



Concordia Natura-e- Plants, Peril and Human parallels

ANTHESIS

Volume 20 | 2024-25



ANNUAL PUBLICATION OF GARGI COLLEGE BOTANICAL SOCIETY

Department of Botany
Gargi College, Siri Fort Road
New Delhi- 110049



ANTHESIS

Volume 20 | 2024-25



"The flowers that bloom tomorrow are the seeds you planted today."

Photograph credit: Manasvini Singh Sambyal [B.Sc. (Hons.) Botany- 3rd year]
Coverpage Art by: Vandita Singh [B.Sc. (Hons.) Botany- 3rd year]

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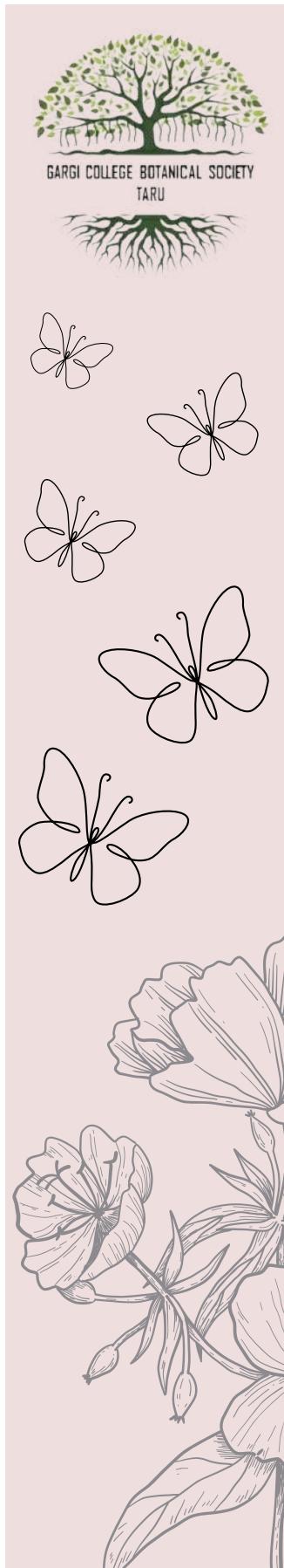
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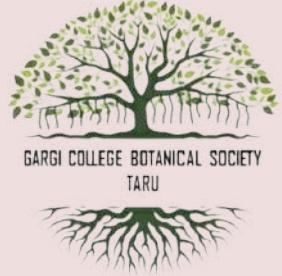
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THE CONSCIOUS FLORA

This segment delves into the fascinating abilities of plants to respond to environmental stimuli, adapt to change, and engage in intricate chemical communications, showcasing their complex roles within ecosystems.



SEGMENT 1



Articles

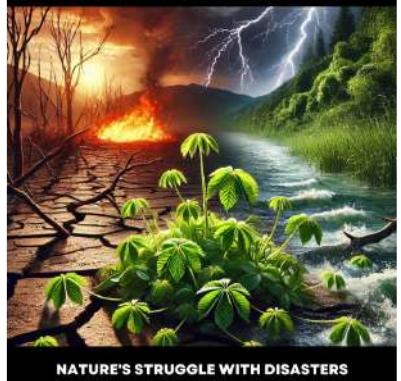
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PLANTS IN PERIL

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SEGMENT 2



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LIFE'S PARALLELS

This segment explores the intricate parallels between plants and humans, focusing on shared biological processes, adaptations, and mechanisms that enhance our understanding of both life forms.



SEGMENT 3



PRINCIPAL'S DESK

Dr. Sangeeta Bhatia



As we step into the end of this academic session I am delighted to learn that the Botanical Society 'Taru' is coming out with yet another edition of their magazine, **Anthesis**, a celebration of the rich and diverse world of plants. Whether it's the latest research in plant science, conservation efforts, or the beauty of botanical artistry, this is sure to bring together insights that inspire both professionals and enthusiasts alike.

Our shared passion for plants connects us across disciplines—be it ecology, horticulture, ethnobotany, or simply the joy of gardening. With climate change and habitat loss posing increasing challenges, the role of botanical knowledge has never been more crucial. Through this magazine, I hope to know more about sustainable practices, and the fascinating intricacies of plant life.

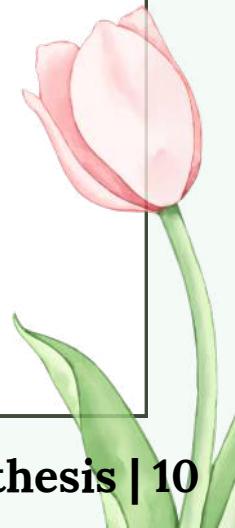
Let us continue to cultivate curiosity and appreciation for the botanical world.

Happy reading!

Prof. (Dr.) Sangeeta Bhatia

Principal (Offg.)

Gargi College, University of Delhi



TEACHER-IN-CHARGE'S DESK

Dr. Reema Mishra



Dear Editorial Team

As we prepare to unveil the 20th volume of our departmental magazine “Anthesis”, it is with immense pride and joy that I extend my heartfelt congratulations to everyone involved in making our departmental magazine a reality. This publication is not just a collection of articles and creative pieces; it is a testament to the dedication, talent, and collaborative spirit that thrives within our department. Bringing Anthesis to life requires passion, perseverance, and teamwork, and I applaud the Editorial Board, the GCBS team, and our faculty advisers for their unwavering commitment and hard work. Your collective efforts have ensured that this magazine continues to serve as a platform for knowledge-sharing, innovation, and inspiration. May this edition not only showcase our academic and creative excellence but also serve as a reminder of the collaborative spirit that binds us together. Your efforts remind us that creativity knows no bounds, and learning is a lifelong adventure.

Thank you all for your dedication, I look forward to seeing the results of your collective efforts!

