP-MS, FTIR, and SEM-EDX were employed. The highest mean concentration of Ag (0.36±0.01), Al (1194.87±67.6), As (0.6±0.02), Cd (0.29±0.01), Cr (107.79±0.39), Cu (17.12±0.07), Fe (1722.73±8.48), Mg (1995.13±31.28), Mn (235.06±0.67), Ni (9.09±0.05), and Zn (87.63±0.84 mg kg⁻¹) were estimated in the thalli of *B. submedialis*, whereas *B. convexula*accumulated highest concentration of Co (1.34±0.02), Li (3.67±0.35), Pb (11.92±0.13), and Se (0.27±0.01 mg kg⁻¹). In both the lichens, FTIR analysis identified the functional groups such as, alcohol (O-H), alkenes (C-H), alkyl halides (C-Br), aromatic (C=C), methoxy (O-CH₃) and octahedral groups (AlO₈). The SEM images revealed the

XLVI ALL INDIA BOTANICAL CONFERENCE of THE INDIAN BOTANICAL SOCIETY

microstructural changes in lichens, surface sorption of elemental ions, fibrous deposition and entrapment of gas bubbles. The analytical results of EDX showed a higher weight of O with 46.11%, Mg 0.43%, Al 0.9 %, Fe 0.38%, Si 1.62%, Zr 1.67% in B. submedialis. Whereas, B. convexula revealed higher weight of C with 62.36% and Ca 0.62%. Thus, results revealed that B. submedialis is more tolerant than B. convexula and can be utilized as biomonitoring tool.

Keywords: Air pollution, biomonitoring, ecosystem health, heavy metal, Lichenized fun

XLVI ALL INDIA BOTANICAL CONFERENCE of THE INDIAN BOTANICAL SOCIETY INDEX TO PRESENTATIONS Synergy in Plant Science and Sustainable Future: 2023



	SECTION - I	
	Mycology Microbiology and Plant Pathology Oral Presentations	
Abstract No.	Abstract Title	Page No.
OP-I-01	Phylogenetically diverse and novel species of rhizobia nodulate native legumes of north Eastern region (Ner) of india. Tak Nisha and Gehlot Hukam S.	73
OP-I-02	Seed to Shield: Unleashing the power of plant growth promoting rhizobacteria (PGPR) for plant health and sustainable food security. Singh Prashant	73
OP-I-03	Antibacterial components in EUCALYPTUS GLOBULUS: 1, 8- Cincole and β-eudesmol. Baig M. M. V. and More Digamber R.	74
OP-I-04	In-vitro antifungal evaluation of different leaf extracts of Datura STRAMONIUM L. Showkat Subiya and T. Senthil Kumar	74
OP-I-05	Antifungal activity and In-silico inhibitory prediction of dichloroacetic acid, tridec-2-ynyl ester derived from PRUNELLA VULGARIS against phytopathogenic fungi. Akhtar Rafia and T. Senthil Kumar	75
OP-I-06	Edible anthocyanins as antimicrobial agents. Menghani Ekta and and Schindler Simona	75
OP-I-07	Bacopa Monnieri (L.) Pennell: A potential source of plant-based antibacterial agents against foodborne bacteria. Kumar Sachin and Kumar Sandeep	76
OP-I-08	Exploring the antibacterial potential of SIDA CORDIFOLIA L. Phyto-extracts: Polyphenol profiling, antibacterial activity, and process optimization against common foodborne bacteria. Kumar Sandeep and Kumar Sachin	76
OP-I-09	Isolation, characterization of mycorrhizal, non-mycorrhizal fungi and their utilization for the acclimatization of in Vitro regenerated plantlets of ANOECTOCHILUS Elatus – An endangered Jewel Orchid. N. Ahamed Sherif, T. Senthil Kumar, Abubacker M. N. and Rao M. V.	77
OP-I-10	Comparative preliminary phytochemical analysis and antimicrobial evaluation of two medicinal plants traditionally used in skin infection. Topno Swati	77
OP-I-11	Diversity of Lichenicolous Genus ARTHONIA SENSU LATO in India. Joshi Yogesh	78
OP-I-12	Milky Mushroom cultivation process and its cost analysis. Kumara Babita and Gupta Dara Singh	78
OP-I-13	Aerospora of Tulsipur. Srivastava S. K.	79

OP-I-14	Conservation of microbes: Some trends. Nagaraju D. and Manoharachary C.	79
	SECTION - I Mycology Microbiology and Plant Pathology Poster Presentations	
PP-I-01	Nanoencapsulation of PIMPINELLA ANISUM essential oil for alternative therapies in dermatophytosis infections against TRICHOPHYTON MENTAGROPHYTES. Yadav Arati and Dwivedy Abhishek Kumar	80
PP-I-02	Antimicrobial activity and phytochemistry of SALVADORA PERSICA. Chavan V. P. and Shahare N. H.	80
PP-I-03	Genetically diverse strains of <i>Bradyrhizobium</i> are root nodule microsymbionts of <i>PUERARIA PHASEOLOIDES</i> Rawal Abhishekh, Dubey Neetika, Gehlot Hukam S. and Tak Nisha	81
PP-I-04	Diversity and enzymes of leaf litter degrading thermophilic fungi. Borkar K. M.	81
PP-I-05	Unraveling the antibacterial potential of ayurvedic plant SIDA CORDIFOLIA L. (bala) against LISTERIA MONOCYTOGENES: A bioactive-rich phytoextract study. Kumar Sachin and Kumar Sandeep	82
PP-I-06	Studies on fungal diseases of BUTEA MONOSPERMA from Achalpurregion. Khapekar, Pradhnya G. and Hate Sandeep	82
PP-I-07	Boosting the plant growth through application of eco-friendly biofertilizers of arbuscular mycorrhizal fungi isolated from the Cynodondactylon. Raut N. S. and Phirke N. V.	83
PP-I-08	Effect of parameters on the diversity of lactic acid bacteria in the steeped Sorghum fermentation process. Khade P. J. and Phirke N. V.	83
PP-I-09	Bacterial degradation of Azo Dyes from textile industrial effluents. Jadhao Kanhaiya Lal and Kamble K. D.	84
PP-I-10	Screening and isolation of effective microbial consortia associated with biogas production from kitchen waste. Banarase S. E. And Phirke N. V.	84
PP-I-11	Fungicidal efficacy of ARGEMONE MEXICANA extracts against Ginger-Infecting fungi. Awachar S. V. and Kamble K. D.	85
PP-I-12	Assessment of antibacterial activity of leaf extracts of VITEX NEGUNDO L and NERIUM OLEANDER L. Singh Archana Kumari and Sinha Vishnu Shankar	85
PP-I-13	Screening of rhizobia associated with symbiotically efficient cultivars of VIGNA RADIATA grown in Rajasthan. Sharma Shilpa and Tak Nisha	86

PP-I-14	Harnessing phosphate transporter genes to enhance identification of am fungi. Shukla Sadhana, Johny Leena, Singh Pushplata and Didwania Nidhi	86
PP-I-15	Evaluation of antibacterial activity of CISSUS QUADRANGULARIS L. Methanolic extracts against some selected pathogens. Dhillon Juhi and Vimala Y.	87
PP-I-16	Diversity of gilled mushrooms from Katepurna Wildlife Sanctuary of Akola District, Maharashtra. Kanherkar Suryakant H., Borul Shailesh S. and Mane Rameshwar Y.	87
PP-I-17	Nutritional potentiality and health assets of paddy straw Mushroom – volariella volvacea. Dilip V. Hande and Deshmukh Anand M.	88
	SECTION - II Algae, Bryophytes and Pteridophytes Oral Presentations	
OP-II-01	Epiphyllous liverworts of Aralam Wildlife Sanctuary, Kannur District, Kerala. Sruthi O. M., Rajesh K. P. and Manju C. N.	89
OP-II-02	Diversity of the family Hypnaceae (bryophyta) in Kerala State, India. Shakira C. and Manju C. N.	89
OP-II-03	Subgenus Pachyfissidens (fissidentaceae; bryophyta) in the Western Ghats, India. Manjula K. M. and Manju C. N.	90
OP-II-04	Reproductive mechanisms and its implication to the taxonomic complexity in Bryaceae Rchb. Vincesha P. M. and Manju C. N.	90
OP-II-05	GIS based distribution of macroscopic NOSTOC from Girnar Wildlife Sanctuary, Gujarat. Balai Kunjan	91
OP-II-06	GIS based assessment of liverworts distribution in Girnar Wildlife Sanctuary, Gujarat. Dangar Bhagyashri	91
OP-II-07	Morpho-anatomical studies and evaluation of phyto- constituents of some ASPLENIUM species from Darjeeling District, West Bengal. Singh Puja and Bhandari Jnan Bikash	92
OP-II-08	Microalgal enzymes: A possible solution of white pollution. Pareek Arvind and Jain Sapna	92
OP-II-09	Exploring airborne algae from Coastal regions: Biodiversity, culturing, and potential applications Kejariwal Mona and Vala Mayur	93
OP-II-10	Present status and habitat specificity of rare hepatics in and around Mukteshwar area of District Nainital, Western Himalayas. Sapana Pant and Tewari S. D.	93

OP-II-11	FORSSTROEMIA PRODUCTA (hornsch.) Paris-a neckeraceaous, pleurocarpous moss new to India. Bhandari Manisha, Pant Sapana, Tewari S. D. and Enroth Johannes	94
OP-II-12	Characterization of heavy metal tolerant entophytic bacteria isolated from a Fern's root. Saha Maitri and Bhandari Jnan Bikash	94
OP-II-13	Quantification of Lycophytes from Western Ghats of Maharashtra (India). Patil Sachin and Lavate Rajendra	95
,	SECTION - II Algae, Bryophytes and Pteridophytes Poster Presentations	
PP-II-01	Structural variations of stomata in pteridophytes Misra P. C. and Tiwari Shraddha	96
PP-II-02	Assessing the role of light spectra in the in VITRO gametophyte development under of ATHYRIUM SCHIEMPERI from Rajasthan. Jain Ritu	96
PP-II-03	Screening of blue green algae (cyanobacteria) from Krishna River. Patil Shubhangi P., Chogule Vinay V. and Mohammad Rafiuddin Naser	97
PP-II-04	Induction and characterization of mycosporine-like amino acids in the Cyanobacterium ANABANOPSIS CIRCULARIS hkar-22 Singh Varsha K., Jha Sapana, Sahu Niharika, Kumari Neha and Sinha R. P.	97
PP-II-05	A method for determining the vase-life of ferns for validation of their ornamental values - a case study in homosporous ferns. Srivastava Sakshi and Singh Ajit Pratap	98
PP-II-06	Synergetic aspects and overview of some bryophytes of Melghat forest. Wankhede T. B. and Manik S. R.	98
	SECTION - III Seed Plants: Anatomy and Reproductive Biology Oral Presentations	
OP-III-01	Comparative Account on Impact of Local Climate on The Secondary Xylem and Growth Patterns in IPOMOEA ERIOCARPA R. Br. (Convolvulaceae) Growing in Arid and Tropical Deciduous Forest. Thacker Khyati D., Raole Vinay M. and Rajput Kishore S.	10
OP-III-02	Diversity in the ontogeny of inter-and intraxylary phloem development in eudicots. Rajput Kishore S.	10
OP-III-03	Development of Successive Cambia and the Structure of The Secondary Xylem in MILLETTIA EXTENSA (Benth.) Benth. Ex Baker (Fabaceae). Tanmay Rohit and Rajput Kishore S.	102

OP-III-04	Comparative study on the stem architecture and growth trajectories in three varieties of MUCUNA PRURIENS (L) dc (fabaceae) Rami Meera, Gurav R. V. and Rajput Kishore S.	103
OP-III-05	Identification features of VINCETOXICUM INDICUM: Microscopy and DNA sequencing. Denni Mammen	103
OP-III-06	Embryo morphology of APONOGETON and its taxonomic significance. Chougule Rupali N., Yadav Shrirang R. and Lekhak Manoj M.	104
OP-III-07	Anatomical studies in the leaves of HYDNOCAPUS PENTANDRUS (buch. – ham) oken. Acharya Darshika and Vaidya Meenakshi Sudhir	104
OP-III-08	Stem anatomy and development of multiple variants in MERREMIA HEDERACEA (Burm.f.) Hallier F. (Convolvulaceae) Ramoliya Dhara G., Raole Vinay M. and Rajput Kishore S.	105
OP-III-09	Leaf architecture patterns in ALSEODAPHNE, DEHAASIA and PERSEA from Lauraceae Vaidya Meenakshi	105
OP-III-10	Floral reversion in CLEOME VISCOSA: Unraveling the mechanisms behind a captivating phenomenon. Kheta Ram	106
	SECTION - III Seed Plants: Anatomy and Reproductive Biology Poster Presentations	
PP-III-01	Floral nectar, chemical composition and flower visitors in MORINGA OLEIFERA lamk. Mahalkar M. S. and Dhore M. M.	106
PP-III-02	Trap gland morphology of UTRICULARIA species from the lateritic plateaus of northern kerala. Vaishnavi K. P. and Nampy Santhosh	107
PP-III-03	Pollen germination, tube growth and stigma receptivity in CROTALARIA JUNCEA L. (Fabaceae) Kukade S. A. and Tidke J. A.	107
PP-III-04	A comparative study of fruit and seed in BARLERIA. Adikane Sujata V. and Kale Pravin J.	108
PP-III-05	Pollination biology of IPOMOEA QUAMOCLIT (Convolvulaceae): floral and visitor behavioral aspects Yogita S. Mirge and Jaykiran A. Tidke	108
Seed	SECTION - IV I Plants: Taxonomy, Ethnobotany and Plant Resource Utilization Oral Presentations	141
OP-IV-01	PIPER BETLE linn. Leaves: a comparative study of antioxidant and antimicrobial potential in three varieties. Chachad Devangi Parag	109

OP-IV-02	Exploring CAJANUS CAJAN pod protein concentrates: an eco- friendly supplement alternative and vegetable waste management solution Charania Sheeza and Vaidya Meenakshi Sudhir	109
OP-IV-03	Taxonomic status of STEREOSPERMUM cham., critical review from India. Gadpayale J.V., Somkuwar Subhash R. and Chaturved Alka A.	111
OP-IV-04	Endemic flowering plants of Nilgiri biosphere reserve, India: A review. Ravichandran V. and Murugan C.	111
OP-IV-05	Traditional to Digital Morphometric Tool for Species Segregation: A Case Study in IPOMOEA Family Convolvulaceae. Oza Kavi K. and Raole Vinay M.	112
OP-IV-06	Medicinal plants used by Kokni tribal of Nasik, Dhule and Nandurbar Districts of Maharashtra. Kuvar Sachin D.	112
OP-IV-07	Phylogeny and Molecular Dating of Indian Musaceae. Rajeesh E. P. and Sabu M.	113
OP-IV-08	Integrative taxonomy, phylogeny, and biogeography of genus POGOSTEMON in India. Toms Ashna and P. Sunojkumar	113
OP-IV-09	Phytochemical Screening, Phyto nanofabrication and Antibacterial Activity Evaluation of POGOSTEMON QUADRIFOLIUS (Roxb. Ex D. Don): A Highly Potent Ethnomedicinal Plant in Family Lamiaceae. Aswathi Ganga and P. Sunojkumar	114
OP-IV-10	Phytochemical and Pharmacognostic Studies on the Fruits of TRAPA NATANS. Robin Elizabeth, Godara Pooja, and Daniel Mammen	114
OP-IV-11	Antioxidant, LC-MS analysis and bioactivity evaluation of seed of <i>BAUHINIA TOMENTOSA</i> . Jagtap Dipali N. and Jadhav Varsha D.	115
OP-IV-12	Antioxidant activity of MITRAGYNA PARVIFOLIA (roxb.) Korth. Mepani Meha and Vaidya Meenakshi Sudhir	115
OP-IV-13	POUZOLZIA SANGUINEA var. NEPALENSIS: Unravelling taxonomic complexity through resurrection. Gupta Amit and Wagh Vijay V.	116
OP-IV-14	Botanical treasures of Chambal ravines: Exploring the rich diversity of plants. Lohit Tushar Anilrao and Wagh Vijay Vishnu	116
OP-IV-15	Survey of mango-based industries of the South-Gujarat. Das Divya and Albert Susy	117
Seed	SECTION - IV I Plants: Taxonomy, Ethnobotany and Plant Resource Utilization Poster Presentations	
PP-IV-01	Diversity, distribution and endemism of the genus polygala L.	117

	(polygalaceae) in Idukki District, Kerala, India. Vishnu Mohan amd Nampy Santhosh	
PP-IV-02	Chemical fingerprints of three PIPER BETLE cultivars: a comparative hptlc study for medicinal insights. Farzan Afkham and Chachad Devangi Parag	118
PP-IV-03	Exploring the phytochemical and anti-oxidant potential of CASSIA flowers. Manasawala Ruqayya and Chachad Devangi	118
PP-IV-04	Exploring the physicochemical evaluation and fluorescence characteristics of GARCINIATALBOTI raizada ex santapau. Shukla Priyanka and Vaidya Meenakshi Sudhir	119
PP-IV-05	Evaluation of in vitro anti-inflammatory activity of KOPSIA FRUTICOSA (roxb.) A. dc. Shinde Rajendra D. and Khan Saif Y.	119
PP-IV-06	Biochemical studies on AZIMATETRACANTHA LAM. Of raichur fort, karnataka. Shrishail H. C.	120
PP-IV-07	Phytochemical profiling and antioxidant activity of crateva religiosa g. Forst. Bark extract. Meenaloshini P. and Kumar T. Senthil	120
PP-IV-08	Ethnobotanical study of medicinal plants of Fatehpur Beer of Sikar District of Rajasthan. Singh Brijendra	121
PP-IV-09	Wild edible fruits used by tribal inhabitants from Katepurna Wildlife Sanctuary (MS) India. Shirsat Rupali P.	121
PP-IV-10	Seed germination in TELOSMA PALLIDA (Roxb.) Craib (apocynaceae): a threatened wild vegetable. Patil Janhavi B. and Satpute Sanjay V.	122
PP-IV-11	Ethnobotanical survey of selected invasive plant species found in Wadoda forest range, Muktainagar, Maharashtra State, India. Patil Geeta P. and Vidya A. Patil	122
PP-IV-12	Documentation of wild plant pollinator diversity from Warud Tahsil of Amravati District. Sarode Akhilesh M., Satpute Sanjay V., and Tidke Jaykiran A.	123
PP-IV-13	Preliminary phytochemistry, biological activities of methanolic extracts of RUNGIA REPENS from Akola District, Maharashtra. Sirsat Ashwini and Kokate Pratiksha	123
PP-IV-14	Ethnophytoetymology of some Taxa in Maharashtra Patil A. M., Patil C. R. and Patil D. A.	124
PP-IV-15	Diversity and systematics of INULEAECASS. (asteraceae) in South-Gujarat. Sharma Jaydeep J. and Nagar Padamnabhi S.	124
PP-IV-16	Nanoencapsulated CYMBOPOGON NARDUS essential oil as potential antifungal and aflatoxin B ₁ suppressor in stored SYZYGIUM CUMINI seeds.	125

	Dwivedy Abhishek Kumar	
PP-IV-17	Wild plants used by Kokni Tribal of Nasik, Dhule and Nandurbar Districts as vegetable from Maharashtra. Kuvar Sachin D.	125
PP-IV-18	The arrangement of the stamens: an identifying key for some species of OXALIS. Pathak Sumit Kumar	126
PP-IV-19	Medicolore of herbal vendors in North Maharashtra in the perspective of contact (touch) therapy Ahirrao Y. A., Patil M. V. and Patil D. A.	126
PP-IV-20	A fossil cypsela fruit from Intertrappean Beds of Mohgaonkalan, M.P., India. Pundkar S. V., Kokate P. S., and Thorat K. M.	127
PP-IV-21	Ethno medicinal uses of gum yielding plants of Ranchi District, Jharkhand, India. Gupta Dara Singh and Gupta Manjula	127
PP-IV-22	Natural polyphenols: an overview on antioxidant potential and bioactive compounds. Ranjan Navi, Vidyarthi S. K. and Kumari Manorma	128
PP-IV-23	Characterization of bioactive compounds on ALLIUM SATIVUM L. Vidyarthi Sanjeev Kumar and Ranjan Navi	128
PP-IV-24	Studies on the wild edibles resources in a Jaunpur range, Rehri, Garhwal, Uttarakhand. Pandey Manisha and Sharma Sachin	129
PP-IV-25	Morphotaxonomic diversity and affinity of a few members of the tribe heliantheae (asteraceae) Kathalkar Mayuri and Wath Manjusha	129
PP-IV-26	Phytochemical analysis of medicinal plants occurring in local area of Maregaon tahsil dist. Yavatmal Maharashtra. Matte R. S.	130
PP-IV-27	Rediscovery of ARGYREIAA RAKUENSIS and a. SRINIVASANII (convolvulaceae) from Eastern ghats, India. Lawand Pramod R. and Shimpale Vinod B.	130
PP-IV-28	Comparative studies on classical and molecular taxonomy of CASSIA FISTULA L., BUTEA MONOSPERMA (Lam.) Taub and DALBERGIA SISSOO Roxb. Of family FABACEAE LIND L. Hansdah Jessica Rene and Srivastava Ajay Kumar	131
PP-IV-29	Evaluation of total protein, nitrogen content, and amino acids, in BRASSICA OLERACEA Var. Botrytis leaves- a potential source of protein supplement. Sawant Neha and Vaidya Meenakshi Sudhir	131
PP-IV-30	Pharmacognostical and phytochemical analysis on leaves of NOTHOPEGIA CASTANAEFOLIA (Roth.) Ding hou. Chandanshive Yugandhara S. and Prof. Jadhav Varsha D.	132
PP-IV-31	Antioxidant screening of wild edible plant IPOMOEA	132

	Jawale R. D. and Wath M. R.	
PP-IV-32	Taxonomic studies on the GERANIUM Subg. ROBERTIUM in India. Imtiyaz Ahmad Hurrah and Wagh Vijay V.	133
PP-IV-33	Taxonomic delineation of Indian GERANIUM species through micro-morphological analysis. Shukla Aparna R., Sahu Nayan and Wagh Vijay V.	133
PP-IV-34	Pollen morphodiversity in some genera of family CONVOLVULACEAE. Rajurkar A.V. and Tidke J. A.	134
PP-IV-35	Assessing the invasion risk of weeds from the apg-iv grade- lamiids in the context of Moradabad District, using the Australian weed risk assessment. Sharma Sachin and Pandey Manisha	135
PP-IV-36	Floral diversity of jhalawar forest, South-Eastern Rajasthan, India. Rathore Neelkamal and Yadav Vijay Kumar	135
PP-IV-37	A comparative study of fruit and seed in BARLERIA. Adikane Sujata V.	136
PP-IV-38	Pharmacognostical and phytochemical screening of various extracts of leaves of CAJANUS SCARABAEOIDES (L.) Thouars. Katkole Siddharth K. and Jadhav Varsha D.	136
PP-IV-39	Grass diversity of hinganghat taluka of Wardha District. Khatri P. K., Dasgupta R., Dongarwar N. M.	137
PP-IV-40	Sociocultural perspectives on NTFPS: empowering tribal communities in Dang District Gujarat. Rajput Shrishti and Raole Vinay M.	137
PP-IV-41	Phytochemical profiling of RUELLIA BRITTONIANA: A lesser known ethnomedicinal plant Jagtap Tripty and Koche Dipak	138
	SECTION - V	
	Cytogenetics, Plant Breeding and Molecular Biology Oral Presentations	
OP-V-01	Appraisal of genotoxic potential of aqueous leaf extracts of NYCTANTHES ARBOR-TRISTIS L. Sinha Vishnu Shankar, Mohanka Reena and Kumar Nandjee	139
OP-V-02	Cytological variation and evolution in some selected members of family asteraceae. Patil Shital and Umale Pratiksha	139
OP-V-03	Assessment of Okra germplasm for mucilage content. Gund G. R. and Gurav R. V.	140
OP-V-04	Diversity analysis of Okra (ABELMOSCHUS ESCULENTUS) genotypes for qualitative and quantitative traits. Chaudhari Bhushan N., Gavhare Supriya B. and Magar Jaywant G.	140
OP-V-05	Variability studies in some cultivars of tomato (SOLANUM LYCOPERSICUM L). Gavhare Supriya B., Chaudhari Bhushan N., and Magar Jaywant G.	141

OP-V-06	Cytological studies of two ARGYREIAL OUR. Species from Maharashtra. Lavate S. S. and Gaikwad N. B.	141
OP-V-07	Morphological and nuclear DNA content variation in some LILIUM cultivars. Deshmukh Shraddha and Nathar Varsha	142
OP-V-08	Phylogenetic relationship between members of bambuseae and arundinarieae based on RBCL sequences and morphological descriptors. More K. C. and Gawande P. A	142
OP-V-09	Development of gamma irradiation induced morpho-chemically distinct variety cim-suras of peppermint (M. PIPERITA L.) Kumar Birendra, Prasad Priyanka, Gupta Akancha, Kumar Rakesh, Kumar Narendra, Kumar Dipender, Verma R. S. and Tandon S.	143
OP-V-10	Genetic variability in M ₁ Population induced by different doses of EMS in varieties viz. NIMTILI, PRATAP, CIM-PUSHTI and POSHITA of Ashwagandha (WITHANIA SOMNIFERA Dunal.) Kumari Puja, Tara Chandra Ram, Nashra Aftab, and Kumar Birendra	143
OP-V-11	Mutagenic effectiveness and efficiency of electron beam, gamma rays andems in kalbhat and balck rice non-bsamati aromatic rice landaraces Londhe Ranjit K., Desai Shitalkumar P., Jadhav Akesh G., Dhole Vinod J., Bapat Vishwas A. and Gaikwad Nikhil B.	144
	SECTION - V Cytogenetics, Plant Breeding and Molecular Biology Poster Presentations	
PP-V-01	Induced morphological variation in mutagen-treated mungbean [VIGNA RADIATA (L.) Wilczek] cultivars in M ² generation. Deshmukh A. G. and Koche D. K.	145
PP-V-02	Effect of leaf colour mutations on bolting and yield in safflower (CARTHAMUS TINCTORIUS L.): A morphological account. Borkar Chaitanya A. and Badere Rupesh S.	145
PP-V-03	Ethyl methane sulphonate, sodium azideand gamma ray induced high yielding and superior quality mutants in LINUM USITATISSIMUM Var. Pkv nl-260. Deshpande Aniruddha S. and Malode S. N	146
PP-V-04	A karyotype analysis of new cytotypein ASPARAGUS OFFICINALIS L. Dhoran V. S., Nathar V. N. and Deshmukh V. P.	146
PP-V-05	Studies on meiotic configurations in the genus CHLOROPHYTUM KERGAW L. Gudadhe S. P. and Nathar V. N.	147
PP-V-06	Phylogenetic relationship in some cultivars of PHASEOLUS VULGARIS L. Seeds using sds-page. Kapil M. R. and Nathar V. N.	147
PP-V-07	Comparative Studies of Protein Content in The Pollen and Pistil of BAUHINIA ACUMINATA and BAUHINIA PURPUREA	148

	Gawande Y. B. and Tidke J. A	
	SECTION - VI	
	Ecology and Environmental Biology	
	Oral Presentations	
OP-VI-01	Study of land use change in Barda Sanctuary of Gujarat, India. Chavada Pratikkumar and Raviya Rajesh	149
OP-VI-02	Pgprs help to boost micronutrients in MORINGA foliage. Giridhar P.	149
OP-VI-03	Coriandrum SATIVUM essential oil as a plant-based preservative against post-harvest biodeterioration of banana. Soni Monisha and Dwivedy Abhishek Kumar	150
OP-VI-04	Current evidences on PARMOTREMA GENUS: Environmental interest, biological activities with therapeutic potential. Alahupreeti J. and Rajalakshmi K.	150
OP-VI-05	Qualitative screening of the potential fungal isolate for the bioremediation of polycyclic aromatic hydrocarbon (pah). Mansuri Sanobar and Albert Susy	151
OP-VI-06	Exposure assessment of local population to heavy metals through consumption of rice collected from urban markets of Varanasi city. Singh Priyanka and Sharma Rajesh Kumar	151
OP-VI-07	Shrinking of forest cover due to mining activities in Saranda Forest. Kumar Peeyush and Mukherjee Prasanjit	152
OP-VI-08	Assessment of carbon storage by tree species in the Girnar eco- sensitive zone, Gujarat, India: A comprehansive quantitative analysis. Bhatt Parth J. and Raviya Rajesh D.	152
OP-VI-09	IPR literacy for plant science student-a review. Shrivastava Neerja and Rathore Neelkamal	153
OP-VI-10	IUCN red list assessments for two endemic plant species from Gujarat. Rana Karan Gopalbhai	153
OP-VI-11	Madhya Pradesh-A treasure house of cultural and biological diversity Sikarwar R. L. S.	153
OP-VI-12	Role of Grassland in wildlife habitat management in Taloba Muratkar G. D. and Gawande P. A.	154
	SECTION - VI Ecology and Environmental Biology Poster Presentations	
PP-VI-01	Study of calorific value of ELEUSINE CORACANA L. Of Nalanda, Bihar. Sinha S. N. Prasad and Chandra Subhash	155
PP-VI-02	Supplementary Effect of Biofertilizers on NERVILIA CONCOLOR (Blume) Schltr from Western Ghats of Maharashtra. Gavit Mangesh P. and Khadke Shivram G.	155

PP-VI-03	A weed mapping framework for the Indian wild life sanctuary region at Bhainsrorgarh. Rathore Neelkamal and Singh Pushpendra	156
PP-VI-04	Direct and indirect effects of soil characters on tree diversity of Gondia District Forest. Kawale Mahesh	156
PP-VI-05	Forest management in India through forest conservation acts. Sharma Rekha and Anil Kumar	157
PP-VI-06	Evaluation of antioxidant properties of some wild edible plants by phosphomolybdenum assay. Rathod S. A., Wath M. R. and Pophale V. V.	157
PP-VI-07	Pollution of southern coast of West Bengal at the mouth of the river Ganges. Das Prerana, Das Trisha, Chatterjee Bidisha and Mitra Arup Kumar	158
PP-VI-08	Increasing contamination of seaside water due to sewage pollution in Mandarmani, West Bengal. Ghosh Sampurna, Chatterjee Bidisha and Mitra Arup Kumar	158
PP-VI-09	Invasive alien plants of Gorakhpur District, Terai region of Eastern Uttar Pradesh, India. Singh Sneha, Datta Arunava and Madhukar Virendra K.	159
PP-VI-10	Aspects of pollination biology in TURNERA ULMIFOLIA L. (turneraceae). Gadkar Pranav V. and Dhore Mukund M.	160
PP-VI-11	Tree species distribution along the riparian zone of river Panchganga. Guray Swati A. and Guray R. V.	160
PP-VI-12	Riparian tree species diversity and dominance in Gudhganga River: Investigating soil erosion and destruction sites. Chavan Sachin and Guray R. V.	161
PP-VI-13	Nano-pesticides: Overview, synthesis, interaction with pests and plants, environmental risks and future perspectives. Kapil Vandna and Thakur Sveta	161
PP-VI-14	Species composition, richness, diversity and emphasis of soil nutrients in Jarida Range Forest. Saudagar S. A. A. G. and Manik S. R.	162
PP-VI-15	Pesticidal effect of oleo-gum- resin from ferula asafoetida on the agriculture pest SPODOPTERA LITURA. Gupta Komal, Pandya Parth and Elizabeth Robin	162
PP-VI-16	Activated carbon prepared from animal waste as environmentally efficient adsorbent and sustainable material for several different treatment applications Manik Vivek S. and Gudahde Swapnil K.	163
	SECTION - VII Plant Physiology and Biochemistry Oral Presentations	
OP-VII-01	Microplastic pollution in agroecosystem: Impacts and bioremediation with pgprs Chandel Riya and Thakur Sveta	165

OP-VII-02	GC-MS analysis of essential oil in ORTHOSIPHON BIFLORUS (A. J Paton and Hedge) from Chikhaldara. Nathar V. N. and Panchariya S. S.	165
OP-VII-03	Emerging technologies for improving post-harvest shelf life and quality of fruits and vegetables Rao T. V. Ramana	166
OP-VII-04	Unveiling potential adaptive strategies of WITHANIA SOMNIFERA and WITHANIA COAGULANS in responses to UV-B Radiation. Tiwari Anjali, Tripathi Saumya and Pandey Neha	166
OP-VII-05	Seasonal variation of metabolites in MESOSPHAERUM SUAVEOLENS (L.) Kuntze. and OCIMUMBASILICUM L. Riddhi M., Parth P. and Monisha K.	167
OP-VII-06	Phytochemistry and biological activities of RAPHANUS CAUDATUS pods. Ashok Rachael and Denni Mammen	167
OP-VII-07	Comparative account of verbascoside and stigmasterol contents from the selected endemic BARLERIA species Otari Shreedhar S., Lekhak M. M., Ghane S. G.	168
OP-VII-08	Ultrasound assisted extraction and optimization of tetracyclic triterpenes (cucurbitacins) from the fruits of LUFFAECHINATA Roxb. Patel Suraj B., Otari Shreedhar S. and Ghane S. G.	168
OP-VII-09	Melatonin supplementation alleviates cadmium toxicity through the adjustments of physiochemical properties and improved ascorbate-glutathione pathway activity in HORDEUM VULGARE L. Barwal Sandeep Kumar, Goutam Chanchal, Chauhan Chandrika Singh Ishwar and Y. Vimala	169
OP-VII-10	Screening of phytochemicals and the antimicrobial potency present in different varieties of chickpea (CICER ARIETINUM L.) Juhi Anila	170
OP-VII-11	Foliar application of chitosan nanoparticles modulates plant growth and helps to control thrips infestation in CAPSICUM SPP. Mawale Kiran Suresh and Parvatam Giridhar	170
OP-VII-12	Phytochemical and essential oil profiling of POGOSTEMON species. Momin Sobiyanaz and Gurav R.V.	171
OP-VII-13	Unlocking the mysteries of Kali Jeeri leaf anatomy: Acomprehensive investigation. Kothari Saloni and Chachad Devangi Parag	171
OP-VII-14	Evaluation of anti-inflammatory activity of methanolic Extract of BAUHINIA RACEMOSA LAM. with Diclofenac Yadav Ankit and Vaidya Meenakshi	172
OP-VII-15	Band gap engineering of bio-inspired cobalt oxides nanoparticles for artificial photosynthesis	172

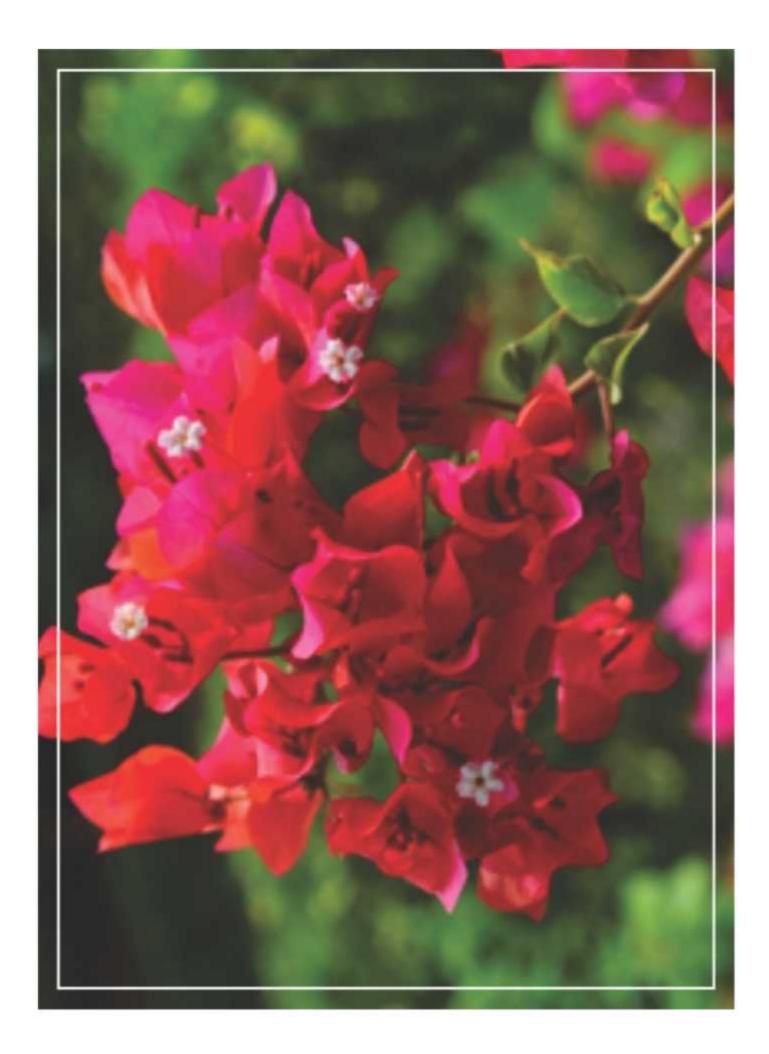
	Nemade Kailash R. and Waghuley Sandeep A.	
	SECTION - VII Plant Physiology and Biochemistry Poster Presentations	
PP-VII-01	Foliar application of growth regulators: Improving performance and yield of SOLANUM MELONGENA L. Aglave Hanumnat R. and ¹ Pawar Parshuram V.	173
PP-VII-02	Phytochemical evaluation, ftir, and GC-MS analysis of petroleum ether and ethanolic extract of POGOSTEMON BENGHALENSIS (Burm. F.) Kuntze leaf extract Udayakumar Sandhiya and Azhagiyamanavalan Lakshmi Prabha	173
PP-VII-03	Temperature-dependent modulation of growth and secondary metabolites biosynthesis in FAGOPYRUM ESCULENTUMMOEN CH. (common buckwheat's) sprouts and microgreens Johnson Marry Albright and Thakur Sveta	174
PP-VII-04	Comparative assessment of cadmium (CD) stress on seven wheat cultivars: Growth and physiological insights Sanjay Kajal and Thakur Sveta	174
PP-VII-05	Impacts of ultraviolet radiation on certain physiological and biochemical processes in the XANTHORIA ELEGANS (L.) Th. Fr. And xanthoriacandelaria (L.) Th.fr. Lichens Gupta Amit, Singh Ashish P., Jaiswal Jyoti and Sinha Rajeshwar P.	175
PP-VII-06	Effects of salt and UV radiation on photosynthetic, biochemical and antioxidant systems of the rice-field cyanobacterium NOSTOCHOPSIS LOBATUS Hkar-21 Singh Ashish P., Gupta Amit, Singh Prashant R., Jaiswal Jyoti and Sinha Rajeshwar P.	175
PP-VII-07	Phytochemical evaluation and in vitro antioxidant studies of PIPER NIGRUM (L.). Ukey Sanghadeep S. and Gogle Dayanand P.	176
PP-VII-08	Spectral estimation of COLEUS SCUTELLARIOIDES and CODIAEUM VARIEGATUM for measuring photosynthetic efficiency Phokmare Ashwini B.	176
PP-VII-09	Comparative phytochemical analysis and antioxidant activity of CURCUMA AROMATICA and CURCUMAAMADA. Patel Rudra and Robin Elizabeth	177
PP-VII-10	Phytochemical analysis of ANDROGRAPHIS PANICULATA (Burm.F.) wall. Ex nees and Andrographis ECHOIDES (L.) Nees Gavali M. B. and Gurav R. V.	177
PP-VII-11	Effect on extraction yield, phytochemical analysis and antioxidant activity of medicinally important herb EXACUM species from Western Ghats. Shaikh Qaisarjahan and Gurav R. V.	178
PP-VII-12	Phytochemical and antioxidant studies of PERSICARIAB ARBATA (L.) Hara and PERSICARIA HYDROPIPER (L.)	178

	Spach Desai Bhagyashri and Gurav R. V.	
PP-VII-13	Preliminary phytochemical and GC-MS profiling of leaves of PORTULACA TUBEROSA Roxb. Magdum Neha G. and Jadhav Varsha D. (Rathod)	179
PP-VII-14	Chromium toxicity induced alterations in growth and biochemicals of SENNA UNIFLORA. Matade N. S. and Pawar K. B.	179
PP-VII-15	GC-MS phytochemical analysis of ethanolic leaf extract of CROTON SPARSIFLORUS L. of dalma range East Singhbhum, Jharkhand, India. Linda Pushpa Salo, Pyare Krishna, Oraon Vinay and Jha Lokokrishna	180
PP-VII-16	Exploring the potential of chitosan nanoparticles as a foliar stimulant for enhancing the growth, yield, and resource use efficiency of Soybean. Kapse Mohan and Naik Dhiraj	180
PP-VII-17	Phytochemical potential of ANISOMELES INDICA (L.) Kuntze, belonging to LAMIACEAE. Sardar P. R., Manik S.R. and Saudagar S. A. A. G.	181
PP-VII-18	Proximate composition, LC-MS fingerprinting of Bioactives and antioxidant potential of CORCHORUS AESTUANS. L seeds Pakala Haripriya, Parvatam Giridhar	181
PP-VII-19	Ethno Botanical & GC-MS Analysis of Aromatic Plant LEONOTIS NEPITIFOLIA (L) Deshmukh Sharayu S.	182
PP-VII-20	"Hill Turmeric (CURCUMA PSEUDOMONTANA): A Medicinal Treasure of Western Ghats – A Review" Iyer N., Saiyam P. and Mondal M.	182
PP-VII-21	Exploring the medicinal properties of ADHATODA VASICA: A study on cultivation, morphologyand phytochemical analysis Darsimbe Avinash N., Gawande Prashant A., bKhanday Ashiq H. and Mundhada Sonal G.	183
	SECTION - VIII Plant Biotechnology Oral Presentations	
OP-VIII-01	In VITROASYMBIOTIC seed germination and propagation of DENDROBIUM HEYNEANUM LIND L. – An endemic epiphytic Orchid of Southern Western Ghats Shiva Krishnan K. and Kumar T. Senthil	185
OP-VIII-02	Genome-wide identification and comprehensive analyses of NAC transcription factorgene family in ANDROGRAPHIS PANICULATA. Saumya Tripathi, Anjali Tiwari, Nidhi Rai and Neha Pandey	185
OP-VIII-03	Collaborative approach of morphomolecular data for authentication of results. Gadge Prashant J. and Nathar Varsha N.	186

OP-VIII-04	Optimization of explants, media and cold pre-treatment for double haploid development in rice hybrids through anther culture. Ingle P. B., Rokade S. S. and Raut R. V.	186
OP-VIII-05	Role of plant growth regulators in induction of phytochemicals in shoot cultures of MESOSPHAERUM SUAVEOLENS (L.) Kuntze, and callus cultures of OCIMUMBASILICUM L. Mavani Riddhi, R. Karan, Parth P. and Monisha K.	187
OP-VIII-06	DNA barcoding using RBCL marker for the assessment of phylogenetic relationships in Fabaceae family. Choukhande Nikhil B. and Umale P. P.	187
OP-VIII-07	Differential proteome responses and gene expression profiling of pearl millet (PENNISETUM GLAUCUM L.) (R. Br.) Genotypes under salt stress. Jha Shweta, Singh Jawahar, Maity Sudipa and Ambatipudi Srinivas Kiran	188
OP-VIII-08	Medium optimization and IN-VITRO asymbiotic seed germination in EULOPHIANUDA LIND L. and EULOPHIA AMANUENSIS Rehb.F. Jadhav Mayur and Gurav R.V.	188
OP-VIII-09	IN-VITRO study on developmental biology, reproductive behaviour and ontogeny of gametophytes in PRONEPHRIUM NUDATUM (the lypteridaceae) and LINDSAEA ENSIFOLIA (lindsaeaceae) - homosporous ferns. Singh Akanksha and Singh Ajit Pratap	189
OP-VIII-10	IN-VITRO antidiabetic assessment of some species of genus BRIDELIA. Priyanka S. Patil and Varsha D. Jadhav	189
OP-VIII-11	Populus transcriptome analysis reveals that ectomycorrhizal fungi PAXILLUS INVOLUTUS prime the poplar seedling against aluminum stress by modulating ascorbate glutathione pathway. Naik Dhiraj	190
OP-VIII-12	Investigations on the multiple shoot induction in beetroot (BETA VULGARIS L. SSP. VULGARIS). Meshram Sachita P. and Badere Rupesh S.	191
OP-VIII-13	Genetic diversity among selected species of genus DESMODIUM using rapd marker collected from Melghat Region of Western Ghats India. Hutke Varsha and Dar Mushtaq	191
OP-VIII-14	Exploring the hidden world of garlic viruses: A comprehensive genomic study using high-throughput sequencing Singh Jitender and Prajapati Malyaj R.	192
	SECTION - VIII Plant Biotechnology Poster Presentations	
PP-VIII-01	Determination of caffeic acid from callus cultures of Desmodiumgangeticum (I) using LC-MS and hptlc analysis. Trivedi Anjali and Joshi Aruna	192

PP-VIII-02	IN-VITRO chemical treatment-induced modification in biochemical status of white and black species of MUCUNA PRURIENS L. Nagar, Laxman, Singh Mahendra and Vimala Y.	193
PP-VIII-03	Assessment of various nutrient media for androgenic induction in CATHARANTHUS ROSEUS. Narkhedkar Vivek R.	193
PP-VIII-04	Effect of elicitors to enhance secondary metabolites production in R. Setigera (Michx.) Suspension culture Warhade Mrunal I. and Badere Rupesh S.	194
PP-VIII-05	Antiproliferative activity and induction of apoptotic by methanolic extract of galangal rhizome in MDA-MS 231 cell line Yaday Khushboo, Wadegaonkar P. A. and Wadegaonkar V. P.	194

XLVI ALL INDIA BOTANICAL CONFERENCE of THE INDIAN BOTANICAL SOCIETY **SECTION - I** Mycology Microbiology and Plant Pathology Synergy in Plant Science and Sustainable Future: 2023



PHYLOGENETICALLY DIVERSE AND NOVEL SPECIES OF RHIZOBIA NODULATE NATIVE LEGUMES OF NORTH EASTERN REGION (NER) OF INDIA

Tak Nisha and Gehlot Hukam S.

BNF and Microbial Genomics Lab., Department of Botany, Centre of Advanced Study, Jai Narain Vyas University, Jodhpur-342001, E-mail: nishatak13@gmail.com

Root nodule bacterial (RNB) symbionts associated with five nodulating legumes (*Mucuna* sp., *Abrus precatorius*, *Tephrosia candida*, *Vigna radiata* and *Vigna vexilata*) sampled from North Eastern Region (NER) states (Meghalaya and Nagaland) of India were characterized at phenotypic and genetic level. Based on protein coding housekeeping (*recA*, *atpD*, *glnII*) and *sym* (*nodA*, *nifH*) genes significant phylogenetic diversity has been observed among NER-RNB strains. NER-RNB strains are phylogenetically novel suggesting a specific geographical pattern of legume-rhizobia co-evolution in this region. These rhizobia are symbiotically efficient, fix nitrogen and therefore can be used as inoculums for crop legumes.

Keywords: Rhizobia, Housekeeping genes, Nitrogen fixing.

OP-I.02

SEED TO SHIELD: UNLEASHING THE POWER OF PLANT GROWTH PROMOTING RHIZOBACTERIA (PGPR) FOR PLANT HEALTH AND SUSTAINABLE FOOD SECURITY

Prashant Singh

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

One of the major challenges in the 21st century is facing food security, the need to improve the stability of crop yields by developing disease-resistant crops. Plants are constantly exposed to potentially harmful microbes in their environment. Biotic stress, which refers to the detrimental effects on plant growth caused by other organisms, poses a significant constraint. Lack of genetic resistance in crops, chemical control methods are heavily relied upon to mitigate pathogen damage. However, reducing the dependence on chemical control is a crucial objective in plant pathology research. Intergenerational Immune Priming (IGIP) is an emerging plant protection strategy that involves transferring immune system memory from one generation to the next. This study explores the potential of utilizing Plant Growth Promoting Rhizobacteria (PGPR) to enhance wheat's defense mechanisms against Spot Blotch, a severe foliar disease caused by Bipolarissorokiniana. The research involved a comprehensive analysis to assess the impact of PGPR treatment on wheat plants and subsequent generations. Wheat plants were inoculated with PGPR strains known for their ability to induce systemic resistance in plants. The primed plants were then exposed to the Spot Blotch pathogen, and disease progression and severity were evaluated. The findings indicate that PGPR-mediated intergenerational immune priming offers significant potential as a sustainable and environmentally friendly approach to enhancing crop protection. By harnessing the natural defence mechanisms of plants, reducing the reliance on synthetic pesticides and will develop of more resilient crop varieties. Further investigation in intergenerational immune priming and its long-term effects is necessary. Overall, this study emphasizes the importance of leveraging beneficial plant-microbe interactions for sustainable crop protection and provides valuable insights for future research and practical implementation in agricultural systems.

Keywords: PGPR, Sustainable food, Plant Microbe interaction.

OP-I.03

ANTIBACTERIAL COMPONENTS IN EUCALYPTUS GLOBULUS: 1, 8-CINEOLE AND B-EUDESMOL

Baig M. M. V. and ¹More Digamber R.

Department of Botany and Biotechnology, Yeshwant Mahavidyalaya, Nanded

¹Department of Botany, NW College, Akhada Balapur, Dist: Hingoli

Email: mmvbaig@gmail.com

The leaves of *Eucalyptus globulus* were steam distilled to isolate the essential oil and the characterization was done by GC-MS. The identification of thirty two compounds was confirmed that represented 100% of the oil. The key components identified were1,8 Cineole (80.20%), αPinene (8.5%), βEudesmol (3.44%), αPhellandrene (1.09%). The antibacterial activity of the oil was tested by the disc diffusion and micro broth dilution methods against two bacterial isolates. The oil exhibited moderate growth suppression against both the Gram negative bacteria with inhibition zones of with inhibition zones of 16 to 19 mm and MIC values of 125 to 500 μg/mL. 1,8Cineole and βEudesmol were found to be the active antibacterial compounds present in the oil.