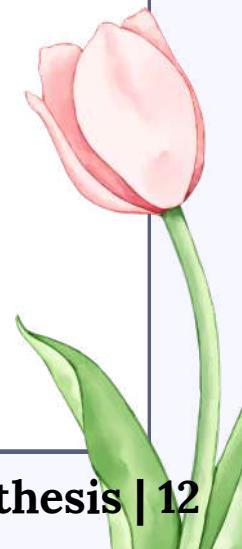
Dr. Reema Mishra
Associate Professor
Department of Botany
Gargi College

प्रिय संपादकीय टीम

हमारी विभागीय पत्रिका 'एंथेसिस' का 20वां खंड जल्द ही अपनी रचनात्मक यात्रा आरंभ करने जा रहा है, मैं अपार गर्व और प्रसन्नता के साथ उन सभी को हार्दिक बधाई देती हूँ जिन्होंने इस पत्रिका को साकार करने में योगदान दिया है। यह प्रकाशन केवल लेखों और रचनात्मक अभिव्यक्तियों का संग्रह नहीं है, बल्कि यह हमारे "एंथेसिस" को साकार करना जुनून, दृढ़ता और टीम वर्क की मांग करता है, और मैं संपादकीय टीम, GCBS टीम और हमारे संकाय सलाहकारों की अथक प्रतिबद्धता और कड़ी मेहनत की सराहना करती हूँ। आप सभी के सामूहिक प्रयासों ने यह सुनिश्चित किया है कि यह पत्रिका ज्ञान-साझाकरण, नवाचार और प्रेरणा का एक मंच बनी रहे। यह संस्करण न केवल हमारे शैक्षणिक और रचनात्मक उत्कृष्टता को प्रदर्शित करे, बल्कि उस सहयोगी भावना की भी याद दिलाए जो हमें एकजुट करती है। आपके प्रयास हमें यह याद दिलाते हैं कि रचनात्मकता की कोई सीमा नहीं होती और सीखना जीवन भर चलने वाली यात्रा है।

आप सभी के समर्पण के लिए धन्यवाद—मैं आपके सामूहिक प्रयासों के परिणाम को देखने के लिए उत्सुक हूँ!

डॉ. रीमा मिश्रा
सह-प्राध्यापिका
वनस्पति विज्ञान विभाग
गार्गी कॉलेज



EDITOR-IN-CHIEF'S DESK

Ms. Rashi Singh



With great pride and heartfelt gratitude, I present to you the 20th volume of *Anthesis*, the annual magazine of the Department of Botany, Gargi College. This milestone edition is more than just a publication—it is a celebration of curiosity, creativity, and collective effort that has kept the spirit of this magazine alive and ever-evolving.

Each page of this issue reflects the diverse voices of our department-students, teachers, and alumni-woven together through scientific inquiry, artistic expression, and an enduring love for the plant world. The journey of curating this edition has been one of thoughtful exploration, filled with late-night edits, stimulating conversations, and a deep commitment to uphold the legacy of *Anthesis* while giving it a fresh and meaningful direction.

This year, we have sought to bring together pieces that not only inform but also inspire. I hope this issue stirs questions, sparks imagination, and offers a quiet moment of reflection amidst the busyness of academic life.

My sincere thanks go to the editorial team, contributors, and faculty mentors who made this edition possible. Here's to honouring the past, embracing the present, and looking forward to the chapters yet to unfold.

Warmly,
Rashi Singh
Editor-in-chief, *Anthesis*
Department of Botany
Gargi College



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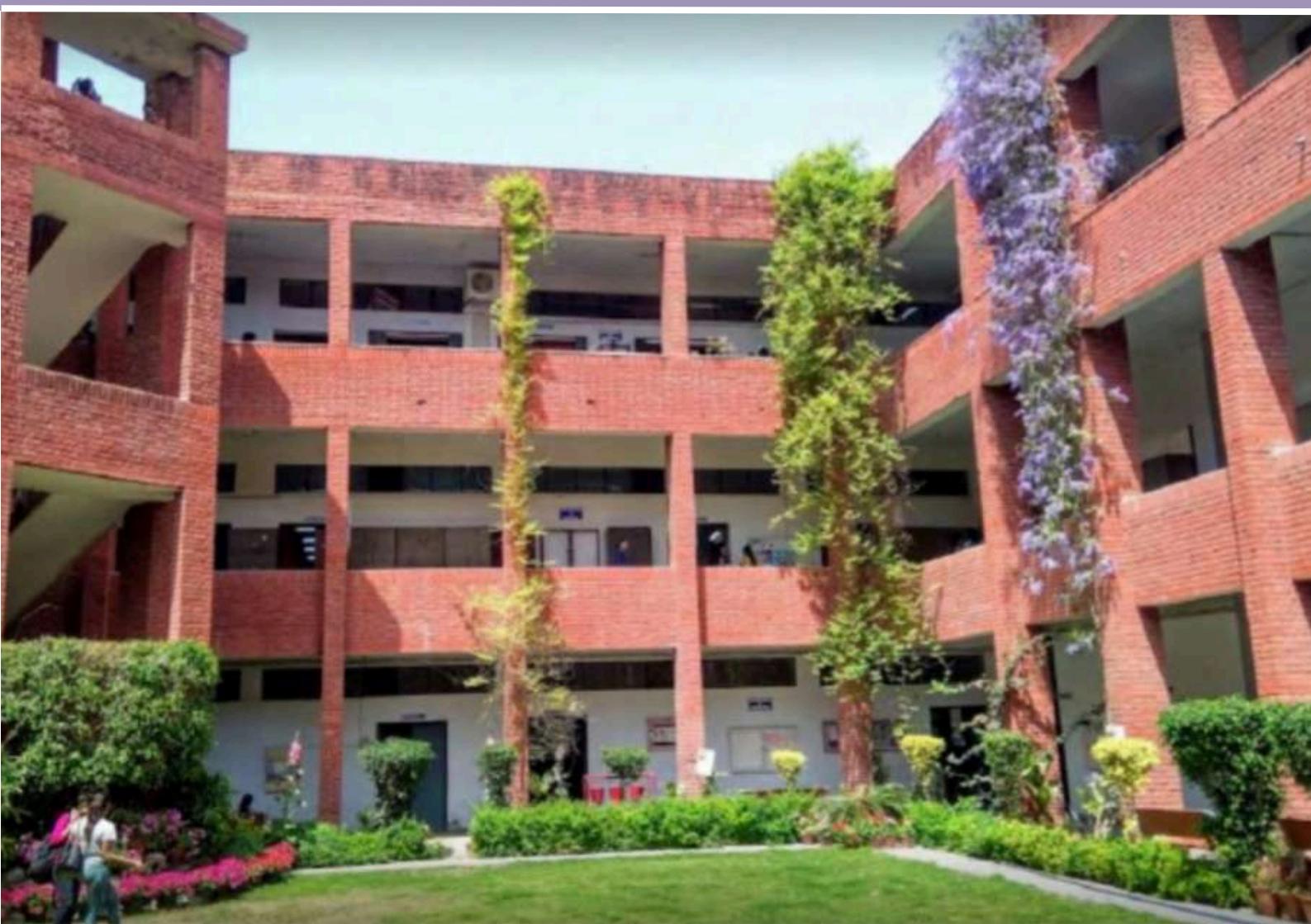
Nishtha Bhardwaj



THE

DEPARTMENT OF BOTANY

(2024-2025)



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(NOVEMBER 21, 1942 TO AUGUST 12, 2016)

DR. BHARTI BHATTACHARYA

(DECEMBER 26, 1942 TO MARCH 23, 2018)

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MS. AKANSHA SINHA

MS. CHANCHAL

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Anshu Kumari
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Anushree Sharma
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Asha Rana
Astha Juyal
Bhavya Gupta
Binal Pandey
Divya Bharti
Dhiseka Pawaiya
Haritha P
Jahanvi
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Juhi Chobey
Kashish
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Kirti Vashishtha
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Manasvini Singh Sambyal
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Muskan Thakur
Neha Kumari
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Prachi Sonkar
Priyanka Saharan
Priyasha
Pulkita Kohli
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Rashmi Pant
Rishika Khandelwal
Riya Vig
Romal Kushwaha
Roshani Kumari
Rukhsar Parveen
Sapna Meena
Shailly
Shilpi Raj
Shiva Upadhyay
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Shruti Priya
Shristi Singh
Smita Singh
Sneha Gupta
Somya
Tanvi
Tanvi
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Vandita Singh
Vartika Yadav

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Akansha Dwivedi
Akriti Sharma
Ananya Jha
Anika
Anita Mandal
Anmol
Anushka Rai
Anushka Singh
Anushka Singh
Anushka Upadhyay
Aparna Rawat
Arjya Mishra
Arunima Bishnoi
Ashvini Purohit
Bhoomi
Bhoomi Bhatnagar
Bhoomika
Chetna
Debarati Debnath
Gunjan Jain
Harshita Raj
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Jyoti
Kajal Sharma
Kashish Arora
Khushi Kumari
Khushi Rani Jha
Kirti
Komal Agrahari
Krishna Chandrawat
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Manashvi Bhati

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Mansi Singh
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Pooja Das
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Priya
Priya Daila
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Ranjita Panda
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Zeba Ansari

Batch of 2024-28



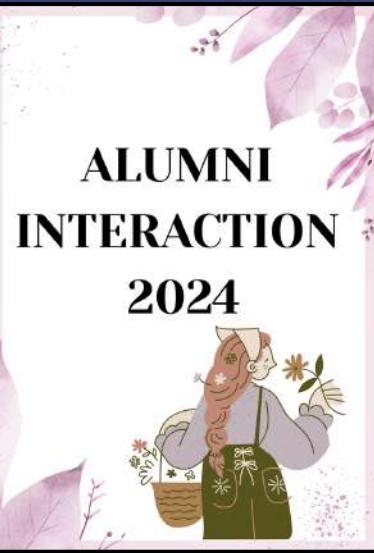
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Aditi Priyadarshini
Akshita Gupta
Amrita Dubey
Amrita Rao
Ananya Kumari
Ananya Yadav
Anavya Yadav
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Raghunandini
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Rishu
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Varsha Raj
Vedika
Vibhuti Raina
Yukti
Zahraa Nasir
Zeenath Nazir



GCBS EVENTS

2024-25



ALUMNI INTERACTION

2024

By: Rashi Singh (Editor-in-chief, Anthesis)

The third-year students of the Department of Botany, Gargi College, had the privilege of interacting with Dr. Neha Parashar, a distinguished alumna from the Batch of 2015, during an alumni interaction session held on 21st August 2024. Dr. Parashar, who is currently pursuing her doctoral research at the prestigious Indian Institute of Technology (IIT) Patna, engaged with the students by sharing valuable insights into her academic and research journey.

During the session, Dr. Parashar elaborated on her ongoing research work focusing on plastic pollution and the development of eco-friendly remediation technologies. She discussed the environmental challenges posed by plastic waste and highlighted innovative strategies being explored to mitigate its impact. Her emphasis on sustainable solutions and interdisciplinary approaches provided the students with a broader perspective on contemporary research trends in the field of environmental sciences.

Glimpses of the Event



ORIENTATION

2024

By: Rashi Singh (Editor-in-chief, Anthesis)

ORIENTATION
2024

Department of Botany, Gargi College organized an orientation session for the freshers on the 29th August 2024, for the academic year 2024-2025. The session aimed to introduce the new students to the department, familiarize them with the available resources, and provide an overview of the academic and extracurricular opportunities that lie ahead.