Keywords: Eucalyptusglobulus, GC-MS, Antibacterial activity

OP-I.04

IN-VITRO ANTIFUNGAL EVALUATION OF DIFFERENT LEAF EXTRACTS OF DATURA STRAMONIUM L

Showkat Subiya and T. Senthil Kumar

Department of Botany, Bharathidasan University, Tiruchirappalli-620024, Tamil Nadu. subiyashowkat786@gmail.com, senthilbdc@bdu.ac.in

In recent years, the use of plant compounds has been considered due to their lower side effects and drug resistance. Inpresent study, antifungal activity of different leaf extracts of Datura stramonium L. against Candida albicans, C.tropicalis and C.guilliermondii were investigated using well diffusion method and minimum inhibitory concentration (MIC) by broth-dilution method. The results revealed that ethyl acetate extract exhibited significant antifungal activity against tested pathogens especially C.guilliermondii (20 mm) followed by methanolic leaf extract against C.albicans (20 mm). At the same time, the least inhibition was observed in choloform extract of Datura stramonium against C.albicans (11mm). Minimum inhibitory concentrations (MIC) ranged from 25µg/ml to 50µg/ml for the ethyl acetate extract, which showed better activity than the other extracts. Further, the extracts were subjected to FT-IR that confirmed the presence of phenols, alkanes, aldehydes, ketones and GC-MS directed the presence and identification of 22 compounds. The major compounds present in GC-MS analysis was Cyclooctasiloxane, Hexadecamethyl, 1-Cyclododecasiloxane, Tetracosamethy Cyclononasiloxane, Octadecamethyl and Cyclodecasiloxane, eicosamethyl. The results of our study demonstrated that Datura stramonium L. is recommended for further research to isolate, purify and characterize potent antifungal compounds.

Keywords: Antifungal activity, GC-MS, Datura stramoniumL., Candida albicans.

OP-1.05

ANTIFUNGAL ACTIVITY AND IN-SILICO INHIBITORY PREDICTION OF DICHLOROACETIC ACID, TRIDEC-2-YNYL ESTER DERIVED FROM PRUNELLA VULGARIS AGAINST PHYTOPATHOGENIC FUNGI

Akhtar Rafia and T. Senthil Kumar

Department of Botany, Bharathidasan University, Tiruchirappalli-620024, Tamil Nadu rafia97rr@gmail.com, senthilbdc@bdu.ac.in

The present study was intended to characterize the secondary metabolites of the medicinal plant *Prunella vulgaris* (Lamiaceae). The spikes of this plant were collected from its natural habitat and were screened against phytopathogenic fungi by using the *in-vitro* and *in-silico* approaches. Different solvents were used for extraction process among them ethyl acetate extract exhibited the maximum zone of inhibition against the selected phytopathogens viz *F. oxysporum*, *A. solani* and *P. digitatum* and demonstrated the best MIC values (25µ1). In this regard, different chromatographic techniques were adopted to isolate the bioactive compound responsible for the inhabitation of growth of these phytopathogens. Furthermore, FT-IR, GC-MS and NMR studies confirmed the presence of abundant compound dichloroacetic acid, tridec-2-ynyl ester (compound 1). Finally, *in-silico* virtual screening was done and after performing exhaustive molecular docking analysis, it was observed that among the receptors selected trihydroxy naphthalene reductase showed significant docking score. Hence, compound 1 has significant inhibitory action against phytopathogens. So, it can be concluded that compound 1 binds to drug targets more efficiently and hence may be used to design new and potent fungicides.

Keywords: Prunella vulgaris, bioactive compounds, antimicrobial activity, phytopathogen

OP-I.06

EDIBLE ANTHOCYANINS AS ANTIMICROBIAL AGENTS

¹Menghani Ekta and ²Schindler Simona

Department of Biotechnology, JECRC University, Jaipur, Rajasthan 303905, India Email: ekta.menghani@jecrcu.edu.in

²University of Heidelberg, Institute of Pharmacy and Molecular Biotechnology, Germany Plants have been used as therapeutically for more than 5000 years. Some of their applications and medicinal effects have already been scientifically proven, while others still need to be further investigated. Our aim was to screen more than 30 different colored plant extracts for antimicrobial properties against *Escherichia coli, Bacillus cereus, Pseudomonas aeruginosa, Klebsiella pneumoniae* and *Staphylococcus aureus*. Colored plant parts were chosen because the focus of our research was set on anthocyanins as antimicrobial agents. Therefore, alcoholic cold extracts of each plant was tested against the different strains, using the agar-well diffusion method. To identify the compounds of the plants thin-layer chromatography was performed. The results showed that among all the cold extracts tested, cloves and pomegranate skin showed the highest significant activity against *E.coli* and *S. aureus*. Other extracts showing growth inhibitory properties against different strains include lychee skin, jamun and lemon skin. Antimicrobial activity against the gram-negative *E. coli* was proven significant (p-value < 0,001) for cloves and pomegranate skin compared to the standard streptomycin. The IZ value of pomegranate

skin was measured 27.5 \pm 2.5 and the IZ for cloves 27.5 \pm 1.5, whereas the mean IZ of streptomycin was identified to be 13.1 \pm 8.9.

Keywords: Anthocyanins, Antimicrobial Activity, TLC.

OP-1.07

BACOPA MONNIERI (L.) PENNELL: A POTENTIAL SOURCE OF PLANT-BASED ANTIBACTERIAL AGENTS AGAINST FOODBORNE BACTERIA

Kumar Sachin and Kumar Sandeep

Department of Botany and Microbiology, Gurukula Kangri (Deemed to be University), Haridwar, 249404 Email: kumarsachindhimaan@gmail.com sandeep.kumar@gkv.ac.in

Bacopa monnieri (L.) Pennell or Brahmi, is a medicinal plant used for treating various disorders. Extracts from this plant have potential as plant-based antibacterial agents against foodborne bacteria. In this study, phytochemical analysis of B. monnierirevealed the presence of carbohydrates, alkaloids, cardiac glycosides, tannins, phenols, saponins, terpenoids, flavonoids, quinone, and coumarins. Among the extracts, ethanolic extract exhibited the highest antimicrobial activity against Listeria monocytogenes (22.33 mm) and E. coli (20.33 mm). Chloroform and ethyl acetate also demonstrated significant activity against S. aureus. Antibiotic sensitivity tests indicated high sensitivity to Gentamicin, Streptomycin, and Ciprofloxacin. HPLC analysis identified dihydroquercetin as abundant in ethanolic extract.

Keywords: Foodborne, Bacopa monnieri, antibacterial agent, phytochemical extraction, screening.

OP-I.08

EXPLORING THE ANTIBACTERIAL POTENTIAL OF SIDA CORDIFOLIA L. PHYTO-EXTRACTS: POLYPHENOL PROFILING, ANTIBACTERIAL ACTIVITY, AND PROCESS OPTIMIZATION AGAINST COMMON FOODBORNE BACTERIA

Kumar Sandeep and Kumar Sachin

Department of Botany and Microbiology, Gurukula Kangri (Deemed to be University), Haridwar, 249404, Email: sandeep.kumar@gkv.ac.in

Foodborne bacterial infections remain a significant public health challenge, necessitating effective antibacterial agents from natural sources. We assessed phytoextracts from *Sida cordifolia* L. for antibacterial activity against common foodborne bacteria. Polyphenol profiles were analyzed, and Response Surface Methodology optimized the process parameters. Six solvent extracts were tested against ampicillin and colistin-resistant *Escherichia coli*, *Listeria monocytogenes*, and *Staphylococcus aureus*. Ethanolic (SC04-ET) and ethyl acetate (SC03-EA) extracts showed potent antibacterial effects (ZOI: 36.3±0.57 mm to 14.7±1.52 mm). SC04-ET extract exhibited bactericidal properties against all strains. UPLC analysis identified major compounds, including Naringenin, Dihyrokaempferol, P-coumaric acid, and Dihydromyricetin, contributing to the antibacterial response. Optimization experiments determined 24 hours incubation, pH 6.5, and 36.5°C as optimal conditions for enhanced antibacterial performance.

Keywords: Antibiotic-resistant, foodborne bacterial infections, Sida cordifolia L., antibacterial agents, UPLC.

OP-1.09

ISOLATION, CHARACTERIZATION OF MYCORRHIZAL, NON-MYCORRHIZAL FUNGI AND THEIR UTILIZATION FOR THE ACCLIMATIZATION OF IN VITRO REGENERATED PLANTLETS OF ANOECTOCHILUS ELATUS – AN ENDANGERED JEWEL ORCHID

^{1,2*}N. Ahamed Sherif, ²T. Senthil Kumar, ³ Abubacker M. N. and ² Rao M. V.
¹Department of Botany, Jamal Mohamed College (*Autonomous*), Affiliated to Bharathidasan University, Tiruchirappalli – 620 020, TN, India.nahamedsherif@gmail.com
²Department of Botany, School of Life Sciences, Bharathidasan University, Tiruchirappalli, TN., India. senthil2551964@yahoo.co.in; mvrao_456@yahoo.co.in
³Department of Biotechnology, National College (*Autonomous*), Affiliated to Bharathidasan University, Tiruchirappalli – 620 001, Tamil Nadu, India. abubacker nct@yahoo.com

In this present study, endophytic fungi were isolated from the root segments of Anoectochilus elatus. Based on the morphological and molecular (Internal Transcribed Spacer) methods, the isolates identified as Rhizoctonia solani (AERII), Fusarium proliferatum (AERI3). and Fusarium oxysporum (AERI2), Further. organogenesis protocol was standardized using internodal explant to increase the population of this species aseptically. The explant was cultured on Mitra medium augmented with plant growth regulators (PGRs) such as N⁶-benzyl adenine, N⁶-(Δ²isopentenyl) adenine, Adenine sulfate, α-Naphthaleneacetic acid, Jasmonic acid, and Paclobutrazol. Among the diverse concentration and combination of PGRs, 25.5±0.3 multiple shoots per explant with a shoot length of 2.9±0.2 cm has been obtained from Mitra medium pertaining 9.6 µM jasmonic acid with 4.2 µM adenine sulfate. All micro-shoots were treated with 7.9 μM phloroglucinol for in vitro rooting. A maximum of 3.0±0.2 roots per shoot has been produced within seventeen days of culture with a root length of 2.1±0,2 cm and 66% initiation frequency. In addition, the in vitro derived plantlets were cocultured with AERI1, AERI2, and AERI3 to examine root colonization, development, and survival rates during hardening and acclimatization. AERII and AERI3, which is effectively formed pelotons in root cortical cells, significantly increased the biomass content and ex vitro survival rate of in vitro raised plants of Anoectochilus elatus.

Keywords: BinucleateRhizoctonia, Endophytes, Fusarium proliferatum, Hardening, Orchid, PGR.

OP-I.10

COMPARATIVE PRELIMINARY PHYTOCHEMICAL ANALYSIS AND ANTIMICROBIAL EVALUATION OF TWO MEDICINAL PLANTS TRADITIONALLY USED IN SKIN INFECTION

Topno Swati

P. G. Department of Botany, Kolhan University, Chaibasa, West Singhbhum, Jharkhand

Plants are the source of various bioactive phytochemicals which have an important role in treating or preventing various acute to chronic diseases. Phytochemicals plays a major role as dietryfibres, antioxidants, ancticancer, detoxifying agents, and immunity potentiating agents and as well as neuropharmacological agents. In the present paper three plants Aloe vera, Lawsonia inermis and adhatoda vasica has been selected for the preliminary

phytochemical analysis and also performed the antimicrobial activity test in *Candida* albicans with agar disc diffusion method. The result revealed that all the extracts were active extracts were found most active. Their comparative study was done to find their importance for the treatment of various ailments.

Keywords: Candida albicans, skin infection, antimicrobial, A.vera, L. inermis.

OP-I.11

DIVERSITY OF LICHENICOLOUS GENUS ARTHONIA SENSU LATO IN INDIA

Joshi Yogesh

Lab. no. 14, Department of Botany, University of Rajasthan, Jaipur - 302004, Rajasthan Email: dryogeshcalo@gmail.com, +91-9415760604

The genus Arthonia in a comprehensive sense, a part of the Arthoniales order according to Henssen ex D. Hawksw. & O.E. Erikss., and falling under the Arthoniaceae family as per Rchb., is notably heterogeneous and polyphyletic. It incorporates around 500 species spanning different life forms: lichens, non-lichenized fungi, and parasymbionts. Out of these 500 species, the majority are lichenized, while approximately one-fourth (146 species) comprise lichenicolous taxa, alongside some non-lichenized and saprotrophic forms found on bark. To date, there are 11 lichenicolous Arthonia species recorded in India, specifically Arthonia apotheciorum (A. Massal.) Almq., A. avseniaeHalici& Candan, A. clemens (Tul.) Th. Fr. s.s., A. cohabitansCoppins, A. coronataEtayo, A. diorygmatis S. Joshi & Upreti, A. epiphysciaNyl., A. molendoi (Frauenf.) R. Sant., A. phaeophysciae Grube & Matzer, A. punctellaNyl., A. subconveniensNyl. Among these, only one -Arthoniadiorygmatis - was originally described from India. In this present investigation, we present two new instances of lichenicolous Arthonia in India - A. aspiciliaeAlstrup& E.S. Hansen, found on the thallus and apothecial discs of Aspicilia, and A. destruensRehm in Rabenh., colonizing the thallus of Physcia stellaris (L.) Nyl. This brings the total count of lichenicolous Arthonia species in India to 13.

Keywords: Himalaya, India, lichenized fungi, new records.

OP-I.12

MILKY MUSHROOM CULTIVATION PROCESS AND ITS COST ANALYSIS

Kumara Babita and Gupta Dara Singh

Department of Botany, Kolhan University, Chaibasa, Email - kbabita404@gmail.com

The Milky mushroom, botanically classified as Calocybe indica, is the only mushroom species both native to and cultivated in the hot and humid climate of India. They are also known as DhuthChatta and Swetha mushrooms. They were named for their Milky white colour, and their name comes from the ancient Hindu language of Sanskrit, where the word for white is sweth or swetha, meaning pure. They can still be found growing wild along roadsides and fields and are favoured for their nutrient-rich properties, long shelf life, and versatility in culinary applications. Milky mushrooms are a unique variety because most mushrooms cannot thrive in the extreme heat of the Indian climate. They also require far less water than most other cultivated mushrooms. The main steps in the cultivation of milky mushrooms are: Substrate preparation, pasteurization or sterilization, spawning, casing, and cropping. Because of their comparable productivity and self-life to any other cultivated mushroom in the world, milky mushrooms could play an important role in

satisfying the growing market demand for edible mushrooms in the near future. This study mainly focuses on the cultivation process of milky mushrooms and the cost analysis of their production.

Keywords: Climate, cultivation, Milky, Mushroom, Production.

OP-I.13

AEROSPORA OF TULSIPUR

Srivastava S. K.

Department of Botany, Shri L. B. S. Degree College, Gonda-271003 Email - sksrivastava62@gmail.com

Tulsipur is located near the India-Nepal border in the Balrampur district of the Indian state of Uttar Pradesh. The present investigation is carried out near the Devipatan temple. In the present study, the sampling of aerobio-particles was done using rotorod air sampler. The aerobio-particles trapped on the cello tape from the air were fungal spores, pollen grains, algae, insect scales, insect part, lichens, epidermal hair, hyphal fragments and protozoan cysts. The identification was done up to generic level only. The total 80 aerobioparticles were identified. The maximum contribution to the total aerospora among fungi was of *Drechslera* 30030 spores/m³ of air followed by Alternaria 13110 spores/m³. Smut spores 11610 spores/m³, *Curvularia* 780 spores/m³, *Cladosporium* 7050 spores/m³ and other Rust spore 6405 spores/m³ of air. In other types crystals were 21585/m³, Insect scales were 5235/m³, Hyphal fragments were 4440/m³, Lichens were 3105/m³, Pollens were 2160/m³ and Algae were 2145/m³. During the period of investigation, temperature, relative humidity and rainfall were recorded.

Keywords: Aerospora, Tulsipur, Fungi, Pollens.

OP-I.14

CONSERVATION OF MICROBES: SOME TRENDS

¹Nagaraju, D and ²Manoharachary, C.

Department of Botany, Govt. City College (A), Hyderabad 500002, Telangana, India.
Mycology and Molecular Plant Pathology Laboratory, Department of Botany, Osmania University, Hyderabad 500 007, Telangana, India

Microorganisms are the life forms present on the earth and are important for humankind, due to their role and direct involvement in the cycling of elements, food chain, crop and soil health, besides being important in human welfare. According to world data centre for microorganisms there are 820 culture collections located in 78 countries including in India. Pathogenic fungi and microbes are mostly unculturable, hence are maintained on their specific habitat and host. Ex-situ conservation has become an important due to their application in food industry, pharmacy and biotechnology. Preservation of microbes and fungi include storage in sterile water, preservation on agar slants, mineral oil storage, lyophilized storage, cryopreservation. Besides the above specific preservation techniques are available for specific organisms. The aspects and prospects of such conservation of microbes and fungi will be discussed in this paper.

Keywords: Ex-situ conservation, Fungi, Herbaria, In-situ conservation, Microbes, Preservation.

NANOENCAPSULATION OF PIMPINELLA ANISUM ESSENTIAL OIL FOR ALTERNATIVE THERAPIES IN DERMATOPHYTOSIS INFECTIONS AGAINST TRICHOPHYTON MENTAGROPHYTES

Yadav Arati * and Dwivedy Abhishek Kumar

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

Email: artiy82440@gmail.com, Phone: +91-7905242538)

The present study evaluates the encapsulation of *Pimpinella anisum* essential oil (PAEO) by ionic gelation. Physico-chemical characterization of Nm-PAEO was done through SEM, FTIR and XRD analysis. The minimum inhibitory concentration (MICs) and minimum fungicidal concentration (MFCs) was determined according to disk diffusion method. The unencapsulated and nanoencapsulated PAEO caused complete inhibition of mycelia growth at 0.04 and 0.03 μL/mL respectively and death of mycelia at 0.14 and 0.04μL/mL respectively. In addition, the PAEO reduced the ergosterol content of fungal plasma membrane and enhanced the leakage of vital cellular ions along with the loss of 260 and 280 nm suggesting plasma membrane as action site. The unencapsulated and nanoencapsulated PAEO also showed moderate free radical quenching activity during DPPH assay. The high antifungal activity of PAEO may confirm its utility as a novel alternative to synthetic drug.

Keywords: Pimpinella anisum L. essential oil; Nanoencapsulation; Trichophyton mentagrophytes; Antifungal; Antioxidant.

PP-I.02

ANTIMICROBIAL ACTIVITY AND PHYTOCHEMISTRY OF SALVADORA PERSICA

¹Chavan V. P. and ²Shahare N. H.

¹Shri R.R. Lahoti Science College, Morshi, Dist. Amravati, Maharashtra ²Brijlal Biyani Science College, Dasera Maidan, Amravati, Maharashtra

Mother Nature bequeathed us with enormous amount of treasure in the form of plants having medicinal values. It is very important to explore the potential of ethnobotanically important plants and their documentation as many plants are on the verge of extinction. The correlation between the claims and the facts by the local Vaidus should be verified experimentally. This study aimed to assess the in vitro antibacterial activities of Salvadora persica. L extracts against the 6 bacterial isolates. The preliminary phytochemical activity of Salvadora persica leaves extract was also studied. This study reveals the low to moderate antibacterial activity of methanol, Acetone Chloroform, and aqueous extract of Salvadora persica leaves.

Keywords: Salvadora persica, Ethanobotany, Disc diffusion, Antimicrobial.

GENETICALLY DIVERSE STRAINS OF BRADYRHIZOBIUM ARE ROOT NODULE MICROSYMBIONTS OF PUERARIA PHASEOLOIDES

Rawal Abhishekh, Dubey Neetika, Gehlot Hukam S. and Tak Nisha

BNF and Microbial Genomics Lab., Department of Botany, Centre of Advanced Study, Jai Narain Vyas University, Jodhpur-342001 (Rajasthan) India E-mail address: abhishekrawal62@gmail.com

Thirty six root nodule bacteria were isolated from *Pueraria phaseoloides* from Tripura. It is vigorous, dense-growing vine legume used as a green manure. In RPO1-DNA fingerprinting of 29 TR-PP strains 18 genotypes were formed. In *recA* gene phylogeny thirteen *Bradyrhizobium* strains formed four novel clades and one novel lineage suggesting significant phylogenetic diversity among TR-PP strains. In *nodA* gene phylogeny ten TR-PP strains formed three clades close to *B. elkanii* and *B. ivorense*. These strains will further be compared with symbionts of *P. phaseoloides* from different NER states to understand the biogeography and evolution of its *sym* genes in India.

Keywords: Bradiyrhizabium, vine, legume, sym genes

PP-I.04

DIVERSITY AND ENZYMES OF LEAF LITTER DEGRADING THERMOPHILIC FUNGI

Borkar K. M.

Department Of Botany, Manoharbhai Patel College of Arts, Commerce & Science Sakoli-441802 Dist- Bhandara (MS), Email: khushalborkar@gmail.com

Microorganism play crucial role in degradation of organic matter in the nature. Temperature is one of the extremely important environmental variables that play decisive role in the survival, growth, distribution and diversity of microorganism on the surface of the earth. The microorganisms are classified according to their temperature requirements. Thermophilic fungi are able to survive at elevated temperatures and are known sources of thermos-stable enzymes and biomolecules which have immense importance in industry. These fungi have been reported from diversity of habitats. Present study aimed to efficient isolation and identification of thermophilic fungi from decomposing leaf litter. Leaf litter was collected from nearby forest area of Sakoli in sterile polythene bags and isolated were made on Emersons YpSs medium. The percentage of incidence, frequency and abundance was assessed. Aspergillus fumigates, Emericellanidulanse, Themomyceslanuginosus, Thermoascusaurantiacus were dominant in all the isolations made. Their hydrolytic enzymes- Cellulase, amylase, lipase and pectinase are also screened. These enzymes provide the chemical means of entrance into the host and a process whereby nutrients can be digested. These fungi are known to produce the high quality of compost with useful micro and macro elements in short duration. This observation would be helpful in improvement of plant productivity and promotes the need of introducing methods of farming for better utility of organic amendments.

Keywords: Leaf litter, Degradation, Thermophilic fungi, Thermostable enzymes.

UNRAVELING THE ANTIBACTERIAL POTENTIAL OF AYURVEDIC PLANT SIDA CORDIFOLIA L. (BALA) AGAINST LISTERIA MONOCYTOGENES: A BIOACTIVE-RICH PHYTOEXTRACT STUDY

Kumar Sachin and Kumar Sandeep

Department of Botany and Microbiology, Gurukula Kangri (Deemed to be University) Haridwar, 249404 kumarsachindhimaan@gmail.com; sandeep.kumar@gkv.ac.in

Medicinal plants play a vital role in modern medicine, providing essential raw materials for pharmaceuticals despite the prevalence of synthetic drugs. With increasing multidrug resistance and foodborne illnesses, the search for new antimicrobial alternatives is crucial. Sida cordifolia L., known as 'Bala' in Ayurveda, has a rich history of traditional use. This study aimed to identify its phytochemical constituents, extraction yield, and antibacterial activity against Listeria monocytogenes. The ethanolic extract displayed the highest inhibitory effect (21.3±1.52 mm), outperforming streptomycin (20.0±0 mm). UPLC revealed significant amounts of Naringenin, Dihydrokaempferol, and P-coumaric acid in the ethanolic extract. Optimal conditions for maximum anti- listerial performance were determined using RSM.

Keywords: Bala, foodborne, RSM, antibacterial, UPLC, phytochemical analysis.

PP-I.06

STUDIES ON FUNGAL DISEASES OF BUTEA MONOSPERMA FROM ACHALPUR REGION

Khapekar, Pradhnya G. and ¹Hate Sandeep

Jagadamba Mahavidyalaya AchalpurDist Amravati-444806 (M.S.)

¹DRB Sindhu Mahavidyalaya, Nagpur (M.S.)
Email: pradhnyakhapekar76@gmail.com; hatesaandeep@gmail.com

Butea monosperma is commonly known as flame of forest belongs to the family Fabaceae. It is commonly called as Palash, dhak, khakara, mutthuga, This is a moderate size deciduous tree which is widely distributed in this Achalpur region. As Achalpur region is situated 22 km away from Chikhaldara and most of the villages are situated nearby which are surrounded by the forest region. Butea monosperma has been found to display a wide variety of biological activities. This plant has many medicinal uses it is anthelmintic, antidiabetic, antidiarrheal, and antibacterial, antifertility, antimicrobial. These plants are very much affected by fungal diseases which may cause heavy loss to the forest hence; an investigation of fungal disease on Butea monosperma was undertaken. Total four fungi were isolated from infected parts of Butea monosperma. Mostly Leaf spot disease was caused by Curvularia sp, Leaf spot diseases caused by Phytophthorasp, wilt disease caused by Fusarium sp, and Anthracnose disease caused by Colletotrichum sp.

Keywords: Butea monospermaAchalpur region, Fungal disease, isolation.

BOOSTING THE PLANT GROWTH THROUGH APPLICATION OF ECO-FRIENDLY BIOFERTILIZERS OF ARBUSCULAR MYCORRHIZAL FUNGI ISOLATED FROM THE CYNODON DACTYLON

Raut N. S. and Phirke N. V.*

Department of Microbiology, Sant Gadge Baba Amravati University, Amravati-444 602, India Email: naynasraut03@gmail.com, *phirkenv@gmail.com

Arbuscular mycorrhizal fungi formed symbiotic association with the plant roots, establishing intricate communication channels that resulted in increased photosynthetic rates and improved gaseous exchange under stressful conditions. Additionally, AMF significantly enhanced plant nutrition by improving nutrient availability and translocation. Moreover, the roots infected with AMF proved valuable for biofertilizer production, offering numerous advantages such as availability, cost-effectiveness, and environmental friendly effects, benefiting both humans and ecosystems. This study underscores the potential of AMF as a sustainable and economically viable solution for enhancing plant growth and promoting ecological well-being.

This study aims on the isolation and utilization of arbuscular mycorrhizal fungi (AMF) to evaluate their impact on various plant parameters. The arbuscular mycorrhizal fungi from *Cynodondactylon* leading to the isolation and identification of spores belonging to the genera *Scutellospora*, *Acaulospora* and *Glomus*, through conventional spore characteristics, the activity of these isolated spores was assessed on several plant species by applying mycorrhizal biofertilizer and their beneficial effects on plant growth compared with non-mycorrhized plants.

Keywords: Arbuscular mycorrhizal fungi, symbiotic association, root colonization, Spores identification.

PP-I.08

EFFECT OF PARAMETERS ON THE DIVERSITY OF LACTIC ACID BACTERIA IN THE STEEPED SORGHUM FERMENTATION PROCESS

Khade P. J. and Phirke N. V.*

P. G. Department of Microbiology, Sant Gadge Baba Amravati University, Amravati-444602, India, Email: pruthvikhade@gmail.com, *phirkenv@gmail.com

In India especially in *Vidarbha and Khandesh* region of Maharashtra during summer season sorghum fermented food items are made. Is it summer season advantageous or not? In this study, we tried to find out the effect of different parameters like temperature time on the sorghum fermentation on the basis of lactic acid bacterial count on selected media. The sorghum grain was soaked at (1:2 w/v) ratio in water and placed at different temperature and time and allowed to fermented, due to increasing temperature and time, the pH also changed. The temperature and time for fermentation set applied at different range: 10, 20, 25, 32, 37, 40, 45 and 50 °C. Time: Zero hours, 24 h, 48 h, 72 h, 96 h, 120 h and144 h. The temperature range 32 °C and 37 °C and time 120 hours (5 days) and 144 hours (6 days) and pH are 4 and 3.5 where optimum bacterial colony count observed. This observation will be helpful for traditional homemade Sorghum fermentation.

Keywords: fermentation, sorghum grains, parameters, lactic acid bacteria.

BACTERIAL DEGRADATION OF AZO DYES FROM TEXTILE INDUSTRIAL EFFLUENTS

Jadhao Kanhaiya Lal and Kamble K. D.*

Department of Microbiology, Sant Gadge Baba Amravati University, Amravati- 444 602 India, Email- kanhaiyajadhao@gmail.com, *kapilkamble@sgbau.ac.in

Textile industries are the major users of dyes in the world. Dye-based effluent discharged in natural ecosystem results into conversion of azo group to aromatic amines and further bioaccumulation of such products could be toxic to aquatic life and even carcinogenic and mutagenic effects on humans. It is also reducing light penetration, gas solubility and interference of phytoplankton's photosynthesis. It is extremely difficult to breakdown the effluents (hazardous of dyes) from textile industry. These effluents can be treated using a variety of microorganisms. In this study total 10bacterial strains were isolated from textile waste and checked for their potential to degrade Congo red dye. The morphological, biochemical test, used to identify the isolates. Results of identification suggest that those strain belong to Bacillus species. By measuring optical density (OD) under optimal (pH 7, 37 °C) static conditions, biodegradation was validated. The impact of the initial dye concentration as well as the impact of pH and temperature on the degradation of dyes was examined. Our research findings showed that Bacillus strainA4 showed highest decolorization 71.87%, Bacillus strain A8 showed 65.62% Decolorization, and Bacillus strain A6 showed56.25% decolorization, on Congo red dye. The result of this study indicates that the promising ability of strain A4 for Congo red dye degradation which are otherwise recalcitrant.

Keywords: Industrial textile effluents, Bacteria, degradation, Congo Red dyes

PP-I.10

SCREENING AND ISOLATION OF EFFECTIVE MICROBIAL CONSORTIA ASSOCIATED WITH BIOGAS PRODUCTION FROM KITCHEN WASTE.

Banarase S. E. And Phirke N. V.*

Post Graduate Department of Microbiology, Sant Gadge Baba Amravati University, Amravati, Email: phirkenv@gmail.com

Anaerobic digestion is an alternative method for the conversation of organic waste into methane which is used as a fuel and energy source. Efficient biogas production depends upon stability of microbial community and its activity in anaerobic reactor. Standard microbiological method and biomethane potential assay were used for screening and isolation of efficient methanogenic species. Morphological and biochemical tests were performed for identification. Bacteria isolated wereidentified as *Bacillus*, *Proteus*, *Pseudomonas* and *Methanogens species*. Bacterial consortia were carried out to analyze their efficiency of degradation and biogas production by using varying ratio. Optimum biogas enhancement observed in the consortia with highest ratio of *Methanogens spp*.

Keywords: anaerobic digestion, vegetable waste, biogas, methanogenic bacteria

FUNGICIDAL EFFICACY OF ARGEMONE MEXICANA EXTRACTS AGAINST GINGER-INFECTING FUNGI

Awachar S. V. and Kamble K. D.

Department of Microbiology, Sant Gadge Baba Amravati University, Amravati (MH), India, Email: writetosachin.awachar@gmail.com; kapilkamble@sgbau.ac.in

Ginger is a plant that is widely used as a spice and in herbal treatments all over the world. Ginger is in high demand all across the world. However, fungal infections severely reduce ginger yield throughout the germination phases. The soft rot disease produced by fungal pathogens reduces ginger yield by approximately 50%. The fungus that affects ginger before germination has a substantial impact on production. As a result, finding sustainable alternatives to synthetic chemical fungicides to combat soft rot has become critical. Fungal infection can be controlled by dressing ginger with Argemone mexicana extracts. We evaluated the in vitro impact of leaves extract by agar-based antifungal methods to determine the efficiency of plant extracts against fungus. Fungal growth was greatly inhibited by ethanolic extracts, which were followed by aqueous extracts. The fungus was isolated by picking infected ginger from the Amravati market. Argemone mexicana was harvested from the Melghat forest and utilised to make the extract. The study might be beneficial in enhancing ginger productivity while having no negative impacts on soil microbiota by suppressing fungal infection during the germination phases of ginger.

Keywords: Argemone mexicana, plant extract, soft rot disease, inhibition

PP-I.12

ASSESSMENT OF ANTIBACTERIAL ACTIVITY OF LEAF EXTRACTS OF VITEX NEGUNDOL AND NERIUM OLEANDER L

¹Singh Archana Kumari and ²Sinha Vishnu Shankar

¹University Department of Botany, Kolhan University, Chaibasa - 833202, India ²PG Department of Botany, Tata College, Chaibasa, - 833202, India

The present study was aimed to assess the antibacterial activity of the leaf extracts of *Vitex negundo* L. (Verbenaceae) and *Nerium oleander* L. (Apocynaceae) against the gram negative bacteria *i.e.*, *E.coli*. Three different solvents such as ethanolic, methanolic and double distilled water (DDW) were used for preparation of solutions. The antimicrobial activity were evaluated by using Agar Well Diffusion method and compared with the standard antibiotics *i, e.* Azithromycin (AZM), Ciprofloxacin (CIP), Metronidazole (MT), Chloromphenicol (CH). Our result confirmed that both plant extracts have antimicrobial activity and the zone of inhibition varied from 8mm to 12mm in *Vitex* extracts and in *Nerium* extracts the zone of inhibition was varied from 6mm to 8mm and no zone were observed in Distilled water in both the plant extracts. It was further noted that *Vitex negundo* L. was more stronger than *Nerium oleander* L. and the gradation of solvents were observed as Ethanolic > Methanolic > Aqueous.

Kewwords: Vitex negundo L., Nerium oleander L., Antibacterial activity, Standard antibiotics, Agar well diffusion.

SCREENING OF RHIZOBIA ASSOCIATED WITH SYMBIOTICALLY EFFICIENT CULTIVARS OF VIGNA RADIATA GROWN IN RAJASTHAN

Sharma Shilpa and Tak Nisha

BNF and Microbial Genomics Lab., Department of Botany, Centre of Advanced Study, Jai Narain Vyas University, Jodhpur-342001 (Rajasthan) India E-mail address: shilpa0013.sharma@gmail.com

Rhizobia are natural symbionts found in root nodules of pulses which fix nitrogen. Vigna radiate is major rain fed crop of Rajasthan. Nine cultivars [Samrat, Shikha, Varsha, RMG-975, KM-2, GM-4, GM-6, GM-7 and MEHA] of Vigna radiata grown in Agriculture research station, Mandore were excavated to compare their nodulation status. RMG-975 and GM-6 showed maximum nodulation as compared to other varieties grown at same conditions. Root nodules were determinate and internally pink. From four cultivars more than 100 root nodule bacterial strains were isolated and purified on CR-YEMA media. Both fast and slow-growing rhizobia were isolated from these cultivars.

Keywords: Vigna radiate, Cultivars, Rhizobia, Rajasthan.

PP-I.14

HARNESSING PHOSPHATE TRANSPORTER GENES TO ENHANCE IDENTIFICATION OF AM FUNGI

^{1, 2}Shukla Sadhana, ²Johny Leena, ^{2*}Singh Pushplata, ^{1*} and Didwania Nidhi ¹Manav Rachna International Institute of Research and Studies (MRIIRS), Faridabad, Haryana, India
²TEPI Sustainable Agriculture Division. The Energy and Resources Institute (TEPI)

²TERI-Sustainable Agriculture Division, The Energy and Resources Institute (TERI), Gurugram, Haryana, India

Identification of Arbuscular mycorrhizal (AM) fungi followed with its classification is a major concern for better categorization and taxonomic analysis. Conventionally, ITS1, ITS2 and 5.8S rDNA regions are used for taxonomic identification of AM fungi however; these DNA markers are sometimes inefficient in identification of AM fungi due to the multinucleate nature of the AM fungal spores. As an essential plant nutrient, phosphorus uptake is acknowledged as a major benefit of the AM symbiosis, but the molecular mechanisms of its transport as inorganic phosphate (Pi) from the soil to root cells via AM fungi remain is poorly known. In this study, we examined various phosphate transporter (PT) genes in multiple strains of *Rhizophagusirregularis* using polymerase chain reaction (PCR) amplification. This research will pave the way for the development of an advanced technique to molecularly characterize AM fungi at the species level.

Keywords: Arbuscular mycorrhizal (AM) fungi, Phosphate transporter, Molecular marker, AM fungi characterization.

EVALUATION OF ANTIBACTERIAL ACTIVITY OF CISSUS QUADRANGULARIS L. METHANOLIC EXTRACTS AGAINST SOME SELECTED PATHOGENS

Dhillon Juhi and Vimala Y.

Plant Physiology and Tissue Culture Lab, Department of Botany, C.C.S University, Meerut (250004), Email: dhillonjuhi1@gmail.com

In recent years, drug resistance to human pathogenic bacteria has been commonly reported from all over the world and this has also necessitated a search for new antimicrobial substances from plants. Higher plants produce diverse bioactive compounds with different biological activities. Studies reveal that the antimicrobial compounds produced by plants are found to be effective against human pathogenic microorganisms. The purpose of current investigation was to determine the efficacy of Cissus quadrangularis L. plant extracts (methanolic) against some selected bacterial cultures (Salmonella typhimurium, Streptococcus pyogenes and Staphylococcus aureus) using agar well diffusion method. The results so obtained indicate the antibacterial efficacy in decreasing series (S. aureus> S. pyogenes> S. typhimurium).

Keywords: anti-bacterial, bioactive, Cissus quadrangularis L., methanolic, Staphylococcus aureus, Streptococcus pyogenes and Salmonella typhimurium.

PP-I.16 DIVERSITY OF GILLED MUSHROOMS FROM KATEPURNA WILDLIFE SANCTUARY OF AKOLA DISTRICT, MAHARASHTRA

1 Kanherkar Suryakant H., 2 Borul Shailesh S. and 3 Mane Rameshwar Y.

Department of Botany

1. 2Yashwantrao Chavan Arts and Science Mahavidyalaya, Mangrulpir, Dist. Washim Maharashtra*

³ Shri Vyankatesh Arts, Com. and Science College Deulgaon Raja, District Buldana, Maharashtra

Email: - shaileshborul111@gmail.com

In the present investigation diversity of gilled mushrooms from Katepurna wildlife sanctuary of Akola district has been studied total 11 species collected from various localities on different substratum. 11 species belonging to 6 families have been reported from Katepurna wildlife sanctuary. The collected specimen shows wide range of morphological and ecological varieties. The present study explores the taxonomic complexities, ecological roles and economic significance of Agaricales fungi within ecosystem and industries. It highlights the need for continued research to understand and conserve the diversity of these gilled mushrooms.

Keywords: Diversity, Agaricales gilled mushrooms, Katepurna, Ecosystem.

NUTRITIONAL POTENTIALITY AND HEALTH ASSETS OF PADDY STRAW MUSHROOM - VOLVARIELLA VOLVACEA

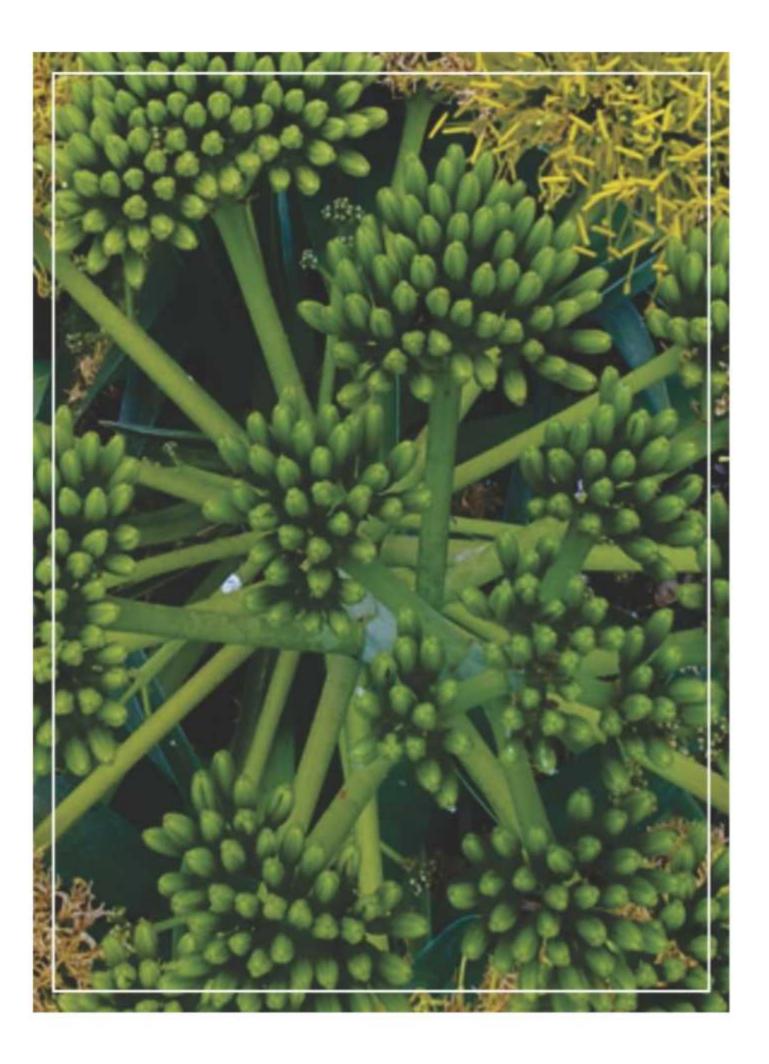
1 Hande Dilip V. and 2 Deshmukh Anand M.

¹Shri Pundalik Maharaj Mahavidyalaya, Nandura Railway, Dist – Buldana, Maharashtra.
² Shri Shivaji Science College, Amravati, Maharashtra.
1dvhande@gmail.com, and 2 mauli.2118@gmail.com

In the traditional applications of fungi in far eastern medicine, medicinal mycology has strong and deep roots. As more individuals look for cures and health approaches free from negative effects brought on by industrial medicines, medicinal mushrooms are transitioning from a fringe to mainstream use. There are around 38,000 different types of mushrooms, 300 of which are edible, and pharmacological research is being done on their potential medical benefits. The goal of this paper is to give a thorough overview of Volvariella volvacea's culinary and therapeutic uses. A member of the Pluteaceae family, Volvariella volvacea is a common edible fungus that grows in temperate, tropical, and subtropical climates in both the eastern and western hemispheres. It has anti-tumor, immunosuppressive, and immunomodulatory actions and is commonly utilized in India's traditional medical system. It is a well-known source of protein, fiber (chitin), vitamins (large amounts of vitamin C and all water-soluble vitamins like riboflavin, biotin, and thiamine), fats (5.7%), carbohydrates (56.8%), amino acids (all essential amino acids like alanine, arginine, glycine, serine, etc.), unsaturated fatty acids, and essential minerals (potassium, sodium, and phosphorus). V. volvacea is a remarkable medicinal fungus, as evidenced by the myriad therapeutic benefits it possesses and by phytochemical studies. KeyWords - Mycology, Volvariella volvacea, Pluteaceae, temperate, tropical, subtropical,

KeyWords – Mycology, Volvariella volvacea, Pluteaceae, temperate, tropical, subtropical, anti-tumor, immunosuppressive, and immunomodulatory.

XLVI ALL INDIA BOTANICAL CONFERENCE of THE INDIAN BOTANICAL SOCIETY **SECTION - II** Algae, Bryophytes and Pteridophytes Synergy in Plant Science and Sustainable Future: 2023



EPIPHYLLOUS LIVERWORTS OF ARALAM WILDLIFE SANCTUARY, KANNUR DISTRICT, KERALA

Sruthi O. M., Rajesh K. P. and 1 Manju C. N.

Department of Botany, the Zamorin's Guruvayurappan College (affiliated to the University of Calicut), GA College PO., Kozhikode, Kerala-673014, India

Bryology Division, Department of Botany, University of Calicut, Calicut University P.O., Kerala-673 635, India.E-mail:sruthiradhabalan@gmail.com, kprajesh.botany@gmail.com, manjucali@gmail.com

Epiphyllous liverworts are shade-loving leafy liverworts found growing exclusively on the adaxial surface of leaves of higher vascular plants. These are mostly found in the understory and lower canopy of forests in humid areas and near riverine areas. A total of 39 epiphyllous species have been documented from Kerala. The present bryofloristic study in Aralam Wildlife Sanctuary in the Kannur district of Kerala reported 17 epiphyllous species, 16 species belong to the family Lejeuneaceae and one to Radulaceae. The presence of 17 out of the 39 epiphyllous species in the sanctuary reveals its high microhabitat diversity, creating favorable conditions for the growth of these plants. Among the 17 species documented *Cololejeuneadiaphana* A. Evans, turned as new to the Indian Peninsula, and *Cololejeuneadianciloba*Steph., *C. sigmoidea* Jovet- Ast& Tixier, and *C. trichomanis* (Gottsche) Besch. were new records for Kerala.

Keywords: Epiphyllous liverworts, Aralam Wildlife Sanctuary, Bryophytes

OP-II.02

DIVERSITY OF THE FAMILY HYPNACEAE (BRYOPHYTA) IN KERALA STATE, INDIA

Shakira C. and Manju C. N.

Bryology Division, Department of Botany, University of Calicut, Thenhipallam P.O,
Malappuram - 673635, Kerala, India
Email: shakiracp00@gmail.com, manjucali@gmail.com

The Kerala State is located at the South-Western borders of Peninsular India. The long tract of Western Ghats in the East and the Arabian Sea in the West provide a variety of phytoclimatic conditions and it offers a vast range of suitable habitats for the growth of bryophytes. Hypnaceae Schimp, is one of the most diverse families of pleurocarpous mosses, distributed mostly in tropical and subtropical regions and generally associated with mesic habits. The family comprises about 67 genera and more than 1000 species worldwide. They are characterized by slender, mat-forming, glossy, creeping and pinnately branched plants, stem with indistinct central strand, leaves with double costa and frequently differentiated alar cells. A total of 33 species from 12 genera are reported from Kerala. BryocrumiamalabaricaManju, Prajitha, Prakashk. & W.Z. Ma, is a new species from Kerala. Ctenidium lychnites (Mitt.) Broth., Isopterygiumalbescens (Hook.) A. Jaeger, Hypnum plumiforme Wilson, Taxiphyllumtaxirameum (Mitt.) M. Fleisch., and Vesiculariavesicularis (Schwägr.) Broth. are some of the species reported from Kerala.

Keywords: Hypnaceae, Bryophyte, Distribution, Kerala, Western Ghats.

SUBGENUS PACHYFISSIDENS (FISSIDENTACEAE; BRYOPHYTA) IN THE WESTERN GHATS, INDIA

¹Manjula K. M. and ²Manju C. N.

¹KSCSTE – Malabar Botanical Garden and Institute for Plant Sciences, Kozhikode Dist., Kerala, India

²Bryology Division, Department of Botany, University of Calicut, Calicut University P.O., Malappuram Dist. 673635, Kerala, India

E-mail: manjulazgc@gmail.com, manjucali@gmail.com

Fissidentaceae Schimp. are monotypic family with a cosmopolitan genus FissidensHedw. distributed mainly in the tropics. Genus Fissidensis divided into four subgenera viz., Pachyfissidens, Octodiceras, Fissidensand Aloma. Subgenus Pachyfissidens includes the most primitive species with three sections: Pachyfissidens, Amblyothallia and Crispidium. Section Amblyothalia contain only one species, section Pachyfissidens contain seven species with two subspecies and four varieties and section Crispidium contain seven species with three varieties in Western Ghats. Among these, Fissidenscrispulusvar. nelliampathiaeisnewly reported, Fissidensasplenioides and Fissidenstaxifolius are new records to Kerala. Fissidensinvolutussubsp. curvatoinvolutus is new record to Karnataka.

Keywords: Fissidentaceae, Fissidens, Pachyfissidens, Western Ghats

OP-II.04

REPRODUCTIVE MECHANISMS AND ITS IMPLICATION TO THE TAXONOMIC COMPLEXITY IN BRYACEAE RCHB

Vineesha, P. M. and Manju, C. N.

Bryology Division, Department of Botany, University of Calicut, Calicut University PO, Malappuram Dist.- 673 635, Kerala Email: vinishapmohan@gmail.com

Bryaceae are one of the largest acrocarpic moss family, well known for its taxonomic complexity at various levels. The phenotypic plasticity, absence of sporophytes, overlapping key characters, incomplete descriptions and copious number of species within a genus contributes to the difficulty. A combination of sporophytic and leaf characters has given emphasis for a long period in the preparation of taxonomic keys. In the absence of sporophytes, specialized asexual propagules provide numerous possibilities in delimiting the taxa especially, the leaf axil bulbils, rhizoidal tubers and leaf axil filiform gemmae. Characteristics of leaf axil bulbils and rhizoidal tubers play an important role in identification of the species within genus Gemmabryum J.R. Spence & H.P. Ramsay. The size and morphology of rhizoidal tubers are important key characters in resolving Bryum billardieri complex and Bryum erythrocarpum complex. Some species within Rosulabryum J.R. Spence and PtychostomumHornsch. are known to produce filiform leaf axil gemmae, also the presence of filiform gemmae is a key character in the identification of Bryum neelgheriense Mont. ex Müll. Hal. Thus, it is clear that a thorough character analysis of asexual propagules could alleviate the taxonomic problems within Bryaceae.

Keywords: Asexual propagules, Bryaceae, Taxonomic complexity.

GIS BASED DISTRIBUTION OF MACROSCOPIC NOSTOC FROM GIRNAR WILDLIFE SANCTUARY, GUJARAT

Balai Kunjan

Department of Life Sciences, Bhakta Kavi Narsingh Mehta University, Junagadh, Gujarat, India.

The cyanobacterial genus *Nostoc* of freshwater includes several species which forms very small to large gelatinous colonies. *Nostoc* has filamentous structure called trichome having nitrogen fixing heterocyst which is embedded in gelatin matrix. Three different species of *Nostoc* have been collected from Girnar Wildlife Sanctuary and their distribution has been recorded with the help of QGIS. The macroscopic species of this genus differ from one another in many aspects like their size and trichome structure. Thalli may remain spherical or changing to irregular shaped on maturity. Their heterocyst also differs from each other. From this study, it can be concluded that *Nostoc commune* found to be in more abundance in comparison to other two species and also assess the distribution with the use of QGIS. *Keywords*: GIS assessment, Nostoc, Girnar Sanctuary.