The session commenced with a warm welcome by Dr. Reema Mishra, Teacher-in-charge, department of Botany, who greeted the freshers and set a positive tone for the event. She provided a brief introduction to the Department, highlighting its rich history, significant achievements, and the various academic programs it offers to students.

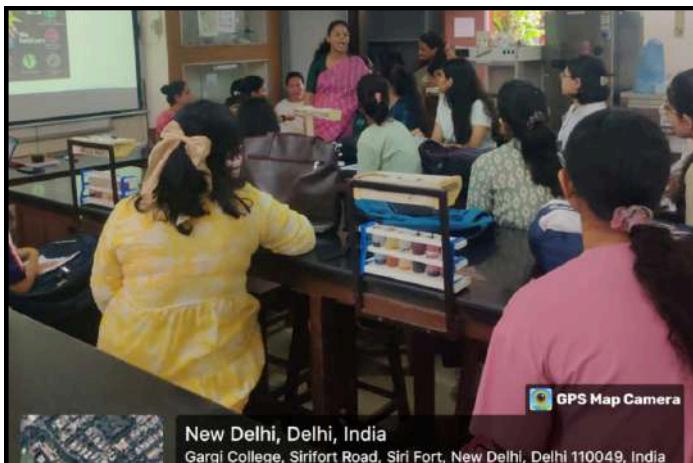
Following this, the faculty presented a detailed overview of the department. The students were introduced to the department's infrastructure, including the laboratories and other facilities. The faculty also introduced the teaching and non-teaching staff, emphasizing their roles in ensuring a supportive and conducive learning environment. The faculty also elaborated on the various departmental activities that students can participate in throughout their academic journey. These activities include conferences, summer workshops, documentary screenings, plantation drives, and interactions with authors. Such events are designed to enhance the students' educational experience and foster a strong sense of community within the department. Gargi College Botanical Society-TARU was also introduced to the new students.

The Undergraduate Curriculum Framework (NEP) was also covered, providing students with a clear understanding of the curriculum's structure and the flexibility it offers. Students were given an overview of Value Added Courses (VAC) and Skill Enhancement Courses (SEC), which are important components of the NEP curriculum. The session also provided an introduction to several special programs and courses available to students. The faculty discussed the Research and Development Cell, which allows students to engage in research projects etc. A significant part of the session was dedicated to discussing the department's collaboration with the National Institute of Immunology (NII), which offers the students unique opportunities throughout their journey.

The faculty also touched upon potential career opportunities for Botany graduates, encouraging students to start thinking about their future career paths from the very beginning of their academic journey. Towards the end of the session, the students were invited to introduce themselves, fostering a sense of belonging and community among the freshers. The teachers then introduced themselves, giving the students an opportunity to get to know the faculty who will be guiding them throughout their time in the department.

In conclusion, the orientation session was successful in welcoming the freshers and providing them with a comprehensive overview of the Botany Department. The session ensured that the new students felt informed, supported, and excited about the academic and extracurricular opportunities that await them in the coming years at Gargi College.

Glimpses of the Event





TEACHERS' DAY CELEBRATION

By: Rashi Singh (Editor-in-chief, Anthesis)

The Department of Botany, Gargi College, University of Delhi, celebrated Teachers' Day on 5th September 2024, with great enthusiasm and heartfelt admiration for the teaching community. The students took the initiative to organize the event, showcasing their deep sense of gratitude and appreciation for both teaching and non-teaching staff.

The celebration served as an expression of respect and an opportunity to strengthen the unique bond between students and teachers. Teachers play a vital role in shaping the minds and lives of students, influencing them beyond imparting knowledge. They guide students on their academic and personal journeys, inspiring curiosity, encouraging critical thinking, and often becoming the foundation upon which young individuals build their future aspirations.

This Teachers' Day, the students of the Botany Department honored the dedication, hard work, and compassion that their teachers consistently exhibit, recognizing the profound impact they have on their lives. One of the most delightful moments of the event was when students dressed up as their teachers, mimicking their appearance, mannerisms, and teaching styles.

The students further expressed their gratitude by presenting thoughtful gifts, cards, and flowers to both teaching and non-teaching staff, symbolizing their appreciation for the support and guidance they receive throughout the year. Heartwarming videos dedicated to their teachers were also created, capturing sincere messages of appreciation and fond memories of classroom moments.

In a world where information is readily accessible, the role of a teacher remains irreplaceable. They inspire, motivate, and instill values that shape individuals for life.

This Teachers' Day celebration at Gargi College was a heartfelt tribute to the teachers who continue to devote themselves to the growth and development of their students. The day was a reminder of the enduring respect and admiration that students hold for their teachers and the lasting bonds that are formed in the journey of education. The day showcased the emotions of gratitude which the students have for the teachers.

Glimpses of the Event





FRESHER'S 2024

By: Mayurakshi (Editorial team member, Anthesis)

College fresher's party is one of the most awaited events in the academic calendar, welcoming all the new students to the campus. It is a celebration of new beginning providing fresher's with a platform to socialize, bond and get familiar with their new environment. The event fostered an inclusive and welcoming atmosphere ensuring all the students start their college journey on a positive note. The fresher's day was a perfect icebreaker filled with fun activities, laughter, music and new friendships.

The event was organised on 25th September embracing the theme "FLORAL ODYSSEY" which implies deep meaning of a long eventful journey often filled with challenges, growth and exploration. Students were blooming with bright colored floral patterned dresses. The programme was attended by respected principal madam and faculty members and inaugurated by the student council members followed by an admirable speech given by president of student council Lovely Pandey. The programme was commenced by a fabulous Nukkad natak performance by team Kshitij, followed by different fun activities letting students mingle and get acquainted. To make the event more engaging, the divas of Gargi College performed a ramp walk dressed in vibrant and blossom-filled attires. Later various societies showcased their skills in music and dance followed by dance performance by the sparkling Enliven which made students groove to their beats and a lively DJ session where everyone was enjoying to the fullest. Fresher's day event was concluded with a vote of thanks and group photos. It was indeed a memorable day filled with happiness and warmth.