OP-II.06

GIS BASED ASSESSMENT OF LIVERWORTS DISTRIBUTION IN GIRNAR WILDLIFE SANCTUARY, GUJARAT

Dangar Bhagyashri

Department Of Life Sciences, Bhakta Kavi Narsinh Mehta University, Junagadh, Gujarat, India.

The Girnar hills, the tallest in Gujarat, rise abruptly from the lowlands. The center region of Girnar, a large dome of diorite and monozonite rising to a height of 1,117 m and culminating in the Gorakhnath peak. Study includes thalloid liverworts plant specially order Marchatiales in which mainly four genera, *Cyathodium, Asterella, Plagiochasma*, and *Riccia*. Morphological and anatomical characteristics of these genera are helpful to distinguish the different thalloid plant from which some key points are very much helpful for identification up to species. Comparative map was prepared by QGIS software and concludes the distribution of these genera. Result shows that *Riccia* genus are more frequently distributed followed by *Cyathodium, Asterella* and *Plagiochasma*.

Keywords: liverworts, Girnar sanctuary, GIS assessment.

MORPHO-ANATOMICAL STUDIES AND EVALUATION OF PHYTO-CONSTITUENTS OF SOME ASPLENIUM SPECIES FROM DARJEELING DISTRICT, WEST BENGAL

Singh Puja and Bhandari Jnan Bikash *

^{1,2}Pteridology and Palaeobotany Laboratory, Department of Botany, University of North Bengal, Raja Rammohunpur, Dist. Darjeeling, West Bengal, India Email - jnanbikashbhandari@nbu.ac.in, rs_pujas@nbu.ac.in

Comparative morphological and anatomical studies along with phytochemical analysis of Aspleniumspecieswere carried out to obtain the characters that help to delineate the species. There are many differences, types of stomata and nature of scale present on rachis and rhizome. From anatomical studies it was found that the number of steles in petiole varies from base to apex among different species. The numbers of spores per sporangium also vary and the sculptures are different. Spore count per sporangium is highest in A. crinicaule and less in other species. The gametophytic study show various responses on culture condition. The phytochemical quantitative analysis was performed to observe the presence of phytoconstituents like phenol, flavonoids etc. which can be utilized for species differentiation and for commercial purpose to prepare herbal drugs.

Keywords- Asplenium, Morphological, Anatomical, Phytochemical, Gametophyte Spore

OP-II.08

MICROALGAL ENZYMES: A POSSIBLE SOLUTION OF WHITE POLLUTION

Pareek Arvind and Jain Sapna

Department of Botany, Maharshi Dayanand Sarasvati University, Ajmer, Rajasthan, India Email- arvindmdsu@gmail.com

One approach to reduce "white pollution" could be to identify potential algae and cyanobacteria, and the metabolic products they produce that can successfully break down polymeric materials biologically. Microalgae aid in the biodegradation of waste plastic by producing ligninolytic and exopolysaccharide enzymes that weaken the chemical bonds of plastic polymers. It is quite intriguing to try and use microalgae to break these polymers down into metabolites like carbon dioxide, water, and new biomass. In spite of this, more study is required because this is a novel subject. More research on this subject is required, including an examination of the presence of enzymes and their role in the biodegradation of polymers. Hence this review has been focused on studies reporting different enzymes in microalgae, various enzymes mainly associated with biodegradation and their occurrences in microalgae. The described enzymes included cellulases, amylases, galactosidases, proteases, lipases, pytases, laccases, antioxidant enzymes, and enzymes that involved in polythene biodegradation.

Keywords: White pollution, Microalgae, bidegradation.

EXPLORING AIRBORNE ALGAE FROM COASTAL REGIONS: BIODIVERSITY, CULTURING, AND POTENTIAL APPLICATIONS

Kejariwal Mona and Vala Mayur

Department of Botany, Rd. and Sh. National College, Bandra, West Mumbai-400050

Airborne algae, commonly known as microalgae, are a significant but understudied component of the aerial environment. Despite their ecological importance and potential applications, there are limited research articles and review papers focusing on aerobiology. This study presents an innovative investigation of airborne microalgae in the Palghar district of the southern Baltic Sea, an area with a hot and humid climate conducive to the flourishing of algae. The research aims to identify and characterize the diversity of airborne algae in this coastal region and explore their potential applications. The petri-plate exposure method with BG11 or F2 media for air sampling to isolate and culture airborne algae. Various taxa such as Anabaena, Lyngbya, and Scytonema have been identified during the primary screening. The selection of species for further research is based on abundance, economic importance, and ease of producing larger biomass. Microalgae produce diverse bioactive compounds, including lipids, polysaccharides, carotenoids, vitamins, phenolics, and phycobiliproteins, that exhibits a wide range of activities, such as antibacterial, antifungal, antiviral, antioxidative, anticancer, neuroprotective, antiglycation, and bioplastic properties and exploring the potential role of airborne algae in cloud formation, the hydrological cycle, earth's climate. Harmful microalgae blooms can impact tourist areas near water bodies. Emphasis for a systematic approach to investigate airborne algae, including the establishment of protocols for sample collection, identification, and mass culturing is needed. In conclusion, this study contributes valuable insights into the occurrence and significance of airborne algae, shedding light on their potential applications and their impact on the environment. It sets the stage for further research and development in utilizing airborne microalgae for sustainable solutions and bioactive compound production.

Keywords: Airborne algae, Microalgae, Aerobiology, Coastal regions, Biodiversity, Culturing.

OP-II.10

PRESENT STATUS AND HABITAT SPECIFICITY OF RARE HEPATICS IN AND AROUND MUKTESHWAR AREA OF DISTRICT NAINITAL, WESTERN HIMALAYAS

Pant Sapana *and S. D. Tewari

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

During the bryodiversity survey in and around Mukteshwar region of the Western Himalayas, we spotted a meagre population of some rare liverworts among them hepatics like *Atichisoniella*, *Stephensoniella*, *and Sewardiella* are listed in IUCN Red Data Book. The presently spotted original site of these rare hepatics was found in a dangerous state due to continuous pressure of anthropogenic ecotourism developmental activities. To protect these vanishing rare hepatics for future, an attempt was made to follow the in-situ transplant conservation method, considering the similar topographic and physicochemical parameters of the underlying substrate. As a result, the resuming thalli in newly created similar habitat conditions has reflected the success of the transplant experiment.

Keywords: Ex-Situ Conservation, Habitat, Hepatics, Rare, Western Himalayas.

OP-II.11 FORSSTROEMIA PRODUCTA (HORNSCH.) PARIS-A NECKERACEAOUS, PLEUROCARPOUS MOSS NEW TO INDIA

1* Bhandari Manisha, Pant Sapana, Tewari S. D., and ²Enroth Johannes

¹Indira Priyadarshini Govt. Girls Postgraduate College of Commerce, Haldwani, Nainital-263139, Uttarakhand, India

²Botany Unit of the Finnish Museum of Natural History, University of Helsinki, Finland-00014

While exploring the bryo-vegetation of Cedrus Trew and Quercus L. dominated forests at Lohaghat and Mukteshwar areas of Kumaun region (Western Himalayas, India), we came across an interesting epiphytic, Neckeraceaous, pleurocarpous moss, Forsstroemiaproducta (Hornsch.) Paris, which turned out to be the new addition to the Indian moss flora. The present paper gives an illustrated taxonomic account of the moss, representing the diagnostic features viz., moderately robust plants with slightly curved secondary branches, foliose to sub-foliose pseudoparaphyllia and stem without a central strand; leaves widely ovate to ovate-lanceolate with the recurved serrulate margin; costa single vestigially forked above, leaf cells isodiametric to shortly oblong; sporophyte frequent, seta short, capsule erect with hairy calyptra, exostome normal with rudimentary endostome.

Keywords: Epiphytes, Forsstroemia, Moss, New record, Western Himalayas.

OP-II.12 CHARACTERIZATION OF HEAVY METAL TOLERANT ENDOPHYTIC

BACTERIA ISOLATED FROM A FERN'S ROOT

Pteridology and Palaeobotany Laboratory, Department of Botany, University of North Bengal, Raja Rammohunpur, Darjeeling, 734013 Email - jnanbikashbhandari@nbu.ac.in

Saha Maitri and *Bhandari Jnan Bikash

Heavy metal contamination is a major environmental concern that increased day by day. To withstand this problem microbial remediation is approached for detoxifying or removing heavy metals from the environment as it is quite cost-effective and efficient. In the present study, endophytic bacteria isolated and characterized morphological, biochemical, heavy metal tolerance against cadmium and PGPR activities. The heavy metal was used in 500 PPM, 1000 PPM, 1500 PPM, and 2000 PPM concentrations for tolerance activity. A total of eight bacteria were found in fern root and some of them showed tolerance activity against this heavy metal.

Keywords: Heavy Metal, Fern, PGPR

QUANTIFICATION OF LYCOPHYTES FROM WESTERN GHATS OF MAHARASHTRA (INDIA)

Patil Sachin and Lavate Rajendra

Department of Botany, Shivaji University, Kolhapur, Maharashtra – 416 004 Email- sach2010d@gmail.com

An ecosystem consists of different communities of an organism interacting with different ecological factors. They are distributed in a distinct habitat. Therefore, the significant apprehension of ecology is studying, mapping and describing the plant communities by vegetation analysis. It documents ecological patterns in the habitats, as shown by diverse assemblages of plant species. The ecological studies provide baseline information for future research into the dynamics and distribution of pteridophytic species and how they relate to the physical environment. Counting of species diversity and comparing with ecosystems can be estimate a standardize tool with which compare both ecosystem and species health. Even though the exact diversity numbers are difficult to yield but knowing how biological resources are distributed within a community can be extremely beneficial in determining species diversity. The are many ways to define the diversity of a species, that uantify the number of traits, individuals or a species in a given area while taking into account their degree of dissimilarity. Traditionally there are three different levels at which diversity can be described. Pteridophytes are the vascular cryptogams having microphyllous (Psilotum, Lycopodium, Selaginella and E uisetum) or megaphyllous levaes (Adiantum, Aleuritopteris, Christella, Pteris, etc.). They are commonly known as fern and fern allies.

(PP□ - 1) the vascular cryptogams are known as lycophytes and ferns. Lycophytes are either homosporous (Lycopodium, Lycopodiella, Huperzia etc.) or heterosporous (Selaginella and Isoetes) with or without legule at the leaf base. During the present investigation □uantification of Lycophytes from different regions of Western □hats of Maharashtra were carried out. The phytosociological attributes like abundance, density, fre □uency and Importance Value Index of lycophyte species were □uantified.

Keywords: Quantification, Lycophytes, Value Index, Western Qhats

However, according to Pteridophytes Phylogeny □roup - I

STRUCTURAL VARIATIONS OF STOMATA IN PTERIDOPHYTES

¹Misra P. C., and ²Tiwari Shraddha

¹Department of Botany, H.N.B.Govt. P. G. College, Naini, Prayagraj. drpcmisra@gmail.com ²Bhawan's Mehta Degree College, Bharwari, Kausambi. drshraddhatiwari7@gmail.com

Pteridophytes in general have attracted a great deal of attraction of botanists from all over the world due to their occupying a pivotal central position in world of higher plants. The present day pteridophytes consists of more than 400 living genera and approximately about 13000 living species are (Crabbe et al. 1975 and Verma 2000). From a long time epidermal details of pteridophytes was a working area for the workers. They have given so many details of it. Stomata are a very peculiar structure of lower surface usually which show several difference itself. In the present study the authors has studied about structure, position, frequency etc of lower and upper epidermal cell of stomata. All these are followed with the terminology and type of stomata described by Van Cotthem in 1970 and Parveen Kidwai in 1981. Authors have studied several genera and species of different families of pteridophytes for the detail structures of stomata. Several new structures and features are described in this paper.

Keywords: Pteridophytes, stomata, variations,

PP-II.02

ASSESSING THE ROLE OF LIGHT SPECTRA IN THE IN VITRO GAMETOPHYTE DEVELOPMENT UNDER OF ATHYRIUM SCHIEMPERI FROM RAJASTHAN

Jain Ritu

Department of Botany K.M.E. Society's G.M. Momin Womens College, Bhiwandi, Mumbai, Dist. Thane Maharashtra -421302, Email: ritujain0933@gmail.com

The present study investigates the growth and development of Athyrium schiemperi, a widely distributed fern species in Rajasthan. The study focuses on the effects of different coloured lights on the growth and development of A. schiemperi. The observations include the initiation of 2D growth, the form of gametophytes, and the development of sporelings. Theresults show that the blue light has a significant effect on the development of the gametophytes, with a 90% frequency of cordate gametophytes. In contrast, the red and yellow lights promote filamentous and irregular forms of gametophytes, respectively. The study concludes that A. schiemperi is well-adapted for dry conditions and that different coloured lights can significantly affect its growth and development.

Keywords: Gametophytes, sporelings, Athyrium schiemperi.

SCREENING OF BLUE GREEN ALGAE (CYANOBACTERIA) FROM KRISHNA RIVER

¹Patil Shubhangi P., ²Chogule VinayV. and ³Mohammad Rafiuddin Naser

¹Department of Botany, Miraj Mahavidyalaya, Miraj, Dist. Sangli, M.S. India.
²Department of Microbiology, MirajMahavidyalaya, Miraj, Dist. Sangli, M.S. India.
³Department of Botany, Moulana Azad College of Arts, Science and Commerce, Rauzabagh, Aurangabad, M.S. India.

Blue green algae are autotrophic, oxygenic, prokaryotic, and capableof fixing atmospheric nitrogen. Cyanobacteria used as Aquaculture, wastewater treatment, food, and biofertilizers. As a natural bio-fertilizer, it is crucial for maintaining and enhancing soil fertility, which in turnboosts cereal crop development and production. A total of 20 water samples from Krishna River in the Sangli region of Maharashtra were collected for the current study. While offering a 2to15fold reduction, a technique using nutrient-saturated glass fibre filters solidified with agar allowed the isolation of the numbers of cyanobacteria from fresh water.20 samples yielded a total of 4 prominent Cyanobacteria lisolates.

Keywords: Blue green algae, nutrient-saturated glass fibre filter agar, bio-fertilizer and atmospheric nitrogen

PP-II.04

INDUCTION AND CHARACTERIZATION OF MYCOSPORINE-LIKE AMINO ACIDS IN THE CYANOBACTERIUM ANABANOPSIS CIRCULARIS HKAR-22

Singh Varsha K., Jha Sapana, Sahu Niharika, Kumari Neha and Sinha R.P. Laboratory of photobiology and Molecular Microbiology, Centre of Advanced Study in Botany, Institute of Science, Banaras Hindu University, Varanasi-221005, India

This study evaluates the response of a cyanobacterium *Anabaenopsis circularis* strain HKAR-22 in terms of their growth, Chl a content and photosynthetic efficiency under different treatment conditions of ultraviolet radiation (UVR), photosynthetically active radiation (PAR), PAR+ UV-A (PA) and PAR+UV-A+UV-B (PAB). Induction and characterization of UV-absorbing mycosporine-like amino acids (MAAs) utilizing UV/VIS absorption spectroscopy, HPLC-PDA detection, HRMS, FTIR and NMR confirms the presence of MAA-shinorine having absorption maxima (λ_{max}) at 332.3 nm and retention time (RT) of 1.47 min. UV-stress elevated the activity of antioxidant enzymes such as CAT, SOD, POD and APX. The induction of MAAs has been investigated to evaluate the impact of UV radiation on the cyanobacterial membrane in addition to enzymatic defensive systems.

Keywords: Antioxidative enzymes; HPLC-PDA detection; Mycosporine-like amino acid; Ultraviolet radiation

A METHOD FOR DETERMINING THE VASE-LIFE OF FERNS FOR VALIDATION OF THEIR ORNAMENTAL VALUES - A CASE STUDY IN HOMOSPOROUS FERNS

Srivastava Sakshi * and 1Singh Ajit Pratap

Pteridology Laboratory, CSIR-National Botanical Research Institute, Lucknow-U.P., India ¹Email- ajitpsingh2000@gmail.com

Fronds of the ferns possess lush green foliage and aesthetic exquisite symmetry. Entire fronds of certain species of ferns, i.e., Nephrolepis tuberosa are used for various ornamental purposes. Unlike to the studies on vase-life in cut flowers of carnations, the ferns received less or no attention for determination of their vase-life by observing the senescence silhouettes including the in-rolling of pinnae margin, wilting of whole fronds, ethylene production and gradual weight loss of the fronds at constant room temperature, light intensity, humidity and atmospheric pressure. We have determined the vase-life of fronds of 21 different species of ferns by observing the in-rolling of pinnae and gradual weight loss of the fronds at an interval of 24 hours at constant variable regulating factors. The study has determined that the trend of in-rolling of pinnae and gradual weight loss of the fronds in the 21 different species was quite variable. We have determined that the highest in-rolling of pinnae and speedy weight loss (on 3rd day) was achieved in Thaug-16 confirming short vase-life. We also determined that the farthest delay in in-rolling of pinnae and slow weight loss (on 13th day) was achieved in Mipun-8 confirming highest vase-life validating their ornamental values. The detailed observations and results have been provided and discussed in the paper

Keywords: Pteridophytes, ferns, fronds, vase-life, ornamental value.

PP-II.6

SYNERGETIC ASPECTS AND OVERVIEW OF SOME BRYOPHYTES OF MELGHAT FOREST

Wankhede T. B. and *Manik S. R.

Department of Botany, Shri Shivaji Science College, Amravati 444603 *Department of Botany, S.G.B. Amravati University, Amravati 444602 E-mail: tusharwan@gmail.com

Melghat is a prime biodiversity repository of Maharashtra state enriched with diverse and luxuriant growth of lower plants like bryophytes. The phylogeny or taxonomic review and interpretation of such association may lead towards the evolutionary significance among these life forms. Bryophytes make a significant contribution to the floral diversity of this "watery planet" and since its inception constitute an important component of the forest ecosystem being the first colonizers on variety of habitats. In present investigations, the bryophytes of Melghat forest were first screened, identified, and arranged as per the latest classification in hierarchical manner so that their distribution can be measured substantially. The exhaustive information of all species under one umbrella of classification to provide the details of bryoflora at a glance. The Melghat bryophyte occurs at different habitats at different localities with response to edaphic, climatic and biotic factors. Liverworts mainly prefer terricolous and rupicolous habitats while hornworts dominantly found on soil substratum and few on saxicolous habitat. The mosses generally prefer and suitable for rocks, soil surface or even tree barks. Hence, about 20 species of

XLVI ALL INDIA BOTANICAL CONFERENCE of THE INDIAN BOTANICAL SOCIETY

bryophytes nearly 10 species found at saxicolous habitat (50 %), maximum 15 species found on terricolous habitat (75%), near about 10 species found on rupicolous habitat (50%) and about 2 species of mosses are found on corticolous habitat (10%). The Melghat forest comes under the region of Central India and shows affinity with South Indian part due to distribution and attachment of Maharashtra state.

Keywords: Melghat forest, Bryophytes, Microclimate

XLVI ALL INDIA BOTANICAL CONFERENCE of THE INDIAN BOTANICAL SOCIETY SECTION - III Seed Plants: Anatomy and Reproductive Biology Synergy in Plant Science and Sustainable Future: 2023



COMPARATIVE ACCOUNT ON IMPACT OF LOCAL CLIMATE ON THE SECONDARY XYLEM AND GROWTH PATTERNS IN IPOMOEA ERIOCARPA R. BR. (CONVOLVULACEAE) GROWING IN ARID AND TROPICAL DECIDUOUS FOREST

Thacker Khyati D., Raole Vinay M. and Rajput Kishore S.

Department of Botany, Faculty of Science, The Maharaja Sayajirao University of Baroda, Vadodara 390002 (Gujarat). Email: ks.rajput15@yahoo.com

Growth pattern and structural alterations in the secondary xylem was compared in *Ipomoea eriocarpa* (Convolvulaceae) growing in Banni (Rann of Kutch) and dry deciduous forest (Toranmal). Samples from both places showed development of successive cambia, interand intraxylary phloem. Samples from Banni showed lobbed outline of the stem, narrow pith, enhanced secondary growth, early development of variant secondary growth as compared to Toranmal samples. Initiation of variant secondary growth in former location began prior to the individuals and showed bifacial activity of intraxylary cambium while intraxylary cambium was unidirectional in other samples. Structural details of the secondary xylem and phloem formed by regular vascular cambium, successive cambia and intraxylary phloem are discussed.

Keyword: Intraxylary cambium, successive cambia, variant secondary growth.

OP-III.02

DIVERSITY IN THE ONTOGENY OF INTER-AND INTRAXYLARY PHLOEM DEVELOPMENT IN EUDICOTS

Rajput Kishore S.

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

Phloem is one of the vital and principal conducting tissues in vascular plants that have a major role in the translocation of photosynthate from the source to the sink. During the evolution, phloem tissue not only modified their structure and function but also occupied various locations within the plant organs. It includes extrafascicular (ectocyclic) phloem, intraxylary/medullary phloem in pith, and interxylary phloem in the secondary xylem tissue of eudicots. Extrafascicular phloem is a network of commissural strands of perifascicular sieve elements external to the vascular bundles. Present study describes the diversity of inter-and intraxylary phloem development in several species within and different taxonomic groups. Intraxylary phloem is strands of sieve elements located on the periphery of the pith. Primary intraxylary phloem development is observed in procambial derivatives, immature and mature pith cells, and intraxylary cambium. In contrast, interxylary phloem is strands of sieve elements produced due to differential activity of the regular vascular cambium. Such interxylaryphloems produced in response to differential activity of the cambium are classified as Strychnos, Combretum, Calvcopteris and Azima subtypes. Besides these subtypes, dedifferentiation/proliferation of unlignified, thin-walled axial parenchyma cells of the secondary xylem follows variety of pathways that are

uncommon and are always neglected in the botanical literature. Present study also documents formation of interxylary cambium and deposition of the interxylary phloem from it in some species. Available literature indicates that formation of an extrafascicular phloem plays an important role in the transport of various macromolecules, various proteins, and long-distance transport of signalling molecules while the occurrence of interxylary phloem is correlated with translocation of photosynthate from the source to sink. The presence of inter-and intraxylary phloem is attributed as a defense mechanism against insects or plants that show sudden and enormous flowering or may be correlated with high temperature or unconducive climate in a desert region where sieve tube elements became nonfunctional due to high temperature.

Keywords: Variant phloem, dedifferentiation, interxylary cambium, meristem, cambium.

OP-III.03

DEVELOPMENT OF SUCCESSIVE CAMBIA AND THE STRUCTURE OF THE SECONDARY XYLEM IN MILLETTIAEXTENSA (BENTH.) BENTH. EX BAKER (FABACEAE)

Tanmay Rohit and Rajput Kishore S.*

Department Of Botany, The Maharaja Sayajirao University of Baroda, Vadodara 390002, Gujarat, * ks.rajput15@yahoo.com

A present study deals with stem and wood anatomy of *Millettia extensa* (Fabaceae). Similar to several eudicots, secondary growth took place by regular vascular cambium. In 25-30 mm thick stems, the regular cambium ceases to divide and a new ring of successive cambium initiated external to the earlier formed phloem. Discrete segments of cambium initiated simultaneously and subsequently united to form a complete cambial ring. Very often in thick stems, these cambia interconnect with each other and formed an anastomosing network of cambial rings. Structurally, the secondary xylem and phloem formed by the successive cambia remains similar to the secondary xylem and phloem formed by regular vascular cambium. Details of cambial initiation and structure of the secondary xylem and phloem is elucidated in details.

Key words: Successive cambia, phloem, cambial variant

COMPARATIVE STUDY ON THE STEM ARCHITECTURE AND GROWTH TRAJECTORIES IN THREE VARIETIES OF MUCUNA PRURIENS (L) DC (FABACEAE)

¹Rami Meera, ²Gurav R. V. and ^{1*}Rajput Kishore S.

Department 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

Stem anatomy and increase in stem diameter was compared in *Mucuna pruriens* var. *pruriens*, *M. pruriens* var. *utilis* and *M. pruriens* var. *hirsuta*. All three species showed regular secondary growth and the vascular cambium was functionally bi-facial. Like several climbing members, the secondary xylem was characteristic of the lianescent habit. The conspicuous characteristic includes dimorphic vessels and abundance of parenchyma cells. After a passage of time, earlier formed axial parenchyma dedifferentiated into interxylary phloem islands in all three varieties and numbers of interxylary phloem islands increased subsequently with age. Fully grown, thick stems of *M. pruriens* var. *pruriens* showed simultaneous differentiation of interxylary phloem centripetally and centrifugally. At this stage, exclusively this variety also showed formation of vascular cylinders external to the regular phloem. Ontogeny of interxylary phloem, successive cambia and structure of the secondary xylem is elucidated in detail.

Keywords: Interxylary phloem, vascular cylinder, ecological wood anatomy.

OP-III.05

IDENTIFICATION FEATURES OF VINCETOXICUM INDICUM: MICROSCOPY AND DNA SEQUENCING

Denni Mammen

School of Science, Navrachana University, Vasana-Bhaili Road, Vadodara-391410, India. Email - drdenni.mammen@gmail.com, Tel.: +91 8980294648

The present research work has been undertaken to identify key microscopic characters of Vincetoxicum indicum, a medicinal twiner with potency to expel mucus from the lungs. Leaf constants were calculated during micromorphological studies. Transverse sections of leaf, stem and root were studied in detail to identify key characters that could help in proper identification of the plant. DNA was isolated from the plant in good purity and amplified using PCR, selectingRUBISCO gene as a phylogenetic marker. The gene was subjected to sequencing for identification of plant species, for which the sequences for both forward and reverse primers were obtained on the basis of the electropherograms obtained. The sequence when uploaded to the NCBI BLAST database, showed similarity index above 99%which proved that the species is indeedVincetoxicum indicum. This work puts forth important microscopic features for proper identification of the plant, as well as species confirmation using DNA barcoding.

Keywords: Vincetoxicum indicum, micromorphology, transverse sections, DNA sequencing

EMBRYO MORPHOLOGY OF APONOGETON AND ITS TAXONOMIC SIGNIFICANCE

Chougule Rupali N. *, Yadav Shrirang R. and Lekhak Manoj M.

Angiosperm Taxonomy Laboratory, Department of Botany, Shivaji University, Kolhapur-416004, Maharashtra, India Email: *rupalichougule4892@gmail.com

Aponogetonaceae area monogeneric aquatic family. Aponogeton L.f. comprising about 60 species is distributed in tropical and subtropical regions of the Old World. In India, ten species are reported. The present paper aims atunderstanding the taxonomic value of embryo morphology inIndianAponogeton species and A. decaryiJum. ex Humbert. Our observations revealed thatthe size, shape, position of plumule on the embryo exhibited significant variation across species. Embryos with appendages were observed in three species, viz. A. appendiculatus, A. nateshii and A. wolfgangianus. Transverse sections of embryo showed circularcotyledon(non-grooved)inA. bruggenii, A. decaryi, A. natansandA. lakhonensis. Cotyledonswere semi-circular (grooved) inA. appendiculatus, A. crispus, A. microphyllus, A.satarensisand A. wolfgangianus. Here, we discuss the morphology of fruits and embryosof 11 species and their utility in delimitation of Aponogeton species.

Keywords: Aquatic plants, Fruit morphology, Taxonomy.

OP-III.07

ANATOMICAL STUDIES IN THE LEAVES OF HYDNOCAPUS PENTANDRUS (BUCH. – HAM) OKEN

Darshika Acharya and Vaidya Meenakshi Sudhir

S.V. K. M's Mithibai College of Arts, Chauhan Institute of Science & 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, minakshispv@gmail.com

Hydnocarpusis a genus of flowering plant, commonly called **chaulmoogra**, belonging to the family Flacourtiaceae. The folklore claims the use of whole plant for curing various ailments. The oil extracted from seeds of Hydnocarpus pentandrus (Buch. -Ham) Oken contains secondary metabolites such as Glycosides, carbohydrates, proteins, tannins, saponins etc. The leaves are used for cardiac problems, hepatic problems, otalgia, and eruptions. Standardization is essential measure for quality, purity & sample identification. Macroscopic characters, along with the microscopy are one of the simplest & cheapest methods to start with for establishing and correct identity of the source materials. In the present study the anatomical sections of leaf, petiole & stem, leaf architecture, types of stomata, stomatal frequency, stomatal index of the leaf of Hydnocarpus pentandruswas undertaken. This study will be helpful in correct identification of the plant materials which is of medicinal importance.

Keywords: Hydnocapus pentandrous, anatomical, leaf architecture, stomatal frequency, stomatal index, standardization.

STEM ANATOMY AND DEVELOPMENT OF MULTIPLE VARIANTS IN MERREMIA HEDERACEA (BURM.F.) HALLIER F. (CONVOLVULACEAE)

Dhara G. Ramoliya, Vinay M. Raole and Kishore S. Rajput*

Department of Botany, Faculty of Science, The Maharaja Sayajirao University of Baroda, Vadodara 390002, Gujarat. Email - ks.rajput15@yahoo.com

Stem anatomy and growth adjustment to increase the stem diameter was investigated in Merremia hederacea (Burm.f.) Hallier f. (Convolvulaceae). After the initiation of secondary growth, differential activity of the cambium consequently resulted in formation of lobbed stems. Subsequently, successive cambia develop from the pericyclic parenchyma as discrete segments, which later join to form a complete ring cambium. In thick stems, unlignified axial parenchyma and cells of phloem wedges dedifferentiated into interxylary phloem pockets. In contrast, f ormation of intraxylary phloem was observed from the primary growth onwards while additional intraxylary phloem differentiated from the adjacent pith cells and by initiating the intraxylary cambium. Structure of the secondary xylem and phloem of successive cambia is compared with regular secondary xylem and phloem formed by the vascular cambium.

Keywords: Inter-and intraxylary phloem, internal cambium, successive cambia.

OP-III.09

LEAF ARCHITECTURE PATTERNS IN ALSEODAPHNE, DEHAASIA AND PERSEA FROM LAURACEAE

Vaidya Meenakshi

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; minakshispv@gmail.com

Leaf architecture study is an important anatomical tool for the study of plant species. Members of Lauraceae are difficult to identify in their vegetative state. The plant material for the present work was personally collected from Shillong- Meghalaya. Alseodaphne, Dehaasia and Persea all belong to Tribe I- Perseaceae of Family Lauraceae according to Hooker. The plants have economic importance, Pinnate type of venation is observed in Alseodaphne, DehaasiaandPersea. Pinnate camptodromous with eucamptodromous secondaries is observed in Alseodaphne kaeniana. Pinnate camptodromous with festooned brochidodromous secondaries is observed in A. owdenii, A. petiolaris, A. semicarpifolia, Dehaasiakurzii and Perseamacrantha. The higher order of venation is also studied so the plants can be identified based on the types venation.

Keywords: Venation, Pinnate camptodromous, festooned brochidodromous Alseodaphne, Dehaasia, Persea.

FLORAL REVERSION IN CLEOME VISCOSA: UNRAVELING THE MECHANISMS BEHIND A CAPTIVATING PHENOMENON

Kheta Ram

Biotechnology and Plant Systematics Laboratory, Department of Botany, Jai Narain Vyas University Jodhpur, Rajasthan, Email - ramkheta@gmail.com

Cleome viscosa, commonly known as Asian spider flower, is a fast-growing, functionally hermaphroditic, entomophilous C3 plant found in humid and warm habitats. It has significant medicinal importance in Ayurveda and other traditional medicinal systems for treating various diseases, including liver ailments, chronic painful joints, and mental disorders. Floral observations revealed three morphs with short, medium, and long gynoecium on the same plant, indicating self-compatibility and autogamy. Flowering during August to November, depending on the extent of rainfall. The study presents compelling evidence of a rare floral reversion phenomenon in C. viscosa, wherein the gynoecium undergoes a transformative process, converting into leafy structures during flowering. This observation suggests that the flower is a modified shoot, with the activation of the shoot meristem into a floral meristem. A valuable genetic species for studying floralto-vegetative reversion. In conclusion, C. viscosa showcases an exceptional floral reversion phenomenon, wherein the gynoccium undergoes a transformative change, resembling leafy structures during the flowering stage. This captivating occurrence underscores the plant's remarkable adaptability and genetic plasticity. Continued investigations into the underlying molecular mechanisms hold promise in advancing our comprehension of plant growth and development, not only in C. viscosa but also in other plant species, promoting progress in plant biology research.

Keywords: Cleome viscosa, Asian spider flower, Arabidopsis thaliana, ABCDE model, Floral reversion, Genetic plasticity.

PP-III.01

FLORAL NECTAR, CHEMICAL COMPOSITION AND FLOWER VISITORS IN MORINGA OLEIFERA LAMK

Mahalkar M. S. and Dhore, M. M.

Department of Botany, Shri Shivaji Arts, Commerce and Science College, Akot

The present paper deals with the study of flowering phenology, flower dynamics, nectar production, chemical composition and flower visitors of *Moringa oleifera* Lamk (Moringaceae). It is moderate sized, soft wooded, deciduous tree. Flowers creamy white, bisexual, honey-scented, zygomorphic, gullet shaped arranged in axillary panicles. Each flower consists of five green sepals; five unequal white petals. Individual flower life lasts for 3 days. Anthesis occurred during the morning. The anther dehiscence takes place after anthesis during 12.00- 13.00hrs. Flower produce nectar from the nectary disc located at the base of ovary. Morphology of nectary was done by scanning electron microscope (SEM). The amount of nectar and nectar concentration from flowers was recorded after every two-hour interval from 08.00hrs -16.00hrs. The average volume of nectar was found to be 4.82μl. The average nectar concentration was found to be 44.82%. Sugars and Amino acid from floral nectars were detected by one directional thin layer chromatography. Glucose, sucrose and fructose were identified from nectar sample. Seven amino acids L- histidine monohydrochloride, DL- isoleucine, 3-DL- alanine, Leucine, DL- valine, DL- methionine

and DL- tryptophan were identified from nectar sample. Flower visitors were observed for their visits and behavior during the flowering period. Xylocarp sp. and bees were the main flower visitors.

Keywords: Moringa oleifera, Nectar, sugars, Amino acid and visitors.

PP-III.02

TRAP GLAND MORPHOLOGY OF UTRICULARIA SPECIES FROM THE LATERITIC PLATEAUS OF NORTHERN KERALA

Vaishnavi K. P.*and Santhosh Nampy

Department of Botany, University of Calicut, Thenhipalam, Malappuram, Kerala – 673 635 *E-mail: vaishnavitly@gmail.com

Carnivorous plants, comprising about 860 species in 19 genera and 10 families, are one of the most fascinating groups within the plant kingdom. Among them, Lentibulariaceae (Lamiales) exhibit the most diversity in species, habits, and life forms. The genus Utricularia L. of the Lentibulariaceae family, also known as bladderworts, is widely dispersed across India's lateritic plateaus. The genus includes about 250 species worldwide and 41 species under 7 sections in India, mainly distributed in the Western Ghats and the North-East India. Carnivorous plants typically grow in nutrient-poor, wet or aquatic habitats, and they get nutrients for growth from animal carcasses. For the digestion and absorption of the prey, carnivorous plants have highly specialised structures called traps. The anatomy of carnivorous traps varies greatly, which is related to their capability to attract, capture, kill, and digest prey. Among different types of traps, the suction trap in Utricularia is the most complicated and are unique among all trapping structures, contains both outer and inner surface glands, mainly to secrete digestive enzymes and aid in the absorption of digested food. The present study focuses on the trap gland morphology of U. cecilii, U. lazulina, U. malabarica, U. minutissima, U. sainthomia, and U. reticulata species in the lateritic plateaus of northern Kerala using light microscopy and staining techniques.

Keywords: Utricularia, Trap gland, carnivorous plants.

PP-III.03

POLLEN GERMINATION, TUBE GROWTH AND STIGMA RECEPTIVITY IN CROTALARIA JUNCEA L. (FABACEAE)

Kukade S. A. and Tidke J. A.

Laboratory of Reproductive Biology of Angiosperms, Department of Botany, Sant Gadge Baba Amravati University, Amravati 444602 (M.S.) India saritakukade8@gmail.com, jaikirantidke@rediffmail.com

Pollen germination, tube growth and stigma receptivity in *Crotalaria juncea* were examined. Maximum percentage of germination (36.53%) was recorded at 20% sucrose solution with average length of pollen tube 177.12μ. The best pollen germination (16.66%) occurred in 10% sucrose supplemented with 200mg/l boric acid solution. Average length of pollen tube was recorded to be 147.6μ. Salt of Potassium nitrate and Magnesium sulfate of different concentrations showed poor germination ability. The stigma is of the wet, papillate type. Length of long and short stigmatic papillae at 400X was found to be 295.2 and 59.04μ. Non-specific esterases were present on the stigma surface. Maximum

receptivity with in vivo pollen germinating (78.95%) was recorded on third day after flower anthesis in natural populations.

Keywords: Crotalaria juncea, pollen germination, tube growth, stigma receptivity.

PP-III.04

A COMPARATIVE STUDY OF FRUIT AND SEED IN BARLERIA

¹Adikane Sujata V. and ²Kale Pravin J.

Department of Botany, Mariya Art and Science College. DeoliDist-Wardha.

Department of Botany, NKS. Model College Karanja (GH.) Dist-Wardha.

Seed shape, dimensions, surface texture and sculpture, Hilum shape and position recorded for four species of *Barleria* by using light microscope (L. M.) and Stereo electron microscope (SM). The aim of the present study was assess the potential systematic value of fruit and seed morphology of *Barleria* species. The species sampling was very low, potentially informative characters have proven to be systematically informative at the infrageneric level.

Keywords: Seed, Morphology, Barleria, Light Microscope, Stereomicroscope.

PP-II.05

POLLINATION BIOLOGY OF IPOMOEA QUAMOCLIT (CONVOLVULACEAE): FLORAL AND VISITOR BEHAVIORAL ASPECTS

Mirge Yogita S. * and Jaykiran A. Tidke**

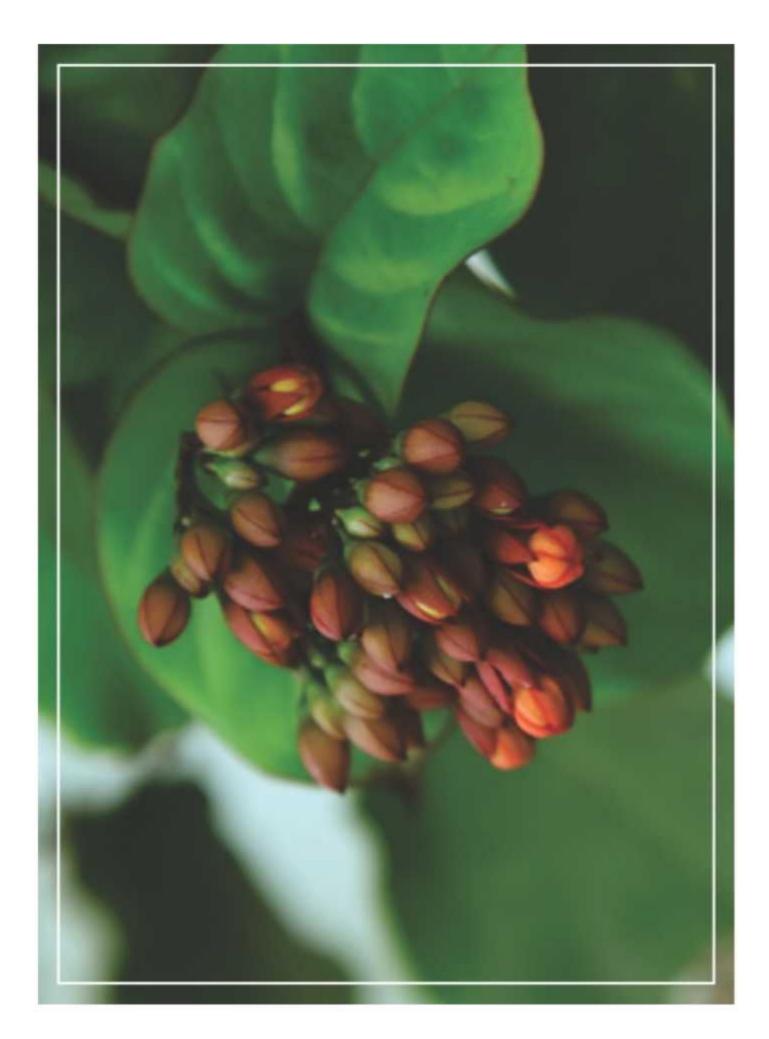
Laboratory of Reproductive Biology of Angiosperms, Department of Botany, Sant Gadge Baba Amravati University, Amravati 444602 (M.S.) India e-mail: *yogitamirge@gmail.com , **jaikirantidke@gmail.com

Pollination depends on floral morphological and behavioral variations between flowers and pollinators. *Ipomoea quamoclit* (L.) (Convolvulaceae) provide pollen and nectar to visitors. It grows in anthropic regions, therefore becomes a significant source of means for the conservation of pollinator. However, what is the efficiency of floral visitor for the pollination? What morphological and behavioral features define the pollinators? In this regard, this study evaluated the *I. quamoclit* flower morphology, visitor ratio and their foraging behavior etc. Also, the efficiency rate of breeding system of this species was quantified.

Ipomoea quamoclit (L.) is an annual climber with, flowering from August to mid-October. Opening of flowers in progress with daylight between 06.00 - 06.30 hours and the anther dehiscence was noted 5 to 6 hours before the anthesis. Foragers include Pyrisitialisa, Pelopidas sp., Battuspolydamas, Lasiusniger and Apisdorsata. Active visitors preferred contact with the reproductive structures of the flower. This species shows a facultative xenogamous type of breeding system. In the present investigation, it is found that there is a strong correlation between floral sizes, pollen: ovule ratio, stigma receptivity, antherstigma distance, and breeding system.

Keywords: Ipomoea quamocli (L.), floral biology, pollination, breeding system.

XLVI ALL INDIA BOTANICAL CONFERENCE of THE INDIAN BOTANICAL SOCIETY SECTION IV Seed Plants: Taxonomy, Ethanobotany and Plant Resource Utilization Synergy in Plant Science and Sustainable Future: 2023



PIPER BETLE LINN. LEAVES: A COMPARATIVE STUDY OF ANTIOXIDANT AND ANTIMICROBIAL POTENTIAL IN THREE VARIETIES

Chachad Devangi Parag

Botany Department, Jai Hind College (Autonomous), 'A' Road, Churchgate, Mumbai – 400020

Piper betle, commonly called betel leaf, is a tropical plant with a lot of traditional and medicinal importance. It is used in many Asian countries for its therapeutic properties. Many varieties of these leaves have been cultivated and are sold in local markets. These are the subject of interest for their potential antioxidant and antimicrobial activity. The antioxidant activity using DPPH scavenging assay demonstrated the strong potential of all varieties, suggesting their possible role in neutralising harmful free radicals in the human body. The antimicrobial activity is primarily attributed to the presence of bioactive compounds such as essential oils. The extracts exhibit inhibitory effects against Staphylococcus aureus, Escherichia coli along with Candida species. This can be a scientific validation for its use as mouth freshener.

Keywords: Piperbetle, Antioxidant, Antimicrobial

OP-IV.02

EXPLORING CAJANUS CAJAN POD PROTEIN CONCENTRATES: AN ECO-FRIENDLY SUPPLEMENT ALTERNATIVE AND VEGETABLE WASTE MANAGEMENT SOLUTION

Charania Sheeza and Vaidya Meenakshi Sudhir

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.sheeza.charania@yahoo.com; meenakshi.vaidya@mithibai.ac.in; minakshispv@gmail.com

Cajanus cajan, commonly known as pigeon pea, a legume with multiple applications in agriculture and nutrition. The present study highlights the crucial significance of utilizing Cajanus cajan pod protein concentrates (PPC) as an eco-friendly, renewable, and costeffective solution for supplementing protein-deficient conditions in rural areas. Specifically, in regions facing challenges like Protein-Energy Malnutrition (PEM), including Marasmus and Kwashiorkor, these PPCs can offer a promising alternative to address nutritional deficiencies and promote sustainable dietary practices. The study also emphasizes the crucial role of Cajanus cajan in vegetable waste management, showcasing its potential to reduce waste and promote sustainability in the food industry. In-depth acute toxicity studies using Wistar rat as animal model have been conducted to ensure the safety of these protein concentrates as an alternative supplement. Biochemical parameter assessments provide valuable insights and potential health benefits of these pod protein concentrates. Moreover, the research investigates the protein efficiency ratio (PER) of Cajanus cajan pod protein concentrates, which provides information in their effectiveness in supporting growth and development in animal subjects. The PER results shed light on the efficiency and quality of protein utilization, making it an essential factor for evaluating

XLVI ALL INDIA BOTANICAL CONFERENCE of THE INDIAN BOTANICAL SOCIETY

their suitability as a supplement alternative. Overall, this comprehensive exploration establishes *Cajanus cajan* pod protein concentrates as a promising solution for sustainable supplement sourcing, vegetable waste management, and advancing eco-conscious practices in the food industry."

Keywords: Acute toxicity, Cajanus cajan, waste pods, PER, protein efficiency ratio, sustainability.

TAXONOMIC STATUS OF STEREOSPERMUM CHAM., CRITICAL REVIEW FROM INDIA

¹Gadpayale Jagannath V., ²Somkuwar Subhash R. and ³Chaturved Alka A.

¹Department of Botany, S. N. Mor College of Arts & Commerce & Smt. G. D. Saraf Science College, Tumsar (M.S.), India - 441 91

²Department of Botany, Dr. Ambedkar College, Deekshabhoomi Nagpur - 440 010
³P.G.T. Department of Botany, University Campus, RTM University, Nagpur-440 033
Corresponding author: - jvgadpayale@gmail.com

The genus Stereospermum Cham., is one of the major group of Angiosperms from the Bignoniaceae family which found in tropical Africa, Madagascar, Indian Subcontinent to S. China and W. Malesia. It is medium size tree can be recognized easily by flowers having a narrowly cylindrical corolla tube, cylindrical, pod-like fruit with a bony texture in which the seeds are seated. The present communication gives explorative present taxonomic information on the actual status of Stereospermum Cham., species in the world, India and along with the Maharashtra state. It also suggest the applied study for the clearing the actual status of this genus in India.

Keywords: - Stereospermum, Taxonomy, review, India.

OP-IV.04

ENDEMIC FLOWERING PLANTS OF NILGIRI BIOSPHERE RESERVE, INDIA: A REVIEW

¹Ravichandran V. and * ²C. Murugan

¹Botanical Survey of India, Southern Regional Centre, TNAU Campus, Coimbatore – 641003, Tamil Nadu ²Botanical Survey of India, Headquarters, CGO Complex, 3rd MSO Building, Salt Lake City, Kolkata–700064, West Bengal, Email: sivanthimurugan@rediffmail.com

The present study outlines the diversity of narrow endemic flowering plants of Nilgiri Biosphere Reserve (NBR), southern Western Ghats, Tamil Nadu. The analysis based on field explorations coupled with scrutiny of pertinent literature and consultation of specimens housed in Madras Hebarium revealed that the NBR harbours ca. 200 narrow endemic taxa, of which 70 species belonging to 41 genera in 21 families have been collected and mapped. Among the 21 families, the balsam family Balsaminaceae ranks first with 8 narrow endemic species, followed by Acanthaceae and Orchidaceae with 7 species each, Asteraceae, Rubiaceae and Melastomataceae with 5 species each, Annonaceae, Apocynaceae and Myrtaceae with 4 species each, Lamiaceae with 3 species subsequent to this the families Apiaceae, CelastraceaeandSymplocaceae are having 2 species, and remaining families, namely Asparagaceae, Berberidaceae, Ebenaceae, Gesneriaceae, Phyllanthaceae, Solanaceae, and Zingiberaceae are with one species each. All the collected narrow endemics from the NBR have been mapped by GIS and the threat status of every taxon has been assessed following IUCN Red List Categories and Criteria.

Keyword: Nigiri Biosphere, families, INCN Red list.

TRADITIONAL TO DIGITAL MORPHOMETRIC TOOL FOR SPECIES SEGREGATION: A CASE STUDY IN IPOMOEA FAMILY CONVOLVULACEAE

Oza Kavi K. * and Raole Vinay M.

Department of botany, Faculty of science, The Maharaja Sayajirao University of Baroda, Vadodara, Gujarat – 390 002, Email: kavioza3018@gmail.com

Leaves are one of the most significant organs of plants which are used for identification in nature due to their variability across different taxonomic groups. Traditional morphometrics has contributed greatly to reducing the problems of plant identification and morphology-based species delimitation. However, image analysis and digital morphometrics have made it easy to detect more characters to complement existing leaf data sets in recent years. The present study aims to investigate leaf shape variation between some species of the genus Ipomoea using geometric morphometric method (GMM). We have examined more than 1500 leaves from 30 species of Ipomoea using digital morphometric technique. We identified different shape variation due to the result of differing length to width ratio, shape, and size changes. The recorded variations were mainly due to changes in leaf blade ratio, size, and shape of the posterior lobes of leaves and anterior lobes for differentiation. Obtained results suggest that leaf blade ratio was highly correlated with first principal component (PC-1) of morphometric variation calculated using Elliptic Fourier Descriptors (EFDs). Subsequent PCs corresponded to complex shape variation which cannot be captured by traditional linear measurements. ANOVA showed a significant difference (p = 0.001159) among all species of the Ipomoea genus. Based on the results obtained, we can suggest that geometric morphometric of leaf shape is effective in interspecific discrimination within members of genus Ipomoea. Further morphometric studies of leaf shape involving a larger number of samples from varied habitats as well as especially in the study of intergeneric and inter specific variation are suggested.