As author Edith Wharton once said, "There are two ways of spreading light: to be the candle or the mirror that reflects it." This celebration was a beautiful reflection of the warmth, vibrancy, and unity that define the spirit of our college.

Glimpses of the Event





DIGITAL ILLUSTRATION COMPETITION

PLANTS TO PIXELS

By: Rashi Singh (Editor-in-chief, Anthesis)

The Botanical Society of Gargi College, TARU, organized an online inter-college digital illustration competition, "Plant to Pixels," from 12th to 18th October 2024. This innovative competition provided a platform for students to showcase their artistic talent while exploring scientific themes.

The theme for the competition, "Altruistic Flora," encouraged participants to imagine how plant life could evolve in response to technological advancements, environmental changes, or alternate realities. Participants created digital illustrations that combined creativity with scientific imagination, resulting in a fascinating blend of art and conceptual depth. The competition was open to undergraduate students, and entries were evaluated by **Dr. Priyanka Pandey** from the Department of Botany, Gargi College and **Prof. Kuntal**, from the Department of Zoology, Gargi College based on originality, thematic relevance, and artistic execution. The winners of the competition were:

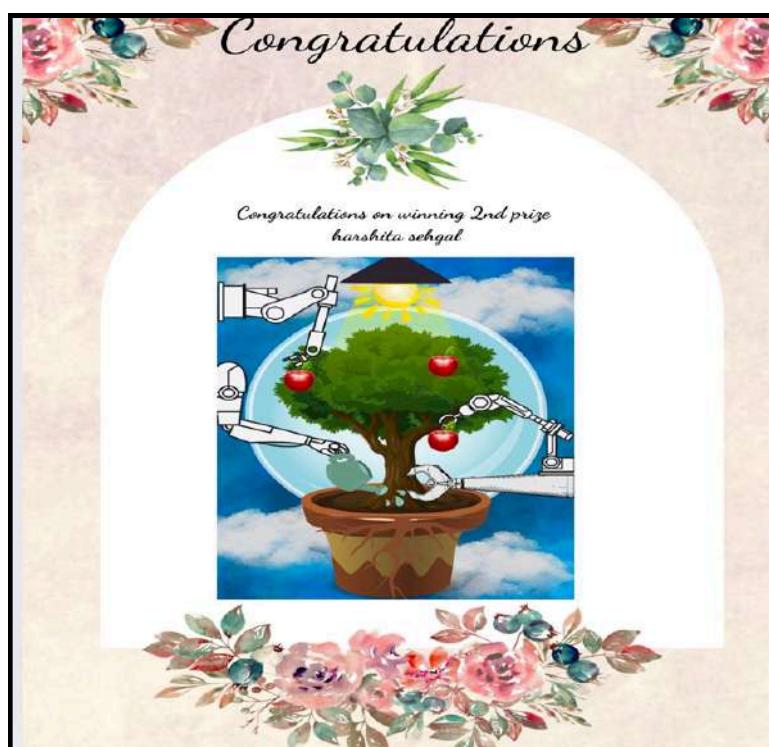
First Prize: Ayush Pradhan

Second Prize: Harshita Sehgal

Third Prize: Vandita Singh

This event successfully demonstrated the potential of art as a medium to explore and express complex scientific ideas. The submissions reflected their creativity and dedication, making this competition a resounding success. "Plant to Pixels" reaffirmed the mission of TARU to nurture intellectual and creative growth among students. The society extends its gratitude to all participants and contributors for making the event memorable and impactful.

Glimpses of the Event





HABIT ACT: SKIT ENACTMENT COMPETITION

By: Kashish and Ayushi (Editorial Team members)

On 22nd October 2024, Gargi College Botanical Society (GCBS)-TARU hosted a vibrant and thought-provoking skit enactment competition on the theme "Sustainability and Environmental Conservation: Acting Today for a Greener Tomorrow" showcasing the creative talents of students from various departments. The event was carefully curated to inspire a deep sense of environmental responsibility. The Lecture Theatre was transformed into a lively hub of artistic expression, with the creative team's meticulous attention to detail creating an inspiring backdrop for the performances.

Prof. Aparajita Mohanty from the Department of Botany, Gargi College and **Dr. Niyati Singh** from the Department of Chemistry, Gargi College presided as the esteemed judges, offering expert insights into each performance. The event was gracefully hosted by Susmita Chakraborty and Nishtha Bharadwaj, who warmly welcomed the judges and audience. The competition featured seven group performances and a solo act, each centered around a critical environmental issue. The participants skillfully brought to life themes such as air pollution, e-waste disposal, deforestation, wildlife conservation, and the environmental hazards of fast fashion. Their innovative use of props and expressive acting breathed life into each skit, delivering a powerful message of sustainability and environmental awareness. Each skit adhered strictly to the competition rules and guidelines, ensuring a focused and impactful delivery. The participants were free to choose their topics within the realm of the competition and were encouraged to use props to enhance their presentations, which they brought with them. The performances adhered to the theme, demonstrated creativity and innovation, showcased expressive body language, and maintained clarity in action. The participants captivated the audience with their innovative approaches, expressive acting, and seamless incorporation of important environmental issues. The competition fostered not only artistic expression but also a deeper understanding of environmental challenges and solutions.

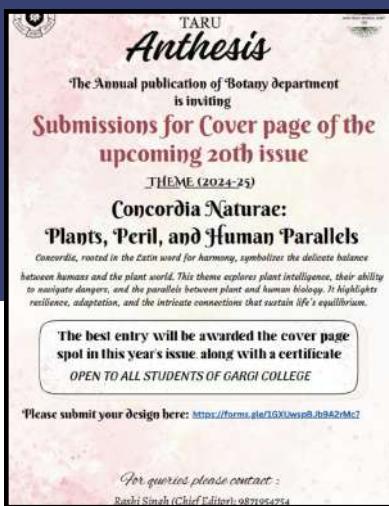
After a round of intense deliberation, **the Novice Team claimed the first position**, delivering a performance that seamlessly combined creativity with a powerful environmental message.

The Green Buddies were awarded second place, followed closely by the Ceo Chicks, who secured the third position with their unique take on environmental conservation.

The event concluded with the announcement of results, and the appreciation of the judges for the outstanding performances and contributions made by each participant. A celebratory group photograph captured the spirit of the day, showcasing the joy and pride of the participants, judges, and GCBS team. This event not only brought out the best in the performers but also reinforced the importance of collective action.

Glimpses of the Event





ONLINE COVER PAGE DESIGNING COMPETITION

By: Rashi Singh (Editor-in-chief, Anthesis)

The Gargi College Botany Society (GCBS) successfully organised an online cover page designing competition on 30th October 2024 on the theme "Concordia Naturae – Plants, Peril and Human Parallels." The theme encouraged participants to reflect on the deep-rooted connections between the plant world and human existence, especially in the context of ongoing environmental challenges. The competition served as a creative platform for students to visually express the delicate balance of nature, the threats it faces, and its resonance with human experiences.

The competition was held as an inter-college event, exclusively for the students of Gargi College. A remarkable number of entries were received, demonstrating a wide spectrum of artistic styles and interpretations. Both digital and hand-drawn submissions were welcomed, allowing students to explore their preferred mediums and present their ideas in innovative ways. The artworks reflected not only aesthetic finesse but also a thoughtful understanding of the theme, were evaluated by **Dr. Geeta** from Department of Botany, Gargi College and **Dr. Neha Sharma** from Department of Chemistry, Gargi College.

After a thorough evaluation process, three winners were declared:

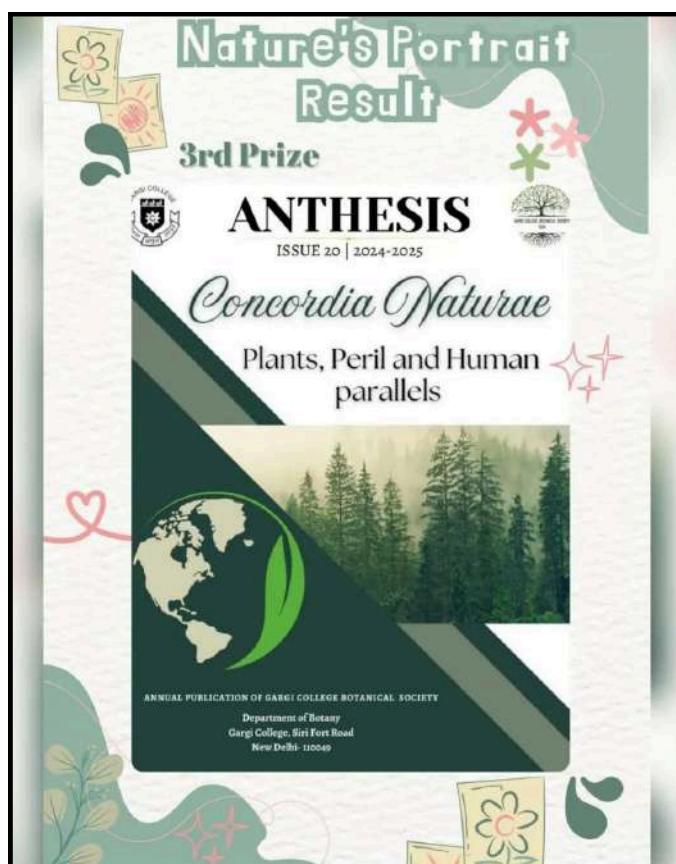
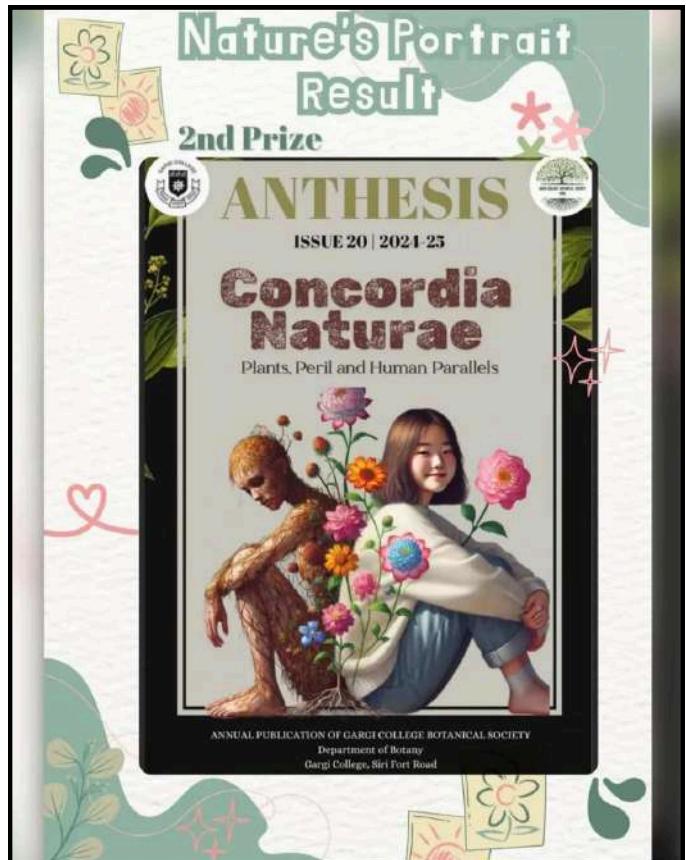
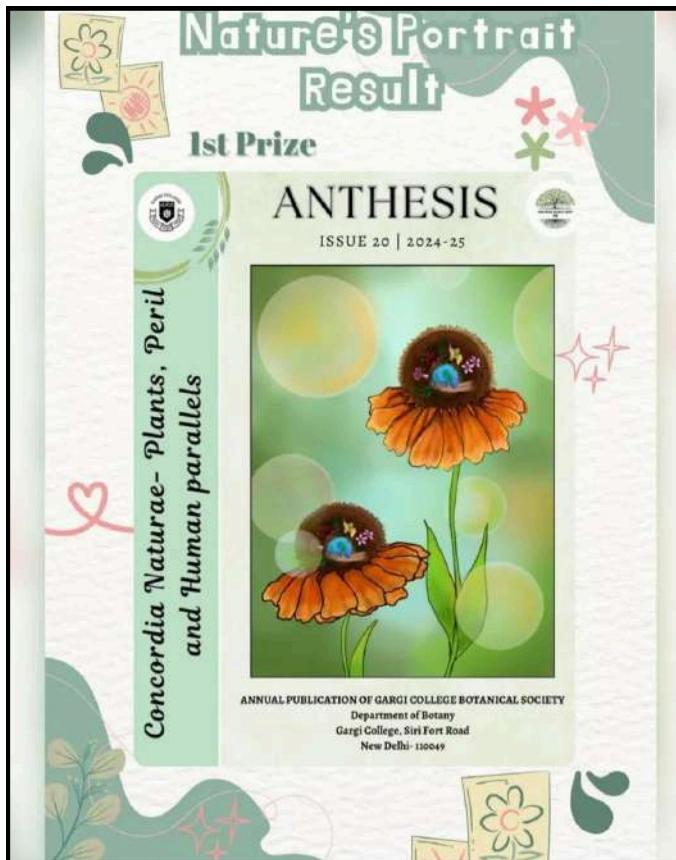
Vandita Singh- B.sc. Botany hons. 3rd year