Keywords: Ipomea species, Leaf GMM, variations, EFD

OP-IV.06

MEDICINAL PLANTS USED BY KOKNI TRIBAL OF NASIK, DHULE AND NANDURBAR DISTRICTS OF MAHARASHTRA

Kuvar Sachin D

Department of Botany, Siddharth College of Arts, Science & Commerce, Fort, Mumbai – 400001, Maharashtra, E-mail: coolsac.sachin@gmail.com

The Kokni tribe residing in Nasik, Dhule and Nandurbar districts of Maharashtra depends on plant wealth for their livelihood and medicine. The ethnobotanical study revealed that plants species belonging to different families were used to cure various ailments by the Kokni tribal community. The method of preparation of crude drugs and their application along with the scientific and local names of the plant used by the tribal is given in the present survey. Tribal system of medicine is an age old system like other traditional systems. It is transmitted through verbal means only. But about the origin of the large number of medicines, practically nothing is known. The glory of tribal medicine is that where modern medicine fails tribal medicine starts.

Keywords: Kokni tribes, Medicinal plants, Nandurbar districts.

PHYLOGENY AND MOLECULAR DATING OF INDIAN MUSACEAE

1*Rajeesh E. P. and 2 Sabu M.

Department of Botany, University of Calicut, Thenhipalam, Kerala- 673635
 Malabar Botanical Garden and Institute for Plant Sciences, Calicut, Kerala- 673014
 rajeeshepuoc@gmail.com

Musaceae is an ancient monophyletic family in the order Zingiberales, consists of 128 taxa, mainly distributed in tropical Asia from the eastern Himalayas to northern Australia and Africa. The genus Musa L. is the largest representative of the family along with Ensete Bruce ex Horan. and Musella (Franch.) C.Y. Wu ex H. W. Li. India represents two species of Ensete and 32 taxa of Musa with 65 % endemism (20 taxa). There is still some confusion about the actual identity of Indian Musaceae members and the marker based phylogenetic studies of Indian Musaceae has not been carried out till date. Based on these backgrounds, the present study focused on the (1). phylogenetics of Musaceae in India based on nuclear (ITS) and plastid (rps16, trnL-F) DNA sequences and (2). Molecular dating for the divergence time calculation. The results of this study helps to solve the identity of Musa spp.in Andaman and Nicobar Islands, complex problems in M. balbisiana and novelty of recently described taxa from India. The dating analysis shows the family originated during Cretaceous Palaeogene boundary, followed by Eocene-Oligocene diversification. Moreover, India is one of centers for origin of the genus Musa (particularly section Musa).

Keywords: Musa sp., Phylogeny, Molecular dating

OP-IV.08

INTEGRATIVE TAXONOMY, PHYLOGENY, AND BIOGEOGRAPHY OF GENUS POGOSTEMON IN INDIA

¹Toms Ashna and ²P. Sunojkumar

Dept. of Botany, University of Calicut, Calicut, ashnatoms2023@gmail.com, drsunoj@gmail.com

The genus Pogostemon Desf. (Lamiaceae) consists of around 85 species distributed primarily along South and Southeast Asia to China, with the highest species diversity and endemism in the Indian subcontinent. The members of the genus are sources of important volatile oil such as Patchouli. Pogostemon can be distinguished from other Lamiaceae members by the presence of exserted stamens bearing moniliform hairs. However, the genera comprise two morphologically distinct groups, one with moniliform hairs and the other without moniliform hairs on the stamens. The present study traces the evolutionary history of these staminal characters along with other morphological, micromorphological, palynological, and phytochemical data and evaluates the systematic significance of these data. The study also revisits the sectional treatments existing for the genus and outlines the most suitable sectional treatment by incorporating the integrated taxonomic data into the phylogenetic tree constructed using 4 chloroplast markers. The phylogenetic reconstruction is employed to trace the biogeographic origin of each major clade by ancestral area reconstruction and molecular dating techniques. The techniques employed include field exploration, light (stereo and compound) microscopy, SEM, DNA isolation, PCR, Sanger's sequencing, and bioinformatics techniques for principal component analysis, phylogenetic

reconstruction, character evolution, and biogeographic analysis (RaxML, MrBayes, BEAST, Phytools, BioGeoBEARS, etc.).

Keywords: Pogostemon, Morphology, Phylogeny, Diversity

OP-IV.09

PHYTOCHEMICAL SCREENING, PHYTO NANOFABRICATION AND ANTIBACTERIAL ACTIVITY EVALUATION OF POGOSTEMON QUADRIFOLIUS (ROXB. EX D.DON): A HIGHLY POTENT ETHNOMEDICINAL PLANT IN FAMILY LAMIACEAE

Aswathi Ganga* and P. Sunojkumar

Department of Botany, University of Calicut, Malappuram – 673 635, Kerala E-mail: aswathiganga96@gmail.com

Pogostemonquadrifolius (Roxb. ex D.Don), belonging to the family Lamiaceae is an aromatic shrub highly known for its various ethnomedicinal uses in different parts of the world. Plant specimens were collected from the premises of University of Calicut, Kerala, as part of the survey conducted to study the campus plants under family Lamiaceae. The habitat, species associated, geographical elevation and phenology of the plant were noted. Preliminary screening of phytochemical constituents of the leaf extract of P. quadrifoliusreveals the presence of several medicinally potent bioactive components. Recently, the scientific community has given a lot of attention to an eco-friendly strategy using these therapeutic herbs combined with contemporary technologies. In this present study, stable silver nanoparticles (AgNP) with diameter range 24–26 nm were biosynthesized from silver nitrate using aqueous leaf extract of P. quadrifolius. Green synthesized AgNP's were then characterized by UV-visible (UV-vis) spectroscopy, scanning electron microscopy (SEM), Fourier transform infrared spectroscopy (FTIR), and X-ray diffraction (XRD). Furthermore, these biosynthesized AgNP's were also evaluated to understand their antibacterial activity against certain bacterial strains.

Keywords: Pogostemon quadrifolius, antibacterial activity, phyto nanofabrication.

OP-IV.10

PHYTOCHEMICAL AND PHARMACOGNOSTIC STUDIES ON THE FRUITS OF TRAPA NATANS

18 Robin Elizabeth, Godara Pooja and Daniel Mammen

¹School of Science, Navrachana University, Vadodara, Gujarat ²Dr. Daniel's Laboratories, Manjalpur, Vadodara, Gujarat, Email- eliza 167@gmail.com

Trapa natans var bispinosa (Roxb.) Makino, often known as water chestnut, singhara nut is a floating aquatic plant belonging to Lythraceae. Trapa natans is important as a source of food and medicine. The fruit which contain a large white seed is edible and is used various food preparations. The detailed pharmacognostic and phytochemical study of Trapa was undertaken in which the pericarp and the seeds were subjected to study of their phytochemical and pharmacognostic characters. The pericarp and the seeds were found to contain pharmacologically active compounds such as flavonoids, phenolic acids, anthocyanins, tannins, quinones and mucilage. A large number of anatomical data which can serve as distinguished pharmacognostic markers are also identified.

Keywords: Trapa natans, phytochemistry, pharmacognosy, fruit, rind

ANTIOXIDANT, LC-MS ANALYSIS AND BIOACTIVITY EVALUATION OF SEED OF BAUHINIA TOMENTOSA

Jagtap Dipali N. and Jadhav Varsha D.

Department of Botany, Shivaji University, Kolhapur Email- dipalijagtapsuk@gmail.com and vdj botany@unishivaji.ac.in

Bauhinia tomentosa L. belongs to family Fabaceaeis a tall shrub with downy, zigzag branches. The seed is eaten in India as tonic and aphrodisiac. In the antioxidant analysis the free radical scavenging activity were done from immature and mature seeds extracts by using various solvents such as methanol, ethanol, aqueous and acetone. Mature seeds of B.variegata shows higher activities such as DPPH (72.92±0.32% EAA), FRAP (196.3±0.88 mg/100g EAA), Reducing power assay (72.92±0.32% EAA), FICA (68.60±0.09% EAA) while immature seed shows higher Total antioxidant activity (18.29±0.04 mg/100g EAA). In LCMS analysis total 152 bioactive compounds were obtained in mature seed of B. tomentosa. Different compounds shows biological activities such as Benzocaine (Antibacterial, Antifungal and Anticancer), Arborinine (Anticancer, Anti-malarial and Antiviral) and Sugiol (Anti-inflammatory, antitumor, antimicrobial and antioxidant. In Vitro Anti-inflammatory study carried out by Protein denaturation method. Ibuprofen at concentration 2 mg/mL was used as reference drug which shown the (49.0±0.001%) inhibition while methanolic mature seed extracts (29.41±0.09%). The HRBC (Human red blood cell) method at 1 mg/mL concentration (82.99±0.39%) inhibition percentage equivalent to Diclofenac sodium (90.47±0.39%) recorded. Since bioactive compounds that show pharmacological action have been discovered, these plants could be used in the pharmaceutical and medical industries to develop various sorts of medications. Keywords: Antioxidant, LCMS, Seed, Anti-inflammatory, Bioactivity.

OP-IV.12

ANTIOXIDANT ACTIVITY OF MITRAGYNA PARVIFOLIA (ROXB.) KORTH

Mepani Meha and Vaidya Meenakshi Sudhir

S.V.K. M'sMithibai College of Arts, Chauhan Institute of Science & Amrutben Jivanlal College of Commerce and Economics (Autonomous), Affiliated to University of Mumbai, Vile Parle - West Mumbai 400056, India, Email- mepanimeha@gmail.co, meenakshi.vaidya@mithibai.ac.in, minakshispy@gmail.com

Antioxidants play a crucial role in protecting living organisms against oxidative stress, a condition associated with various chronic diseases and aging. Extensive research has been conducted to identify and characterize natural compounds with potent antioxidant activity, aiming to harness their potential benefits for human health. *Mitragynaparvifolia* (Roxb.) Korth, a member of the Rubiaceae family, has gained considerable importance in the field of traditional medicine, particularly in the Ayurveda system. This research aims to investigate the plant extract for their total phenolic content (TPC) total flavonoid content (TFC), and antioxidant assays, including 2,2-diphenyl-1-picrylhydrazyl (DPPH) radical scavenging assay, ferric reducing antioxidant power (FRAP) assay, Nitric oxide free radical scavenging activity assay, Phosphomolybdate assay. The results obtained provide valuable insights into the potential of Mitragyna *parvifolia* and its potential applications in the development of natural antioxidants.

Keywords: Mitragyna parvifolia, Antioxidantactivity, DPPH, FRAP, Phosphomolybdate.

POUZOLZIA SANGUINEA VAR. NEPALENSIS: UNRAVELLING TAXONOMIC COMPLEXITY THROUGH RESURRECTION

¹Gupta Amit and ²Wagh Vijay V.

²Plant Diversity, Systematics and Herbarium Division, CSIR-National Botanical Research Institute, Lucknow - 226001, Uttar Pradesh, India
¹Academy of Scientific and Innovative Research (AcSIR), Ghaziabad - 201002, Uttar Pradesh, India.

Pouzolzia sanguinea is a distinct species within the tribe Boehmerieae, this species circumscribed with 4 varieties, two of them being reported from India. Pouzolzia sanguinea var. nepalensis has traditionally been considered a morphological variant of Pouzolziasanguinea var. sanguinea. However, a thorough examination of its morphological characteristics reveals distinct differences, indicating that it should be recognized as a separate variety. To reinstate the taxonomic status of Pouzolziasanguinea var. nepalensis, present study provides a comprehensive description of the variety, accompanied by illustrations and color photographs. Additionally, we present a taxonomic key to facilitate its identification and a detailed comparison with related taxa to emphasize its uniqueness.

Keywords: Pouzolzia sanguinea, variety, taxonomic key, lectotype.

OP-IV.14

BOTANICAL TREASURES OF CHAMBAL RAVINES: EXPLORING THE RICH DIVERSITY OF PLANTS

¹Lohit Tushar Anilrao and ²Wagh Vijay Vishnu

¹Plant Diversity, Systematics & Herbarium Division, CSIR-National Botanical Research Institute, Lucknow - 226001, Uttar Pradesh, India.

²Academy of Scientific and Innovative Research (AcSIR), Ghaziabad-201002, U.P, India. Email: tusharlohit2015@gmail.com

The Chambal Ravines of India stand as an intriguing landscape known for its distinctive geological features and ecological significance. This study aims to conduct a comprehensive assessment of the floristic diversity within the Chambal Ravines (Madhya Pradesh, Rajasthan and Uttar Pradesh). The research methodology involves systematic field surveys and collection of plant specimens across different habitats within the ravines. The study identified a rich and diverse flora encompassing a wide spectrum of plant species. A thorough taxonomic analysis carried out, resulted in the documentation of 350 taxa so far belonging to 226 genera and 72 families. The study revealed the presence of rare, endangered, and economically valuable plant species within the ravines, underscoring their ecological and conservation significance. In conclusion, this floristic diversity assessment provides a comprehensive understanding of the plant life within the Chambal Ravines of India. The findings contribute not only to botanical knowledge but also offer valuable insights for conservation initiatives aimed at safeguarding the ecological integrity and biodiversity of this distinct landscape.

Keywords: Angiospermic plants, Chambal river, conservation, flora

SURVEY OF MANGO-BASED INDUSTRIES OF THE SOUTH-GUJARAT

Das Divya and Albert Susy

Professor, Department of Botany, □aculty of Science, The Maharaja Sayajirao University of Baroda.

Mango holds a significant socio-economic value in India and its state of □ujarat.In the present study, the telephonic survey of mango-based industries has been conducted in South -ujarat region. Survey identified industries preferred mango varieties, fruit procurement locations and related waste management practices. Varieties of Kesar, Alphonso and Totapuri for ripe mangoes' products, while Rajapuri and Totapuri for raw mangoes' products were found as most preferred. Industries mostly use regionally grown mangoes for processing. The major produced waste of peel got used for fertilizer, biogas or cattle feed, while seed for making mukhwas and seedlings plantlets. This waste offers potential for commercial valorisation, waste reduction, sustainability, and economic benefits.

Keywords: Mango based-industries, South-□ujarat, waste-management.

PP-IV.01

DIVERSITY, DISTRIBUTION AND ENDEMISM OF THE GENUS POLYGALA L. (POLYGALACEAE) IN IDUKKI DISTRICT, KERALA, INDIA

Vishnu Mohan amd Santhosh Nampy

Department of Botany, University of Calicut, CALICUT

Polygala L. is the largest genus in the family Polygalaceae. Paiva (1□□8) recognized 725species worldwide. The genus is widely distributed throughout the world except in the Arctic, Antarctic, and New □ealand. Polygala is characterized by the presence of 8 (rarely 6) monadelphous stamens, two petaloid inner and three smaller outer sepals, and the dehiscent capsules containing two pubescent caruncular seeds. During documentation of angiosperm diversity of Idukki district, the largest floristically rich district of Kerala, we have reported ten species of Polygala. This includes one new species, P. idukkiana Vishnu □amp□ Nampy resembling *P. sibirica and *P. rosmarinifolia characterised by colour change flower before and after blooming. In this paper, the diversity, distribution, endemism and status assessment of the genus in Idukki district are discussed.

Keywords: Diversity, Endemism, status, Polygala.

CHEMICAL FINGERPRINTS OF THREE PIPER BETLE CULTIVARS: A COMPARATIVE HPTLC STUDY FOR MEDICINAL INSIGHTS

Farzan Afkham and Chachad Devangi Parag

Botany Department, Jai Hind College (Autonomous), 'A' Road, Churchgate, Mumbai – 400020

Piper betle Linn, belongs to family Piperaceae. The plant is native to South and Southeast Asia. The leaves have been used traditionally for its medicinal properties. There are many cultivars of these leaves in the market and they may vary in their chemical composition. Mainly the Eugenol content which is considered as the important active constituent medicinally for the present study, local varieties of Betel leaves were subjected to extraction and estimation of Eugenol using HPTLC. Eugenol quantification along with HPTLC verification can be utilized to compare the chemical profiles of these cultivars.

Keywords: Piperbetle, Eugenol content, HPTLC analysis

PP-IV.03

EXPLORING THE PHYTOCHEMICAL AND ANTI-OXIDANT POTENTIAL OF CASSIA FLOWERS

Manasawala Ruqayya and Chachad Devangi

Botany Department, Jai Hind College (Autonomous), 'A' Road, Churchgate, Mumbai – 400020

The genus Cassia belongs to the family Leguminosae, the third largest flowering family. Cassia has been used in many traditional practices for treatment of flatulence, skin diseases and as purgatives. Mostly the roots, stem and seed powders that have been proved to be rich in various phytochemicals. However not much is known about the phytochemical properties of Cassia flowers. Hence this research focused on exploring the phytochemical potential of Cassia flowers. Cassia species have been known to possess high phenolics and flavonoid content. The flavonoids reported show high antioxidant potential. This research aimed at estimating the total phenolic, total flavonoid and anti-oxidant activity of flowers of three common yellow Cassia sps viz., Cassia siamea, Cassia alata and Cassia fistula. Cassia siamea reported highest phenolic content and flavonoid content followed by Cassia alata and Cassia fistula. Consequently, highest anti-oxidant activity was reported from Cassia siamea followed by Cassia alata and Cassia fistula. This indicates a strong corelation between phenolic and flavonoid content with anti-oxidant potential.

Keywords: Cassia Flowers, Antioxidant activity, phytochemistry.

EXPLORING THE PHYSICOCHEMICAL EVALUATION AND FLUORESCENCE CHARACTERISTICS OF GARCINIA TALBOTI RAIZADA EX SANTAPAU

Shukla Priyanka and Vaidya Meenakshi Sudhir

S.V. K. M's Mithibai College of Arts, Chauhan Institute of Science & Amrutben Jivanlal College of Commerce and Economics (Autonomous) Affiliated to University of Mumbai, Vile Parle - West Mumbai 400056, India. shuklapriyanka2602@gmail.com; meenakshi.vaidya@mithibai.ac.in, minakshispv@gmail.com

The genus Garcinia belongs to the family Clusiaceae which has 400 species in the world, out of which 35 species are endemic to the India. Out of which 31 species are found in India and rest plants are used as garden plants. Herbal plants are used to cure various health issues from ancient times as they have less side effect. The demand for natural drug is high now days. Garcinia talboti Raizada ex Santapau is an economically important species and was used medicinally in ancient period. Standardization would be beneficial to know more about the plant content and so the present study is undertaken. The study investigates the physicochemical screening of the plant sample like phytochemical tests, extractive values, ash values, and fluorescence analysis under UV light short wavelength and long wavelength of various extracts of Garcinia talboti leaf has been studied.

Keywords: Garciniat alboti, Physicochemical analysis, Ash values, Extractive values, fluorescence analysis.

PP-IV.05

EVALUATION OF IN VITRO ANTI-INFLAMMATORY ACTIVITY OF KOPSIA FRUTICOSA (ROXB.) A.DC

Shinde Rajendra D. and Khan Saif Y.*

Department of Botany, St. Xavier's College, 5, Mahapalika Marg, Mumbai- 400001. Email-saif.khan@xaviers.edu

The study aims to explore the in vitro anti-inflammatory activity of plant parts of Kopsia fruticosa. Stem and leaf extracts were evaluated using protein denaturation, antiproteinase, and heat-induced haemolytic assays. Plant extracts exhibited good inhibitory activity in all assays. Ethanolic leaf extracts showed superior activity (71.0 \pm 1.45 %), and 40.00 \pm 1.95% in heat-induced haemolysis) compared to standard drug Diclofenac sodium. Overall, the study observed satisfactory anti-inflammatory potential. Further research is needed for in vivo validation and improved herbal drug formulations.

Keywords: Kopsia fructicosa, haemolytic assay, ethanolic extract, Anti inflammatory

BIOCHEMICAL STUDIES ON AZIMA TETRACANTHA LAM. OF RAICHUR FORT, KARNATAKA

Shrishail H. C.

Assistant Professor, Department of Applied Botany Kuvempu University, Shankarghatta-577451, India

Biochemical studies were under taken in Raichur fort on Azima tetracantha plant. This plant commonly grown on both wall and ground in Raichur fort. In this study our results show, high content of total chlorophylls, total carbohydrates, total proteins, total lipids were recorded in this plants grown on wall and ground. However, total proteins, total lipids, total carbohydrates, total alkaloids, total phenols and total flavonoids, total steroids is less in Azima tetracantha. Comparing to ground plant, wall plant have high metabolites because they grow under stress condition.

Keywords: Raichur Fort. Biochemical Estimation, Azimat etracantha, Metabolites.

PP-IV.07

PHYTOCHEMICAL PROFILING AND ANTIOXIDANT ACTIVITY OF CRATEVA RELIGIOSA G. FORST. BARK EXTRACT

Meenaloshini, P and T. Senthil Kumar

Department of Botany, Bharathidasan University, Tiruchirappalli-620 024, Tamil Nadu meenaloshini.p1998@gmail.com; senthilbdc@bdu.ac.in

Medicinal plants are used in traditional medicine due to their therapeutic properties. In the present study therapeutic agents present in the hydroalcoholic bark extract of Crateva religiosa was explored by phytochemical analysis and antioxidant activity. The phytochemical analysis possesses various phytoconstituents like alkaloids, flavonoids, phenol, terpenoid, reducing sugars, glycosides, saponins and steroids and their quantification shows the presence of total phenolic content (1 ± 0.07 mg GAE/g) and total flavonoid content (1.682 ± 0.01 mg CE/g) respectively. The antioxidant activity was determined using DPPH and ABTS assay, the plant extract showed prominent antioxidant activity in a dose-dependent manner. At the concentration of 500 µg /ml showed the maximum scavenging potential in both the assays. Moreover, the GC-MS analysis of C, religiosa revealed the presence of 35 phytoconstituents. Whereas, Cyclohexasiloxane, dodecamethyl-, Cycloheptasiloxane, tetradecamethyl- and Hexadecanoic acid, 2-hydroxyl-(hydroxymethyl) ethyl ester are the major phytoconstituents observed in the extract. All these outcomes of the present study denote the pharmacological importance of C. religiosa in human health care.

Keywords: Cratevareligiosa, hydroalcoholic extract, phytochemical, antioxidant and GC-MS analysis.

ETHNOBOTANICAL STUDY OF MEDICINAL PLANTS OF FATEHPUR BEER OF SIKAR DISTRICT OF RAJASTHAN

Singh Brijendra

Department of Botany, Govt. College, Fatehpur (Sikar) 332301

Fatehpur beer is characterized by a variety of cultures and diversity of medicinal plants. The objectives of this study was to assess the indigenous knowledge system for medicinal plants use and cultural practices associated with the healing process of these plants by traditional healers in Fatehpur beer area. An ethnobotanical survey was employed to collect information from tribal people, Ayurveda doctors, Ojhas, Bhopas, Bhagats, Priests, local people etc. during 2020-2022. Interviews, observations, field visits with informants to collect ethnobotanical data in the study area. The local and tribal people of the area use theses plant species in daily life for many purpose. During the survey, 115 ethnobotanical plant species belonging to 78 families were recorded from the study area.

Keywords: Ethnobotany, Tribal, healers, Fatehpur

PP-IV.09

WILD EDIBLE FRUITS USED BY TRIBAL INHABITANTS FROM KATEPURNA WILDLIFE SANCTUARY (MS) INDIA

Shirsat Rupali P.

Department of Botany, Shri Dr. R. G. Rathod Arts and Science College, Murtizapur,
District- Akola 444017, Maharashtra, India
Email: rupalikoche1985@gmail.com

Wild edible plants (WEPs) especially those bearing edible fruits are a rich source of nutrition for the aboriginal tribal and local communities inhabiting the forest catchment area since ancient times. Wild fruits are refreshing, delicious, and cheap supplements of vitamins, minerals, and proteins for the users. However, the current scenario indicates that their use and knowledge are declining day by day. In the present study, we reported wild edible fruits belonging to 26 angiosperm plants from 23 genera and 23 families from the protected area of Katepurna wildlife sanctuary (MS) India. The identified wild edible fruit plants, were 69% trees, 23% shrubs and 8% climbers. Most of the fruits were eaten raw, some cooked and few were used to make pickles or chutney. Further, it was noted that most of these fruits were used by the tribals of this area for their ethnomedicinal

Potential. This knowledge about the duel application of wild edible fruits should be preserved and utilized for the benefit of human society.

Keywords: Wild edible plants, Ethnomedicine, Katepurna wildlife sanctuary, Tribal communities.

SEED GERMINATION IN TELOSMA PALLIDA (ROXB.) CRAIB (APOCYNACEAE): A THREATENED WILD VEGETABLE

¹Patil Janhavi B. and ²Satpute Sanjay V.

Department of Botany, Vidya Bharati Mahavidyalaya, Amravati, MS.
 Department of Botany, Mahatma Fule Mahavidyalaya, Warud, Dist. Amravati, MS.

The medicinal plants and wild vegetables represent an integral part of the natural biodiversity. *Telosma pallida* (Roxb.) Craib (Apocynaceae) is a highly valued wild vegetable. Locally, it is known by the name 'Jivati'. Flowers and tender leaves are used as vegetables. During the rainy season, this plant provides a good source of income to the poor village people. However, due to overexploitation, loss of wild habitats, eradication of green natural fences along cultivated lands, and open grazing by domestic animals, the 'Jivati' population is declining every year. Studies on seed germination and seedling production are crucial for its cultivation and conservation. Therefore, attempts have been made to study the percent seed germination, seedlings height, root-shoot ratio, and seedlings survival.

Keywords: Telosma pallida, Apocynaceae, Seed germination.

PP-IV.11

ETHNOBOTANICAL SURVEY OF SELECTED INVASIVE PLANT SPECIES FOUND IN WADODA FOREST RANGE, MUKTAINAGAR, MAHARASHTRA STATE, INDIA

¹Patil Geeta P. and ² Patil Vidya A.

 Department of Botany, Arts, Commerce and Science College, Bodwad
 Department of Botany, BhusawalArts, Science and P O Nahata Commerce College, Bhusawal.

An alien or non-indigenous species become invasive after being introduced in new ecosystem. They possess a strong adaptability in new area over a native species. It destroys the existing ecosystem and reduces Biodiversity by preventing native species from obtaining food and living space. Despite the negative impact on the ecosystem, some Invasive Alien species are used to control various kinds of diseases including cuts, wounds, itching, headache, diabetes etc. The present study reveals that there are 27 invasive plant species belonging to 17 families used by the local people to cure health problems. The traditional uses of these plants are enlisted in this study.

Keywords: Invasive, alien, traditional, ecosystem, native, non-indigenous.

DOCUMENTATION OF WILD PLANT POLLINATOR DIVERSITY FROM WARUD TAHSIL OF AMRAVATI DISTRICT

¹Sarode Akhilesh M., ²SatputeSanjay V. and ³Tidke Jaykiran A.

¹ Research Student, PGTD of Botany, Sant Gadge Baba Amravati University, Amravati. Email ID: akhileshmsarode@gmail.com

² Professor and Head, Department of Botany, Mahatma Fule Mahavidyalaya, Warud, Dist. Amravati. Email ID: satpute20@gmail.com

³ Ex- Professor and Head, PGTD of Botany, Sant Gadge Baba Amravati University, Amravati.

Pollinators are important from agricultural and ecological point of view. They provide ecosystem services and also help to increase yield of plants all over the world. They not only enhance the pollination in plants but also facilitate reproduction, productivity and diversification of plants. Production of crop plants is dependent on pollination by insects. Warud tahsil is known for orange production. 95% fruit setting is possible after pollination of Citrus flowers with honeybees. However increased use of insecticides, growth promoting foliar sprays and herbicides resulted into decrease in pollinator diversity and density. Therefore, documentation of wild plant pollinators has been undertaken to create awareness amongst the common people.

Keywords: Documentation, Pollinator Diversity, Warud, Amravati.

PP-IV.13

PRELIMINARY PHYTOCHEMISTRY, BIOLOGICAL ACTIVITIES OF METHANOLIC EXTRACTS OF RUNGIA REPENS FROM AKOLA DISTRICT, MAHARASHTRA

Sirsat Ashwini and Kokate Pratiksha

Department of Botany, Shri Shivaji College of Arts, Commerce, and Science, Akola (MS) India

Email: itsme.ashu9489@gmail.com

Rungia repens is a common Acantheceae member growing mostly in agricultural wastelands. This plant is noted to have febrifuge, antitussive, and vermifuge properties. The qualitative phytochemical study of the leaves and stem of R. repens showed that the plant is rich in phytochemical composition. The chemical analysis showed the presence of alkaloids, phenolics, cardiac glycosides, and steroids in the methanolic extract of this plant. The DPPH and FRAP assay showed that the plant parts have significant antioxidant potential. The disc diffusion of the methanolic extract of this plant reveals its antimicrobial activity. Thus, it is stated that the plant has significant antioxidant and antimicrobial potential.

Keywords: Rungia repens, Qualitative, Phytochemicals, Antioxidant, DPPH, FRAP

ETHNOPHYTOETYMOLOGY OF SOME TAXA IN MAHARASHTRA

1 Patil A. M., Patil C. R and Patil D. A.

Department of Botany, Rani Laxmibai Mahavidyalaya, Parola- 425111. Dist. Jalgaon (M.S.). India patilajay231@gmail.com, Mob. 9423902890, crpatil115@gmail.com,, Mob. 9421514495

²Post-Graduate Department of Botany, S.S.V.P. S's L.K.Dr.P. R. Ghogrey Scienc College, Dhule-424005 (M.S.) India. E-mail: dapatil 10aug@yahoo.com, Mob. 94048 13010

Plants are a gift for humans from nature and a major source of sustenance. Nay, mankind is a guest in the plant-world. He discriminates all objects whether living on non-living. The present authors analysed etymologically vernacular plant names in Maharashtra, a Marathi speaking state. As many as 28 species pertaining to 28 genera and 24 angiosperm families. They divulged total 16 bases of coining vernacular plant names. Abstract as well as concrete relationships of man with the plants are revealed. The authors thus seek attention of plant learners and lovers to tap down knowledge, experiences and wisdom interwoven with traditional vernacular plant names for welfare of mankind.

Keywords: Vernacular Plant Names, Ethnophytoetymology, Maharashtra.

PP-IV.15

DIVERSITY AND SYSTEMATICS OF INULEAE CASS. (ASTERACEAE) IN SOUTH GUJARAT

Sharma Jaydeep J. * and Nagar Padamnabhi S.

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

South Gujarat constituting of 5 districts (Surat, Tapi, Navsari, Dangs and Valsad) were surveyed for understanding the diversity and systematics of Inuleae tribe. The tribe is represented by 8 generas and 17 species, wherein there are eight species in *Blumea*, two each in *Pluchea* and *Pentanema* and one each in *Caesulia, Laggera, Pseudoconyza, Pullicaria* and *Sphaeranthus*. An identification key was prepared for these species based on detailed morphological characters. Critical analysis revealed that *Blumea malcolmii* has been misinterpreted as *Blumea lacera* over the period of time where as *Blumea sinuata*, *Pseudoconyza viscosa, Pluchea tomentosa* and *Plucheaw allichiana* are new records to the flora of south Gujarat.

Keywords: Inulea, Diversity, Gujarat, Morphology

NANOENCAPSULATED CYMBOPOGON NARDUS ESSENTIAL OIL AS POTENTIAL ANTIFUNGAL AND AFLATOXIN B1 SUPPRESSOR IN STORED SYZYGIUM CUMINI SEEDS

Dwivedy Abhishek Kumar *

Department of Botany, Institute of Science, Banaras Hindu University, Varanasi-221005, India, Email: abhishekdwivedy1987@gmail.com

The study aimed to synthesize Cymbopogon nardus (L.) Rendle leaf essential oil (CNEO) loaded chitosan nanoemulsion (Ne-CNEO) and its practical application for protection of Syzygium cumini seeds against storage fungi & aflatoxin B1. Ne-CNEO exhibited enhanced in vitro antifungal, antiaflatoxigenic (0.16 µL/mL), and antioxidant activity over CNEO. The antifungal and antiaflatoxigenic mechanism of action of Ne-CNEO was associated with increased leakage of cellular contents, ergosterol inhibition, and impairment in methylglyoxal biosynthesis. In situ, studies showed significant protection of S. cumini seeds against fungal inhabitation, & AFB1 production. The acute oral toxicity assay of Ne-CNEO showed its non-mammalian toxicity.

Keywords: essential oils, nanoencapsulation, antifungal, antiaflatoxigenic, preservative, mode of action

PP-IV.17

WILD PLANTS USED BY KOKNI TRIBAL OF NASIK, DHULE AND NANDURBAR DISTRICTS AS VEGETABLE FROM MAHARASHTRA

Kuvar Sachin D.

Department of Botany, Siddharth College of Arts, Science & Commerce, Fort, Mumbai – 400001, Maharashtra E-mail- coolsac.sachin@gmail.com

The survival of tribal people who live in forested environments depends heavily on wild food plants. The goal of the study was to compile information on the edible wild plants used by the Kokni tribe in Maharashtra's Nasik, Dhule and Nandurbar district. Largely the tribals depend on the preparations made from wild plants. The Kokni tribe's economically poorer division. The tubers, leaves, flowers, fruits, seeds, and grains of the wild plants were all devoured by the tribe. Wild plants used as food were identified as 67 plant species, 59 genera, and 41 families in total. Additional information was provided about the plant species, families, local names, plant parts used, and methods of application.

Keywords: Kokni Tribes, Nandurbar, Wild vegetables

THE ARRANGEMENT OF THE STAMENS: AN IDENTIFYING KEY FOR SOME SPECIES OF OXALIS

Pathak Sumit Kumar

Yogoda Satsanga Mahavidyalaya, Ranchi.

Oxalis is a large genus of flowering plants in the wood-sorrel family. There are four different species of Oxalis namely Oxalis corniculata, Oxalis latifolia, Oxalis debilis and Oxalis triangularis were growing in Jharkhand. Among the 4 species of genus Oxalis, the species Oxalis corniculata spread by seed dispersion whereas other three species reproduce by bulbils. Oxalis corniculata is widely spread than three species. Oxalis latifolia and Oxalis debilis are agricultural weeds whereas, Oxalis triangularis is an ornamental herb. The arrangements of stamens are unique in these species of Oxalis. This can be the identifying key to identify all the said four species. The position of androecium and gynoecium were different in all the four species of Oxalis. The stamens were present in two separate bundles (5+5) whereas 5 carpels in each flower in all the four species of Oxalis. The stamens remain present in two separate bundles in Oxalis corniculata one bundle remains parallel to the carpel while another remains in the top. The striking variation between the stamens and carpels can be seen. The two separate bundles of stamens remains above the bundles of carpel, the first bundles of stamen remains just above the carpel while the another bundles remains in the top. In Oxalis debilis interestingly the two separate bundles remains below the carpel. It can be said that the carpel remains in between the two separate bundles of stamens. In Oxalis triangularis both the bundles of stamens remains below the carpel, the carpel remains in the top.

Keywords: Oxalis, stamens, Carpel, identification key.

PP-IV.19

MEDICOLORE OF HERBAL VENDORS IN NORTH MAHARASHTRA IN THE PERSPECTIVE OF CONTACT (TOUCH) THERAPY

¹Ahirrao Y. A., ²Patil M. V. and ^{2*} Patil D. A.

¹S.S.V.P. Sanstha's Arts, Commerce and Science College, Shindkheda, District Dhule, M.S. (India), Email: ¹yaabotany@gmail.com
²Post-Graduate Department of Botany, S.S.V.P.Sanstha's ,L.K.Dr.P.R. Ghogrey Science College, Dhule-424005, M.S. (India), Email: ²mvp16may@gmail.com, dapatil 10aug@yahoo.com

The present authors tapped down medicolore of herbal vendors in North Maharashtra region. The vendors were interviewed on various public places and in indifferent periods. The data regarding their name of plant or plant part, disease treated, period of treatment, etc. were enquired during field studies. Botanical determination was carried out using various floras. As many as 12 species pertaining to 11 genera and 11 families have been documented as employed for contact therapy Scientific validation of these use-reports are obviously needed for the welfare of mankind.

Keywords: Contact Therapy, Ethnomedicine, North Maharashtra.

A FOSSIL CYPSELA FRUIT FROM INTERTRAPPEAN BEDS OF MOHGAONKALAN, M.P., INDIA

¹Pundkar S. V., ²Kokate P. S., and ³Thorat K. M.

¹Department of Botany, Shri Shivaji Science College, Amravati (MS) India.
²Department of Botany, Shri Shivaji college of Arts, Com & Science, Akola (MS) India.
³Dr. Manorama and Prof. Haribhau S. Pundkar College ACS College, Balapur (MS) India.
Email - swatipundkar54@gmail.com

The fossil chert were collected from Mohgaonkalan, District Chhindwara, M.P. India, a well-known rich fossiliferous locality of Deccan Intertrappean beds for all major groups. Fruit is dicotyledonous, oblong, ovoid, single seeded, indehiscent cypsela like. Pericarp dry differentiated into outer thick epicarp, middle compact mesocarp and inner thin endocarp. Pericarp separated from seed coat, seed coat differentiation not seen. Endosperm and embryo is well developed, embryo straight. Stalk of the fruit not seen. Asteraceae is characteristics of cypsela fruit. It is with attached pappus. The present specimen reveals the characters except presence of pappus at matured stage. The fruit is compared with the living and reported fossils but most of the characters, except few are closely related to family Asteraceae. Hence, the fossil fruit described placed under the family Asteraceae. The new generic name is Asterocarpon deccanii. The generic name is after the family Asteraceae and specific name is after Deccan Trap.

Keywords: Fossil, Dicotyledon, Fruit, Deccan Intertrappean beds.

PP-IV.21

ETHNO MEDICINAL USES OF GUM YIELDING PLANTS OF RANCHI DISTRICT, JHARKHAND, INDIA

1 Gupta Dara Singh and 2Gupta Manjula

Assistant Professor, University Deptt. of Botany, Kolhan University, Chaibasa, Jharkhand Email - darasgupta.jcc@gmail.com

²Research Scholar, University Deptt. of Botany, Kolhan University, Chaibasa, Jharkhand

Gum yielding plants are very important for us, because they yield gums which are essential components of our body. Many metabolic activities are maintained with the help of Gum. The present research work deals with the gum yielding trees of Ranchi District and their ethnomedinal uses. Gum is a most common non-timber forest product of the district areas. The gum is odourless, water soluble, non-starch polysaccharides obtained from the sap of the plant. It is adhesive substances generally obtained as exudate or damage the bark of trees. Plant gum is also an imoratnt constituent of many dishes and Ayurvedic medicines. Most of them are usages as meidicines for the treatment of different diseases at the research areas, so considerable account of gum yielding plants of the area are discussed in this communication.

Keyword: Gum yielding plants, metabolic activities, Adhesive, Ayurvedic medicines, treatment

NATURAL POLYPHENOLS: AN OVERVIEW ON ANTIOXIDANT POTENTIAL AND BIOACTIVE COMPOUNDS

^{1*}Ranjan Navi, ²Vidyarthi S. K. and ³Manorma Kumari
 ¹ Department of Botany, M. V. College, Buxar-802101, India
 ² Department of Botany, Dr. LKVD College, Samastipur-848122, India
 ³ Department of Botany, A. N. College, Patna-800013, India

Polyphenols, as important constituents of the human diet and potent in vitro free radical scavengers, have been extensively studied for their beneficial effects on cardiometabolic health. The bioavailability and bio-accessibility of polyphenols are of the highest importance to secure their impact on human and food health. However, it has been demonstrated that the *in vivo* antioxidant activity of polyphenols is distinct from their *in vitro* free radical-scavenging capacity. Indeed, bioavailability of nutritional polyphenols is low and conditioned by complex mechanisms of absorption, distribution, metabolism and excretion. Nowadays, it is commonly accepted that the cellular antioxidant activity of polyphenols is mainly carried out via modification of transcription of genes involved in antioxidant defence.

Keywords: Polyphenols, Antioxidants, Flavonoids, Free Radical.

PP-IV.23

CHARACTERIZATION OF BIOACTIVE COMPOUNDS ON ALLIUM SATIVUM L

1*Vidyarthi Sanjeev Kumar and 2Ranjan Navi

¹Department of Botany, Dr. LKVD College, Samastipur-848122, India. ²Department of Botany, M. V. College, Buxar-802101, India.

Allium sativum L. (Garlic) is one of the greatest gifts of natural medicine and the oldest medicinal herb that is cultivated all over the world. It is a widely used spice plant with well-known medicinal properties. Allium sativum L contains diverse bioactive compounds, such as Allicin, Alliin, Diallyl sulfide, Diallyl disulfide, Diallyl trisulfide, Ajoene, and Sallyl-cysteine. The present studies have shown that Allium sativum L. and its bioactive exhibit antioxidant, anti-inflammatory, antibacterial, constituents immunomodulatory, cardiovascular protective, anticancer, hepatoprotective, digestive system protective, anti-diabetic, anti-obesity, neuroprotective, and renal protective properties. Allium sativum L. contains 17 amino acids, which include Lysine, Histidine, Arginine, Threonine, Aspartic acid, Glutamine, Proline, Serine, Glycine, Alanine, Cysteine, Valine, Methionine, Isoleucine, Leucine, Tryptophan, and Phenylalanine. A very effective component of Allium sativum L. is Polysaccharides, which are becoming more and more attractive due to their various pharmacological effects. Although there are many chemical and biological studies of garlic and its characteristic organosulfur compounds, there has been little research on the metabolites in humans after garlic consumption.

Keywords: Allium sativum L., Phytochemicals, Antibacterial, Antifungal

STUDIES ON THE WILD EDIBLES RESOURCES IN A JAUNPUR RANGE, TEHRI, GARHWAL, UTTARAKHAND

Pandey Manisha and Sharma Sachin

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 present study was aimed to document the wild edible plants with their total importance value in Jaunpur Range Tehri Garhwal Uttarakhand. A total of 70 plant species belonging to 60 genera and 38 families are recorded. Ethnobotanical classification showed that a major proportion of species are being used for edible (52%) followed by medicinal purposes (29.5%) uses as fodder (7.5%), fuel wood (7.5%), timber (1.5%), and other use (1.5%). The highest TIV was recorded (31%) for trees followed by shrubs (24%), herbs (24%) and climbers (24%), Grasses (29%), Fern (29%).

Keywords: Ethnobotanical, Garhwal Himalayan, TIV value, Wild edible,

PP-IV.25

MORPHOTAXONOMIC DIVERSITY AND AFFINITY OF A FEW MEMBERS OF THE TRIBE HELIANTHEAE (ASTERACEAE)

Kathalkar Mayuri and Wath Manjusha

Angiosperm Taxonomy Laboratory, Department of Botany, Government Vidarbha Institute of Science and Humanities, (Autonomous), Amravati (MS), India-444604, Email- kathalkarmayuri007@gmail.com

The morphological traits play an indispensable part in the establishment of the relationships within species. The aim of the present study is to formulize the phenetic relationship of members of family Asteraceae on the basis of morphotaxonomic characters. Ten members belonging to the tribe Heliantheae have been studied morphologically. Special emphasis has been given tothe capitulum, involucral bracts, ray floret and disc floret, pappus, reproductive parts and achene; architectural features of achene like shape, colour, size surface ornamentation, presence and features of stylopodium and carpopodium also taken into consideration. The work also highlights the binary matrix to find the taxonomic affinityanalysis with the help of PAST software. Dendrogram analysis confirmed two clusters; the first cluster consist of Ecliptaprostrata (L.), Wedeliatrilobata (L.) Hitche, Bidens biternata (Lour.) Merr. And Sherff., Tridax procumbens L., Spilanthuspaniculata Wall.ex.DC. and Lagasca mollisCav., while the second cluster L., Galinsoga included Sieges beckiaorientalisL.Blainvilleaacmella Cav.andXanthiumstrumarium L. Based on this, it can be concluded that the morphological characters that influence the clustering of ten species of tribe Heliantheae of the family Asteraceae with noteworthy emphasize on floral characters.

Keywords: Asteraceae, Affinity, Morphotaxonomic, Tribe Heliantheae.

PHYTOCHEMICAL ANALYSIS OF MEDICINAL PLANTS OCCURRING IN LOCAL AREA OF MAREGAON TAHSIL, DIST. YAVATMAL MAHARASHTRA

Matte R. S.

Department of Botany, Lokmamanya Tilak Mahavidyalaya, Wani

Medicinal plants have bioactive compounds which are used for curing various human diseases and also play an important role in healing. The present study involves ten different medicinal plants Derodendron Infortunatu, Urginea indica, Soyamida febrifuga, Tinospra cordifolia, Andrographis paniculata, Benica hispida, Mucuna pruriens, Cissus quadrangularis, Combratumo valifolium, and Butea monosperma. Locally available in Maregaon tehsil region of Maharashtra. The main objective of the research work was to check the presence or absence of the phytochemical constituents in all the selected medicinal plants. The results of the phytochemical analysis of these medicinal plants showed that terpenoids, phlobatannins, reducing sugar, flavonoids and alkaloids were found to be present in the aforementioned medicinal plants.

Keywords: Medicinal plants, Phytochemicals, Maregaon

PP-IV.27

REDISCOVERY OF ARGYREIA ARAKUENSIS AND A. SRINIVASANII (CONVOLVULACEAE) FROM EASTERN GHATS, INDIA

Lawand Pramod R. and 2*Shimpale Vinod B.

Department of Botany, Y. C. Institute of Science, Satara, Maharashtra – 415 004, India Department of Botany, The New College, Kolhapur, Maharashtra – 416012, India E-mail: vshimpale@gmail.com; Presenting author

Genus Argyreia Lour, is endemic to Asia, with all of species distributed in the Indian Subcontinent, Southeast Asia and China. The genus Argyreia comprises 135 species in whole of its distribution range while India comprises 40 species. The complexity within genus was due to choosing shaky species identification characters. It should be noted here that genus stands firm on its characters of taxonomic value as leaf shape and indumentum on it, number of secondary veins, inflorescence architecture, bracts size, shape and indumentum, sepal apices and size, fruit color and nature etc. During this study, in 2018 authors came across some interesting specimens of two species of Argyreia. The literature shows, primarily identified as Argyreiaarakuensis and Argyreia srinivasanii and both the species were confirmed from type specimen and protologue studies. Argyreia arakuensis represent recollection after more than 56 years of its type collections. A. srinivasanii is recollected after its type collection and its extended distribution is reported from three states viz. Chhattisgarh, Odisha and Telangana other than its type locality i.e., Sileru, Andhra Pradesh. According to Wood et al., (2022) both these species are doubtful and need to studied carefully. In conclusion, both species shows stable taxonomic characters and should be treated as distinct species. Taxonomic characters for species identification, photoplates and field notes are presented in the present communication.

Keywords: Argyreia arakuensis, Argyreia srinivasanii, Type, Eastern Ghats, Rediscovery.

COMPARATIVE STUDIES ON CLASSICAL AND MOLECULAR TAXONOMY OF CASSIA FISTULA L., BUTEA MONOSPERMA (LAM.) TAUB AND DALBERGIA SISSOO ROXB. OF FAMILY FABACEAE LINDL

¹Hansdah Jessica Rene and ²Srivastava Ajay Kumar

¹Research Scholar, Dept. of Botany, Ranchi University; ²Head, Dept. of Botany, St. Xavier's College Ranchi

Plant taxonomy is based upon identification, classification and nomenclature of plants. There are various methods to achieve these three basic goals of plant taxonomy, molecular taxonomy being one of the most accurate ways. Plants show various specific morphological salient features which helps us classify them without undergoing molecular studies. The research intends to through light on the comparations in traditional classical taxonomy and the modern molecular taxonomy, putting light on the accuracy and limitations of both the branches of taxonomy.

Keywords: Classical taxonomy, Molecular taxonomy, Cassia fistula L., Butea monosperma (Lam.) Taub, Dalbergia sissoo Roxb., Fabaceae Lindl

PP-IV.29

EVALUATION OF TOTAL PROTEIN, NITROGEN CONTENT, AND AMINO ACIDS, IN *BRASSICA OLERACEA* VAR. BOTRYTIS LEAVES- A POTENTIAL SOURCE OF PROTEIN SUPPLEMENT

Sawant Neha and Vaidya Meenakshi Sudhir

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

> Email- nehasawant97@gmail.com, meenakshi.vaidya@mithibai.ac.in, minakshispv@gmail.com

This study presents a comparative analysis of total protein content in *Brassica oleracea* var. botrytis leaves (cauliflower), employing Lowry's and Biuret methods. Additionally, Kjeldahl's method was used to calculate the amount of nitrogen and amino acids calculated using the ninhydrin method. The findings revealed significant variations in total protein levels between the two methods. Moreover, the estimation of amino acids and nitrogen content provided valuable insights into the nutritional composition of cauliflower leaves. This research contributes to our understanding of the plant's potential as a sustainable protein source and highlights the significance of precise analytical techniques in botanical studies.

Keywords: Brassica oleracea var. botrytis, Total protein, Amino acids, Nitrogen Content

PHARMACOGNOSTICAL AND PHYTOCHEMICAL ANALYSIS ON LEAVES OF NOTHOPEGIA CASTANAEFOLIA (ROTH.) DING HOU

Chandanshive Yugandhara S. and Jadhav Varsha D.