Somya- B.Sc. Botany hons. 3rd year

Rashi Singh- B.Sc. Botany Hons. 3rd year

Their entries stood out for their conceptual clarity, creativity, and impactful representation of the theme. The competition was well-received and appreciated by participants and faculty alike. It highlighted the importance of integrating art and environmental consciousness, and the potential of students to use creativity as a means of communication and awareness. GCBS congratulates the winners and extends heartfelt appreciation to all participants for their enthusiasm and artistic contributions. Events like these continue to foster a culture of thoughtful engagement and interdisciplinary exploration within the department and the college at large.

Glimpses of the Event





INTERNATIONAL FASCINATION OF PLANTS DAY (LECTURE)

By: Aparna Rawat (Editorial team member, Anthesis)

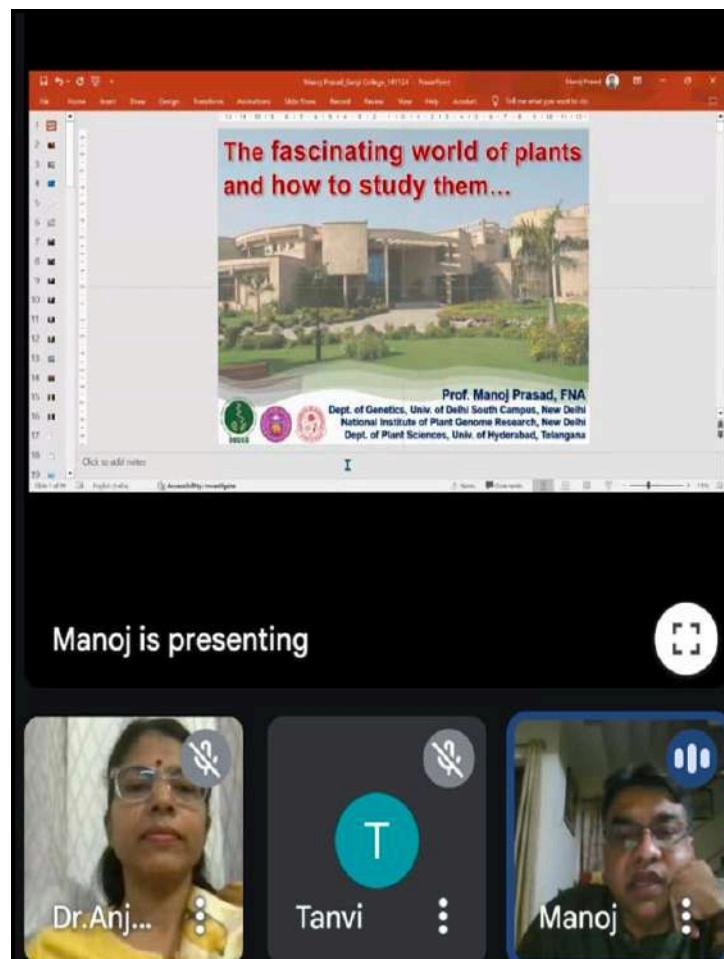
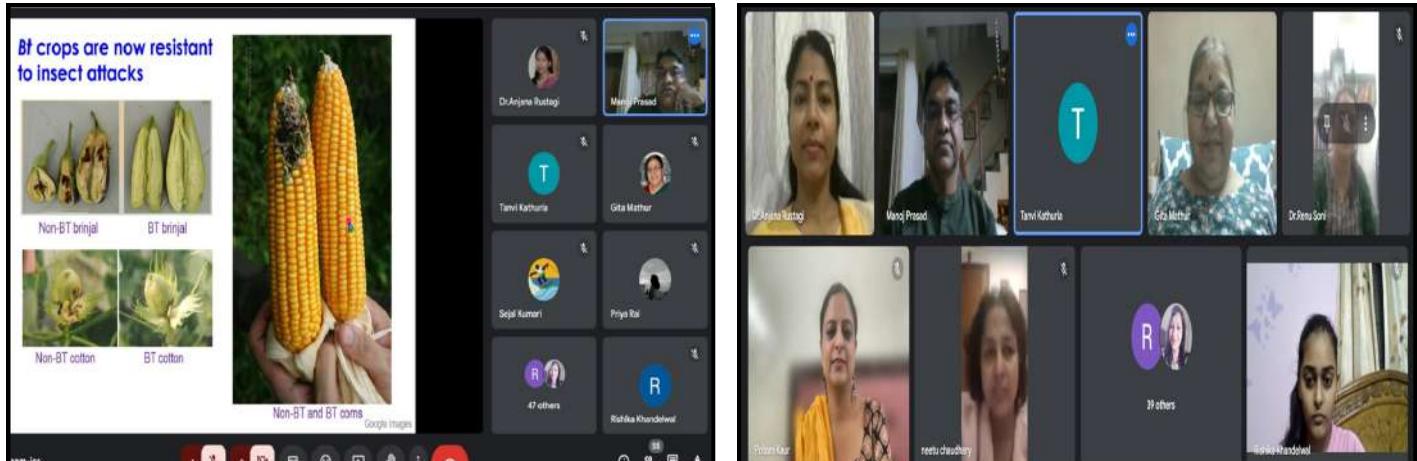
On 14th November 2024, the Gargi College Botanical Society 'Taru' celebrated the "International Fascination of Plants Day" in collaboration with the National Medicinal Plants Board, Ministry of Ayush. The event featured an online talk titled "Climbing The Career Ladder in Plant Sciences" by Prof. Manoj Prasad from the Department of Genetics, University of Delhi South Campus.