Department of Botany, Shivaji University, Kolhapur E-mail id- yugandharabotany@gmail.com and vdj_botany@unishivaji.ac.in

The plant species Nothopegia castanaefolia belongs to family Anacardiaceae is a endemic tree present in border between Maharashtra and Karnataka state. Also known as "Amberi". The tree is upto 7-8 cm in height and its leaves are green, petiolate, oblong, unicostate reticulate venation. Leaves of this plant used by local communities in traditional food or in folk medicine. Leaf latex used against muscle pains especially in rheumatism. The collected plant material was air dried and prepare the fine powder for further analysis. In powder behavior study reveals that presence of Alkaloid, Saponin, Tannin and Xanthoprotein. Preliminary phytochemical analysis was gives idea about qualitative analysis of the compounds. Phytochemical analysis of leaves was carried out by using different solvents like Chloroform, Acetone, Aqueous, Petroleum ether and Methanol. Highest to lowest suitable solvents like Acetone, Chloroform, Methanol, Aqueous and Petroleum ether. The study revealed presence of Alkaloid, Tannin, Saponin, Flavonoid, Phenol, Protein, Carbohydrate, Glycoside, Steroids, Starch, Anthraquinones, Coumarins and Fixed oil. Among the studied phytochemicals alkaloid, tannin and saponin shows presence in all solvent systems. The anatomical study of plant was used for proper identification of plant. This investigation is helpful to assess bioactivity of plant and

Keywords: Nothopegia castanaefolia, Powder behavior, Fluorescence analysis, Leaves, Phytochemicals

PP-IV.31

ANTIOXIDANT SCREENING OF WILD EDIBLE PLANT IPOMOEA AQUATICA

Jawale R. D. and Wath M. R.

Govt. Vidarbha Institute of Sciences and Humanities, Amravati- 444604

In this study investigation of qualitative, quantitative characters and Antioxidant activity of wild edible plant species was undertaken. Analysis of qualitative character was performed for edible parts of the wild edible species *Chenopodium album*. The plant was collected from the area in Amravati district and edible part analysed for dry matter, the qualitative and quantitative nutritional and nutraceutical were performed as well as antioxidant activity performed by DPPH method. The percentage of free radical inhibition was 54.40% at 50µg/ml concentration of sample. The purpose of present study is to explore and provide information about nutritional content in selected wild edible plants.

Keywords: wild edible plants, nutritional content, Ipomea aquatic.

TAXONOMIC STUDIES ON THE GERANIUM SUBG. ROBERTIUMIN INDIA

¹Imtiyaz Ahmad Hurrah and ²Wagh Vijay V.

²Plant Diversity, Systematics and Herbarium Division, CSIR-National Botanical Research Institute, Lucknow - 226001, Uttar Pradesh, India
¹Academy of Scientific and Innovative Research (AcSIR), Ghaziabad - 201002, Uttar Pradesh, India, Email: saithimtivaz18@gmail.com

Geranium L. (Geraniaceae) is a diverse genus with approximately 325 species found across the globe, excluding lowland tropical areas and polar regions. Its subgeneric classification is based on the unique ballistic seed dispersal mechanism and includes subg. Geranium, subg. Robertium (Picard) Rouy, and subg. Erodiodea (Picard) Yeo. Among these, subg. Robertium stands out as the second largest group in terms of species number, but is morphologically most diverse, primarily distributed in Macaronesia, the Mediterranean Basin, and the Himalayas. This study focuses on exploring the taxonomic diversity and distribution of subg. Robertium in India using extensive literature review, field surveys, and herbarium consultations. The research reveals the presence of 10 taxa belonging to 6 sections, each exhibiting distinct morphological characteristics. These characteristics include palmately divided leaves and fronds on the apex of the mericarp, umbelled inflorescence, acute apex of mericarps, lucid leaves and carinate sepals, cleistogamous flowers with a purple petal base, presence of staminodes, inoperative fruit dispersal, and various sculpturing patterns on the mericarp surface, which differentiate the subgroups. The taxa within subg. Robertium display varying distribution ranges viz.G. ocellatum Cambess, is widely distributed across the Himalayas and other hilly regions of peninsular India, whereas others like G. mascatense Boiss, are restricted to dry tropical hills of the Western Ghats, and G. polyanthesEdgew. & Hook. f. is found in the central and eastern Himalayas, Additionally, G. pusillum L, is confined to the western Himalayas. During the course of this study, two new taxa have been discovered in Himachal Pradesh and Uttarakhand. The present study intends to provide a morphotaxonomic revision of subg. Robertium, including identification keys, distribution patterns, and phenology. Keywords: Geranium, carpel projection, Himalayas.

PP-IV.33

TAXONOMIC DELINEATION OF INDIAN GERANIUM SPECIES THROUGH MICRO-MORPHOLOGICAL ANALYSIS

1.2Shukla Aparna R., 2Sahu Nayanand and 1Wagh Vijay V.

Plant Diversity, Systematics and Herbarium Division, CSIR –National Botanical Research Inst., Lucknow, Uttar Pradesh, India.

²Indira Gandhi National Tribal University Amarakantak Madhya Pradesh India. Email - aparnashukla602@gmail.com

The genus Geranium is widely distributed across almost every continent and various ecosystem, with the exception of polar regions, arid deserts, and low-altitude tropical areas. In India, it is primarily found in the Indian Himalayan region. Taxonomically, the genus Geranium is highly complex, making it challenging to distinguish species, especially within the Pratense group complex, solely based on morphological characteristics. In this research, we focused on studying five Geranium species: Geranium clarkei, G.

himalayanse, G. pratense, G. dachigamansis, and G. jainii. For micromorphological analysis, we examined the seed, mericarp, and pollen of these species. The seeds displayed variations in shape, ranging from oblong, elliptical-ovate, rounded-ovate to ovoid, while the mericarp exhibited diverse surface patterns, including reticulate, pusticulate, and polygonal ornamentations. Pollen analysis revealed predominant characteristics such as large size, spheroidal shape, tricolporate, radially symmetrical, and reticulate-clavate patterns. Our findings indicate that micromorphological studies of seeds, mericarps, and pollen can serve as valuable tools in resolving taxonomic complexities within the genus Geranium, particularly when identifying and classifying new taxa in this diverse group.

Keywords: Geranium, Geraniaceae, micromorphology, seed, mericarp.

PP-IV.34

POLLEN MORPHODIVERSITY IN SOME GENERA OF FAMILY CONVOLVULACEAE

¹Rajurkar A.V. and ²Tidke J. A.

Department of Botany, Lokmanya Tilak Mahavidyalaya, Wani Laboratory of Reproductive Biology of Angiosperms, Department of Botany, SantGadge Baba Amravati University, Amravati 444602 (M.S.) India rajpollen@gmail.com, jaikirantidke@rediffmail.com

Pollen morphology of Eight genera of Convolvulaceae viz., Argyreia nervosa, Ipomoea fistulosa, Ipomoea hederifolia, Ipomoea palmata, Ipomoea quamoclit, Ipomoea triloba, Jacquemontia violacea, Merremia dissecta from Sant Gadge Baba Amravati University Campus have been examined by Light and Scanning Electron Microscope (SEM). Pollen grains are usually pantoporate, pantocolpate, trizonocolporate, radially symmetrical, circular in outline, tectumechinate, perforate granulate, reticulate, circular aperture between the spine in all Ipomoea species, shape suboblate-oblate spheroidal or prolate-spheroidal. Among the five species of Ipomoea maximum pollen size (108.08-106.4μm) across was found in I. hederifolia whereas, minimum pollen size (59.17- 65.75 μm) across was noted in I. palmata. The maximum spine length (8-14μm) was recorded in I. palmata, while it was minimum (4.99-7.33μm) in I. triloba. SEM represents minor important features of pollen grains that were not found in LM observations and found to be vital instrument in studying pollen characters at high magnifying level.

Keywords: Pollen morphology, Convolvulaceae, LM, SEM.

ASSESSING THE INVASION RISK OF WEEDS FROM THE APG-IV GRADE-LAMIIDS IN THE CONTEXT OF MORADABAD DISTRICT, USING THE AUSTRALIAN WEED RISK ASSESSMENT

Sharma Sachin* and Pandey Manisha

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 global spread of alien weed plant species is disrupting ecological and agricultural ecosystems. Early warning and avoiding high-risk introductions are crucial to reducing losses and boosting benefits. (A-WRA) system has been a successful prediction project for predicting naturalisations in four sub-districts of Moradabad. A study evaluated 30 weed species in the Lamiids Grade of the APG-IV system. The study found that 93% of the reported weed species were of low rank and 7% had medium rank status. Study found that 67% of the weed species were herbs. Ruderal weeds (45%) were the most common, followed by Agrestal weeds (31%).

Keywords: Global Compendium of Weeds, Moradabad, Risk score, Weed Risk Assessment, Weeds

PP-IV.36

FLORAL DIVERSITY OF JHALAWAR FOREST, SOUTH-EASTERN RAJASTHAN, INDIA

¹Rathore Neelkamal and ²*Yadav Vijay Kumar

¹Government P.G. College, Kota, Rajasthan.

²World Agroforestry (CIFOR-ICRAF), State Office – Jaipur, Rajasthan.

*Email: yadavvijaykumar3@gmail.com

The Jhalawar district of Rajasthan (India), is situated between 23° 45′ 20" and 24° 52′ 17" north latitudes and 75° 27′ 35" and 76° 56′ 48" east longitudes, covering an area 6322.35 sq. km. The forest area 1349.79 sq. km. (21.63% of the total geographical area) but present forest cover is only 396.00 sq. km. and contributes only 6.35% with respect to the total Geographical Area (G.A.) of the district. Tree Outside Forest (TOF) covers only 0.33% of G.A. As per the Rajasthan Forest Policy, 2023, target of the forest cover is to achieve 20% from present 9.60 % of G.A. The study was conducted during May 2020 to April 2021. The present study revealed that there were 9 forest communities, flora species - 287 (Trees-128, Shrubs-72, Climbers/Lianas-26, Herbs-33, Grasses-23 and Parasites-5) belongs to 69 families were recorded. As a result of the biodiversity study in flora category, Common-147, Rare -109 and at the verge of extinction (Vext.) - 2. The dominance trend among floral category was trees > shrubs > herbs > climbers/lianas > grasses > parasites. Based on the data collected, it shows that management plans need to be developed and awareness towards conservation of important floral species of Jhalawar Forest, South-eastern Rajasthan.

Keywords: Flora, Forest, Jhalawar, Rajasthan, TOF

A COMPARATIVE STUDY OF FRUIT AND SEED IN BARLERIA

Adikane Sujata V.

Assistant Professor, Department of Botany, Mariya Art and Science College.DeoliDist-Wardha.

Seed shape, dimensions, surface texture and sculpture, hilum shape and position recorded for four species of *Barleria* by using light microscope (L.M.) and Stereo electron microscope (SM). The aim of the present study was to assess the potential systematic value of fruit and seed morphology of *Barleria* species. The species sampling was very low, potentially informative characters have proven to be systematically informative at the infrageneric level.

Keywords: Seed, Morphology, Barleria, Light Microscope, Stereomicroscope

PP-IV.38

PHARMACOGNOSTICAL AND PHYTOCHEMICAL SCREENING OF VARIOUS EXTRACTS OF LEAVES OF CAJANUS SCARABAEOIDES (L.) THOUARS

Katkole Siddharth K. and Jadhav Varsha D.

Department of Botany, Shivaji University Kolhapur. E-Mail id- sidkatkole@gmail.com and vdj_botany@unishivaji.ac.in

Cajanus scarabaeoides (L.) Thouars is a closest wild relative crop of cultivated Pigeonpeaandit belongs to family Fabaceae. It is commonly known as "Raantur". Leaves are pinnately tri-foliate and lower surface densely white-pubescent. Leaves are used as fodder and leaf paste is used to cure swelling and pain in leg. Plant material was collected and shed dried. Leaves extract preliminary phytochemical analysis was done. The solvents such as Methanol, Acetone, Chloroform, Petroleum ether and Aqueous were used for extraction. The study shows presence of phytocompounds such as Carbohydrates, Proteins, Alkaloids, Phenols, Flavonoids, Anthraquinones, Saponins, Tannins, Coumarins, Glycosides, Steroids, and Fixed oil. Among the selected solvents Methanol, Acetone and Aqueousare potential solvents for phytochemical screening. Leaf sections were taken to study different tissue layers. The present study may eventually helpful for detection, development and supply drugs for modern medicine discoveries.

Keywords: C.scarabaeoides, Phytoconstituents, Leaves, Fluroscence, Powder behaviour.

GRASS DIVERSITY OF HINGANGHAT TALUKA OF WARDHA DISTRICT

Khatri P. K., Dasgupta R. and Dongarwar N. M.

Botany Department, Rashtrasant Tukadoji Maharaj Nagpur University, Nagpur, Maharashtr, pratikkhatri1112@gmail.com

Hinghanghat shows a mixed type of vegetation dominated by diverse grass species with various flowering and fruiting periods. The present study signifies observed morphometric characteristics of the splendid inflorescence of various grass taxa and statistical correlation of the dominant grass species. Some shows flowering throughout the year, some shows flowering for few months. During the study period, two taxa, *Chloris barbata*, and *Eragrostis japonica*, showed their dominance- this inspired to further investigation for correlation data amongst the studied taxa through laying 200 quadrats randomly. As a consequence to our surprise both the taxa don't show a similar occurrence in all of the studied quadrats. This gives a negative correlation test between both the dominant grass taxa and shows that the presence one taxon doesn't have any effect either on existence of the other one. A brief tabulated data represents the detailed morphometric characters of various floral parts of all the studied grass taxa.

Keywords: Diversity, Hinganghat, Chloris barbata, Eragrostisjaponica, Mrphometry.

PP-IV.40

SOCIOCULTURAL PERSPECTIVES ON NTFPS: EMPOWERING TRIBAL COMMUNITIES IN DANG DISTRICT GUJARAT

Rajput Shrishti * and Raole Vinay M.

Department of Botany, Faculty of Science, The Maharaja Sayajirao University of Baroda, Vadodara, Gujarat-390002, Email-shrishtirajput2000@gmail.com

Non-Timber Forest Products (NTFPs) are a variety of commodities that are gathered from forests excluding timber. They sustain communities that depend on the forest and provide income diversification. NTFPs promote social integration and the preservation of cultural traditions. Additionally, NTFPs are crucial for sustainable forest practices since they help conserve biodiversity and environmental resilience. The present work aims to provide a sociocultural and ethnobotanical assessment of the available NTFPs in the Dang district of South Gujarat. The main focus is on the district's tribal residents' educational and professional advancement. For the sociocultural evaluation of available phytoresources, quantitative methods have been used to compare the cultural significance and applications of diverse plant taxa. To obtain previous knowledge regarding the flora used by tribal people, interview and observational data was collected. This was addressed independently going forward. User report (UR), Frequency of citation (FC), Number of Uses (NU), Cultural influence index (CI), Relative frequency of citation (RFC), and Relative importance index (RI) was created using the data. Observations indicate that there is little correlation between the cultural and economic value of species: while some species are frequently utilized, others are rarely mentioned in interviews. These indicators are useful in raising the locals' awareness of several ethnobotanically important plants. By cultivating these plants nearby, they will be made aware of significant plants that can aid them in earning a living and balancing their domestic duties and the ways the area achieves economic sustainability for them.

Keywords: Dang District, Social, Cultural, NTFPS

PP-IV.41

PHYTOCHEMICAL PROFILING OF RUELLIA BRITTONIANA: A LESSER KNOWN ETHNOMEDICINAL PLANT

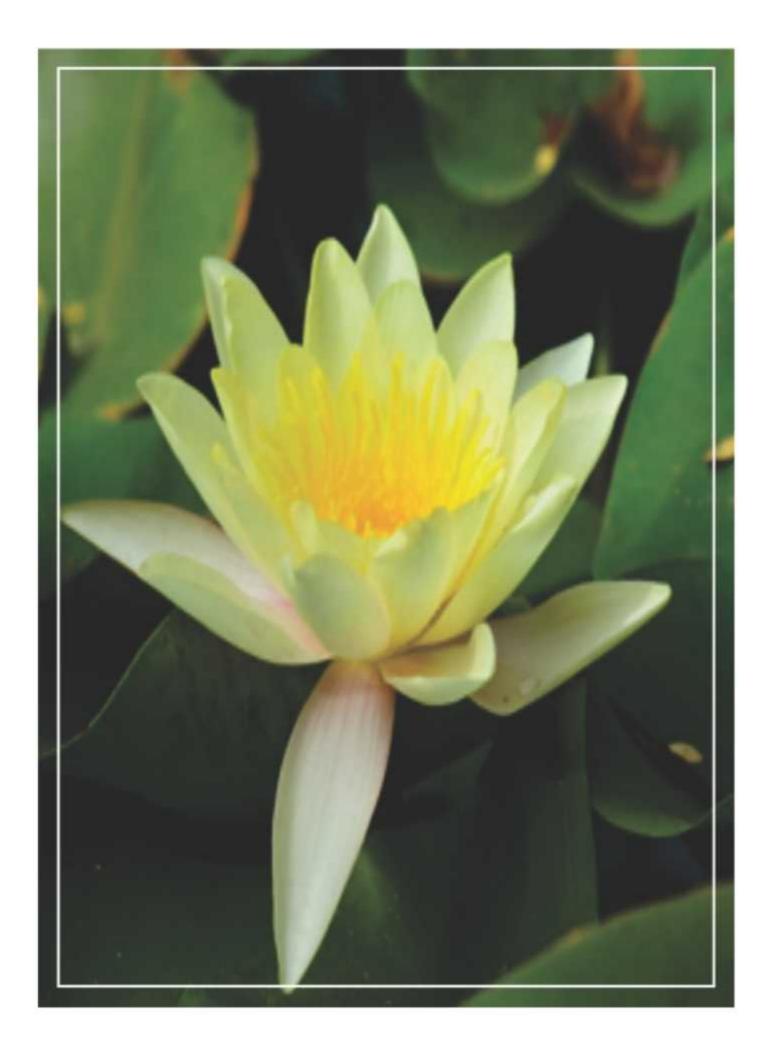
Jagtap Tripty and Koche Dipak

Department of Botany, Shri Shivaji College of Art's, Commerce and Science, Akola (MS) India, triptyjagtap441@gmail.com

The members of genus *Ruellia* are commonly known as wild Petunias which belong to the family Acanthaceae. *Ruellia brittoniana* is a common species but lesser known for its ethnomedicinal values. The plant is used ethnomedicinally to cure asthma and other bronchial disorders, as an antidote for snake bites, wound healer and to recover bone fractures. The qualitative phytochemical analysis showed the richness of plants with the availability of alkaloids, glycosides, phenolics and flavonoids, terpenoids, and saponins. The quantitative phytochemistry showed that the plant has a significant amount of major phytochemicals like alkaloids, phenolics, flavonoids, and saponins. HPTLC fingerprinting of methanolic extracts of the leaf, stem, and root of *R. brittoniana*. HPTLC fingerprint revealed several peaks of phytochemical compounds with respective Rf, retention time, and peak area. Off these, the identified compounds include phenolic compounds (ferulic acid, p-coumaric acid), flavonoids (quercetin, rutin, naringenin, apigenin), saponins, and cardiac glycoside (peruvoside). The identified compounds are medicinally important and probably impart medicinal value to *R. brittoniana*.

Keywords: Ruelliabrittoniana, Acanthaceae, Ethnomedicine, Qualitative phytochemistry, Quantitative phytochemistry, HPTLC.

XLVI ALL INDIA BOTANICAL CONFERENCE of THE INDIAN BOTANICAL SOCIETY SECTION - V Cytogenetics, Plant Breeding and Molecular Biology Synergy in Plant Science and Sustainable Future: 2023



APPRAISAL OF GENOTOXIC POTENTIAL OF AQUEOUS LEAF EXTRACTS OF NYCTANTHES ARBOR-TRISTIS L

¹Sinha Vishnu Shankar, ²Mohanka Reena and ³Kumar Nandjee

¹P G Department of Botany, Tata College, Chaibasa, Jharkhand – 833202, India,
 ²Department of Botany, Patna Science College, Patna, Bihar – 800005, India.
 ³Department of Botany, Magadh University, BodhGaya, Bihar-823234, India.

The present investigation is aimed to evaluate the genotoxic potential of aqueous leaf extracts (i.e., 10%, 25%, 50%, 75% and 100%) of Nyctanthes arbortristis Linn (Oleaceae) in the root tip cells of Allium cepa (onion) and Vicia faba L. 50 g of fresh leaves of Nyctanthes were grinded to get the mother solution of the leaf extract which was further diluted by adding required quantity of double distilled water for different concentrations. The root tips of Allium cepaL and Viciafaba L were treated with different concentrations i.e., 10%, 25%, 50%, 75% and 100% of the extract of Nyctanthes arbor-tristis Linn and also with double distilled water for the control for four hours at room temperature. The treated and control root tips were subjected to squash with staining. It was observed that the mitotic index decreased from 14.12±0.56 to 03.86±0.22 (Allium) and 16.22±0.12 to 5.82±0.32 (Vicia) in comparison to their control 20.63±0.32 and 17.86±0.16while chromosomal aberrations were induced from 4.56% to 20.28% (Allium) and from 05.33 to 25.09 % (Vicia). The chromosomal aberrations recorded in ascending order were e stickiness, fragment, disturbed metaphase/ anaphase / telophase, bridges, laggards, micronuclei in both Allium and Vicia. The chromosomal abnormalities showed a linear correlation with doses of the extracts. The mitotoxic potential of Nyctanthes leaf extracts may be considered as a potential antitumor promoting agent.

Keywords: Genotoxic, Nyctanthes arbor-tristis Linn, leaf extract, MI, Chromosomal abnormalities.

OP-V-02

CYTOLOGICAL VARIATION AND EVOLUTION IN SOME SELECTED MEMBERS OF FAMILY ASTERACEAE

Patil Shital and Umale Pratiksha *

*Professor and Head, Department of Botany, Shri Shivaji College of Arts, Commerce and Science, Akola.

Asteraceae mark the pilgrimage among the vast plant kingdom due to its cosmopolitan and worldwide distribution of various taxa. Circumstantial typification about its primitive to evolutionary path has become ease of present investigation on cytological study of family Asteraceae. Three selected taxa were subjected to cytological investigation, namely Blainvillea acmella (2n=34) Cyathocline purpuria (2n=18) and Emilia sonchifolia (2n=10). Structural variation also recorded among these taxa accordingly: 1ST+16SM+17M in Blainvillea acmella, 1ST+10SM+7M in Cyathocline purpuria and 2SM+8M in Emilia sonchifolia. Variation in chromosome numbers and characteristics may witnessed evolution among the family. Presence of least chromosome number may tend towards the primordial nature of taxa among the family in comparison with the other taxa which consist gradual higher chromosome number.

Keywords: Asteraceae, Blainvillea acmella, Cyathocline purpuria, Emilia sonchifolia, Evolution, Variation.

ASSESSMENT OF OKRA GERMPLASM FOR MUCILAGE CONTENT

Gund G. R. and Gurav R. V. *

Department of Botany, Shivaji University, Kolhapur, 416004 *Email-botanyraj@reddifmail.com

Bhendi or okra, scientifically called Abelmoschus esculentus belonging to the family Malvaceae, is commonly known as "lady's finger". Variability is a requirement for any breeding programme to evolve the varieties with desirable attributes. For the successful breeding programme germplasm assessment is necessary. This assessment of germplasm was to find out a potential accession having high mucilage content. Okra mucilage is important as emulsifying agent in food industries, clarification agent in jaggery production, pharmaceutical excipient, in cosmetic industry and has antitumor, antioxidant, and antimicrobial, hypoglycaemic properties. From different locations in Kolhapur district total 55 accessions of Abelmoschus esculentus were collected and 31 accessions (26 Germinated) were procured from ICAR-NBPGR RS, Akola. Total 81 accessions of Abelmoschus esculentus were studied. For the assessment of germplasm, the important character Mucilage content (%) was focused along with Plant Height (cm), No. of leaves/plant, No. of fruits/plant, No. of Nodes/plant, No. of Branches/plant, Fruit length (cm), Fruit diameter (cm), Days to flowering, Fruit Locule Number and 100 Seed Weight (Seed index). It is concluded that accession No. 61 (Bhatnangnur, Kolhapur) (Latitude:16.4839053, Longitude:74.2982639) out of all 81 accessions is showing the highest mucilage content and hence potential accession for mutation breeding for the improvement in mucilage content.

Keywords: Breeding, Okra, Germplasm, Accession, Mucilage content, Variability,

OP-V-04

DIVERSITY ANALYSIS OF OKRA (ABELMOSCHUS ESCULENTUS) GENOTYPES FOR QUALITATIVE AND QUANTITATIVE TRAITS

¹Chaudhari Bhushan N., ²Gavhare Supriya B. and ²Magar Jaywant G. KCE's MooljiJaitha College (An Autonomous), Jalgaon, Maharashtra, 425001.

Okra (Abelmoschus esculentus L.), a commercially exploited vegetable crop, is grown worldwide. It belongs to family Malvaceae. Genotype characterization is important before the conducting of breeding programme. Morphological characterization was carried on 24 different characters as per DUS guidelines. This experiment was carried out in various crop seasons. Present study shows the variability in genotypes on selected characters. Analysis of variance among the genotypes on the basis of characters which are measured for number of individual plants or parts of plants shows good variability. The present study shows that more weightage should be given to quantitative characters of fruit.

Keywords: Abelmoschus esculentus, DUS Test, Genotypes, Morphological character, Variance.

VARIABILITY STUDIES IN SOME CULTIVARS OF TOMATO (SOLANUM LYCOPERSICUM L)

Gavhare Supriya B., Chaudhari Bhushan N. and Magar Jaywant G. KCE's MooljiJaitha College (An Autonomous), Jalgaon, Maharashtra, 425001.

Tomato (Solanum lycopersicum L. Mill), the world's largest grown crop belongs to family Solanaceae, holds a prominent position in the economy of human society due to its exceptional nutritive value and widespread cultivation in diverse agro-climatic conditions. The characters like TSS, lycopene, fruit firmness, are important as processing point of view. In present study, 10 cultivars obtained from IIVR Varanasi. The study shows variability among these cultivars. The best-performing genotypes can be utilized in promoting the tomato production program as elite germplasm varieties. Alternatively, they can be considered for commercial cultivation after undergoing testing over several years and various locations.

Keywords: Cultivars, Morphology, Variability, Tomato

OP-V-06

CYTOLOGICAL STUDIES OF TWO ARGYREIA LOUR. SPECIES FROM MAHARASHTRA

Lavate S. S. and Gaikwad N. B.

Department of Botany, Shivaji University, Kolhapur, Maharashtra

The chromosomes of Family Convolvulaceae showed great variation in length. ArgyreiaLour. is the genus with dibasic chromosome number i.e., x=14 and x=15. In present studies two genus Argyreia species were cytologically investigated. Out of these two species, chromosome number of A. cymosais reported for the first time with 2n=2x=30, whereas chromosome count for A. nervosa was confirmed with 2n=2x=30. Karyotypic formula for A. cymosa was 14m+1M with one pair of chromosome is with exact median point of centromere while in case of A. nervosa it was found with 14m+1sm. Based on degree of asymmetry these karyotypes are classified into 4A and 3A category, respectively.

Keywords: Chromosomes Morphology, Argyreias p., karyotype formula

MORPHOLOGICAL AND NUCLEAR DNA CONTENT VARIATION IN SOME LILIUM CULTIVARS

Deshmukh Shraddha and Nathar Varsha

Department of Botany, Sant Gadge Baba Amravati University, Amravati, Maharashtra, India, Email-varshanathar@sgbau.ac.in

Lilium is a member of Liliaceae family which belongs to class monocotyledon, comprises approximately 110-115 species, distributed throughout the world but large distribution is in Northern hemisphere, Asia, North America and Europe. It is divided into 3 groups Longiflorum (L), Asiatic (A) and Oriental (O) hybrids. Lily is a plant which is perennial having ornamental value and medicinal properties. From horticultural point of view, it is one of the most important genera because of its flower size, beauty, variation in color of flower as well as it possess different fragrance and having potential to adapt several environmental conditions. The present investigation focuses upon variation in three cultivars of Liliumi.e. Courier, Fangio and Ercolano. Flow cytometry is used as an effective, reliable, vital, quick and important tool for analysis of DNA content and ploidy levels. Though cultivars seems to be originated from same groups which showed same ploidy but show differences in morpho-metric measurements and DNA content.

Keywords: Cultivars, LA Hybrids, Lilium, Morphology, DNA content

OP-V-08

PHYLOGENETIC RELATIONSHIP BETWEEN MEMBERS OF BAMBUSEAE AND ARUNDINARIEAE BASED ON RBCL SEQUENCES AND MORPHOLOGICAL DESCRIPTORS

More K. C.* and Gawande P. A.

Department of Botany, Sant Gadge Baba Amravati University, Amravati, Maharashtra, India 444602. Email- kamlakarmore@sgbau.ac.in

Bamboo is important for economic, nutritive, medicinal, and ecological benefits. The correct identification and characterization of bamboo is an essential prerequisite for species conservation. The present work elucidates the phylogenetic relationship between the tribe Bambuseae and Arundinarieae based on rbcL sequences and morphological descriptors. Nineteen bamboo species rbcL genes sequenced and their accession numbers (OM574866 to OM574883) generated from NCBI along with rbcL gene sequences of additional bamboo species including the outgroup species retrieved from Gene Bank. It has been observed that the species of Bambuseae and Arundinarieae grouped in separate clades showing tribe, subtribe and genera level discriminatory potential of rbcL with some exceptions. The phylogenetic tree revealeda sister relationship of Bambusa affinis and Bambusa oliveriana in both maximum likelihood (ML) and maximum parsimony (MP) derived phylogenetic tree with 100% bootstrapping support and least ML distance (0.002). The Bambusa cacharensis and Bambusawamin shared a common cluster in MP derived tree of rbcL gene with (0.000) ML distance, the MP-derived phylogenetic tree with bootstrapping support of above 60% in Arundinarieae clade and above 95 % in Bambuseaeclade. Conclusion: The species clustering pattern in the rbcL gene was not totally agreed with morphological characters derived species clustering, this pattern of incongruence happened due to poor lineage sorting, hybridization or absence of informative characteristics in bamboo. The additional morphological as well as multigene sequence information needs to be utilized for generating a robust phylogenetic relationship and correct species identification in bamboo.

Keywords: Bamboo Phylogeney; Arunidinarieae; Bambuseae, rbcL

OP-V-09

DEVELOPMENT OF GAMMA IRRADIATION INDUCED MORPHO-CHEMICALLY DISTINCT VARIETY CIM-SURAS OF PEPPERMINT (M. PIPERITA L.)

^{1,4}Birendra Kumar, ^{1,4}Priyanka Prasad, ^{1,4}Akancha Gupta, ²Rakesh Kumar, ¹Narendra Kumar, ²Dipender Kumar, ⁶Verma R. S. and ³Tandon S.

¹Plant Breeding & Genetic Resource Conservation Division, CSIR-Central Institute of Medicinal and Aromatic Plants, Lucknow, 226015, Uttar Pradesh.

²Crop Production and Crop Protection Division, CSIR-CIMAP, Lucknow-226022
³Phytochemistry Division, CSIR-CIMAP, Lucknow-226022

*Academy of Scientific and Innovative Research (AcSIR), Ghaziabad-201002
*Corresponding Author: b.kumar@cimap.res.in, birendrak67@rediffmail.com

Peppermint (Mentha piperita L.; Fam. Lamiaceae), is an essential oil-bearing crop, cultivated in temperate and sub-tropical countries of the world for perfumery and aroma industries. The plant is vegetatively propagated through runners derived from mother stalks of plants resulting in low genetic base. Induced mutagenesis is unique and supplemental breeding approach to overcome the limitations of low genetic base. CIMAP/MPS-36, a half-sib seed progeny of variety Kukrail served as mother genotype for mutation breeding using different doses of gamma irradiation. A variant, MPS-3633, was identified as a novel and promising genotype with distinct quality of peppermint oil having high menthol (68-78%) with low menthofuran (0.25-0.29%) content, sucker producing, erect growth habit, flower bearing, an increase in herb yield, oil content, and oil yield and later released as a commercial variety CIM- Suras. Further, dementholisation (DMO) can be used as such as peppermint oil in addition to extracting menthol from oil.

Keywords: Peppermint, genetic diversity, mutant, essential oil, menthol-rich genotype, variety CIM-Suras

OP-V-10

GENETIC VARIABILITY IN M₁ POPULATION INDUCED BY DIFFERENT DOSES OF EMS IN VARIETIES VIZ. NIMTILI, PRATAP, CIM-PUSHTI AND POSHITA OF ASHWAGANDHA (WITHANIA SOMNIFERA DUNAL.)

¹Puja Kumari, ¹*Tara Chandra Ram, ²Nashra Aftab and ²Birendra Kumar
 ¹Department of Botany, Mahatma Gandhi Central University, Motihari, Bihar- 845401
 ² Central Institute of Medicinal and Aromatic Plants. Lucknow, Uttar Pradesh- 226015

Withania somnifera Dunal (family Solanaceae) is a annual crop having various medicinal properties due to the presence of bioactive compound viz. withanolide A, withanolide B withaferine A, withamine, etc. Its root is used to improve memory and fertility as general tonic and also used as anti-stress, anti-anxiety, cardiotonic, sedative, anti-microbial, anti-oxidative, etc. to treat psychiatric palpitation, tumors, nocturnal leg cramps, diarrhea, etc. The seeds of varieties NIMTILI, Pratap, CIM-Pushti and Poshita are induced chemically by different doses of EMS and raised for the seed germination. Germination percentage has

been recorded in the M1 generation. during the investigation LD 50 was observed as 0.8% dose in NIMTILI, 1% and 0.2% in Pratap, 0.4% in CIM-Pushti and 1% in Poshita. The Data on morpho-metric trait viz. Plant height (cm), No. of Branches(cm), No. of Leaves, No. of Berries/Plant, wet berry weight, Dry Berry Weight (gm), No. of Seeds/Berry, Seed weight/Berry, 1000 Seeds Weight, Main Root Length (cm) and Dry Root weight(gm) has been recorded. The results revealed that Plant height ranged from 21cm to 175cm, No. of Branches ranged from 1-175, No. of Leaves ranged from 9-341, No. of Berries/Plant ranged from 11-120, Dry Berry Weight ranged from 011-18gm, No. of Seeds/Berry ranged from 0-39, Seeds Weight/ Berry ranged from 0.124- 0.517 gm, 1000 Seeds Weight ranged from1.013793 -21.35gm, Main Root Length ranged from 7-62 cm, and Dry Root Weight ranged from1gm- 41gm has been recorded.

Keywords: Ashwagandha, Berries, Genetic diversity, Mutagen, Root, Varieties

OP-V-11

MUTAGENIC EFFECTIVENESS AND EFFICIENCY OF ELECTRON BEAM, GAMMA RAYS AND EMS IN KALBHAT AND BALCK RICE NON-BSAMATI AROMATIC RICE LAND ARACES

¹Londhe R. K., ¹Desai S. P., ¹Jadhav A. G., ²Dhole V. J., ³Bapat V. A. and ^{1*}Gaikwad N. B.

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

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

Basmati and non basmati aromatic rice has been preferred for consumption because of its pleasant aroma and taste. Kalbhat and Black Rice are non basmati aromatic rice landraces known for their aroma and nutritional values. These landraces are having some undesirable traits like tallness, late maturity period, low yield and shattering of grains. Gamma rays, Electron beam and Ethyl methanesulphonate were used to induce the mutation for improvement of Kalbhat and Black rice. The effect of different mutagens on biological parameters in the M₁ generation was studied from Kalbhat and Black Rice. The maximum lethality % was reported from 300Gy electron beam treatment from both the landraces whereas highest chlorophyll deficient sectors, chromosomal abnormalities and plant survival % were reported in Gamma ray 100Gy treatment. Highest pollen sterility was reported under higher dose of Gamma rays and Electron beam from both the landraces. Highest mutation frequency was reported under electron beam treatment from both the landraces. Mutagenic effectiveness and efficiency was found highest in EMS treatments in both the landraces followed by electron beam and gamma rays. Maximum mutation rate in terms of effectiveness and efficiency was noticed from EMS treatment followed by electron beam and gamma rays. From the present studies it was observed that higher doses of Electron beam and gamma rays and higher concentration of EMS are most effective treatments for induction of effective mutation. Black rice landrace was found to be more sensitive for all the mutagenic treatment compared with Kalbhat rice landrace.

Keywords: Mutation frequency, Effectiveness, Efficiency, Mutation rate, Kalbhat, Black rice.

INDUCED MORPHOLOGICAL VARIATION IN MUTAGEN-TREATED MUNGBEAN [VIGNA RADIATA (L.) WILCZEK] CULTIVARS IN M2 GENERATION

Deshmukh A. G. and Koche D. K.

Department of Botany, Shri Shivaji College of Arts, Commerce and Science Akola (M.S.), India, Email- deshmukhakshay489@gmail.com

The Mungbean [Vignaradiata (L.) Welczek] is one of the most important pulse grain crops of the Indian subcontinent having a high amount of protein. In the present study seeds of two varieties of mungbean (AKM-4 and AKM-8802) were treated with gamma rays (100Gy, 200 Gy, 300Gy and 400Gy), EMS, and SA (0.1%, 0.2%, 0.3%, and 0.4%). In the M1 generation, it was noted that physical mutagen gamma rays and chemical mutagen showed a morphological variation in both varieties of mungbean AKM-8802 and AKM-4. The M2 sowing was done as per a plant-to-row scheme and observed for morphological variations. The variety AKM-8802 shows a large leaf size, hairy and rough leaf surface, different branching pattern, increase in number of pods, tough coating of pods, bold seed, and high yield. And the variety of AKM-4 mutant plant types showed variation in a branching pattern, plant height, pod position mostly upwards, increased number of pods, and high yielding. Especially chemical mutagen sodium azide of the variety AKM-4 shows high yielding.

Keywords: Mungbean, gamma rays, EMS, SA, M2 generation, morphological variation.

PP-V.02

EFFECT OF LEAF COLOUR MUTATIONS ON BOLTING AND YIELD IN SAFFLOWER (CARTHAMUS TINCTORIUSL.): A MORPHOLOGICAL ACCOUNT

Borkar Chaitanya A. and Badere Rupesh S.

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

Leaf colour mutants, although, are commercially undesirable but provide a good opportunity to understand the role of pigment metabolism in plants. Thus, two EMS-induced true breeding chlorophyll mutants (dark green and light green) of safflower were investigated in this study. The purpose of this investigation was to analyse the effect of contrasting levels of chlorophylls on overall growth and development in plants. Few morphological parameters related to leaf, stem, head (inflorescence) and seed were studied in both the mutants along with their parent variety. Both the mutants displayed an obvious altered phenotype with delay in bolting and reduction in seed size being most prominent. Further analysis will give a better insight into the relationship between pigment metabolism, stress adaptation and phytohormonal regulations in plants.

Keywords: Induced Mutants, Photosynthesis, Photosynthetic Pigments, Stomatal Conductance, Yield

ETHYL METHANE SULPHONATE, SODIUM AZIDEAND GAMMA RAY INDUCED HIGH YIELDING AND SUPERIOR QUALITY MUTANTS IN LINUM USITATISSIMUM VAR. PKV NL-260

Deshpande Aniruddha S. and Malode S. N *

Cytology and Genetics laboratory, P. G. Dept. of Botany, Government Vidarbha Institute of Science and Humanities, Amravati – 444604 Email: satishmalodel7@gmail.com

Development of high yielding linseed cultivars with superior quality characteristics has become the top priority in recent years. In the present study, seeds of *Linum usitatissimum* var. PKV NL – 260 were subjected to different doses of Sodium Azide, Ethyl Methane Sulphonate and gamma rays. Mutagenized seeds were sown to raise M₁ generation; all seeds harvested from M₁ sown to carry out M₂ generation. M₂ population was screened to evaluate high yielding mutants, bold seeded mutants and high oil mutants. All mutants were selected on the basis of improved qualitative and quantitative traits were sown to raise M₃ generation. About four high yielding mutants, two bold seeded mutants, one dwarf with high yield mutant and three high oil mutants were recorded. These mutants might be helpful to achieve good economic gain as well as improve the national scenario of oilseed production.

Keywords: Linseed, Mutation, High yield, Bold seed, Dwarf etc.

PP-V.04

A KARYOTYPE ANALYSIS OF NEW CYTOTYPE IN ASPARAGUS OFFICINALIS L

Dhoran V. S., Nathar V. N. and Deshmukh V. P.1

Laboratory of Cytology, Department of Botany, Sant Gadge Baba Amravati University, Amravati-444602, Maharashtra, India.

Department of Botany, Jagadamba Mahavidyalaya, Achalpur City, Dist-Amravati-444806, Maharashtra, India, Email: varshanathar@sgbau.ac.in

Asparagus is an important genus with medicinal properties and showing broad variations in chromosomal numbers and ploidy level. Members of Asparagus have ornamental, medicinal and horticulture significance and amongst them A. officinalis L. (Garden Asparagus) is the only species under cultivation practices with very high economic and medicinal potential. Large number of untapped genetic resources exists within A. officinalis revealing diversity in both morphology and chromosome number. In Asparagus officinalis the chromosome numbers reported hitherto shows 3 basic cytotype (2n = 20, 22 and 44). This paper reports a new cytotype in Asparagus officinalis (L.) with mitotic chromosome number 2n = 40 which is completely new and occurrence of tetraploidy is the first report for this species. The chromosome analysis revealed asymmetrical karyotype with $12m\pm1$ sm ±7 st formula.

Keywords: Asparagus officinalis, Karyotype, New cytotype, Tetraploid.

STUDIES ON MEIOTIC CONFIGURATIONS IN THE GENUS CHLOROPHYTUM KER GAWL

Gudadhe S. P.1 and Nathar V. N.2

¹Department of Botany, Arvindbabu Deshmukh Mahavidyalaya, Bharsingi. ²Department of Botany, Sant Gadge Baba Amravti University, Amravati Email - smitagudadhe@gmail.com

Chlorophytum is the genus of family Liliaceae, one of the largest plant families with about 240 genera and 4,000 species distributed throughout the world. Cytological studies in Chlorophytum confined that the ploidy ranges from diploid to octaploid with two basic numbers, x=7 and x=8. The diploid chromosome number of some species of Chlorophytum like C. borivilianumSantapau& Fernandes is 2n=16 and while other species shows ploidy up to 2n=56 in Chlorophytumnepalensis. Morphological and cytological variations have been observed in the Genus Chlorophytum. Earlier cytological studies in this genus reported various meiotic aberrations and meiotic configuration of chromosomes in some species but there are very few reports and not in detail. This present study tried to focus specially on the detailed meiotic configurations, meiotic abnormalities in some species of Chlorophytum Ker Gawl to study the evolutionary changes in this Genus.

Keywords: Meiotic Configurations, Meiotic Abnormalities, Chlorophytum Ker Gawl.

PP-V.06

PHYLOGENETIC RELATIONSHIP IN SOME CULTIVARS OF PHASEOLUS VULGARIS L. SEEDS USING SDS-PAGE

Kapil M. R. and Nathar V. N.

Molecular Biology Laboratory, Department of Botany, Sant Gadge Baba Amravati University, Amravati -444602, Maharashtra State, India. Email- manishakapil62@gmail.com

Investigations of seed proteins in eight cultivars of *Phaseolus vulgaris L.* cultivars. by sodium dodecyl sulphate polyacrylamide gel electrophoresis (SDS-PAGE). The results showed total eleven bands in B4 (BEANS French Yellow) and three minimum number of protein bands in B1 (Brown Beans). The highest similarity index was observed in cultivar B2 (Surbhi)i. e., 0.909 and lowest in B4 (Beans French Yellow) and B6 (Laffa) i.e0.272. The highest dissimilarity value was found in B4 (Beans French Yellow) and B6(Laffa) i.e0.728 in both the cultivars and lowest value in B2 (Surbhi) cultivar i.e0.09. Clustering with un-weighted paired group method with arithmetic averages (UPGMA) exhibited two clusters A and B which were grouped into four sub-clusters I,II,III and IV. Phylogenetic tree was constructed based on the presence or absence of protein bands using NTSYS-PC software version 2.0. It is concluded that SDS-PAGE analysis of common bean seed storage protein is useful for evaluation of genetic variability and cultivars identification that help in common bean breeding program.

Keywords: Phaseolus vulgaris L., Phylogenetic Analysis, SDS-PAGE.

COMPARATIVE STUDIES OF PROTEIN CONTENT IN THE POLLEN AND PISTIL OF BAUHINIA ACUMINATA AND BAUHINIA PURPUREA

Gawande Y. B. and Tidke J. A

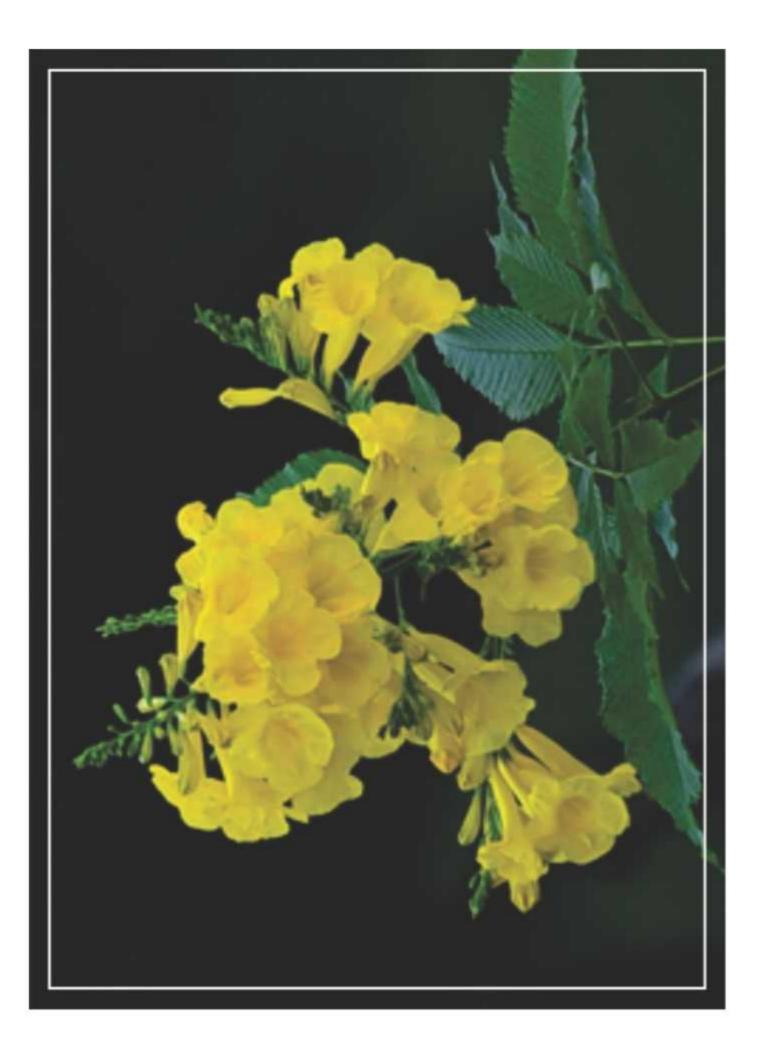
Dept. of Botany, Sant Gadge Baba Amravati University, Amravati 444602 (MS) gawandeyogita@rediffmail.com

The pollen-pistil interactions commence in the plants on the onset of pollination. When the highly desiccated pollen deposited on the stigmatic surface was firstly discriminated by the stigmatic proteins. The protein from the pollen coat and the proteins released from the stigmatic surface interact with each other. Because of such identification of compatible pollen which brings about proper fertilization, which is very important in the life of every angiospermic plants. Hence, it is necessary to study the amount of protein content of the pollen and the pistil. In the present studies it was foun that in the two species of Bauhinia (Caesalpiniaceae) the protein content of pollen grains extract in 0.1 ml and 0.2 ml concentration was found to be 0.60 and 0.84 ugm/ml, in B. Acuminata and 0.48 and 0.58 ugm/ml in B. Purpurea. The protein content in the unpollinated pistil extract for B. Acuminata was found to be 0.46 and 0.54 ugm/ml and for pollinated pistil extract was found to be 0.48 and 0.58 ugm/ml in 0.1 ml and 0.2 ml concentrations respectively. In B. Purpurea the protein content in 0.1 ml and 0.2 ml concentrations were 0.44 and 0.53 ugm/ml and for unpollinated pistil extract and that for pollinated pistil were showed as 0.46 and 0.54 ugm/ml respectively. From these studies it is confirmed that the protein content of pollen grains and pistil extracts is greater in B. acuminata as compared to B. purpurea as

are very important in the process of pollen-pistil interactions in the angiospermic plants. **Keywords**: pollen-pistil interactions, protein, pollen, unpollinated and pollinated pistil

well as increase in the protein content in pollinated pistil. So, the protein estimation studies

XLVI ALL INDIA BOTANICAL CONFERENCE of THE INDIAN BOTANICAL SOCIETY SECTION - VI **Ecology and Environmental Biology** Synergy in Plant Science and Sustainable Future: 2023



STUDY OF LAND USE CHANGE IN BARDA SANCTUARY OF GUJARAT, INDIA

Chavada Pratikkumar * and Raviya Rajesh

Department of Life Sciences, Bhakta Kavi Narsinh Mehta University, Junagadh – 362263, Gujarat, India, Email-pbchavda97@gmail.com, +91 99092 46738

Barda Sanctuary is located between Porbandar and Devbhumi Dwarka district of Gujarat. This research deals with the land use pattern of Barda sanctuary, Gujarat. The data from the year 2020, 2021, and 2022 was downloaded from Sentinel-2 by the means of ESRI land cover explorer. All the downloaded data was processed in QGIS software. The results indicate 2.3687 km² increase in scrubland and 2.3092 km² decrease in trees. Increase of scrubland depicts formation of woody species, which is helpful in soil properties and ecosystem change.

Keywords: Land use, Barda sanctuary, QGIS, Sentinel-2

OP-VI.02

PGPRS HELP TO BOOST MICRONUTRIENTS IN MORINGA FOLIAGE

Giridhar P.

Plant Cell Biotechnology Department, CSIR-Central Food Technological Research Institute, Mysuru-570 020 Email- giridharp@cftri.res.in

Biological Compost and fertilizers are the essential segments of present-day farming practices as they give significant full-scale micronutrients required for plant development. In any case, widespread utilization of fertilizers goes unchecked and wound up causing ecological concern. Plant growth-promoting rhizobacteria (PGPR) can be extraordinary compared to other potential approaches to diminishing the unfavourable impacts of synthetic composts. Vitamin A (Vit A) and Vitamin E (Vit E) delivered in plants are of incredible human significance. Their insufficiencies are predominant in the populace of less fortunate and developing nations. M. oleifera is known for its astounding substance of numerous supplements and can be utilized as a sustenance security supplier in both underdeveloped and developing nations. So as to make it a promising dietary security supplier, PGPR (Bacillus spp.) were utilized to look at their influence on growth, total carotenoids, β carotene and tocopherols in M. oleifera and for a profile advancement of same for value addition. There was a 10-14 folds increase in α tocopherol and 1-1.15fold β carotene significantly (P< 0.05) upon B. subtilis SE34 and B. pumilus T4 treatments. RTqPCR study in B. pumilusSE34treated plant foliage reveals overexpression of genes such as CAT, yTMT, PSY and LBC at the 6th week of treatment. Further RT-qPCR and field study was structured utilizing PGPRs giving critical outcomes to get the molecular insights and viability of life forms. A foliar spray of ferric citrate and agromin max improved the iron content of leaves. Messenger RNA expression of the iron transporter (OPT; Oligopeptide transporter) and antioxidant genes were likewise considered after foliar application. The most astounding substance of all-out iron (20.70 mg/100g DW) was recorded in the PKM-1 cultivar. Foliar shower of ferric citrate (179.0 % increase contrasted with control) trailed by Agromin max ready to lift iron levels in foliage.

Keywords: Moringa, PGPRs, Micronutrients boosting

CORIANDRUM SATIVUM ESSENTIAL OIL AS A PLANT-BASED PRESERVATIVE AGAINST POST-HARVEST BIODETERIORATION OF BANANA

Soni Monisha * and Dwivedy Abhishek Kumar

Laboratory of Herbal Pesticides, Centre of Advanced Study (CAS) in Botany, Banaras Hindu University, Varanasi-221005 Email- monishasoni1@gmail.com, Mob: +917007161145

The study explores the antifungal and anti-aflatoxigenic potential of Coriandrum sativum essential oil (CSEO) in protecting banana fruits from post-harvest deterioration. Aspergillus flavus (AFLHP B4) was identified as the most aflatoxigenic isolate. Chemical characterization of CSEO revealed linalool (65.18%) as the major component. CSEO completely inhibited AFLHP B4 growth and aflatoxin B1 secretion at 1.6 μL/mL and 1.2 μL/mL respectively. Reduction in ergosterol, increased leakage of cellular ions from CSEO treated fungal cells accentuate the fungal plasma- membrane as the antifungal site of CSEO. Based on the above findings CSEO may be recommended as safe green preservative forBanana.

Keyword: Coriandrum sativum essential oil; Antifungal; Aflatoxin B₁; Ergosterol; Green preservative

OP-VI.04

CURRENT EVIDENCES ON PARMOTREMA GENUS: ENVIRONMENTAL INTEREST, BIOLOGICAL ACTIVITIES WITH THERAPEUTIC POTENTIAL

Alahupreeti J. and Rajalakshmi K.

Department of Botany, Nallamuthu Gounder Mahalingam College, Pollachi-642 001, Tamilnadu, India.

Parmotrema is one of the most representative genera in Parmeliaceae family, which is most widespread genera distributed in cosmopolitan, being more concentrated in temperate regions. The current endeavor is to provide a comprehensive assessment of the existing knowledge on the genus, include everything from fundamental concepts such as taxonomy and phylogeny to their ecological significance for climatic indicators and biological relevance for potential pharmaceutical therapeutics. Additionally, they produce specialized products/metabolites, including secondary components that have been implicated in exerting intriguing pharmacological effects. The recent and historical information about sources of ecological indicators, bioactive compounds with potential therapeutic applications.

Keywords: Lichen, Parmotrema, Biologicalactivity

QUALITATIVE SCREENING OF THE POTENTIAL FUNGAL ISOLATE FOR THE BIOREMEDIATION OF POLYCYCLIC AROMATIC HYDROCARBON (PAH)

Mansuri Sanobar and Albert Susy

Department of Botany, Faculty of Science, the Maharaja Sayajirao University of Baroda

Polycyclic aromatic hydrocarbons (PAHs) are pervasive environmental pollutants that have the potential to cause tumors and mutagenicity. Due to the harmful qualities of PAHs, their cleanup has become a critical requirement. Numerous PAHs are found in crude oils and its products. The concern has driven researchers to investigate methods for removing these chemical molecules from the natural environment. This study focusses on qualitative screening various fungal strains to identify their potentiality to breakdown hydrocarbon. A number of 21 isolated (SA1-SA21) fungal strains were screened on Capek growth medium supplemented with fuel oil and among these strain, five fungal isolates exhibited capability to degrade PAH.Further quantitative analysis can be done to know the best fungal isolate for remediation of PAH.

Keywords: Environment Pollutant, PAHs, Degrading Fungus

OP-VI.06

EXPOSURE ASSESSMENT OF LOCAL POPULATION TO HEAVY METALS THROUGH CONSUMPTION OF RICE COLLECTED FROM URBAN MARKETS OF VARANASI CITY

Singh Priyanka and Sharma Rajesh Kumar

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

In the present study, concentrations of heavy metal such as Cd, Cr, Pb, Ni, Cu, Zn and Co in nineteen varieties of rice frequently consumed by local population of northern Indian were quantified using Atomic Absorption Spectrophotometer. Health risk associated with contaminated rice grains were also assessed by computing acceptable daily dose (ADI), hazard quotient (HQ) and Life Time Cancer Risk (LCR). The results showed that concentrations of both Pb and Ni in tested rice varieties were found below the detection limits (0.2 and 0.04 mg/kg dry weight, respectively). Both Cd and Cr were detected inonly in some varieties of rice grains i.e., Chintu, Cuttack, Kinki and Gawahi. Jeera-32 and Silky variety of rice were found contaminated only with Cd and Cr, respectively. Concentrations of Cd, Cr, Cu, Zn and Co (mg/kg dry weight) in different varieties of rice grains ranged between 0.13-1.3, 0.25-4.1, 1.8-10.5, 19.5-36.8 and 0.25-2.9, respectively. The concentrations of all tested heavy metals were within the safety limits of Indian Standard. Whereas Cd concentration in rice grains exceeded the safety limits of USEPA, CS, WHO/FAO and ISIRI (0.1, 0.1-0.2, 0.2 and 0.06 mg/kg dry weight, respectively). ADI, HQ and LCR values of all the heavy metals were markedly higherin children (0.27, 9.7 and 0.58, respectively) than adults (0.23, 8.5 and 0.50, respectively). HQ values for both children and adult were more than a unit for both Cd and Cr. It can be concluded that longterm consumption of rice grains by the local population is not safe and may cause health related problems.

Keywords: Heavy metals, Contamination, Rice grains, Safety limit, Health risks

SHRINKING OF FOREST COVER DUE TO MINING ACTIVITIES IN SARANDA FOREST

¹Kumar Peeyush and ² Mukherjee Prasanjit

¹Department of Environmental Science, Magadh University, Bodh Gaya, Bihar ²Department of Botany, K.O. College, Gumla, Jharkhand, Email: peeyush.kumar90@gmail.com

Saranda forest is a dense Sal tree (Shorea robusta) forest in West Singhbhum district of Jharkhand. It is spread over an area of about 820 km². Huge deposits of iron ore is found under the ground of Saranda forest. The forest is harboring a rich plant and animal wealth including a number of endemic and endangered species. It is the home of 28 species of mammals, 63 species of butterflies, 20 species of reptiles, 8 species of amphibians and 60 species of birds. It is a unique habitat of 11 species of Dendrobium genus. The flying lizard is found in the forest. Due to mining of iron ore, the forest is getting depleted. Land degradation, soil erosion, formation of sinkholes, loss of flora and fauna, contamination of soil and groundwater and many more problems have arisen in the forest. The existing mines have already destroyed many Sal trees. More than 1100 hectares of virgin forest have already been devasted due to iron ore mining. Sustainable and eco-friendly mining is the dire need in the present scenario to conserve the Saranda forest.

Keywords: Saranda forest, depleted, contamination, mining

OP-VI.08

ASSESSMENT OF CARBON STORAGE BY TREE SPECIES IN THE GIRNAR ECO-SENSITIVE ZONE, GUJARAT, INDIA: A COMPREHENSIVE QUANTITATIVE ANALYSIS

Bhatt ParthJ and 2Raviya Rajesh D.

Research Scholar, Department of Life Sciences, Bhakta Kavi Narsinh Mehta University, Junagadh

² Associate Professor, Department of Life Sciences, Bhakta Kavi Narsinh Mehta University, Junagadh

Climate change and carbon are inextricably related subjects. Carbon sequestration is one strategy to slow global climate change. The Eco-sensitive zone (ESZ) serves as a buffer zone between the sanctuary, national parks and protected areas. The average carbon storage of Indian forest is 99.99 t/ha while that of ESZ villages is 100.59 t/ha little higher than the national average. Roadsides, farm boundaries, religious sites, and village areas all have a role in tree hoisting in villages and these perameters are considered. The ESZ is recapitulated in detail, with results pertaining to geographic condition, population, density, family, genus, and species.

Keywords: Girnar Eco Zone, Tree Species, Carbon Sequestration.

IPR LITERACY FOR PLANT SCIENCE STUDENT-A REVIEW

Shrivastava Neerja and Rathore Neelkamal

Professor, Department of Botany, Government College, Kota, (Raj)

Now day it is realized that knowledge and awareness regarding Intellectual Property Rights (IPR) is an essential and important for innovation and progress of any country specially when our population is increase and for fulfillment of demand of our population lot of research and innovation are going on in plant science field. Protection of IPR is necessary to encourage continued investment in research and development and is important for bringing news innovations. Our research indicates that students of Plant Science are not very much aware about IPR and its tools. There is great challenge that how we can make awareness among our students so that we can protect their IP Rights. Present paper deals with these issues and make some suggestion that how IPR are important for student of Plant Science.

Keywords: Plant science, IPR, Literacy

OP-VI.10

IUCN RED LIST ASSESSMENTS FOR TWO ENDEMIC PLANT SPECIES FROM GUJARAT

Rana Karan Gopalbhai

Assistant Professor, School of Science, Navrachana University, Vadodara - 391410. Email-karanr@nuv.ac.in

In this contribution, the conservation status assessments of two vascular plants that are endemic to India are evaluated according to IUCN categories and criteria. It includes the assessment of *Tephrosia collina* V. S. Sharmaand *Tephrosia amragarenesis* Santapau at global level. *T. jamnagarensis* is currently restricted to Jamnagar district, Gujarat state, India. The species is assessed as critically endangered based on the criteria B1ab (i, ii, iv) +2ab (i, ii, iv) since it has a very restricted geographic range and is threatened by cattle grazing, a major threat in the region, which is resulting in the spread of invasive alien species such as *Senna uniflora*. *T. collina* has been assessed globally as Vulnerable based on the criteria VU B1ab (i, ii, iii, iv, v) +2ab (i, ii, iii, iv, v).

Keywords: Conservation, extinction risk, IUCN assessments, threats

OP-VI.11

MADHYA PRADESH-A TREASURE HOUSE OF CULTURAL AND BIOLOGICAL DIVERSITY

Sikarwar R. L. S.

Department of Environmental Science, A.K.S. University, Satna (M.P.) - 485 001 Email- rlssikarwar@rediffmail.com; sikarwarrls@gmail.com

Madhya Pradesh is situated in the centre of country, endowed with rich and diverse cultural and biological diversity. The biodiversity rich areas of Madhya Pradesh apart from national parks, wildlife sanctuaries and biosphere reserves are Chitrakoot, Patalkot, Bagh caves, Bori forest, Kuno Palpur, Narwar, Chambal Ravines, Panpatha, Kusmi, Parasmania, Narmada valley, and Tamia etc. Scrutiny of literature on floristic studies of Madhya

Pradesh reveals that this region is explored by large number British and Indian workers during 19th and 20th century. A total number of 2214 species under 930 genera belonging to 166 families are recorded from the state and reported in the Flora of Madhya Pradesh published in three volumes and one supplements. Large number of plants species have been added as new records to the flora of Madhya Pradesh. The tribal population is an integral part of the biodiversity since ages. There are 46 recognized tribes, constitute 21.9% of state population reside in and around the forests of Madhya Pradesh and utilize wide varieties of plant resources for their daily needs. But, the biodiversity of Madhya Pradesh is declining fast due to the degradation of habitats by heckles and indiscriminate cutting of forests for timber, fuel wood, expansion of agriculture, construction of roads, querying of stones, grazing, invasion of alien weeds, overexploitation of plants for medicines etc. Consequently, a large number of flora and fauna became threatened. Conservation of biodiversity with 12 National Parks, (6 are Tiger Reserves), 29 Wildlife sanctuaries and 3 Biosphere Reserves is done.

OP-VI.12

ROLE OF GRASSLANDS IN WILDLIFE HABITAT MANAGEMENT IN TADOBA AND HARI TIGER RESERVE, CHANDRAPUR MAHARASHTRA STATE, INDIA

Muratkar G. D. and P. A. Gawande

Assistant Professor, Department of Environmental Science, Arts, Science & Commerce College Chikhaldara Dist. Amravati, Maharashtra State mail gmuratkar@gmail.com Professor, Department of Botany S. G. B. Amravati University, Amravati, Maharashtra

Tadoba Andhari Tiger Reserve (TATR) is situated in Chandrapur District of Maharashtra State in India, the area is 1727.5 Sq. Km. with core area 625.40 Sq. km.and buffer area 1101 Sq. Km. 667 plant species in TATR and - Mammals - 80 species, Bird-280 species, Reptiles -54, Amphibians - 11, pisces-84. The grasslands of TATR are of three types smalle, intermediate and taller type with 81 different grass species, 6 wild leguminous plants, more than 20 weed species. The common grasses, are Dicanthium annulatum, D. caricosum, Ischemum rugosum, Cynodon dactylon, Chrysopogon aciculatus, Bothrochloa pertusa, Vitiveria zizaniodes, Heteropogon contortus. Grasslands of TATR with diversity of grasses with reference to change in texture, colour, pH of soil. Taller grasslands play vital role in breeding, resting, hiding habitat of wildlife; smaller grasslands for grazing habitat; intermediate grasslands for grazing, resting, hiding, nesting, browsing and veloving habitat of herbivores. Wild herbivores are classified into two parts on the basis of soft and course palatable grasses: soft feedder herbivores and course feeder herbivores. The grasses are different types annual, perennial, palatable, non palatable. The browsing plant tree species and bamboo play vital role in browsing habitat. Grasses are the architects of forest ecosystem and useful in wildlife habitat management.

Keywords: Grasslands, TATR, Wildlife Habitat

STUDY OF CALORIFIC VALUE OF ELEUSINE CORACANA L. OF NALANDA, BIHAR

¹Sinha S. N. Prasad and ²Chandra Subhash

¹Department of Botany, G.D.M. College, Harnaut, Nalanda, Bihar - 803110, ²Department of Botany, K.S.T. College, Salempur, Sohsarai, Nalanda, Bihar - 803118

The present study deals with calorific value of Eleusine coracana L. varieties VL-124 and VL-149 in Harnaut, Nalanda, District of Bihar. The calorific value of two varieties increased upto flowering stage. Calorific value in different parts of Eleusine coracana L. variety VL- 124 shows higher value in different stages of growth in comparison to variety VL-149.

Keywords: Calorific value, Eleusine coracana L., Bihar.

PP-VI.02

SUPPLEMENTARY EFFECT OF BIOFERTILIZERS ON NERVILIA CONCOLOR (BLUME) SCHLTR FROM WESTERN GHATS OF MAHARASHTRA

¹Gavit Mangesh P. and ²Khadke Shivram G.

Department of Botany, Bharati Vidyapeeth's Dr. Patangrao Kadam Mahavidyalaya, Sangli.

²Department of Botany, Smt. KasturbaiWalchand College, Sangli Email-mangeshgavit439@gmail.com and shiyramkhadke@gmail.com

Nervilia concolor (Blume) Schltr is terrestrial, perennial, deciduous, herb orchid, with an oval to almost spherical tuber. The white round fleshy rhizomes of the plant N. aragoana has a very diverse use such as in the treatment of epilepsy, in urinary complaints, diarrhoea and asthma; anticancer, antitumor, and effective on heart and gall bladder and found to possess narcotic effects. Due to its medicinal properties, exploitation of this plant is carried out on large scale. This study was conducted to determine the effect of supplementary biofertilizers on the growth of Nervilia concolor (Blume) Schltr. Results revealed that, different treatments involving combinations of biofertilizers and inorganic fertilizers highly influenced the growth characters of the plant. The tuber size obtained was the largest for Diammonium Phosphate with Trichoderma. This treatment also improved leaf area, dry matters. This study helps for conservation and sustainable production of Nervilia concolor (Blume) Schltr.

Keywords: Orchid, Nervilia, Rhizome, Biofertilizers, Trichoderma, Dry matter.

A WEED MAPPING FRAMEWORK FOR THE INDIAN WILD LIFE SANCTUARY REGION AT BHAINSRORGARH

Rathore Neelkamal and Singh Pushpendra

Associate Professor, Faculty of Botany, Government P.G. College, Kota – 324001, Rajasthan

Email: neelkamalrathor@gmail.com, ppsb4441@gmail.com

As agriculture plays a significant role in Indian Economy, it is very important that farmers are provided with all necessary information and support to maximize their yield. In this regard, weed management plays a significant role in enhancing the quality of the yield. Weeds compete with the crops for space, nutrients from the soil, water and space which are the primary factors for growth of crops. The objective of this study is to analyse the weeds in the Bhainsrorgarh wild life sanctuary region situated in the Chittorgarh district in South East Rajasthan. The people living in more than 20 villages in this region are dependent on agriculture for their livelihood. The occurrence of weeds depends on the season, life span and the location. Hence, morphological analysis of 15 types of weeds for their diversity indices, richness index, frequency, relative density and importance value index were studied. The findings of the study will benefit the forest department and the local community in understanding the impact of these weeds on their harvest and thereby help the decision makers towards an effective and efficient control on weed management.

Keywords: Weed analysis, Morphological analysis, Bhainsrorgarh Wild Life Sanctuary

PP-VI.04

DIRECT AND INDIRECT EFFECTS OF SOIL CHARACTERS ON TREE DIVERSITY OF GONDIA DISTRICT FOREST

Kawale Mahesh

Dhote Bandhu Science College, Gondia kawalemahesh@gmail.com

Gondia is a forest dominated district of Maharashtra situated at extreme eastern end. The district is well-known for its biodiversity which is also proved by the presence of two protected areas i.e., Navegaon Bandh National Park and Nagzira Wildlife sanctuary. Physical and chemical properties of soil play an important role in establishing various kinds of vegetation. It has been observed through literature review that there is no research on the relationship between soil properties and tree diversity of Gondia district. Hence, keeping this objective in mind, soil properties of different Gondia forests were determined using standard laboratory methods, and diversity of trees was analyzed by using quadrate method. Important Value Index (IVI) and different diversity indices were used to indicate tree species dominance and diversity respectively. *Madhuca indica*, *Diospyrous melanoxylon* and *Cassia fistula* were found dominant in all the studied sites. The paper explains the direct and indirect correlation between various soil parameters and tree species diversity.

Keywords: quantitative analysis, IVI, soil properties, diversity indices

FOREST MANAGEMENT IN INDIA THROUGH FOREST CONSERVATION ACTS

1Sharma Rekha and 2Anil Kumar

¹Department of Botany, SLBS Degree College, Gonda ²Feroze Gandhi College, RaeBareli (U.P.)

Forest play very important role in the in the conservation of natural ecosystem and maintain ecological balance for the survival of life on the earth. However, with increase in the population and other developmental activities forests need legal protection so that its area should be maintained at sustainable level for preservation and conservation of forests in India. The Indian Forest Act, 1927 was introduced. Realizing the inefficiency of Forest Act, 1927 that was enacted during British Regime, the Indian Government introduced Forest Conservation Act, 1980 through Parliament. Now this act is amended and Forest Conservation Act, 2023 has been introduced considering the need for some relaxation on the tight rules against any disturbances in the forest land. The present paper discuss pros and cons of the all forest conservation act and its amendments since 1980 on forest resources of the country and its impact on Forest Cover, biodiversity conservation and climate change.

Keywords: Forest management, conservation, Forest Acts, Ecological balance

PP-VI.06

EVALUATION OF ANTIOXIDANT PROPERTIES OF SOME WILD EDIBLE PLANTS BYPHOSPHO MOLYBDENUM ASSAY

Rathod S. A., Wath M. R.* and Pophale V. V.

Department of Botany, Shri Shivaji College of Arts, Commerce & Science, Akola (MS).

* Department of Botany, Government Vidarbha Institute of Science & Humanities,
Amravati (MS).

Email Id- shubhamarathod95@gmail.com

Wild edible plants potentially have a variety of phytochemicals along with nutritional values; which makes them precious from a nutraceutical point of view. Most of the wild edible plants reported that they have an antioxidant property along the nutritional profile. Edible plants along with antioxidant properties may reduce the risk of some crucial diseases like diabetes, cancer, and disease-associated complications. In the current study, the antioxidant evaluation of wild edible plants like *Oxalis corniculata* Linn., *Cocculus hirsutus* (L.), and *Boerhavia repens* L. was done by using Phospho-Molybdenum assay. All these plants showed significant antioxidant activity ranging from 85.68 to 92.09%, highest in *Boerhavia repens* L. The results indicate that these plants could be used as sources of antioxidants, however the phytochemical analysis and pharmacological testing is essential. *Keywords:* Wild edible plants, antioxidant activity, Phospho-Molybdenum assay, *Oxalis corniculata* Linn., *Boerhavia repens* L. and *Cocculus hirsutus* (L.).

POLLUTION OF SOUTHERN COAST OF WEST BENGAL AT THE MOUTH OF THE RIVER GANGES

Das Prerana, Das Trisha, Chatterjee Bidisha and Mitra Arup Kumar Department of Microbiology, St. Xavier's College (Autonomous), Kolkata, Correspondence: mnpdas03@gmail.com

Coastal waters are economically important housing diverse groups of microorganisms that need to be assessed. However, cumulative impact of various pollutants from anthropogenic sources as well as natural processes like sedimentation poses a substantial threat to the marine ecosystem. In this regard, the current study aims to analyse the bacterial load present in the waters of the lower delta plain of the Ganges-Brahmaputra delta in the Bengal basin and critically evaluate the pollution status of the coastal waters surrounding a coastline of 210 km of West Bengal covered by the Bay of Bengal. The study, sample of seawater at the depth of 5 inch was collected from Bakkhali, situated in the South 24 Parganas district along the coast of West Bengal, and physicochemical parameters were assessed. The bacterial colonies were characterized and used to conduct various studies such as salt tolerance experiments, antibiotic sensitivity tests, pathogenicity screening and several enzymatic assays like protease and lipase. The bacteria preferred growing in saline conditions (> 2% salt concentration), few of which exhibited haemolytic properties and supposed virulence upon further screening by performing siderophore and enzymatic assays. This study further aims of evaluating the probable pathogenicity and potential toxic properties of such bacterial strains isolated from the coastal areas of West Bengal which will bridge the current gap in the knowledge of the impact of these halophilic organisms on the environment and their implication in human health and the economy of that particular geographical region.

Keywords: Coast of West Bengal, Halophilic bacteria, Virulence, Environmental concern

PP-VI.08

INCREASING CONTAMINATION OF SEASIDE WATER DUE TO SEWAGE POLLUTION IN MANDARMANI, WEST BENGAL

Ghosh Sampurna, Chatterjee Bidisha and Mitra Arup Kumar

¹Department of Microbiology, St. Xavier*s College (Autonomous), Kolkata

Correspondence: ghoshsampurna529@gmail.com

Marine microorganisms encompass a wide range of bacteria fungi, and viruses. Mandarmani is a popular seaside destination situated in the state of West Bengal, India. It is known for its long and pristine beach that stretches kilometres and offers picturesque views of the sea and surrounding landscape. It is a perfect destination for a huge number of tourists every day and is home to a wide range of marine animals and plants. In the current study, seven different microorganisms have been isolated from a water sample of Mandarmani. The present research has investigated the probable pathogenicity of the microorganisms. In order to do so, a predictive analysis of the pathogenicity of the microorganisms and various enzymatic tests have been performed including protease and lipase. The research has also focused on the capability of these microorganisms to haemolyse blood cells, and siderophore assays have also been performed to determine their probable pathogenicity. The findings of the study have indicated probable pathogenicity of

some of the isolated organisms. Some of them have shown haemolytic properties while some of the organisms have shown protease, siderophore, and lipase activity as probable virulence factors. At present, there is still a lack of comprehensive studies focusing on the pathogenicity of such strains isolated from the coastal regions of West Bengal. The current study aims to address the research gap in pathogenicity associated with marine microorganisms that can act as a scaffold for future research in undertaking the pathogenicity of marine microorganisms and their implications for human health.

Keywords: Marine Microorganisms, Sewage Pollution, Pathogenicity, Environmental pollution

PP-VI.09

INVASIVE ALIEN PLANTS OF GORAKHPUR DISTRICT, TERAI REGION OF EASTERN UTTAR PRADESH, INDIA

Singh Sneha*, Datta Arunava and Madhukar Virendra K.

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

¹Department of Botany, St. Xavier's College, Dr. CamilBulcke Path, Ranchi-83400, India

Email-snsneha1011@gmai.com

Invasive alien plants pose avital threat to ecological community; agricultural productivity as well as human well-being. The intensity and impact of these plants are increasing on biodiversity every year in the invaded ecological community. Gorakhpur district is the most developed district of the Terai region of eastern Uttar Pradesh and situated adjacent to an international boundary of Nepal. The precise identification and documentation of these plants are crucial for future research and management activities. During intensive field survey a total 58 alien plants species are listed, considered under 25 angiosperm families of which 15 alien species are invasive possess high impact, 37 alien species are naturalized having moderate impact and 6 alien species are casual having low impact over ecological communities. All the invasive plants are not equally problematic and spread cross the district while some of them viz. Ageratum houstonianum Mill., Alternanthera philoxeroides (Mart.) Abh., Chromolaena odorata (L.) R. M. King & H. Rob., Mesosphaerum suaveolens (L.) Kuntze., Mikania micrantha Kunth Nov., Parthenium hysterophorus L., Pontederia crassipes Mart., Antigonon leptopus Hook, & Arn., Lantana camara L., are spread most part of the district and they are highly potent to spread protected area of this region.

Keywords: Invasive, Naturalized, Alien plants, Terai Region, Eastern Uttar Pradesh

ASPECTS OF POLLINATION BIOLOGY IN TURNERA ULMIFOLIA L. (TURNERACEAE)

Gadkar Pranav V. and Dhore Mukund M.

Department of Botany, BapuraojiButle Arts, Narayanrao Bhat Commerce and Bapusaheb Patil Science College Digras.445203 pranavgadkar@gmail.com

Turnera ulmifolia L. is a distylic flowering subshrub native to Mexico, the West Indies, and exotic species in India. We investigated the pollination biology of a population in the Digras tehsil of the Yavatmal district, focusing on effective pollinators. The flower attracted 13 different insect species, the majority of which were bees. Several bees, including Xvlocopa latipes, Apisdorsata, Apis mellifera, and Apis Cerana indica have been observed to be effective pollinators. The flower also attracted majority of butterflies. Extra floral nectaries also reward some ant pollinators which is ffective for seed set. Because of the abundance of insect pollinators on Turnera ulmifolia, some neighbouring flowering plants benefits as well. These yellow flowers bloom at 6 a.m. and wilt at 11.30 a.m. The flower has a lifespan of about 6 hours. The larvae of the Tawny Coster (Acraea tepsicore) butterfly feed on these plants.

Keywords: Turnera ulmifolia, distyly, Exotic species, Pollination biology, pollinator, Extra floral nectaries.

PP-VI.11

TREE SPECIES DISTRIBUTION ALONG THE RIPARIAN ZONE OF RIVER PANCHGANGA

Gurav Swati A. and Gurav R. V.

Department of Botany, Shivaji University, Kolhapur, 416004 Email- botanyraj@rediffmail.com

Panchganga river is important tributary of Krishna River in Kolhapur district. It is formed at Prayag Chikhali near Kolhapur by five tributaries which are Bhogavati, Dhamani, Tulsi, Kumbhi and Kasari. The plant diversity along the riparian zone of river Panchganga has multiple taxonomic groups with various peculiar characters. The study area comprises 81km, of the riparian zone including both the sides. The study includes survey, collection, identification and preparation of herbarium specimens and documentation of primary data. Mapping trees along the riverbanks by using GPS (Global Positioning System) along with their altitude, longitude and latitude. At present the tree diversity of the riparian zone of river Panchganga having total 25 species recorded belongs to 11 families of Angiosperms. Keywords: Riparian, Diversity, Survey, Mapping, GPS.

RIPARIAN TREE SPECIES DIVERSITY AND DOMINANCE IN DUDHGANGA RIVER: INVESTIGATING SOIL EROSION AND DESTRUCTION SITES

Chavan Sachin and Gurav R. V.*

Department of Botany, Shivaji University Kolhapur Email: *botanyraj@rediffmail.com

Riparian vegetation, thriving at the interface between terrestrial and aquatic environments. This study highlights the rich diversity of tree species in dudhganga river's riparian zone, with 67 species from 25 families identified through extensive field surveys from january 2021 to june 2023. Riparian vegetation significantly contributes to water purification and nutrient cycling, benefiting the river's health and surroundings. However, urgent conservation measures are essential as 57 destruction sites, 155 soil erosion points, and 17 soil extraction sites were observed, threatening the ecological balance. Preserving these habitats is crucial for sustainable development and safeguarding these vital ecosystems from human activities and environmental changes.

Keywords: Diversity, Dominance, Tree species, Soil erosion, Dudhganga river

PP-VI.13 NANO-PESTICIDES: OVERVIEW, SYNTHESIS, INTERACTION WITH PESTS AND PLANTS, ENVIRONMENTAL RISKS AND FUTURE PERSPECTIVES

Kapil Vandna and Thakur Sveta*

Department of Biosciences, Himachal Pradesh University, Shimla *Correspondence author email: svetathakur19@gmail.com

Excessive use of chemical pesticides poses a risk to human health and the environment. Majority of them end up polluting instead of achieving their intended goals. This results in pesticide poisoning, claims 300,000 lives each year, and is a significant public health problem. We require ecological methods to handle these issues. With improved pesticide action, tailored release, and financial viability, nano-pesticides have become ground-breaking advancements in agricultural research. Extensive applications still face difficulties, though. By taking into account synthesis processes, pest-plant interactions, etc. we must evaluate efficacy and long-term biosafety of nano-pesticides. To encourage this still, more research is needed.

Keywords: Agriculture, Nanotechnology, Nanopesticides, Sustainable development, Phytoremediation

SPECIES COMPOSITION, RICHNESS, DIVERSITY AND EMPHASIS OF SOIL NUTRIENTS IN JARIDA RANGE FOREST

Saudagar S. A. A. G. and Manik S. R.

Department of Botany, Sant Gadge Baba Amravati University, Amravati. E mail- sa.saudagar67@gmail.com

The diversity of plant community is an essential attribute to the terrestrial ecosystem which is significant to know the productivity of the ecosystem. The present investigation refers to study of plant communities in selected stands of Melghat forest, District Amravati. Among 4 ranges of East Melghat, Jarida forest range was selected with its four stands. It is situated in Amravati district between 21°36 N' and 77°28' E latitude with an area of 18127.97 hectors. During the study 96 species belonging to 43 families were recorded. The highest species richness was recorded at Mehriaam and least at Kamida. The mean IVI value for Jarida range exhibited between 36.93 to 167.50. The highest value of IVI was found to be in order Climbers, Shrubs, Trees, Grasses, Herbs respectively. The mean value of basal area was recorded as 333.00 m²/Ha and stand density as 1378.125 no. of trees/Ha. The Simpson Index of dominance and Shannon-Wiener index of diversity ranged from 0.662 – 0.763 and 3.085 – 4.979. The study concluded that soil nutrients have great influence on species diversity.

Keywords: Community, Shannon-Wiener index, Basal, Dominance, Influence.

PP-VI.15

PESTICIDAL EFFECT OF OLEO-GUM- RESIN FROM FERULA ASAFOETIDA ON THE AGRICULTURE PEST SPODOPTERA LITURA

Gupta Komal, Pandya Parth and Elizabeth Robin

Department of Biomedical and Life Sciences, School of Science, Navrachana University, Vadodara, Gujarat

The genus Ferula is one of the largest genera of the Apiaceae family which encompasses about 170 species distributed in Central Asia, Mediterranean countries and Northern Africa. These species produce a sort of milky latex or translucent oleo-gum-resin which turns to yellowish-brown when exposed to air. This exudate is made up of three fractions comprising of volatile oils, gums and resins. These products which exude spontaneously from the duct channels occurring in the plant taproots can also be obtained by incision. The exudate has a very strong odour due to sulphurous and balsamic compounds present in them which gives them a bitter taste and are frequently used in traditional medical systems as well as in foodstuffs, perfumery and cosmetics. In some parts of Iran and India, these oleo-gum-resins have widely been used as an insect or pest repellent due to their strong odour. Ferula asafoetida has also been used for fumigation purposes which aids in killing of pests moreover feeding on agricultural plants. Spodoptera litura is a highly polyphagous species that feeds on hosts from at least 40 different plant families such as Cucurbitaceae, Fabaceae, Malvaceae, and Solanaceae which contain economically significant crops. Larvae feed primarily on leaves and then completely defoliate the area and gradually almost all the other parts are then consumed at high population densities. This study was undertaken to test the toxicity of Ferula asafoetida on Spodoptera litura. Healthy individual adult insects were divided into groups thereafter, the compound was applied and the insects were monitored. The tested compound showed positive effective outcome results in the LC50. This study could be pioneer research for the formulation of bio pesticides, a healthy alternative approach for sustainable agriculture.

Keywords: Ferula asafoetida, Spodoptera litura, Pesticidal Activity, Toxicity, Sustainable Agriculture

PP-VI.16

ACTIVATED CARBON PREPARED FROM ANIMAL WASTE AS ENVIRONMENTALLY EFFICIENT ADSORBENT AND SUSTAINABLE MATERIAL FOR SEVERAL DIFFERENT TREATMENT APPLICATIONS

¹Manik Vivek S. and ²Gudadhe Swapnil K.

Department of Environmental Science, Gramgeeta Mahavidyalaya, Chimur. 442903
Department of Environmental Science, Dr. Khatri Mahavidyalaya, Chandrapur.

The activated carbon is a non-hazardous, processed carbonaceous adsorbent with a porous structure and a significant internal expanded surface area. Fossil fuels, agricultural wastes, animal waste, and other inputs can be utilised to synthesise activated carbon. Conventional pyrolysis technique has some drawbacks like lengthy processing, non-uniform heating, low yields etc. which can be removed by using microwave heatingin which both internal and volumetric heating resulting in direct and rapid heating, high yields and environment friendly technique. Herein, in this review, special attention has been paid to the use of animal waste to explore its efficiency in preparing powdered activated carbon by conventional and non-conventional Pyrolysis technique and microwave induced treatment and comparing both the techniques. The products will be characterized for various quality control parameters and evaluation of adsorption efficiency for removal of different pollutants.

Keywords: Activated Carbon, Animal Waste, Pyrolysis, Microwave technique, Adsorption Efficiency. XLVI ALL INDIA BOTANICAL CONFERENCE of THE INDIAN BOTANICAL SOCIETY SECTION - VII Plant Physiology and Biochemistry Synergy in Plant Science and Sustainable Future: 2023



MICROPLASTIC POLLUTION IN AGROECOSYSTEM: IMPACTS AND BIOREMEDIATION WITH PGPRS

Chandel Riya and Thakur Sveta *

Department of Biosciences, Himachal Pradesh University, Shimla Email- syetathakur19@gmail.com

The miniature size and inadequate management of new-age white pollutants i.e., microplastic (MP) have posed a major threat to our agroecosystem. The one possible solution to this problem could be microbes-based remediation. Some recent studies have highlighted the potential role of plant growth-promoting Rhizobacteria (PGPRs) as a specialized group of microbes capable of MP degradation and alleviation of plant stress in MPs-contaminated soil. However, the mechanism behind their remediation action is still unexplored. By conducting a thorough review of scientific literature and experimental studies of their mechanism, PGPRs could be used as promising weapons for MPs' remediation from agroecosystems.

Keywords: Microplastic pollution, Agroecosystems, Bioremediation, PGPRs, Sustainable

OP-VII.02

GC-MS ANALYSIS OF ESSENTIAL OIL IN ORTHOSIPHON BIFLORUS (A. J PATON AND HEDGE) FROM CHIKHALDARA

Nathar, V. N and Panchariya, S. S.

Department of Botany, S.G.B. Amravati University Amravati, 444602 (MS)

Corresponding author – varshanathar@sgbau.ac.in

Orthosiphon, a member of family Lamiaceae is native to Asia, Africa and Queensland, with only one species O. americanus (Harley & A. J. Paton) in Colombia. There are 40 species of genus Orthosiphon. Orthosiphon biflorus was collected from Melghat region. The present study was aimed to investigate GC-MS analysis of volatile constituents in Orthosiphon biflorus. The hydro – distilled essential oils from leaves of Orthosiphon biflorus was examined to determine its chemical compositions. The essential oils were analyzed by Gas Chromatography coupled with Mass Spectroscopy. Total 14 in Orthosiphon biflorus were identified. Trans-2, 3-Epoxyoctane (49.53%); Oxirane, 2-methyl-3-propyl, Trans- (12.58%); Copaene (5.12%); D-Limonene (4.01%) were major compounds in Orthosiphon biflorus which are reported for the first time. They revealed several biological properties which include cytotoxicity, antioxidant, anti – inflammatory, anti – bacterial activity respectively.

Keywords: GC - MS Analysis, Essential Oil, Orthosiphon biflorus, Volatile Compounds.

EMERGING TECHNOLOGIES FOR IMPROVING POST-HARVEST SHELF LIFE AND QUALITY OF FRUITS AND VEGETABLES

T. V. Ramana Rao

Department of Food Technology, Vignan's Foundation for Science, Technology & Research

(Deemed to be University), Vadlamudi, Guntur, Andhra Pradesh -522213, INDIA. drtvrr ft@vignan.ac.in

The study by ASSOCHAM estimates India's post-harvest losses at Rs 2.50 lakh crore in FY14. Existing storage techniques for horticultural products have limitations and costs, leading to a search for alternative post-harvest technologies. Multi-component edible coatings offer a potential solution, acting as a semi-permeable barrier to water vapor and gases, delaying ripening and reducing quality changes and quantity losses. These coatings can incorporate additives like antioxidants and antimicrobials to enhance functionality. Additionally, post-harvest elicitor treatments such as irradiation and electrolysed water can enrich fruits and vegetables with phytochemicals, promoting their consumption as fresh market products or for functional foods and supplements. The talk will cover recent trends in post-harvest preservation using emerging technologies.

Keywords: edible coatings, elicitors, fruits, post-harvest, preservation, vegetables

OP-VII.04

UNVEILING POTENTIAL ADAPTIVE STRATEGIES OF WITHANIA SOMNIFERA AND WITHANIA COAGULANS IN RESPONSES TO UV-B RADIATION

Tiwari Anjali, Tripathi Saumya and Pandey Neha

Department of Botany, CMP College (A constituent PG College of University of Allahabad), Prayagraj.

This research investigates the impact of UV-B radiation on *Withania somnifera* and *Withania coagulans*. UV-B radiation triggers adaptive mechanisms, inducing the synthesis of secondary metabolites, like flavonoids as defense mechanisms in plant cells. The present study demonstrates differential responses of both the species of *Withania*against UV-B stress, Different parameters including antioxidative enzymes & secondary metabolites, their expression and storage in glandular trichomes were found to be different in UV-B treated *W. somnifera*and *W. coagulans* suggesting their different survival strategies. The results gave an idea about why *W. coagulans* considered endangered while *W. somnifera*thrives well in the similar climate.

Keywords: Withaniasomnifera, Withaniacoagulans, UV-B radiation.

SEASONAL VARIATION OF METABOLITES IN MESOSPHAERUM SUAVEOLENS (L.) KUNTZE. AND OCIMUM BASILICUM L

¹Riddhi M., ²Parth P. and Monisha K*

School of Science, Navrachana University, Vasna Bhayli Road, Vadodara – 391410, Gujarat, India Email- monishak@nuv.ac.in

Lamiaceae is a large family comprising of species rich in Phenolics, Flavonoids and an enormous amount of volatile essential oils such as monoterpenoids, sesquiterpenoids and diterpenoids. Due to their aromatic properties, they have a wide array of applications in medicines, fragrances, and cosmetics. The present study is aimed at the study of comparative seasonal variation in the levels of Total Terpenes in *Mesosphaerum suaveolens* (L.) Kuntze. and *Ocimum basilicum* L. by GC-MS (Gas Chromatography Mass Spectrometry) and study of metabolites by LC-MS. The Total Phenolics were found to be highest in the monsoon samples for *Mesosphaerum suaveolens* (L.) Kuntze. at 6mg/ml and in the summer samples for *Ocimum basilicum*L. at 7.8mg/ml. Total Flavonoids were to be highest in summer samples in both the plants with 3.7gm/ml and 5.4gm/ml in *Mesosphaerum suaveolens* (L.) Kuntze. and *Ocimum basilicum* L. respectively. Total Terpenoids were found to be highest in the summer samples in both plants with 69mg/ml and 62mg/ml in *Mesosphaerum suaveolens* (L.) Kuntze. and *Ocimum basilicum* L. respectively.

Keywords: Mesosphaerum, Ocimum, Phenolics, Flavonoids, Terpenoids, GC-MS (Gas Chromatography Mass Spectrometry), LC-MS

OP-VII.06

PHYTOCHEMISTRY AND BIOLOGICAL ACTIVITIES OF RAPHANUS CAUDATUS PODS

Ashok Rachael and Denni Mammen

School of Science, Navrachana University, Vasana-Bhaili Road, Vadodara-391410, India.

This research investigates the total phenolic content, total flavonoid content, antioxidant and antibacterial activities of plant extracts derived from pods of rat-tail radish (*Raphanus caudatus*). The total phenolic content, total flavonoid content and the antioxidant activity of the methanolic extract was found to be greater than the aqueous extract. HR-LC-MS analysis of aqueous extract indicated important endogenous metabolites such as neurotransmitter γ-aminobutyric acid, plant hormone indole 3-acetic acid, nicotinic acid and flavonoids Apigenin, Luteolin, Kaempferol, Quercetin, Taxifolin and the purple pigment Cyanin. Phenolic acids such as Salicylic acid, Gentisic acid, Caffeic acid and Protocatechuic acids were also identified. The plant also showed 16 amino acids, apart from Methyl Xanthines such as Theobromine and Theophylline. The IC₅₀ values obtained by the antibacterial activities suggested promising antibacterial properties in the aqueous extract which can help combat oxidative stress and bacterial infections.

Keywords: Raphanus caudatus, phenolics, flavonoid, antioxidant potential, antibacterial activity

COMPARATIVE ACCOUNT OF VERBASCOSIDE AND STIGMASTEROL CONTENTS FROM THE SELECTED ENDEMIC BARLERIA SPECIES

Otari Shreedhar S., Lekhak M. M. and Ghane S. G. *

Plant Physiology Laboratory, Department of Botany, Shivaji University, Kolhapur, India. Email- sgg.botany@unishivaji.ac.in

The genus Barleria L. (Acanthaceae) has 285 species in Asia and Africa of which 30 are found in India. In the present study, we aimed at HPLC analysis of two medicinally important compounds, viz. verbascoside (V) and stigmasterol (S) from nine endemic species. The HPLC analysis involved testing of various solvent systems, and methods for the separation and detection of bioactive compounds. In the study, separation of V and S was carried out using mobile phase consisting of aqueous methanol (10:90 v/v) and acetonitrile (30:70 v/v), respectively. Both these compounds were detected at 320 and 210 nm, respectively. At the same time, HPLC analysis of V and S include flow rate of 1 ml/min, an injection volume of 20 µl, and a total run time of 20 minutes. The highest V content (28.36±0.010 mg/g DW) was reported from the methanol extract of B. prattiana whereas, B. involucratavar. elata had the lowest (0.30±0.010 mg/g DW) content. Among all the endemic taxa studied, B. buxifoliais highlighted as the most promising species in terms of S content (83.13±0.011 mg/g DW). These findings suggested that endemic Barleria species have promising pharmacological potential due to the presence of verbascoside and stigmasterol contents. Ongoing and future research on the taxa including synthetic methodologies and exploration of unexplored species will expand our understanding of these compounds and their potential applications in medicine and biotechnology.

Keywords: Acanthaceae, Barleria, Endemic, HPLC, Stigmasterol, Verbascoside

OP-VII.08

ULTRASOUND ASSISTED EXTRACTION AND OPTIMIZATION OF TETRACYCLIC TRITERPENES (CUCURBITACINS) FROM THE FRUITS OF LUFFAECHINATA ROXB.

Patel Suraj B., Otari Shreedhar S. and Ghane S. G.*

Plant Physiology Laboratory, Department of Botany, Shivaji University, Kolhapur, India. Email- sgg.botany@unishivaji.ac.in

Luffa echinate Roxb. is a neglected medicinally important climber commonly called as Bristly luffa. It is known for vital source of medicinally active substances including cucurbitacins (CUs). Which exhibit various medicinal properties like anticancer, antioxidant, anti-inflammatory etc. In the present analysis, three tri-terpenes (cucurbitacins) viz. CUI, CUB, CUE and CUI+B+E (total cucurbitacins) were optimized using RSM. Independent factors like extraction time (s), solute to solvent ratio (g/mL), particle size (μm) and amplitude (μm) of probe were considered and their combined effects on recovery of three cucurbitacins were studied. RSM together with Ultrasound assisted extraction (UAE) method was used to study the recovery of CUs. Design matrix of total 28 combinationswas obtained with different levels of CUI, CUB, CUE and CUI+B+E. Under suggested conditions, run number 12 (40 s extraction time, 1g/mL SS ratio, 125μm particle size and probe amplitude of 20μm) represented the maximum CUI (1.7±0.2 mg/g), CUB

(535.1±11.2mg/g), CUE (204.7±2.6mg/g) and total cucurbitacin (741.5±14.1mg/g) contents. Similarly, values of regression coefficient and adjusted regression coefficient in all tested models were very close to each other which suggested the use of proposed model for the optimized production of CUI, CUB, CUE and CUI+B+E. Additionally, p value of all tested models found less than 0.05, indicated significance of models. Under model predicted combinations, experiment was performed wherein model predicted values and experimental values were very close; hence, the adequacy of model proved and used for extraction.

Keywords: RSM, Cucurbitacin, Luffa echinata, UAE, Bristly luf

OP-VII.09

MELATONIN SUPPLEMENTATION ALLEVIATES CADMIUM TOXICITY THROUGH THE ADJUSTMENTS OF PHYSIOCHEMICAL PROPERTIES AND IMPROVED ASCORBATE-GLUTATHIONE PATHWAY ACTIVITY IN HORDEUM VULGARE L

Barwal Sandeep Kumar, Goutam Chanchal, Chauhan Chandrika, Singh Ishwar and Y. Vimala

Pant Physiology and Tissue Culture Laboratory, Department of Botany, Chaudhary Charan Singh University Meerut India, Email- yvimala17@gmail.com

The global productivity of agriculture has been significantly affected by heavy metal contamination. One of the heavy metals, that poses the greatest risk to plants is cadmium (Cd). Plants commonly contain the signalling chemical melatonin (MT), which can support their ability to withstand abiotic stressors especially heavy metals. N-acetyl-5methoxytryptamine, often known as MT, is a common chemical found universally in all living organisms. MT is known as a biostimulator of plant growth, particularly in stressful environmental situations. In this work, we examine the effects of MT on barley (Hordeum vulgare L.) growth and development under different concentrations of cadmium stress (0.1, 0.5, land 1.5 mM) was evaluated Cadmium markedly reduced the growth, biomass, chlorophyll content and significantly raised the enzymatic antioxidants (SOD, POX, CAT, APX, GR), non-enzymatic antioxidant metabolites (AsA, carotenoids, total phenolic, protein, proline content), hydrogen peroxide (H2O2) and the stress indicator malondialdehyde (MDA) content. Foliar application of 100 µM MT administered topically, both control and Cd stressed plants significantly improved growth traits, enzymatic, nonenzymatic antioxidants and protein, proline, phenolic content whereas, decreased the H2O2, and MDA content. ML treatment may therefore be thought of as a successful strategy for reducing Cd absorption and its negative effects in Hordeum vulgare plants cultivated in polluted soils. In conclusion, this study demonstrated that MT could alleviate the negative effects of Cd stress on Hordeum vulgare.

Keywords: Melatonin, Antioxidants, Cadmium, ROS, Proline

OP- VII. 10

SCREENING OF PHYTOCHEMICALS AND THE ANTIMICROBIAL POTENCY PRESENT IN DIFFERENT VARIETIES OF CHICKPEA (CICER ARIETINUM L.)

Juhi Anila

Institute of Biosciences and Technology, Mahatma Gandhi Mission University, N-6 CIDCO, Aurangabad-431001, Maharashtra, anila.juhi@gmail.com

Plants are rich source of healthy and important nutrients as well as biologically active compounds referred to as phytochemicals. These chemicals have played dominant role in maintaining human health since ages. Legumes are crops belonging to family Leguminosae, also called as Fabaceae. They are mainly cultivated for their edible seeds and thus are named grain legumes. Chickpea is generally consumed as a seed food, and is a good source of protein and other essential human nutrients. Chickpea (Cicer arietinum L.) has recently been shown to have antioxidant, antibacterial, anticancer and antidiabetic activities. This article presents information on the chemical components of Chickpea (Cicer arietinum L.) and their antibacterial activity in relation to potential medicinal uses. Keywords: Cicer arietinum, phytochemical constituents, antimicrobial activity.

OP-VII. 11

FOLIAR APPLICATION OF CHITOSAN NANOPARTICLES MODULATES PLANT GROWTH AND HELPS TO CONTROL THRIPS INFESTATION IN CAPSICUM SPP

1,2 Mawale Kiran Suresh and 1,2 *Parvatam Giridhar

¹Plant Cell Biotechnology Department, CSIR-Central Food Technological Research Institute, Mysuru-570020,

²Academy of Scientific and Innovative Research (AcSIR), Ghaziabad -201002, India. Email- mawalekiran@gmail.com

The study aimed to determine the physiological and biochemical impacts of chitosan-based nanoparticles on *Capsicum amnuum*. The foliar study with different concentrations of nanoparticles (CS, CSAg, and CSCu) indicates protection against thrips (70-85%) and improvement of physiological characteristics. The foliar application of NPs shows improvement in chlorophyll (20-75%), carotenoids (20-30%), total phenolic content (20-45%), total flavonoids content (40-125%), reducing sugars (15-40%), total antioxidant activity (10-82%), FRAP (10-100%), DPPH (76-83mg ml⁻¹) activity increased. The major pungency metabolite of *C annuum* i.e., total capsaicinoids (125-142%) increased compared to CS and control treatments. The results obtained in this study suggest that chitosan-based nanoparticles are suitable for sustainable agronomic improvement.

Keywords: Foliar spray, nano-pesticide, infestations, phytochemicals.

OP VII.12

PHYTOCHEMICAL AND ESSENTIAL OIL PROFILING OF POGOSTEMON SPECIES

Momin Sobiyanaz and Gurav R.V.*

Department of Botany, Shivaji University, Kolhapur (MS) 416004 Email: rvg_botany@unishivaji.ac.in

The first written document pertaining to the genus Pogostemon was given by Van Rheede (1678-1693) in his monumental work, 'Hortus malabaricus'. The Genus Pogostemon Desf.as described by Desfontains (1815) was considered as a distinct genus of the family Lamiaceae. It is globally represented by 96 species (Mabberley, 2005). India has the highest number of Pogostemon species in the world, is represented by 56 taxa (53 species and 3 varieties), of which 22 taxa (19 species and 3 varieties) are endemic. Pogostemon cablin (Patchouli) is the only one species in this genus currently commercially cultivated for its essential oil, which is extensively used in cosmetics. Currently 200-300 kinds of essential oils traded in the global market. India is the third largest producer of essential oils in terms of quantity that contribute about 16% of the total production of the world. The patchouli oil is one of themPatchouli oil possesses a distinct heavy, woody, earthy scent with hints of mustiness and camphor. At present, India's annual consumption of patchouli oil ranges from 200 to 300 tonnes, with a significant amount being imported from countries such as Indonesia, Malaysia, China, and Singapore, Despite India's abundant diversity in Pogostemon species, there has been no scientific investigation to determine their suitability for commercial use. Therefore, it is crucial to conduct bio prospecting of this genus in order to assess the potential of indigenous species. Patchouli is grown for commercial purposes in Karnataka, Maharashtra, Kerala, Goa, Gujarat, and Assam in India. India's existing infrastructure and conducive environment create a favourable setting for capturing a significant share of the global market. The study involved the phytochemical analysis and essential oil profiling in Pogostemon species using GC-MS.

Keywords: Pogostemon, Phytochemical, Essential Oil, Global market, GC-MS, Patchouli.

OP VII.13

UNLOCKING THE MYSTERIES OF KALI JEERI LEAF ANATOMY: A COMPREHENSIVE INVESTIGATION

Kothari Saloni and Chachad Devangi Parag

Botany Department, Jai Hind College (Autonomous), 'A' Road, Churchgate, Mumbai – 400001

Baccharoide santhelmintica (L.) Moench, commonly known as Kali Jeeri, has been used in local medicine to cure a wide spectrum of disorders including asthma, sores, inflammatory swellings, skin ailments, kidney troubles, itching of the eyes, and hiccough. The medicinal plant has been reported to possess a variety of pharmacological activities such as antimicrobial, anticancer, antidiabetic, anti-inflammatory, analgesic, antipyretic, as well as a diuretic and larvicidal activities. However very little information is available regarding its anatomy. Therefore, for the present work leaf anatomy including macroscopy, microscopy, leaf constants, stomata, trichomes and leaf architecture was studied in detail.

Keywords: B. anthelmintica, Anatomy, Micro and Macro characters.

OP VII.14

EVALUATION OF ANTI-INFLAMMATORY ACTIVITY OF METHANOLIC EXTRACT OF BAUHINIA RACEMOSA LAM. WITH DICLOFENAC

Yadav Ankit and Meenakshi Vaidya

Research Laboratory, Department of Botany, SVKM's Mithibai College of Arts, Chauhan Institute of Science & Amrutben Jivanlal College of Commerce and Economics (Autonomous), Vile Parle-(W) Mumbai-400056, Maharashtra, India

Commercially available synthetic anti-inflammatory medications have their own restrictions due to adverse side effects, there has always been a need for anti-inflammatory phytotherapeutic substances. Therefore, novel, highly effective anti-inflammatory medicines derived from natural sources are being investigated. Bauhinia racemosa Lam. (Fabaceae) is found throughout India. It has been found to have a range of therapeutic properties. In the present study, we have shown the potential anti-inflammatory activity of Bauhinia racemosa Lam.and compared with standard drug. Extraction of Bauhinia racemosa Lam.leaves was done as per the standard method. Different concentrations of the extracts were used for anti-inflammatory activity by inhibition of albumin denaturation. All samples were analyzed in triplicate. The results were statistically analyzed. The plant have shown to have anti inflammatory activity in a dose-dependent manner than standard drug diclofenae. Further studies on the identification of the active principles present in the leaf extract need to be done.

Keywords: Bauhinia racemosa Lam, Anti-inflammatory, Protein denaturation, Diclofenac.

OP-VII.15

BAND GAP ENGINEERING OF BIO-INSPIRED COBALT OXIDES NANOPARTICLES FOR ARTIFICIAL PHOTOSYNTHESIS

Kailash R. Nemade; Sandeep A. Waghuley*

Department of Physics, Indira Mahavidyalaya, Kalamb Dist. Yavatmal 445401, India.

*Department of Physics, Sant Gadge Baba Amaravti University, Amaravti 444 602, India.

*Email- sandeepwaghuley@sgbau.ac.in

The natural world has developed highly efficient systems, and by emulating the diverse facets of nature, we unlock a realm of boundless opportunities. Utilizing nanoparticles, which can be meticulously designed through either a bottom-up or top-down approach, imparts distinct properties to commonplace materials. Artificial photosynthetic arrangements have already surpassed natural catalytic systems in terms of simplicity, the breadth of their light absorption spectrum, and control over charge transport. In this study, cobalt oxide nanoparticles with a tailored optical band gap that varies with substrate temperature were synthesized using the spray-pyrolysis technique. We conducted a comprehensive analysis of the structural, morphological, and optical characteristics of these cobalt oxide nanoparticles, employing techniques such as X-ray diffraction, field-emission scanning electron microscopy, Raman spectroscopy, photoluminescence spectroscopy, and ultraviolet-visible spectroscopy. This research introduces a convenient approach for tuning the band gap of these nanoparticles to meet specific application requirements. We successfully adjusted the band gap of the synthesized cobalt oxide

nanoparticles to fall within the wavelength range of 310-335 nm, making them ideal candidates for use as light-harvesting antennas in artificial photosynthesis systems. Nevertheless, understanding, analyzing, and manipulating the interface between artificial and biological components remains a significant challenge.

Keywords: artificial photosynthesis; cobalt oxide; bandgap engineering

PP-VII.01

FOLIAR APPLICATION OF GROWTH REGULATORS: IMPROVING PERFORMANCE AND YIELD OF SOLANUM MELONGENA L

Aglave Hanumnat R and ¹Pawar Parshuram V

Department of Botany, Lokmanya Mahavidyalaya, SonkhedDist Nanded 'Madhavrao Patil Mahavidyalaya, Palam Dist. Parbhani

This study was conducted in an agricultural area located in Dharmabad, Nanded district, Maharashtra. The experiment followed a randomized design with three replications and involved the application of ten different growth regulator treatments. The findings indicated that foliar treatment significantly influenced the vigour of Brinjal plants and their yield-contributing features when compared to the control group. Specifically, the foliar application of Tricontanol and Gibberellic acid during the flowering and bud stages resulted in notable improvements in plant height, plant spread, number of branches, and number of fruits per plant. These treatments also demonstrated positive effects on various yield-contributing characteristics such as days to 25% flowering, fruit set, fruit length, and fruit diameter, as compared to the control group.

Keywords: Growth regulators, Flowering, Plant height, Plant spread.

PP-VII.02

PHYTOCHEMICAL EVALUATION, FTIR, AND GC-MS ANALYSIS OF PETROLEUM ETHER AND ETHANOLIC EXTRACT OF POGOSTEMON BENGHALENSIS (BURM. F.) KUNTZE LEAF EXTRACT

Udayakumar Sandhiya and Azhagiyamanavalan Lakshmi Prabha

Department of Botany, School of Life Sciences, Bharathidasan University, Tiruchirappalli – 620024, Tamil Nadu, sandhiyaudayakumar05@gmail.com; dralprabha@bdu.ac.in

Qualitative and quantitative Phytochemical profiling in Soxhlet assisted Petroleum Ether and Ethanol extract of *Pogostemon benghalensis* (Burm. F.) Kuntze leaf extract was performed in the present study. This extract was tested for the presence of secondary metabolites such as alkaloids, reducing sugar, tannins, phenolics, saponins and flavonoids. The highest phenol and flavonoid content were observed in the ethanol extract. FTIR analysis confirmed the presence of functional groups like aldehydes, alkanes, aromatics, aliphatic amines, and alkyl halides. 30 compounds were identified in the petroleum ether extract & Ethanol extract revealed the presence of 25 compounds, where hexadecenoic acid was identified as the main compound (24.76%). An antioxidant assay like DPPH was also performed for both the extract and ethanolic extract and showed the maximum scavenging potential. The current research focusing on the phytochemical profile of *P. benghalensis* will be helpful in the preparation of new drugs with significant pharmaceutical value.

Keywords: Secondary metabolites, FTIR, ethanol, Antioxidant, GCMS

TEMPERATURE-DEPENDENT MODULATION OF GROWTH AND SECONDARY METABOLITES BIOSYNTHESIS IN FAGOPYRUM ESCULENTUM MOENCH. (COMMON BUCKWHEAT'S) SPROUTS AND MICROGREENS

Johnson Marry Albright * and Thakur Sveta

Department of Biosciences, Himachal Pradesh University Shimla-171005 Email- marrylenthra@gmail.com

This study investigates the response of common buckwheat's (Fagopyrum esculentum M.) sprouts and microgreens to different temperature regimes. Experimental data reveal that lowering the temperature to a specific range can accelerate the physiological processes by generating eustress i.e., mild to moderate stress, resulting in enhanced growth rates and secondary metabolites accumulation (total phenolics & flavonoids). Comprehending these effects is crucial to optimize production strategies and ensuring the nutritional values of common buckwheat's sprouts and microgreens that will potentially contribute to good human health. These findings also hold promising implications for promoting them as a superfood in the global markets.

Keywords: Common buckwheat, sprouts, microgreens, secondary metabolites, growth, temperature, superfood

PP-VII.04 ON SEVEN

COMPARATIVE ASSESSMENT OF CADMIUM (CD) STRESS ON SEVEN WHEAT CULTIVARS: GROWTH AND PHYSIOLOGICAL INSIGHTS

Sanjay Kajal* and Thakur Sveta

Department of Biosciences, Himachal Pradesh University Shimla-171005 Email- sanjaykajal354@gmail.com

Cadmium (Cd) toxicity in environment poses a significant threat to agriculture, especially for wheat, a staple food crop. This study aims to assess the impact of Cd stress (500, 800, and 1000 μ M) on the overall growth of seven wheat cultivars, with a focus on physiological studies for four selected varieties. The results showed that Cd stress reduced the germination rate, root/shoot length, fresh weight and pigment contents (total chlorophyll and carotenoids). In addition, it increased the MDA and free proline content in the seedlings. The results will aid in identifying Cd-resistant wheat cultivars under such challenging environments.

Keywords: Cadmium, Triticum aestivum L., Seedlings, Physiological stress

IMPACTS OF ULTRAVIOLET RADIATION ON CERTAIN PHYSIOLOGICAL AND BIOCHEMICAL PROCESSES IN THE XANTHORIA ELEGANS (L.) TH. FR. AND XANTHORIA CANDELARIA (L.) TH.FR. LICHENS

Gupta Amit, Singh Ashish P., Jaiswal Jyoti and Sinha Rajeshwar P.

Laboratory of Photobiology and Molecular Microbiology, Centre of Advanced Study in Botany, Institute of Science, Banaras Hindu University, Varanasi-221005, India Email-rpsinhabhu@gmail.com

The aim of this study was to test in a short-term laboratory experiment the physiological and biochemical effects of ultraviolet radiationin the epiphytic lichens *Xanthoria elegans* (XE) and *Xanthoria candelaria* (XC). We conducted a comparative study of the effects of long-term (6 days) exposure to UV-B radiation on accumulation of lipid peroxidation products (TBARS), H₂O₂ content and superoxide dismutase (SOD) activity. The H₂O₂ content and SOD activity were found to increase in the thalli. Decrease in the protein content as the exposure time increased was observed. Parietin was found to be a major secondary metabolite acting as aphotoprotector.

Keywords: Ultraviolet radiations, lipid peroxidation, Antioxidant, Parietin.

PP-VII.06

EFFECTS OF SALT AND UV RADIATION ON PHOTOSYNTHETIC, BIOCHEMICAL AND ANTIOXIDANT SYSTEMS OF THE RICE-FIELD CYANOBACTERIUM NOSTOCHOPSIS LOBATUS HKAR-21

Singh Ashish P., Gupta Amit, Singh Prashant R., Jaiswal Jyoti and Sinha Rajeshwar P*.

Laboratory of Photobiology and Molecular Microbiology, Centre of Advanced Study in Botany, Institute of Science, Banaras Hindu University, Varanasi-221005, India Email- rpsinhabhu@gmail.com

The variation in photopigments of the rice-field cyanobacterium *Nostochopsis lobatus* HKAR-21 and its photosynthetic performance under different salt and ultraviolet radiation (UVR) was studied. In the cells exposed to UVR, we observed that excessive energy was dissipated by non-photochemical quenching (NPQ), whereas photochemical quenching is important for preventing photoinhibition. Our results suggest that to reduce ROS-induced oxidative stress, *Nostochopsis* employs effective antioxidant systems, like carotenoids, and enzymes such as SOD, POD, CAT, and APX. Based on the findings, it was concluded that the salinity and UVR severely affect the major macromolecular components of *Nostochopsislobatus* HKAR-21.

Keywords: Cyanobacterium, abiotic stresses, photopigments, PAM fluorometry, photosynthetic activity, reactive oxygen species (ROS), lipid peroxidation

PHYTOCHEMICAL EVALUATION AND IN VITRO ANTIOXIDANT STUDIES OF PIPER NIGRUM (L.)

¹Ukey Sanghadeep S. and ²Gogle Dayanand P.

¹Department of Botany, Lokmanya Tilak Mahavidyalaya, Yavatmal-445304, Maharashtra, India. Post Graduate Teaching Department of Molecular Biology and Genetic Engineering, RTM Nagpur University, Nagpur-440033, Maharashtra, India.

Piper nigrum (L.) is most extensively used spice all over the world. Extraction and isolation of bioactive compound is the new challenge in the field of phytochemistry. The aim of the present study was to evaluate the extractive value of P. nigrum in different solvent fractions. Phytochemical analysis of fractions was conducted to detect the presence of various phytochemical constituents. Quantitative analysis of phenol, flavonoid and various antioxidant assays of the selected herb was performed. The qualitative analysis of crude extract and solvent fractions revealed the presence of various phytochemicals of pharmacological significance. The total phenols in Piper were found to be 178.42±3.29mg/g of GAE and total flavonoids was 157.22±5.24mg/g of QE respectively. DPPH scavenging assay showed IC₅₀ value of Piper as 46.66±1.32μg; ABTS assay showed IC₅₀ value as 10.23±0.31μg respectively and DMPD assay showed IC₅₀ value as 211.43±6.85μg.

Keywords: Piper, phytochemical, antioxidant, DPPH, ABTS, DMPD, etc.

PP-VII.08

SPECTRAL ESTIMATION OF COLEUS SCUTELLARIOIDES AND CODIAEUM VARIEGATUM FOR MEASURING PHOTOSYNTHETIC EFFICIENCY

Phokmare Ashwini B.

Assistant Professor
Department of Botany
Shri Shivaji Arts, Commerce and Science College, Akot
ashphokmare1991@gmail.com

The spectrophotometric study of these two plants were done to measure a photosynthetic efficiency which shows absorbance and transmission of a light through different wavelength. In this study, these two plants shows two same peaks at different wavelengths. Wavelengths are 440nm and 660nm which concluded that at this wavelength absorbance of light is high. Another aspect of concentration and factor of these two plants were also estimated by using spectrophotometry. Changes in the spectral characteristics of the transmitted light, intensity and maximum wavelengths can be a sensitive indicator of the physiological state of the plants and characterize its needs, especially in relation to photosynthetic photon flux. (T E Kuleshova, et al).

Keywords: Spectrophotometer, absorbance, wavelength, transmission, ethanol etc.

COMPARATIVE PHYTOCHEMICAL ANALYSIS AND ANTIOXIDANT ACTIVITY OF CURCUMA AROMATICA AND CURCUMA AMADA

Patel Rudra and Robin Elizabeth *

Department of Biomedical and Lifesciences, School of Science, Navrachana University

This research focused on studying the phytochemical constituents and antioxidant activity of Curcuma species from Gujarat. Comparative analysis of Curcuma aromatica Salisb. and Curcuma amada Roxb. revealed variations in their phytochemical profiles. Curcuma amadae xhibited higher tannins and terpenoids, while Curcuma aromatica contained notable alkaloids. Both species displayed potent antioxidant capabilities, with Curcuma amada revealing the presence of curcuminoids and phenolic compounds known for their health benefits. GC-MS analysis identified terpenoids and essential oils, contributing to Curcuma amada's medicinal potential. These findings suggest its possible applications in traditional medicine and natural product-based therapies, providing valuable insights for nutraceutical and pharmaceutical industries.

Keywords: Curcuma, Curcuma aromatica Salisb, Curcuma amada Roxb. essential oil, metabolomics, secondary metabolites, GCMS, LC-MS, anti-oxidants

PP-VII.10

PHYTOCHEMICAL ANALYSIS OF ANDROGRAPHIS PANICULATA (BURM.F.) WALL. EX NEES AND ANDROGRAPHIS ECHOIDES (L.) NEES

Gavali M. B. and Gurav R. V. *

Department of Botany, Shivaji University, Kolhapur 416004 *Email-botanyraj@rediffmail.com

Plants are major source of therapeutic compounds in the form of herbal preparation and purified compounds. The leaf, stem, and root samples of Andrographis paniculate (Burm.f.) Wall. ex Nees and Andrographis echoides (L.) Nees were selected for the investigation of phytochemicals present in the plant specimens of the above said species from the genus AndrographisWall. ex Nees. The said species were investigated for phytochemical compounds, total moisture content, total ash, water-soluble ash, acid insoluble ash from the leaf, stem and root sample. The results showed the presence of compounds viz., Phenolics, Flavonoids, Antioxidants, Crude Protein etc. It was observed that there are variations occurred in the concentrations of total moisture content, total ash, water soluble ash and acid insoluble ash from leaf, stem and root powder samples selected from plant specimen.

Keywords: Phytochemical Analysis, *Andrographis* Wall. ex Nees, Phenolics, Flavonoids, Antioxidants, Crude Protein.

EFFECT ON EXTRACTION YIELD, PHYTOCHEMICAL ANALYSIS AND ANTIOXIDANT ACTIVITY OF MEDICINALLY IMPORTANT HERB EXACUM SPECIES FROM WESTERN GHATS

Shaikh Qaisarjahan and Gurav R. V.

Department of Botany, Shivaji University, Kolhapur. Email: botanyraj@rediffmail.com

Phytochemicals derived from plants possess significant importance in human well-being, agriculture, and the environment due to their antioxidant properties. The study investigated five Exacum species (E. pedunculatum, E. pumilum, E. lawii, E. petiolare, and E. tetragonum) using various extraction methods and solvents to compare their extraction yields, phytochemical profiles, and antioxidant activity. Soxhlet extraction and sonication proved the most effective, especially with acetone as the solvent. Employing the Folin-Ciocalteu and aluminium chloride methods, the highest phenolic content was found in E. pumilum in acetone extract (226.1±0.05 mg GAE / g extract) and E. tetragonum showed the highest flavonoid content in its aqueous extract (29.5±0.09 mg QE / g extract). E. pumilum demonstrated remarkable antioxidant activity (89.4±0.04 %) in the DPPH assay. Keywords: Exacum sp, phenols, Havanoids, DPPH arsay

PP-VII.12

PHYTOCHEMICAL AND ANTIOXIDANT STUDIES OF PERSICARIABARBATA(L.) HARA AND PERSICARIA HYDROPIPER(L.) SPACH

Desai Bhagyashri and Gurav R. V.

Department of Botany, Shivaji University Kolhapur Email- botanyraj@rediffmail.com

Polygonaceae member Persicaria barbata (L.) Hara and Persicaria hydropiper (L.) Spach are used as traditional medicinals from ancient time. They possess potential antioxidant, anti-inflammatory, antifungal, antibacterial and antihelminth activity. It is also used in treatement of snakebite, headache, toothache, gastric ulcer and skin problems. In present investigation quantitative assessment of bioactive compounds like Flavonoids and Phenolics is done. Three solvent systems (Aqueous, Methanol and Acetone) and plant parts like roots, stems and leaves used for extraction. The highest phenolic content found in Acetonic leaf extact of Persicaria. Barbata (27.6 ± 0.02 mg GAE/g of sample). The highest Flavonoids found in methanolic leaf extract of Persicariabarbata (16.33 ± 0.19 mg QE/g of sample). The highest antioxidant activity determined using Ferric Reducing Antioxidant Power (FRAP) and 2,2 diphenyl-1-picrylhydrazyl (DPPH). The highest Ferric Reducing Activity found in acetonic leaf extract of Persicaria hydropiper (87.00 ± 0.01 mM AAE/g of sample) and maximum radical scavenging activity found in methanolic leaf extract of Persicaria hydropiper (91.11 ± 0.001 %).

Keywords: Persicaria sp, DPPH arsay, Scavenging activities.

PRELIMINARY PHYTOCHEMICAL AND GC-MS PROFILING OF LEAVES OF PORTULACA TUBEROSA ROXB

Magdum Neha G. and Jadhav Varsha D. (Rathod)

Department of Botany, Shivaji University, Kolhapur-416004. Email- nehamagdum93@gmail.com and vdj botany@unishivaji.ac.in

Portulaca tuberose Roxb. belongs to family Portulacaceae. This family is also called as Purslane family. The plant is prostrate, diffusely branched, fleshy and perennial herb with tuberous roots and showy flowers. Phytochemical studies of leaves were carried out by using four different solvents - Methanol, Acetone, Ethanol and Aqueous. Phytochemical screening revealed presence of Alkaloids, Phenols, Glycosides, Flavonoids and Saponins in all four solvents. Proximate evaluation of leaves shows- Moisture (89%), Dry matter (11%), Crude Protein (18%), Total ash (15%) and Crude fiber (9%). Minerals like Nitrogen, Potassium, Magnesium and Calcium along with some trace elements were also observed. GC-MS profiling of methanolic leaf extract of P. tuberose Roxb.reveals presence of 10 bioactive compounds having activities like Anti-microbial, anti-oxidant, cardioprotective, allopathic and analgesic. The present study highlights the medicinal importance of the plant and its nutritive value.

Keywords: GC-MS, Anti-microbial, Phytochemical, Bioactive, Medicinal.

PP-VII.14

CHROMIUM TOXICITY INDUCED ALTERATIONS IN GROWTH AND BIOCHEMICALS OF SENNA UNIFLORA

Matade N. S. and Pawar K. B.

Department of Botany, Shivaji University, Kolhapur-416004 Email- neha24matade1996@gmail.com; kbp botany@unishivaji.ac.in

An attempt has been made to study toxic effect of chromium on growth performance and biochemicals of an aggressively growing *Senna uniflora* Mill. Irwin and Barneby. Seed germination and seedling growth with respect to root length, shoot length and fresh weight was decreased due to treatment of chromium (25ppm, 50ppm, 100ppm and 200ppm) with maximum decrease in root length (1.32, 1,18 cm), shoot length (4.25, 4.72 cm) and fresh weight (0.17, 0.24 g) was due to 200ppm in both petriplate and soil bioassays. There was decrease in contents of chlorophyll, protein, reducing sugar and total sugar and increase in proline content due to different concentrations of lead. Chromium at 200ppm caused high reduction in contents of chlorophyll (8.76, 7.70 mg/g) protein (18.62, 17.94 mg/g) reducing sugar (12. 88, 10.77 mg/g) and total sugar (29.51, 27.90 mg/g) and increase in proline content (5.96, 8.90 mg/g). Chromium at high concentrations caused alterations in growth performance and biochemical contents of *S. uniflora* and may become toxic for growth and development of plants.

Keywords: Chlorophyll, Chromium, Proline, Protein, Senna uniflora Mill. Irwin and Barneby, Sugars

GC-MS PHYTOCHEMICAL ANALYSIS OF ETHANOLIC LEAF EXTRACT OF CROTON SPARSIFLORUS L. OF DALMA RANGE EAST SINGHBHUM, JHARKHAND, INDIA

¹Linda Pushpa Salo, ²Pyare Krishna, ³Oraon Vinay and ⁴Jha Lokokrishna

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

²Associate Professor, University Department of Botany, Kolhan University, Chaibasa ³University Department of Botany, Ranchi University, Ranchi ⁴Department of Chemistry, Kolhan University, Chaibasa

Medicinal plants have many bioactive compounds, which are used traditionally for curing various infectious diseases since prehistoric period. This study evaluated chemical composition and their medicinal properties such as antibacterial, antiviral, antidiabetic, anti-inflammatory, antioxidant, anticancer etc., activities of *Croton sparsiflorusL*. extract. Plants are the traditional sources for many chemicals used as pharmaceutical biochemical, fragrances, food colours and flavours in different countries especially in India. Most herbal medicines and their derivative products were often prepared from crude plant extracts, which comprise a complex mixture of different phytochemical constituents (plant secondary metabolites). The chemical features of these constituents differ considerably among different species. GC-MS method used for the analysis of the obtained extracts is an interesting tool for testing the amount of some active compounds in herbs used in cosmetic, drugs, pharmaceutical or food industry.

Keywords: Pharmaceutical; Biochemicals; Medicinal Plants; GC-MS Method; Medicinal Plants

PP-VII.16

EXPLORING THE POTENTIAL OF CHITOSAN NANOPARTICLES AS A FOLIAR STIMULANT FOR ENHANCING THE GROWTH, YIELD, AND RESOURCE USE EFFICIENCY OF SOYBEAN

Kapse Mohan and Naik Dhiraj

Department of Botany, Bajaj College of Science, Civil Lines, Wardha-442001 Email-mohankapse42@gmail.com; naikdhiraj@gmail.com

Chitosan is a naturally derived chemical that is commercially produced from the exoskeletons of crustaceans, particularly crab shells. It has been utilised as a superior substance for enhancing vegetable growth and productivity, as well as serving as a defensive mechanism against fungal, bacterial, and viral pathogens. The biopolymer known as "Chitosan" has garnered significant attention in the field of agriculture due to its exceptional biocompatibility, biodegradability, and bioactivity. In order to explore the potential utilisation of chitosan nanoparticles (ChNPs) in agriculture for economic gain, an investigation was conducted to examine the impact of chitosan NPs on soybean plants in an open environment. A factorial experiment was conducted using a randomised complete block design with eleven replications. The experimental variables consisted of different concentrations of chitosan NPs (0 (control), 0.01, 0.05, 0.15, and 0.2% w/v), the technique of administration (foliar application), and various concentrations of bulk chitosan (0.01,

0.05, 0.15, and 0.2% w/v). The soybean seeds were individually sown in separate pots. Subsequently, the nanoparticles (ChNPs) were introduced to the designated entities via foliar application over three distinct phases. Based on the obtained findings, it can be inferred that an elevated concentration of chitosan has a positive correlation with both plant growth and yield. In summary, the application of chitosan through foliar means yielded notable enhancements in vegetative growth, pod quality, and resource utilisation efficiency when compared to the control group of plants treated with no chitosan (0 ppm). The findings of our study indicate that the use of ChNPs can serve as an environmentally conscious method to improve soybean yield, thereby promoting sustainable agricultural practises.

Keywords: Chitosan, Chitosan Nanoparticles, ionic gelation, foliar stimulant, legumes

PP-VII.17

PHYTOCHEMICAL POTENTIAL OF ANISOMELES INDICA (L.) KUNTZE, BELONGING TO LAMIACEAE

Sardar P. R., Manik S.R. and Saudagar S. A. A. G.

Department of Botany, Sant Gadge Baba Amravati University, Amravati. Email- pravin.sardar54@gmail.com

In India aromatic plants play an important role in the country's agricultural profile due to their application in various fields, its cultivation can help small-scale farmers to strengthen their livelihoods. *Lamiaceae* is one of highly aromatic plants family used in herbal medicine for thousands of years. Traditional applications of the *Lamiaceae* show high applicability as a common tea, flavours, insect repellant, in flu control and as an anti-inflammatory, sedative and analgesic. *Anisomeles indica* (L.) Kuntze belongs to the family *Lamiaceae* (*Labiatae*) under the order Lamiales of class Magnoliopsida. It is distributed in countries like Sri Lanka, China, Indonesia, India, Japan, Philippines and in Australia. It is a camphor-scented large perennial woody shrubby herb which can reach up to 2 m tall. Tribal people of Maharashtra used this plant against fever and common cold. The GC-MS studies on inflorescence oil revealed presence of camphane, Isophorone, p-Mentha, Sylvestrene and α-Bergamotene.

Keywords: Lamiaceae, Anisomeles indica, inflorescence oil, GC-MS.

PP-VII.18

PROXIMATE COMPOSITION, LC-MS FINGERPRINTING OF BIOACTIVES AND ANTIOXIDANT POTENTIAL OF CORCHORUS AESTUANS. L SEEDS

1,2 P. Haripriya and 1,2 Parvatam Giridhar

¹Plant Cell Biotechnology Department, CSIR-Central Food Technological Research Institute, Mysuru-570020,

²Academy of Scientific and Innovative Research (AcSIR), Ghaziabad -201002, India. Email- p.haripriya02@gmail.com

Corchorus aestuans. L is one of the lesser-known green leafy vegetables that originated from the tropics of Africa and Southeast Asia. Traditionally the plant has pharmaceutical and functional food properties. However, substantial scientific information in support of its ethnobotanical and functional properties is not known. Sporadic reports onthis plant explained that both the seed and foliage parts contain many bioactive compounds and

nutraceutical properties. The Basic proximate analysis of C. aestuans seed confirmed that the presence of flavonoids, phytosterols, phenolics, carbohydrates (19.36±5.85), proteins (22.6±0.05), and Lipids (6.97±1.15). The fatty acid profile of the seed confirmed the presence of unsaturated fatty acids such as Linoleic acid (64.03 ± 0.05), alpha-linolenic acid (0.94 ± 0.02), and Oleic acid (6.08 ± 0.00). The results obtained from the seed confirmed that the potential benefits of this plant need to be explored for potential benefits. The antioxidant potential, good content of bioactive and high unsaturated fatty acids all are important for its possible functional food applications.

Keywords: Corchorus aestuans, LC-MS Profile, antioxidant potential, Bioactive compounds.

PP-VII.19

ETHNO BOTANICAL AND GC-MS ANALYSIS OF AROMATIC PLANT LEONOTIS NEPITIFOLIA (L)

Deshmukh Sharayu S.

Department of Botany, Science College, Congress Nagar Nagpur Email-botanysharu5@gmail.com

India has a very rich tradition of indigenous and health care practices. The current piece of work is a focus on micro level study and is purely based on contents in leaf of *Leonotis nepitifolia* in Nagpur region. Many aromatic plants being to species of the Lauraceae, Umbelliferae, Myrtaceae, and Labiatae families. Aromatic plants are a special kind of plants used for their aroma and flavour. Many of them are also used for medicinal purposes. Aromatic plants are from a numerically large group of economically important plants. Aromatic compounds are present in plants i.e., in the root, wood, bark, foliage, flower, fruit, and seed etc. Many of them are also used for medicinal purposes. Aromatic plants are from a numerically large group of economically important plants. The chemical composition of *Leonotis nepetifolia* are Hematoporphyrin, Cyclodecasiloxane, Decanic acid, 2-(5-(5-[Cyano-(9,9-dimethyl-1,4-dixa-7-aza-spiro [4,4] non-7-en-8-y)methylene]-3-3-dimethylprrolidin02-ylide.

Keywords: Leonotis nepetifolia, Ethonobotany, Phytochemical, Aromatic Plant.

PP-VII.20

HILL TURMERIC (CURCUMA PSEUDOMONTANA): A MEDICINAL TREASURE OF WESTERN GHATS - A REVIEW

Iyer N., Saiyam P. and Mondal M.*

*Dept. of Botany, St. Xavier's College, Mumbai-01.

Curcuma pseudomontana J. Graham, a member of the Zingiberaceae family, thrives primarily in the Western Ghats of India and select regions of South Asia. This erect herb flourishes in damp, shaded environments on the fringes of wet forests, grasslands, as well as within moist deciduous and semi-evergreen woods. Known as Hill turmeric or Raanhalad in Marathi, it has been an integral part of traditional and tribal medicine for centuries, owing to its diverse biological activities. In recent times, Curcuma pseudomontana has garnered significant attention within the scientific community. Researchers are actively investigating its potential anti-diabetic, anti-cancer, anti-inflammatory, and cardioprotective properties. The present work is a detailed review of the

phytochemical constituents present in the plant and its proven pharmacological properties. It attempts to contribute to the growing body of literature surrounding the medicinal potential of *Curcuma pseudomontana* and paves the way for further exploration of its therapeutic applications.

Key Words: Biological activities, Curcuma pseudomontana, Zingiberaceae

PP-VII.21

EXPLORING THE MEDICINAL PROPERTIES OF ADHATODA VASICA: A STUDY ON CULTIVATION, MORPHOLOGYAND PHYTOCHEMICAL ANALYSIS

Darsimbe Avinash N., Gawande Prashant A., bKhandayAshiq H. and aMundhada Sonal G.

Department of Botany, Shri Shivaji Science College, Amravati
 Department of Botany, Sant Gadge Baba Amravati University, Amravati
 Tal. - Amravati, Dist.-Amravati 444 602, Maharashtra, India
 Email-darsimbeangmail.com

Since time immemorial to the human civilization plants are the major resources of medicine and drugs. In ancient literature like Ayurveda, Siddha, Unani medicines, Traditional medicinal System, plants are known for their active biological compounds. It's well known that the medicinal plants producing different types of chemical compounds as a part of their defence system. However, these are used and act on different system of human being and also shows significant effects on the metabolic activities of different organisms along withantioxidant, antimicrobial and other antipyretic effect. This research explores the medicinal properties of Adhatoda vasica, a plant species that has been used for centuries in traditional medicine. Through cultivation practices, morphology studies and phytochemical analysis, it was found that Adhatoda vasica contains active biological compounds with significant medicinal properties. The study concludes that this plant is an important member of the Acanthaceae family and can be cultivated through stem cutting. This research sheds light on the potential uses of Adhatoda vasica in modern medicine.

Keywords: Adhatoda vasica, medicinal properties, Acanthaceae

XLVI ALL INDIA BOTANICAL CONFERENCE of THE INDIAN BOTANICAL SOCIETY SECTION - VIII Plant Biotechnology Synergy in Plant Science and Sustainable Future: 2023



IN VITRO ASYMBIOTIC SEED GERMINATION AND PROPAGATION OF DENDROBIUM HEYNEANUM LINDL. – AN ENDEMIC EPIPHYTIC ORCHID OF SOUTHERN WESTERN GHATS

Shiva Krishnan K. and T. Senthil Kumar

Department of Botany, Bharathidasan University, Tiruchirappalli, Tamil Nadu - 620 024 shivakrishnank4696@gmail.com, senthilbdc@gmail.com

Dendrobium heyneanum Lindl. is an endemic, red-listed orchid of Southern Western Ghats, India. The aim of the present study was to develop an optimal nutrient media for in vitroasymbiotic seed germination and study the effect of plant growth regulators (PGRs) on protocorm development. The mature pods were collected from Vellingiri hills, Tamil Nadu and the seeds were inoculated aseptically onto Murashige and Skoog's media with modifications. The protocorms developed were further subcultured onto ½ MS media supplemented with different PGRs like Thidiazuron (TDZ), 6-Benzylaminopurine (BAP), Kinetin (KN) and α-Naphthaleneacetic acid (NAA) in the concentration ranging from 0.1-2.0 mg/L. Among the different media, ½ MS medium showed best seed germination response (86.60%) and ½ MS medium supplemented with 1.0 mg/L KN had the highest percentage (95.76%) of shoot initiation and multiple shoot buds (6.56), after 100 days of cultures. The optimized protocol reported here can be used for conservation of this valuable species and also has great potential for improvement by biotechnological approaches.

Keywords: Protocorm, Endemic, Kinetin, Murashige and Skoog media.

OP-VIII.02

GENOME-WIDE IDENTIFICATION AND COMPREHENSIVE ANALYSES OF NAC TRANSCRIPTION FACTOR GENE FAMILY IN ANDROGRAPHIS PANICULATA

Saumya Tripathi, Anjali Tiwari, Nidhi Rai and Neha Pandey*

Department of Botany, CMP Degree College (A constituent PGCollege of university of Allahabad), Prayagraj-211001.

The NAC (NAM, ATAF, and CUC) is one of the largest and most diverse families of plant-specific transcription factors (TFs) and plays important roles in regulation of plant growth, development, metabolism, and biotic and abiotic stresses. In this study, a total of 120 NAC protein sequences were identified and sequences were further studied for physicochemical properties, phylogenetic relationship, sub-cellular localization, gene structure, and conservedmotif identification. The phylogenetic relationship analysis showed that the ApNAC genes within the same clade had a similar number of conserved motifs and intron-exon. The cis-actingregulatory analysis of ApNAC genes indicated a higher number of light-responsive cis regulatory elements followed by hormone responsive, plant-growth-and-development-related, and stress-responsive elements were presentin the promoter region.

Keywords: NAC protein, motifs, intion exar, Andiographis paniculate.

COLLABORATIVE APPROACH OF MORPHOMOLECULAR DATA FOR AUTHENTICATION OF RESULTS

1*Gadge Prashant J. and 2Nathar Varsha N.

¹Department of Botany, NKSPT's A.S.C. College, Badnapur, Dist. Jalna Maharashtra 431202

³Department of Botany, S. G. B. A. University, Dist. Amravati, Maharashtra 444602 Email- prashant.gadge10@gmail.com

Use of modern equipment's, online resources and molecular level research creates enormous amount of molecular data. Authenticity of the obtained result is more concerned point in all research work. The present study is focused on the use of morphological and molecular data to authenticate results obtained through the investigations of species and accessions of Plumbago L. Total 32 characters were selected and utilized for the morphological investigation through NTSYS software. In molecular analysis the plant material (leaves) were used to isolate DNA and subjected to ISSR analysis. The binary data obtained were subjected to NTSYS software. The results obtained through morphological and molecular analysis were compared. It is clearly observed that both the analysis shows the similarity in the phylogenetic analysis. The present investigation clearly suggests that morphomolecular analysis is convenient and can be used as authentication of result.

Keywords: Morphomolecular, Phylogenetic, ISSR and Molecular.

OP-VIII.04

OPTIMIZATION OF EXPLANTS, MEDIA AND COLD PRE-TREATMENT FOR DOUBLE HAPLOID DEVELOPMENT IN RICE HYBRIDS THROUGH ANTHER CULTURE

¹Ingle P. B., ^{3*}Rokade S. S. and ²Raut R. V.

¹S.S.S.K.R Innani Mahavidyalaya, Karanja (Lad), Dist-Washim (M.S.) India ³Late PundalikraoGawali Arts and Science Mahavidyalaya, Shirpur (Jain) Dist. Washim (M.S.) India.

²Nirmal Seeds Pvt.Ltd. Pachora Dist. Jalgaon (M.S.) India *Email- rokadesim@gmail.com

Rice (Oryza sativa) is an essential daily diet nutrient crop of human beings in India and around the world. Anther culture is widely accepted in rice crops for improvement to create variability for higher-yielding hybrid and variety production. A considerable perfection of embryogenic potential callus has been obtained using auxin and cytokine enriched best supplemented N6 media was found to be most efficient for callus formation when compared with MS media. The N6 media grown calli showed maximum green shoot regeneration frequency in supplemented MS medium. The cold temperature treatment of spike at 10°C for 2-7 days was found to be the most suitable induction of callusing and green shoot regeneration producing green plants in *indica* rice hybrids. The ploidy status assessed, revealed fertile diploids at a frequency of about 1 to 42%. This investigation identified the favourable media composition and condition for callus induction and green plant regeneration. This would further increase the knowledge and better understanding of rice hybrids development for polyploidy.

Keywords: Media Optimization, Anther Culture, Callus, anther culture, doubled haploid.

ROLE OF PLANT GROWTH REGULATORS IN INDUCTION OF PHYTOCHEMICALS IN SHOOT CULTURES OF MESOSPHAERUM SUAVEOLENS (L.) KUNTZE. AND CALLUS CULTURES OF OCIMUM BASILICUM L

¹Mavani Riddhi, ²R. Karan, ²Parth P. and *Monisha K.

School of Science, Navrachana University, VasnaBhayli Road, Vadodara – 391410, Gujarat, India, *Email- monishak@nuv.ac.in

Plants grown in vitro show differential synthesis of secondary metabolites like phenolics, flavonoids and terpenes. The responses also vary with respect to the growth medium used. This study was aimed at studying the effect of growth regulators like NAA (Naphthalene Acetic acid) and BAP (6-Benzylaminopurine) on the accumulation of total phenolics, flavonoids and terpenes in Mesosphaerum suaveolens (L.) Kuntze. and Ocimum basilicumL.At a concentration of 2.0mg/ml NAA and BAP, Mesosphaerum showed Total Phenolic Content (TPC) of14mg/ml, Total Flavonoid Content (TFC) of11gm/ml and Total Terpene Content (TTC) of 69mg/ml while in Ocimum, 2.5mg/ml NAA and BAP showed TPC of 16mg/ml, TFC of 9.5gm/ml and TTC of 75mg/ml suggesting an enhanced biomass and increase in secondary metabolite content in response to growth regulators.

Keywords: Plant growth regulators, Ocimum, Mesosphaerum, Secondary Metabolites, TPC, TFC, TTC.

OP-VIII.06

DNA BARCODING USING RBCL MARKER FOR THE ASSESSMENT OF PHYLOGENETIC RELATIONSHIPS IN FABACEAE FAMILY

Choukhande Nikhil B. and P. P. Umale

Department of Botany, Shri Shivaji College of Arts, Commerce & Science Akola.

DNA Barcode is a short section of specific genes or genome. Over the last decade three plant DNA barcode markers rbcL, matK, and ITS2, have been developed and used to address basic questions in systematics, ecology, conservation, monitoring biodiversity, including taxonomic discovery and assessing priority areas for environmental protection. Therefore, in the present study we have constructed a Phylogeny tree or cladistics for family Fabaceae with the help of DNA sequences by using rbcL (ribulose-bisphosphate carboxylase gene) as a DNA Barcode Marker with the help of Mega-X Software (Neighbour Joining Method). The DNA barcode rbcL provides the best discrimination power at species-level. Considering the overall performance of rbcL barcode, we suggest that the rbcL region is a suitable barcode (Genetic Marker) for Fabaceae Family.

Keywords: DNA Barcoding, Fabaceae, Mega-X, Phylogeny, rbcL.

DIFFERENTIAL PROTEOME RESPONSES AND GENE EXPRESSION PROFILING OF PEARL MILLET (PENNISETUM GLAUCUM (L.) R. BR.) GENOTYPES UNDER SALT STRESS

^{1*}Jha Shweta, ^{1,2}Singh Jawahar, ³Maity Sudipa and ³Ambatipudi Srinivas Kiran ¹Plant Functional Genomics Lab, Biotechnology Unit, Department of Botany (UGC-Centre of Advanced Study), J.N.V. University, Jodhpur (Rajasthan)-342001, India ²Sainsburylaboratory, University of Cambridge, Cambridge CB2 1LR, United Kingdom ³Department of Biotechnology, IIT-Roorkee, Roorkee (Uttarakhand)-247667, India *Email- jha.shweta80@gmail.com

Salinity is a major abiotic stress that can severely impede plantgrowth and productivity. Identification of key players involved in salt stress signaling is crucial to develop stress resilience in plants. In our study, we have compared morphological, physio-biochemical, proteome and gene expression profile of *Pennisetum glaucum* genotypes showing contrasting salt-tolerance, using 2-DE and mass spectrometry. Differentially expressed proteins (DEPs) were identified and analyzed for their functional annotation, pathway and protein-protein interaction using bioinformatics tools. Salinity tolerance in *P. glaucum* genotype was associated with higher antioxidant enzymes activity, lower lipid peroxidationrate, and highosmolytes. The DEPs were found to be associated with carbohydrate/energy/amino acid metabolism, photosynthesis and plant defense mechanisms. Our study has provided critical insights into molecular mechanism of salinity tolerance in pearl millet using proteomic approach.

Keywords: Pennisetum glaucumgeno, proteomic approach, salt-tolerance

OP-VIII.08

MEDIUM OPTIMIZATION AND IN-VITRO ASYMBIOTIC SEED GERMINATION IN EULOPHIANUDA LINDL. AND EULOPHIA ANDAMANENSIS RCHB.F

Jadhav Mayur and Gurav R. V.*

Department of Botany, Shivaji University, Kolhapur (MS) – 416004 *E-mail: rvg_botany@unishivaji.ac.in

In plants, every species knows how to tackle the harsh environment, how to store the food into seed, how to tolerate the stress and how to use the natural things to disperse the seed by giving them a small reward sometime. The orchids are beautiful however; they lack food storage tissue in seed for the growth of embryo and require fungus for germination. This limitation lowers the seed germination naturally which lead to decrease their natural populations. To tackle this issue the plant tissue culture comes into the light which works asymbiotically and provides a synthetic source of sucrose and it happens aseptically which is protective for seed germination. It gives more than 80% of seed germination of viable seeds which is far better than the germination in nature. The vegetative characteristics such as the thickness of the leaf, the floral traits- number of flowers per spike inflorescence and vase- life showed the highest value for the orchids in world markets. Orchids are the most exploited groups of plants in an ecosystem. They are important natural resources for the modern floriculture industry and having medicinal properties too. In the present paper updated and comprehensive information on *in-vitro* culture of *Eulophia nuda* and

Eulophiaandamanensis by asymbiotic seed germination and optimizing media for its growth and development by using different growth hormone concentrations is provided. **Keywords:** Symbiosis, Tissue culture, Growth hormones, *In-vitro*.

OP-VIII.09

IN-VITRO STUDY ON DEVELOPMENTAL BIOLOGY, REPRODUCTIVE BEHAVIOUR AND ONTOGENY OF GAMETOPHYTES IN PRONEPHRIUM NUDATUM (THELYPTERIDACEAE) AND LINDSAEA ENSIFOLIA (LINDSAEACEAE) - HOMOSPOROUS FERNS

Singh Akanksha * and Singh Ajit Pratap

Pteridology Laboratory, CSIR-National Botanical Research Institute, Lucknow-U.P., India Email- ajitpsingh2000@gmail.com

The ontogeny has been in practice for investigation of developmental pattern and morphological progression of the gametophytes in homosporous ferns. Previous studies on the sexual expression and reproductive compatibility have shown that most of the homosporous ferns have bisexual gametophytes. Nevertheless, the occurrence of gametophyte self-incompatibility, unisexual gametophytes and apogamous tendency are also not uncommon. Present study aims to investigate the developmental biology, reproductive behaviour and ontogeny of gametophytes in Pronephrium nudatum (Roxb.) Holtt and Lindsaea ensifoliaSw in order to develop an understanding on the viability and extent of spore germination, ontogeny of gametophytes, sexuality and establishment success of the sporophytes. We have investigated the spore viability, spore germination percentage, various developmental stages of gametophytes, sexual expression, preferred mating mechanism, sexuality, and the establishment success of the sporophytes. The observations and result on the spore viability period, germination rate, filamentous, spatulate, semi-cordate, coardate, archegoniate, antheridiate, mating mechanisms, and sporophytes establishment in respect to the spores and gametophytes of P. nudatum and L. ensifolia shall be presented and discussed in the paper.

Keywords: Pteridophytes, homosporous ferns, in-vitro culture, spores, reproductive biology, ontogeny.

OP-VIII.10

IN-VITRO ANTIDIABETIC ASSESMENT OF SOME SPECIES OF GENUS BRIDELIA

Patil Priyanka S. and Jadhav Varsha D.

Department of Botany, Shivaji University, Kolhapur Email - patilps2205@gmail.com and vdj botany@unishivaji.ac.in

Diabetes mellitus is a metabolic disorder that is increasing in developing countries. The long-term use of synthetic drug shows the adverse effect on human body. The present study focused on antidiabetic activity of *Bridelia species*. The selected plant species like *Bridelia retusa*, *B. stipularis* and *B. montana*, were collected from various localities. The methanol and ethanol solvents used for the extraction. Among the selected plant part, leaves of all plant showing the high inhibition percentage. The alpha amylase (75%) and glucose uptake percentage (70%) of B. montana leaves was more in ethanol extract compare with other

part. The leaves show potential anti-diabetic activity in present work. This study suggests that further use of plant for proper investigation.

Keywods: Bridelia, anti-diabtic activity, In-vitro method, ethanol.

OP-VIII.11

POPULUS TRANSCRIPTOME ANALYSIS REVEALS THAT ECTOMYCORRHIZAL FUNGI PAXILLUS INVOLUTUS PRIME THE POPLAR SEEDLING AGAINST ALUMINUM STRESS BY MODULATING ASCORBATE GLUTATHIONE PATHWAY

Naik Dhiraj

Botany Department, Bajaj College of Science, Civil Lines, Wardha-442001 Email- naikdhiraj@gmail.com

Aluminum (Al) toxicity poses a significant threat to forest trees growing in acidic soils, particularly impacting Populus, a promising biofuels feedstock known for thriving in marginal environments characterized by acidic and metal-enriched soils. Ectomycorrhizal (EM) fungi have emerged as critical allies, ameliorating the detrimental effects of Al in the root zone. In our study, we performed a comprehensive transcriptome analysis of EMassociated poplar seedlings to unravel the intricate mechanisms of Al toxicity mitigation and enhanced tolerance in Populus. Our results unveiled 1,143 Al-responsive genes in mycorrhizal roots, surpassing non-mycorrhizal roots. Moreover, mycorrhizal roots exhibited significantly higher expression of Al-induced transcripts under prolonged Al stress. The central role of EM symbiosis is enhancing Populus' ability to respond and adapt to Al toxicity. Notably, EM-associated Al-stressed plants displayed a significant upregulation of genes involved in oxidative stress and early signaling pathways. Furthermore, our analysis revealed the involvement of osmoprotectant genes in EMassociated Al-stressed plants, further bolstering their capacity to endure Al-induced stress. However, intriguingly, we observed a suppression of auxin-related pathways in these plants, implying a trade-off between growth-related processes and stress responses in the presence of Al stress. In conclusion, our study highlights the potential of genome-wide transcriptome profiling as a powerful tool for unraveling the molecular mechanisms governing Populus' response to Al stress. Our findings provide compelling evidence that EM symbiosis activates stress-related genes and signaling pathways, ultimately priming the plant to exhibit enhanced abiotic stress tolerance. This new understanding of the intricate relation between EM fungi and Populus' responses to Al stress opens doors to innovative strategies for improving tree growth and sustainability in acidic and metal-enriched soils. It also holds promise enhancing their utility in biofuels production, carbon sequestration, even in challenging environmental conditions.

Keywords: Populus, model forest tree, ectomycorrhizal fungi, Microarray, functional genomic, Aluminum stress

INVESTIGATIONS ON THE MULTIPLE SHOOT INDUCTION IN BEETROOT (BETA VULGARIS L. SSP. VULGARIS)

Meshram Sachita P. and Badere Rupesh S. Department of Botany, RTM Nagpur University, MJP Educational Campus, Nagpur- 440033

Beta vulgaris L. ssp. vulgaris (Beetroot) is a rich source of betalains which has many health benefits and is a potential natural dye. The present investigation was carried to study the effect of BAP and NAA on the multiple shoot induction in beetroot. The explants like hypocotyl, shoot-tip and cotyledonary leaf were harvested from the 8–14 days-old seedlings. These were then cultured over MS medium containing various concentrations of BAP and NAA either alone or in combination. Among all, only shoot-tip explant induced multiple shoots with frequency varying with age of explant and the PGR combination. In general, high frequency of multiple shoot induction and more of number of shoots per explant were induced by BAP alone at 0.5 and 1.0μM concentration. Hence it was concluded that shoot-tip explant from the younger seedling is suitable for multiple shoot induction in beetroot over MS medium containing BAP at low concentration.

Keywords: explant, micropropagation, MS medium, PGR, regeneration

OP-VIII.13

GENETIC DIVERSITY AMONG SELECTED SPECIES OF GENUS DESMODIUM USING RAPD MARKER COLLECTED FROM MELGHAT REGION OF WESTERN GHATS INDIA

Hutke Varsha and Dar Mushtaq

Dept. of Botany, Govt. Vidarbha Institute of Science and Humanities (Autonomous), Amravati, Email- vdhutke@gmail.com

The genus Desmodium is an important member of family Fabaceae and is represented by more than 27 species and majority of these species are nutritionally, medicinally and economically important. Six species of genus Desmodium (D. triflorum, D. latiflolium, D. dichotomum, D. rotundifolium, D. gangeticum and D. laxiflorum) available, were collected from Melghat region of Western Ghats to study their diversity and relevance using RAPD marker. A total of twenty primers were used in the study. The results of diversity and relativeness were developed by calculating the presence and absence (Binary digit system-1 & 0, respectively) of bands on Agarose gel. The polymorphic information content (PIC) value for all the primers was nearer to 0.43. The data observed and calculated was developed into the phylogenetic trees using Neighbor Joining and Unweighted Pair Group Method with Arithmetic Mean (UPGMA) methods. In Neighbor Joining method six species analyzed were grouped into two major clads (Clad I- D. triflorum, D. latiflolium, D. dichotomum, D. gangeticum and Clad II-D. rotundifolium, and D. laxiflorum) and showed a type of congruency in majority of primers. In UPGMA analysis the dendrograms obtained were diverse and showed a prompt change in the taxa positioning in different markers. It was concluded from the data, the Neighbor joining method to calculate the distance matrix and similarity pattern is reliable and specific. This was also concluded that the species of Desmodium has changed and diverging from each other with course of time, which is also reflected in the morphology of species.

Keywords: RAPD, genetic diversity, PIC, Neighbour joining, molecular marker

EXPLORING THE HIDDEN WORLD OF GARLIC VIRUSES: A COMPREHENSIVE GENOMIC STUDY USING HIGH-THROUGHPUT SEQUENCING

¹Singh Jitender and ²Prajapati Malyaj R.

Department of Microbiology, Chaudhary Charan Singh University, Meerut, Uttar Pradesh, India-250001

²College of Biotechnology, Sardar Vallabhbhai Patel University of Agriculture and Technology, Meerut, Uttar Pradesh, India-250110

Garlic (Allium sativum L.) is widely utilized as a spice and medicinal plant worldwide due to its rich nutritional and therapeutic attributes. While fungal, Viral and bacterial diseases pose significant threats in garlic cultivation due to its vegetative propagation method and the transmission of viruses, which reduce yields and quality deterioration. In this study, the first comprehensive analysis of multiple viruses infecting Yamuna Safed-3 (G282) garlic cultivars in India, approaching genome-level characterization. We employed RNAsequencing (RNA-Seq) on an Illumina HiSeq 2000 platform, yielding a total of 34,873,376 and 31,497,569 paired-end sequence reads. De novo assembly of garlic transcriptomes produced 131,305 and 108,668 contigs from garlic cloves and leaves, respectively. Our blast analysis confirmed the near-complete genome sequences of several viruses, including Allexi viruses (Garlic Virus A [GarV-A], Garlic Virus B [GarV-B], Garlic Virus D [GarV-D], Garlic Virus E [GarV-E], and Garlic Virus X [GarV-X]), Carlavirus (Garlic Common Latent Virus [GCLV]), and Potyviruses (Onion Yellow Dwarf Virus [OYDV] and Leek Yellow Stripe Virus [LYSV]). Validation of the presence of these viruses in collected field samples is done using PCR-based methods. The evidence concerning the prevalence of garlic viruses holds significance for virus indexing to produce virus-free propagative materials and for breeding new garlic cultivars with resistance to the aforementioned viruses.

Keywords: Garlic; Allexivirus; Potyvirus; Carlavirus; HTS; Diagnosis; India

PP-VIII.01

DETERMINATION OF CAFFEIC ACID FROM CALLUS CULTURES OF DESMODIUM GANGETICUM (L) USING LC-MS AND HPTLC ANALYSIS

Trivedi Anjali and Joshi Aruna

Department of Botany, Faculty of Science, The Maharaja Sayajirao University of Baroda – Vadodara Email - anjalitrivedi3110@gmail.com

Desmodium gangeticum (L.) belonging to family Fabaceae is an economically important medicinal plant which is utilized in Dashmoolarishta. Various bioactive compounds have been isolated from whole plant and roots, and one of them is an important phenolic compound - caffeic acid (CA). This phenolic acid and its derivatives have antioxidant, anti-inflammatory and anticarcinogenic activity against an important type of cancer, hepatocarcinoma (HCC), considered to be of high incidence, highly aggressive and causing considerable mortality across the world. In the present study callus cultures were developed and optimum callus was induced in MS medium fortified with BA (20 μ M) and IAA (2 μ M) using leaf explant at the end of 8 weeks. This callus was analysed for presence of

caffeic acid using LC-MS. As the probable molecular mass of caffeic acid was depicted from the chromatogram, further quantification of the methanolic extracts of in vivo sample (leaf) and in vitro sample (leaf derived callus) was caried out using HPTLC. Thus, the chemical finger print that was obtained, confirmed the presence in both the samples **Keywords:** Dermodium gaugetion, caffeic Acid, Census HPTLC.

PP-VIII.02

IN VITRO CHEMICAL TREATMENT-INDUCED MODIFICATION IN BIOCHEMICAL STATUS OF WHITE AND BLACK SPECIES OF MUCUNA PRURIENS L

*Nagar Laxman, Singh Mahendra and Vimala Y.

*Department of Microbiology, Department of Botany, Chaudhary Charan Singh University, Meerut lifemaster2021@gmail.com

The present study aims to evaluate the effect of different concentrations and combinations of plant growth regulators (PGRs), L Dopa precursor tyrosine (Tyr) and polyploidy inducer (313µM Colchicine) treatments on biochemical status of white (W) and black (B) varieties of *Mucuna pruriens* L. four weeks old calli. In general, white and black varieties behaved almost identically in increase or decrease of proline, phenolics, sugar, and nitrogen, but in protein accumulation white variety required higher 2,4-D, Kn, tyrosine compared to black variety upon 12 hrs treatment with colchicine. Besides increase in the number of hours of treatment with colchicine (18hrs) led to decline in protein in white variety whereas decrease in the hour of colchicine treatment (6hrs) led to decline in protein in black variety. Proline and Nitrogen increased with increasing tyrosine creating stress condition whereas the same reduced sugars and 2,4-D,/Kn in higher concentration led to accumulation of phenolics and non-reducing sugar. The study revealed that treatments of PGRs, Tyr or Colchicine have direct impact on growth activities calli of both varieties of *M. pruriens*.

Keywords: Mucuna pruriens, L. Dopa, Colchicine, PGRs

PP-VIII.03

ASSESSMENT OF VARIOUS NUTRIENT MEDIA FOR ANDROGENIC INDUCTION IN CATHARANTHU SROSEUS

Narkhedkar Vivek R.

Mahatma JyotibaFule Commerce, Science and Vitthalrao Raut Art's College, Bhatkuli – 444602

Anther culture explores the fact that a certain proportion of pollen grains in situ are embryogenic. The diploid plants developed from anther culture could be homozygous double haploids (DHs) or heterozygous somatic diploids produced by the anther-wall tissue. The experiments were conducted in Catharanthus roseus for determining the optimal nutrient media and microspore developmental stages for androgenic induction. The results revealed that Gamborg B5 media is superlative to the other three nutrient media tested. But, no major differences were noted between induction efficiencies of Gamborg B5 and MS nutrient media. The microspores at uninucleate stage of development are more susceptible for pretreatment stress and the diversion of gametophytic development towards the sporophytic pathway is more plausible at this stage only. The best combination for plant regeneration via callus culture was 0.5 mg/l NAA, 1.0 mg/l BAP and 1.5 mg/l TDZ.

Keywords: Haploids, Androgenesis, Gamborg media, Catharanthus roseus.

PP VIII.04

EFFECT OF ELICITORS TO ENHANCE SECONDARY METABOLITES PRODUCTION IN R. SETIGERA (MICHX.) SUSPENSION CULTURE

¹Warhade Mrunal I. and ²Badere Rupesh S.

¹Department of Botany, GramgeetaMahavidyalaya, Chimur -442 903
²Department of Botany, RTM Nagpur University, MJP Educational Campus, Nagpur -440033, E-mail- mrunalwarhade@gmail.com

Elicitation is the key method to increase secondary metabolites through plant tissue culture application. The attempt was made to determine the effect of Fungal elicitor (FE), yeast extract (YE), pectin and salicylic acid (SA). Rosa setigera (michx.) (Rosaceae) is priced for various classes of volatile compounds like alcohol (geraniol), aromatic ethers (methyl-eugenol) etc. Leaf disc were kept on MS media with alone or in combination with auxins and cytokininsfor callus induction and later suspension culture were initiated. The geraniol and eugenol content were semi quantitatively estimated by densitometry. Compared with the control culture, geraniol and eugenol content is reduced when treated with all the elicitors accept SA. All the elicitors did not affect the yield of secondary metabolites accept SA. Higher concentration of salicylic acid significantly increases the yield of geraniol and eugenol. The study indicates that the elicitation with salicylic acid promotes the accumulation of geraniol and eugenol in suspension culture of rose.

Keywords: Elicitation, Salicylic acid, secondary metabolites

PP VIII.05

ANTIPROLIFERATIVE ACTIVITY AND INDUCTION OF APOPTOTIC BY METHANOLIC EXTRACT OF GALANGAL RHIZOME IN MDAMB231CELL LINE

Khushboo Yadav, P. A. Wadegaonkar and V. P. Wadegaonkar

Department of Biotechnology Sant Gadge Baba Amravati University, Amravati-444602, Maharashtra (India), Email- khushboo05sgbau@gmail.com, prasadwadegaonkar@sgbau.ac.in

In this study we check the potential of methanolic extract of *Alpinia galanga* rhizomes a plant species of the Zingiberaceae family to induce cytotoxic and apoptotic effects in the cultured Human Adenocarcinoma mammary gland cell line, (MDA-MB231). Cells was cultured in Leibovitz's L-15 medium and treated with crude methanolic extract of galangal rhizomes and the migration effect of cells was examined using wound healing assay, cellular morphology of the cells was determined by DAPI staining and the study of apoptotic cells was done by Annexin V-Propidium Iodide Apoptosis Assay. The results showed that the crude methanolic extract of alpinia galangal rhizomes decreased cell viability in the malignant cells at different concentration and the morphology of MDA-MB231 cells that are treated with the crude methanolic extract has confirmed the results of proliferation assay.

It has been concluded that the crude methanolic rhizome extract of plant *Alpinia galanga* has a pro-apoptotic effects in a triple negative mammary gland cell line and it could be considered as a potential chemotherapeutic agent against breast cancer.

Keywords: Alpinia galanga, Zingiberaceae, MDA-MB231, cytotoxicity

XLVI ALL INDIA BOTANICAL CONFERENCE of THE INDIAN BOTANICAL SOCIETY PAST OFFICE BEARERS OF THE SOCIETY Synergy in Plant Science and Sustainable Future: 2023



THEINDIANBOTANICALSOCIETY PASTOFFICE-BEARERS

PRESIDENT

Year	Name	Year	Name
1921	Prof. Dudgeon Winfield	1965	Prof. B. M. Johri
1922	Rai Bahadur K. Rangachariar	1966	Prof. V. Puri
1923	Prof. B. Sahni	1967	Dr. B. Samantarai
1924	Prof. S. R. Kashyap	1968	Prof. T. S. Mahabale
1925	Prof. R. S. Inamdar	1969	Prof. S. M. Sircar
1926	Prof. S. L. Ajrekar	1970	Prof. K. S. Bhargava
1927	Rev. Dr. E. Blatter	1971	Prof. S. B. Saksena
1928-29	Prof. M. O. P. Iyengar	1972	Prof. C. V. Subramanian
1930	Prof. P. Parija	1973	Prof. K. S. Thind
1931-32	Prof. T. Ekambaram	1974	Prof. M. R. Saxena
1933	Prof. S. P. Agharkar	1975	Prof. Reayat Khan
1934	Prof. R. H. Dastur	1976	Prof. D. D. Pant
1935	Prof. J. H. Mitter	1977	Prof. R. P. Roy
1936-37	Prof. S. R. Bose	1978	Prof. S. C. Agarwala
1938	Prof. H. G. Champion	1979	Dr. M. S. Swaminathan
1939	Rai Bahadur Prof, K. C. Mehta	1980	Prof. A. K. Sharma
1940	Prof. H. Chaudhuri	1981	Prof. Jafar Nizam
1941	Prof. S. L. Ghose	1982	Prof. K. K. Nanda
1942	Prof. M. A. Sampathkumaran	1983	Prof. B. S. Trivedi
1943	Dr. K. Bagchee	1984	Prof. S. C. Maheshwari
1944	Prof. Y. Bharadwaja	1985	Prof. Y. S. R. K. Sarma
1945	Dr. N. L. Bor	1986	Prof. H. Y. MohanRam
1946	Prof. ShriRanjan	1987	Dr. S. K. Jain
1947	Prof. S. N. Das Gupta	1988	Prof. K. S. Bilgrami
1948	Prof. A. C. Joshi	1989	Prof. (Mrs.) Archana Sharma
1949	Prof. G. P. Majumdar	1990	Prof. A. Gnanam
1950	Dr. B. P. Pal	1991	Prof. G. P. Agrawal
1951	Prof. P. Maheshwari	1992	Prof. S. N. Chaturvedi
1952	Dr. K. Biswas	1993	Prof. S. S. Bir
1953	Prof. K. A. Chowdhury	1994	Prof. S. C. Pandeya
1954	Prof. R. K. Saksena	1995	Prof. Dalbir Singh
1955	Prof. H. Santapau	1996	Prof. R. S. Dwivedi
1956	Prof. A. C. Joshi	1997	Prof. R. M. Pai
1957	Dr. S. K. Pande	1998	Prof. R. P. Purkayastha
1958	Prof. R. Misra	1999	Prof. K. S. Manilal
1959	Dr. E. K. Janaki Ammal	2000	Prof. A. K. Koul
1960	Prof. 1. Banerji	2001	Prof. R. K. S. Chauhan
1961	Prof. J. Venkateswarlu	2002	Prof. R. L. Paliwal
1962	Prof. P. N. Mehra	2003	Prof. H. Shekar Shetty
1963-64	Prof. T. S. Sadasivan	2004	Prof. R. S. Tripathi
2005	Prof. Bharat Rai	2014	Prof. T. Pullaiah
2006	Dr. R. R. Rao	2015	Prof. A. K. Bhatnagar
2007	Prof. C. P. Malik	2016	Prof. S. M. Reddy
2008	Prof. C. Manoharachary	2017	Prof. A. K. Pandey
2009	Prof. C. M. Govil	2018	Prof. V. P. Singh
2010	Prof. K. R. Shiyanna	2019	Prof. Ashwani Kumar
2011	Prof. S. V. S. Chauhan	2020	Prof. M. Anis
2012	Prof. A. R. Kulkarni	2021	Prof. D. K. Maheshwari
2013	Prof. P. C. Trivedi	2022	Prof. S. R. Yadav

VICE-PRESIDENT

Year	Name	Year	Name
1921	Dr. W. Burns	1974	Prof. K. S. Thind, Prof. R. Misra
1922	Prof. S. P. Agharkar	1975	Prof. R. P. Roy, Prof. M. R. Suxena
1923	Prof. M. O. P. Iyengar	1976	Prof. Reayatkhan, Prof. B. Tyagi
1924	Prof. M. A. Sampathkumaran	1977	Prof. D. D. Pant, Prof. S. C. Agarwala
1925	Prof. S. L. Ajrekar	1978	Prof. R. P. Roy, Prof. V. R. Dnyansagar
1926	Prof. P. Parija	1979	Prof. S. C. Agarwala, Prof. Jafar Nizam
1927	Dr. H. Chaudhuri	1980	Dr. M. S. Swaminathan, Prof. B. S. Trivedi
1928-29	Prof. S.L. Ajrekar	1981	Prof. A. K. Sharma, Prof. M. S. Chennaveeraiah
1930	Dr. S. K. Mukherji, Dr. T. Ekambaram	1982	Prof. Jafar Nizam, Prof. Y. S. R. K. Sarma
1931-32	Dr. S. K. Ghose, Prof. P. Parija	1983	Prof. S. C. Pandeya
1933	Prof. T. Ekambaram, Prof. J. H. Mitter	1984	Prof. B. Padhi
1934	Prof. M. O. P. Iyengar, Prof. J. H. Mitter	1985	Prof. Dalbir Singh
1935	Prof. P. Parija, Prof. S. R. Bose	1986	Prof. A. R. Jafar
1936	Prof. P. Parija, Dr. K. Bagchee	1987	Prof. A. Mahadevan
1937	Prof. B. Sahni, Prof. H. G. Champion	1988	Prof. R. P. Sinha
1938	Prof. S. L. Ghose, Prof. R. H. Dastur	1989	Prof. G. R. Rao
1939	Prof. H. G. Champion, Prof. H. Chaudhuri	1990	Prof. H. D. Padhye
1940	Prof. K. C. Mehta, Dr. K. Bagchee	1991	Prof. Bharat Rai
1941	Prof. H. Chaudhuri, Prof. Shri Ranjan	1992	Prof. C. P. Sharma
1942	Prof. Y. Bharadwaja, Dr. N. L. Bor	1993	Prof. R. N. Joshi
1943	Prof. P. Parija, Prof. M. A. Sampathkumaran	1994	Prof. S. K. Hasija
1944	Prof. A. C. Joshi	1995	Prof. G. S. Rawla
1945	Prof. H. Chaudhuri, Dr. B. P. Pal	1996	Prof. A. K. Koul
1946	Dr. N. L. Bor, Dr. M. S. Randhawa	1997	Prof. D. K. Maheshwari
1947	Prof. Shri Ranjan, Prof. A. C. Joshi	1998	Prof. H. Shekharshetty
1948	Prof. S. N. Das Gupta, Dr. M. S. Randhawa	1999	Prof. P. S. Duby
1949	Prof. A. C. Joshi, Prof. M. O. P. Iyengar	2000	Dr. R. H. Shete

	<u> </u>	- 24	4
1950	Prof. G. P. Majumdar, Prof. T. S. Mahabale	2001	Prof. A. P. Garg
1951	Dr. B. P. Pal, Prof. S. P. Agharkar	2002	Prof. C. Manoharachary
1952	Prof. P. Maheshwari, Prof. R. K. Saksena	2003	Prof. V. P. Singh
1953	Dr. K. Biswas, Prof. S. N. Das Gupta	2004	Prof. M. Iqbal
1954	Prof. K. A. Chowdhury, Prof. Y. Bharadwaja	2005	Prof. T. Pullaiah
1955	Dr. R. K. Saksena, Prof. B. P. Pal	2006	Dr. S. Kumar
1956	Rev. Fr. Dr. H. Santapau, Prof. P. Maheshwari	2007	Prof. S. S. Katewa
1957	Prof. A. C. Joshi, Prof. P. Maheshwari	2008	Prof. A. K. Jain
1958	Dr. S. K. Pande, Prof. P. Maheshwari	2009	Prof. Anupam Dikshit
1959	Prof. R. Misra, Prof. P. Maheshwari	2010	Prof. M. Krishnappa
1960	Dr. E. K. Janakiammal, Prof. R. Misra	2011	Prof. S. R. Yadav
1961	Prof. I. Banerji, Prof. P. N. Mehra	2012	Prof. Seshu Lavania
1962	Prof. J. Venkateswarlu, Prof. S. M. Sircar	2013	Prof.ArunArya
1963-64	Prof. P. N. Mehra, Prof. B. G. L. Swamy	2014	Prof. N. N. Tripathi
1965	Prof. T. S. Sadasivan, Prof. R. P. Roy	2015	Prof. R. H. Shete
1966	Prof. B. M. Johri, Prof. P. Maheshwari	2016	Prof. Kailash Agarwal
1967	Prof. V. Puri, Prof. B. M. Johri	2017	Prof. Jyoti Kumar
1968	Prof. B. Samantarai, Prof. R. P. Roy	2018	Prof. J. I. S. Khattar
1969	Prof. T. S. Mahabale, Prof. A. C. Joshi	2019	Propf. Avinash Tiwari
1970	Prof. S. M. Sircar, Prof. S. B. Saksena	2020	Prof. Santhosh Nampy
1971	Prof. K. S. Bhagava, Prof. R. Misra	2021	Dr. T. R. Rana
1972	Prof. B. G. L. Swamy, Prof. S. B. Saksena	2022	Dr. Nalini Pande
1973	Prof. C. V. Subramanian, Prof. R. Misra		

SECRETARY

Year	Name	Year	Name
1921-22	Prof. S. R. Kashyap	1950-55	Prof. R. Misra
1923	Prof. B. Sahni, Prof. R. S. Inamadar	1956-60	Prof. J. Vcnkateswarlu
1923-28	Mr. N. K. Tiwary	1961-64	Prof. V. Puri
1929-30	Prof. S. R. Kashyap	1966-71	Prof. R. P. Roy
1931	Prof. Winfield Dudgeon	1972-74	Prof. K. S. Bhargava
1932-34	Dr. S. K. Mukerji	1975-86	Prof. Y. S. Murty

XLVI ALL INDIA BOTANICAL CONFERENCE of THE INDIAN BOTANICAL SOCIETY

1934-38	Dr. E. K. Janaki Animal	1987-92	Prof.DalbirSingh
1938-41	Prof. Y. Bharadwaja	1993-98	Prof. S. K. Hasija
1942-44	Prof. G. P. Majumdar	1999-2004	Prof. S.V. S. Chauhan
1945-46	Prof. S. N. Das Gupta	2005-10	Prof. P. C. Trivedi
1947	Prof. R. L. Nirula	2011-17	Prof. V. P. Singh
1948-49	Prof. T. S. Mahabale	2017-23	Prof. Seshu Lavania

TREASURER

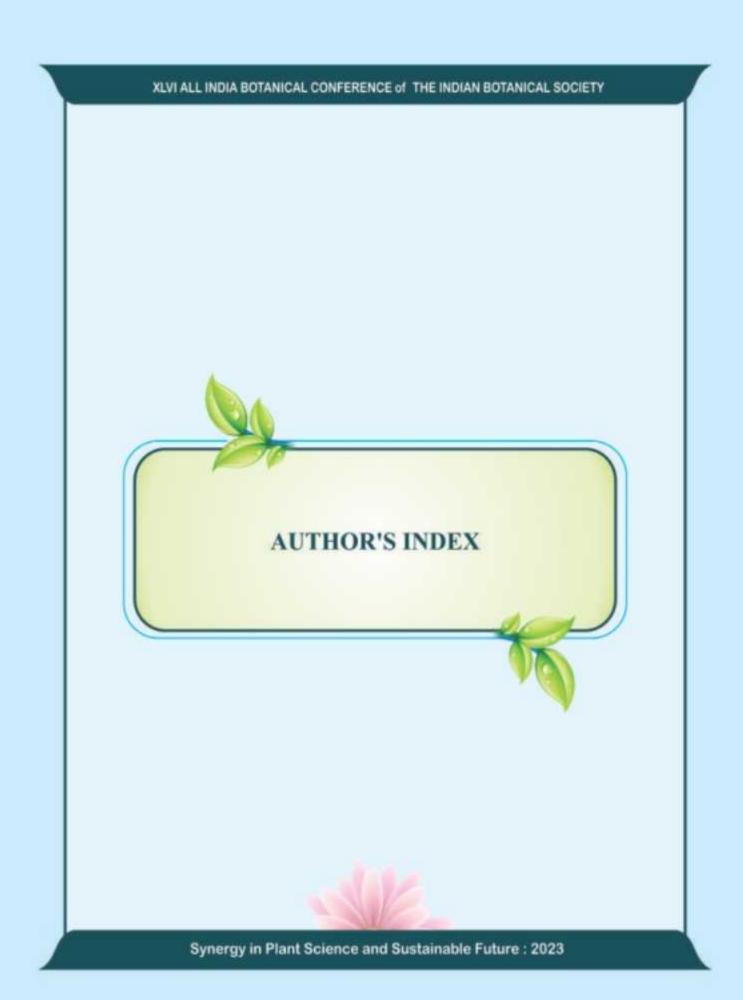
Year	Name	Year	Name
1929-30	Prof. M. O. P. Iyengar	1974-80	Prof. L. P. Mall
1930-33	Prof. T. Ekambaram	1981-83	Dr. S. K. Jain
1933-43	Prof. M. O. P. Iyengar	1984-86	Prof. K. S. Manilal
1944	Prof. G. P. Majumdar	1987-89	Prof. T. Prasad
1945-47	Prof. A. C. Joshi	1989-92	Prof. S. K. Hasija
1948-50	Prof. S. P. Agharkar	1993-98	Prof. Uma Kant
1951	Dr. R. L. Nirula	1999-2004	Prof. S. M. Reddy
1952-65	Prof. T. S. Sadasivan	2005-10	Prof. T. Singh
1966-71	Prof. J. Venkateswarlu	2011-2023	Dr. Alok Srivastava
1972-74	Prof. M. R. Suxena	3	

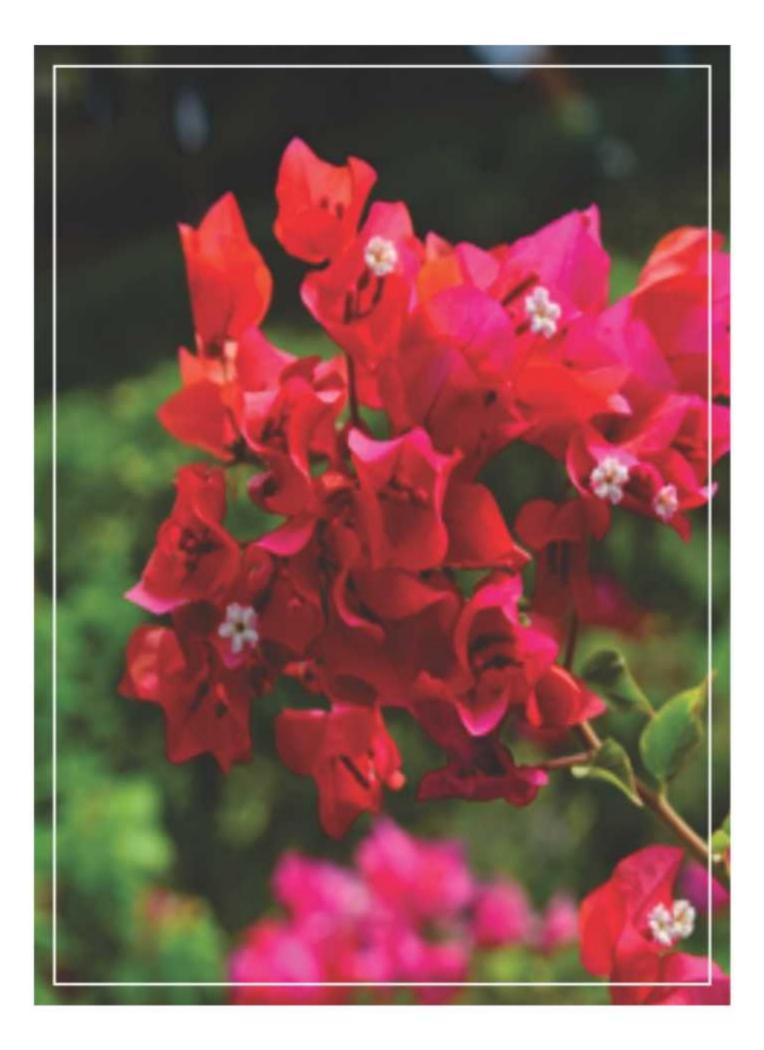
EDITOR

Year	Name	Year	Name
1921-25	Prof. P. F. Fyson	1966-67	Prof. T. S. Sadasivan, Prof. C. V. Subramanian
1926-28	Prof. B. Sahni	1968-78	Prof. V. Puri, Prof. Y. S. Murty
1929	Prof. M. O. P. Iyengar	1979-86	Prof. S. C. Agarwala, Prof. B. N. Prasad
1930-33	Prof. S. R. Kashyap	1987-89	Prof. A. Mahadevan
1934-42	Prof. P. Parija	1989-92	Prof. D. Banerjee, Prof. C. M. Govil
1943-47	Prof. M. O. P. Iyengar	1993-2000	Prof. C. M. Govil, Prof. A. P. Garg
1948-49	Prof. G. P. Majumdar	2000-03	Prof. D. K. Maheshwari, Dr. R. C. Dubey
1950-54	Prof. A. C. Joshi	2004-06	Prof. R. N. Gohil
1955-65	Prof. T. S. Sadasivan	2007-23	Prof. Y. Vimala

HONORARY LIBRARIAN

Year	Name	Year	Name
1960-71	Prof. R. Misra	1992-1993	Prof. J. S. Singh
1972-76	Prof. R. N. Singh	1994-1997	Prof. Bharat Rai
1976-78	Prof. Y. S. R. K. Sarma	1997-2000	Prof. K. P. Singh
1972-76	Prof. R. N. Singh	2000-2003	Prof. V. S. Jaiswal
1976-78	Prof. Y. S. R. K. Sarma	2003-2008	Prof. D. N. Tiwari
1978-80	Prof. H. D. Kumar	2009-2012	Prof. B. R. Chaudhary
1980-82	Prof. E. R. S. Talpasayi	2012-2013	Prof. A. K. Rai
1982-84	Prof. R. S. Dwivedi	2014-2016	Prof. L. C. Rai
1984-86	Prof. D. N. Rao	2016-2018	Prof. M. Agarwal
1986-87	Prof. S. K. Roy	2018-2020	Prof. R. S. Upadhyay
1988-90	Prof. R. S. Ambasht	2020-2022	Prof. N. K. Dubey
1991-92	Prof. Y. B. Choudhary		





AUTHOR'S INDEX

Author Name	Page No.	Author Name	Page No.
Abubacker M. N.	77	Chaturvedi Alka A.	111
Acharya Darshika Hitesh	104	Chaudhari Bhushan N.	140,141
Adikane Sujata	108,136	Chauhan Chandrika	169
Afkham Farzan Ruzbeh	118	Chavada Pratikkumar	149
Aglave Hanumant A.	173	Chavan Sachin	161
Ahirrao Y. A.	126	Chavan V. P.	80
Akhtar Rafia	75	Chogule Vinay V.	97
Alahupreeti J.	150	Chougule Rupali N.	104
Albert Susy	117,151	Choukhande Nikhil B.	187
Ambatipudi Srinivas Kiran	188	Dangar Bhagyashri	91
Ashok Rachael	167	Daniel Mammen	114
Aswathi Ganga	114	Dar Mushtaq	191
Awachar S. V.	85	Darsimbe Avinash N.	183
Azhagiyamanavalan Lakshmi Prabha	173	Das Divya	117
Badere Rupesh	145,191,194	Das Prerana	158
Baig M. M. V.	74	Das Somenath	51
Balai Kunjan	91	Das Trisha	158
Banarase S. E.	84	Dasgupta R.	137
Bapat Vishwas A.	144	Datta Arunava	154
Barwal Sandeep Kumar	169	Denni Mammen	103,167
Bhandari Jnan Bikash	92,94	Desai Bhagyashri	178
Bhandari Manisha	94	Desai Shitalkumar P.	144
Bhatnagar A. K.	27	Deshmukh A. G.	145
Bhatt Parth J.1	52	Deshmukh A. M.	88
Birendra Kumar	143	Deshmukh Sharayu S.	182
Borkar Chaitanya	145	Deshmukh Shraddha	142
Borkar K. M.	.81	Deshmukh V. P.	146
Borul Shailesh S.	87	Deshpande Aniruddha S.	146
Chachad Devangi P.	45,109,118,	Dhillon Juhi	87
	118,171	Dhole Vinod J.	144
Chandanshive Yugandhara S.	132	Dhoran Varsha S.	146
Chandel Riya	165	Dhore M. M.	106
Chandra Subhash	155	Dhore Mukund M.	160
Charania Sheeza	109	Didwania Nidhi	86
Chatterjee Bidisha	158,158	Dongarwar N. M.	28,137

Author Name	Page No.	Author Name	Page No.
Dubey N. K.	13	Hande D. V.	88
Dubey Neetika	81	Hansdah Jessica R.	131
Dwivedy Abhishek K.	80,125,150	Harikrishna Jennifer Ann	31
Enroth Johannes	94	Haripriya Pakala	181
Gadge Prashant J.	186	Hate Sandeep	82
Gadkar Pranav V.	160	Hurrah Imtiyaz A.	133
Gadpayale Jagannath V.	111	Hutke Varsha D.	191
Gaikwad N. B.	141,144	Ingle P. B.	186
Gavhare Supriya B.	140,141	Iyer Nandini I	82
Gavit Mangesh P.	155	Jadhao Kanhaiyalal	84
Gawali M. B.	177	Jadhav Akesh G.	144
Gawande P. A.5,	142,154,183	Jadhav Mayur1	88
Gawande Y. B.	148	Jadhav Varsha D.	115,132,
Gehlot Hukam S.	73,81		136,179,189
Ghane S. G.	168,168	Jagtap Dipali N.	115
Ghosh Sampurna G.	158	Jagtap Tripti	138
Giridhar Parvatam	149,170,181	Jain Ritu	96
Godara Pooja	114	Jain Sapna	92
Gogle Dayanand P.	176	Jaiswal Jyoti	175,175
Goswami Hitesh K.	30	Jawale R. D.	132
Goutam Chanchal	169	Jha Lokokrishna	180
Gudadhe S. P.	147	Jha Shweta	188
Gudadhe Swapnil K.	163	Jhal Sapna	97
Gund Ganesh	140	Johnson Marry A.	174
Gupta Akancha	143	Johny Leena	86
Gupta Amit (BHU.)	175,175	Joshi Aruna1	92
Gupta Amit (Luck.)	116	Joshi Yogesh	78
Gupta Dara S.	47,78,127	Juhi Anila	170
Gupta Komal	162	Kajal Sanjay	174
Gupta Manjula	47,127	Kale P. J.	108
Gupta Vartika	52	Kamble K. D.	84,185
Gurav Rajaram V.	103,140,160,	Kanherkar Suryakant H.	87
	161,171,177,	Kapgate Dashrath R.	35
	178, 188	Kapil M. R.	147
Gurav Swati A.	107	Kapil Vandana	161

Author Name	Page No.	Author Name	Page No.
Kapse Mohan	180	Lawand Pramod R.	130
Kathalkar Mayuri	129	Lekhak Manoj M.	104,168
Katkole Siddharth K.	136	Linda Pushpa S.	180
Kawale Mahesh	156	Lohit Tushar A.	116
Kejariwal Mona	93	Londhe Ranjit K.	144
Khade Pruthviraj J.	83	Loo Sarah	31
Khadke Shivram G.	155	Madhukar Virendra K.	159
Khairnar M. K.	9	Magar Jaywant G.	140,141
Khan Saif Y.	119	Magdum Neha G.	179
Khanday A. H.	183	Mahalkar M. S.	106
Khapekar Pradnya G.	82	Maity Sudipa	188
Khatri P. K.	137	Malode S. N.	146
Kheta Ram	106	Manasawala Ruqayya	118
Koche Dipak	138,145	Manchester Stevem R.	35
Kokate Pratiksha	123,127	Mane Rameshwar Y.	87
Kothari Saloni P.	171	Manik S. R.	98,162,181
Kukade S. A.	107	Manik Vivek S.	163
Kumar Anil	157	Manju C. N.	51,89,89,
Kumar Ashwani	32		90,90
Kumar Dipender	143	Manjula K. M.	90
Kumar Nandjee	139	Manoharachary C.	34,79
Kumar Narendra	143	Mansuri Sanobar	151
Kumar Peeyush	143,152	Mao Ashiho A.	19
Kumar Rakesh	143	Matade N. S.	179
Kumar Sachin	76,76,82	Matte R. S.	130
Kumar Sandeep	76,76,82	Mawale Kiran S.	170
Kumari Babita	78	Mazumdar Purabi	31
Kumari Manorama	128	Meenaloshini P.	120
Kumari Neha	97	Menghani Ekta	75
Kumari Puja	143	Menon Sajitha S.	51
Kumbhare Shravan D.	45	Mepani Mepani	115
Kuvar Sachin D.	112,125	Meshram Sachita	191
Lavania Seshu	52	Mirge Yogita S.	108
Lavate Rajendra	95	Misra P. C.	96
Lavate S. S.	141	Mitra Arup K.	158,158

Author Name	Page No.	Author Name	Page No.
Mohan Vishnu	117	Pareek Aparna	43,48
Mohanka Reena	139	Pareek Arvind	92
Momin Sobiyanaz	171	Patel Rudra	177
Mondal Manoshree D.	45,182	Patel Suraj B.	168
Monisha K.	167,187	Pathak Sumit K.	126
More Digambar R.	74	Patil A. M.	124
More K. C.	142	Patil C. R.	124
Mukherjee Anita	23	Patil D. A.	124,126
Mukherjee Prasanjit	152	Patil Geeta	122
Mundadha S. G.	183	Patil Janhvi	122
Muratkar G. D.	154	Patil M. V.	126
Murugan C.	111	Patil Priyanka S.	189
Nagar Laxman	124,193	Patil Sachin	95
Nagar Padamnabhi S.	124	Patil Sharadkumar P.	35
Nagaraju D.	79	Patil Shital	139
Naik Dhiraj	180,190	Patil Shubhangi P.	97
Nampy Santhosh	107,117	Patil Vidya	122
Narkhedkar Vivek R.	193	Pawar K. B.	179
Naser Rafiuddin	97	Pawar P. V.	173
Nashra Aftab	143	Phirke N. V.	83,83,84
Nathar V. N.	1,142,146,	Phokmare Ashwini B.	176
	147, 147,	Pophale V. V.	157
	165, 186	Prajapati M. R.	192
Nayaka Sanjeeva	52	Prasad Manoj	46
Nemade K. R.	172	Prasad Priyanka	143
Oraon Vinay	180	Prerna Anoma	38
Otari Shreedhar S.	168,168	Pundkar S. V.	127
Oza Kavi K.	112	Pyare Krishna	180
Pal Amita	15	Rai Nidhi	185
Panchariya S. S.	165	Rajalakshmi K.	150
Pandey Arun	37	Rajeesh E. P.	113
Pandey Manisha	129,135	Rajesh K. P.	89
Pandey Neha	21,166,185	Rajput Kishore S.	101,101,102,
Pandya Parth	162,167	(198)	103,105
Pant Sapana	93,94	Rajput Shrishti	137

Author Name	Page No.	Author Name	Page No.
Rajurkar A. V.	134	Schindler Simona	75
Ram Tara Chandra	143	Shahare N. H.	80
Rami Meera	103	Shaikh Qaisarjahan	178
Ramteke Deepak D.	35	Shakira C.	89
Rana Karan	153,187	Sharma Ameeta	49
Ranjan Navi	128,128	Sharma Jaydeep J.	124
Rao M. V.	77	Sharma Rajesh K.	151
Rao T. V. Ramana	166	Sharma Rekha	157
Raole Vinay M.	101,105,112,	Sharma Sachin	129,135
	137	Sharma Shilpa	86
Rathod S. A.	157	Shekhawat G. S.	40
Rathore Neelkamal	135,153,156	Sherif N. Ahamed	77
Raut N. S.	83	Shimapale Vinod B.	130
Raut R. V.	186	Shinde R. D.	119
Ravichandran V.	111	Shirsat Rupali P.	121
Raviya Rajesh	149,152	Shiva Krishnan K.	185
Rawal Abhishek	81	Showkat Subiya	74
Resmi S.	44	Shrishail H. C.	120
Riddhi M.	137,187	Shukla Aparna R.	133
Robin Elizabeth	114,162,176	Shukla Priyanka	119
Rokade S. S.	186	Shukla Sadhana	86
Romaliya Dhara	105	Sikarwar R. L. S.	153
Sabu M.	113	Singh Ajit P.	98,189
Saha Maitra	94	Singh Akanksha	189
Sahu Nayan	133	Singh Archana K.	85
Sahu Niharika	97	Singh Ashish P.	175,175
Saiyam P.	182	Singh Brijendra	121
Samdurkar Anish	48	Singh Ishwar	169
Sandhiya Udaykumar	173	Singh Jawahar	188
Sansdah Jessica	131	Singh Jitendra	192
Sardar P. R.	181	Singh Mahindra	52,193
Sarode Akhilesh	123	Singh Prashant	73,175
Satpute Sanjay	122,123	Singh Priyanka	151
Saudagar S. A. A. G.	162,181	Singh Puja	92
Sawant Neha	131	Singh Pushpendra	156

Author Name	Page No.	Author Name	Page No.
Singh Pushplata	86	Topno Swati	77
Singh Roshan K.	46	Tripathi R. D.	17
Singh Sneha	159	Tripathi Saumya	166,185
Singh Varsha K.	97	Trivedi Anjali	185, 192
Sinha Rajeshwar P.	97,175,175	Trivedi P. C.	25, 49
Sinha S. N. Prasad	155	Ukey Sanghadeep S.	176
Sinha Vishnu S.	85,139	Umale Pratiksha	139,187
Sirsat Ashwini	123	Vaidya Meenakshi S.	104,105,109,
Smith Selena Y.	35		115,119,131,
Somkuwar Subhash R.	111		172
Soni Monisha	150	Vaishnavi K. P.	107
Srivastav Neerja1	53	Vala Mayur	93
Srivastava Ajay K.	131	Verma R. S.	143
Srivastava S. K.	79	Vidyarthi S. K.	128,128
Srivastava Sakshi	98	Vimala Y.	52,87,169,
Sruthi O. M.	89	33305-5367-537-537-537-537-537-537-537-537-537-53	193
Sunojkumar P.	113,114	Vineesha P. M.	90
T. Senthil Kumar	74,75,77,	Wadegaonkar P. A.	194
	120,185	Wadegaonkar V. P.	194
Tak Nisha	73,81,86	Wagh Vijay V.	116,116,133,
Tandon S.	143	- Washington and American States	133
Tanmay Rohit	102	Waghuley S. A.	172
Tewari S. D.	93,94	Wang Gwo Rong	31
Thacker Khyati D.	101	Wankhede T. B.	98
Thakur Sveta	161,165,174,	Warhade Mrunal I.	194
	174	Wath M. R.	129,132,157
Thorat K. M.	127	Yadav Ankitl	72
Tidke Jaykiran A.	107,108,123,	Yadav Arati	80
	134,148	Yadav Khusboo	194
Tiwari Anjali	166	Yadav Shrirang R.	41,104
Tiwari Shraddha	96	Yadav Vijay K.	135
Toms Ashna	113		



With Bost Compliments From:





Labline Instruments (India) Pvt. Ltc

2nd Floor, Agrawal Complex, Rallies Plots, AMRAVATI. (M.5 Ph: (0721) 2679123, Tele. Fax: (0721) 2564637 E-mail: labline.ipl@gmail.com, labline.ipl@rediffmail.com







PH/Conductivity/etc testers



PCR



Laminar Air Flow



Rotary evaporator



hand held meters

An ISO 9001: 2015 & ISO 27001:2013 Certified Co.

Deals In:

- Chemistry, Physics, Botany, Zoology and Microbiology Lab Instruments
- Soil , Water, Plant, Oil and Food Analysis Instruments
- Chemicals, Medias, Reagents, Cultures, Glassware's etc...
- Biotechnology & Microbiology Lab Equipments.
- Microscopes, Microphotography & Gel Doc. systems
- Biological, Immunology Products & Teaching Kits.
- Analytical, Research, Medical, Pathology & PCR Products

With Best Compliments from

SHIKSHAN PRASARAK MANDAL, GHATANJI

S.P.M. Science And Gilani Arts Commerce College, Ghatanji Dist. Yavatmal (NAAC Accredited B- Grade)

www.spmgilanicollege.in



Shri. S. A. Gilur President



Adv. A. A. Lonkar Secretory



Dr. M. A. Shahezad Principal

Members and Teaching and Non-Teaching Staff of S.P.M. Science And Gilani Arts Commerce College, Ghatanji Dist. Yavatmal

- ф В.А.
- ♦ B.Com.
- ♦ B.5c.
- ♦ M.A. (History)
- ♦ M.A. (Marathi)
- ♦ Home Economics for Girls
- Research Center:
- Botany, Zoology, Chemistry, History, Commerce
- ♦ Well Equipped Library and Gym,
- ♦ Junior College with H.S.C. Vocational
- ♦ YCMOU Study Center



With Best Compliments From:





Labline Instruments (India) Pvt. Ltd.

2nd Floor, Agrawal Complex, Rallies Plots, AMRAVATI. (M.S.)
Ph : (0721) 2679123, Tele. Fax: (0721) 2564637
E-mail: labiline.lpl@gmail.com, labiline.lpl@rediffmail.com













An ISO 9001: 2015 & ISO 27001:2013 Certified Co.

Deals In:

- Biotechnology & Microbiology Lab Equipments
- Analytical Instruments, Biological Products.
- Scientific, & Research Laboratory Instruments.
- Chemicals, Glassware's, Plastic wares & all Types of Lab wares.
- Physics & Nanotechnology Lab Equipments,
- Electronic-Electrical Instruments and Digital balances



SANT GADGE BABA'S TEN COMMANDMENTS

To Serve God is to Provide...

- Food to Hungry
- Water to Thirsty
- Clothes to Naked
- Education to Poor Children
- Shelter to Homeless
- Medicines to Blind,
- Handicapped & Diseased
- Protection to Dumb Animals
- Marriage of Poor Young-Boys & Girls
- Courage to Distressed & the Frustrated