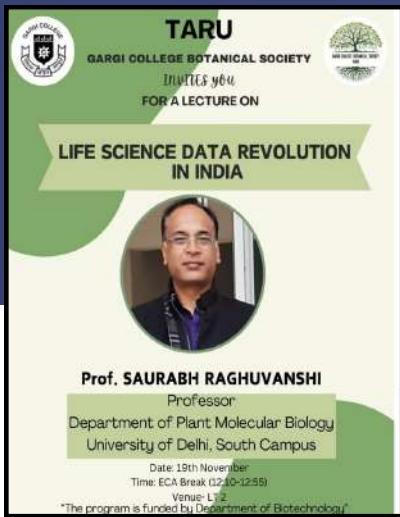
The event began with an introduction by Tanvi, the GCBS President, who presented the theme of the event. D. Anjana Rustagi welcomed the guest speaker, Prof. Manoj Prasad, and provided an overview of his achievements. Prof. Prasad's talk covered the formation of Earth and the origin of plant life, plant domestication, agriculture, and modern techniques like genome editing and de novo domestication. He emphasized the importance of studying plants and shared success stories of his students, providing insights into the aspirations and qualities needed for success in plant sciences.

The Q&A session was facilitated by Tanvi, followed by closing remarks from Dr. Anjana Rustagi, who thanked Prof. Prasad for his insightful session. Rishika delivered the vote of thanks, extending gratitude on behalf of the entire GCBS. The event concluded with a group photograph.

The event was a resounding success, offering valuable insights into plant sciences and inspiring students to pursue careers in this field. Prof. Prasad's talk not only highlighted the historical and scientific aspects of plant life but also motivated attendees with real-life success stories and practical advice, making the event both informative and memorable.

Glimpses of the Event





LIFE SCIENCE AND DATA REVOLUTION IN INDIA (LECTURE)

By: Rashi Singh (Editor-in-chief, Anthesis)

The Gargi College Botanical Society (TARU) organized an insightful lecture titled "Life Science Data Revolution in India" on the 19th November 2024 in an online mode by Prof. Saurabh Raghuvanshi, Department of Plant Molecular Biology, University of Delhi, South Campus. The session was organized under the patronage of the Department of Biotechnology, Ministry of Science and Technology, Government of India.

The event began with a serene Saraswati Vandana that set a reflective and academic tone for the proceedings. Ms. Tanvi, president of the Gargi College Botanical Society, warmly welcomed the participants and provided a concise overview of the Botany Department and its ongoing endeavors. This was followed by Prof. Raghuvanshi's address, where he delved into the significant strides being made in the domain of life science data and its implications for research and innovation.

Prof. Raghuvanshi elaborated on the transformative potential of data in the biological sciences, beginning with an introduction to the Earth BioGenome Project. This ambitious global initiative aims to sequence and catalog the genomes of all eukaryotic species on earth, providing a comprehensive foundation for understanding biodiversity and advancing biological research. His discussion on the importance of big data emphasized the challenges and opportunities in collecting, managing, and analyzing vast biological datasets. He stressed the necessity of sharing data based on the principles of making it Findable, Accessible, Interoperable, and Reusable (FAIR), which are now regarded as global standards. The talk also covered biocuration and the annotation of genetic data, with specific reference to the rice genome. He explained the processes of mapping and clustering pipelines used to improve genome sequencing efficiency. The Indian Biological Data Centre (IBDC) was highlighted as a pivotal platform for housing biological data at a national level. Prof. Raghuvanshi detailed its mandate, operational frameworks, levels of collaboration, and various data access modes, which include open access, managed access, and restricted access. He also discussed the challenges faced in genome sequencing, especially for eukaryotes, and the necessity of developing robust tools for better data management.

The session concluded with an engaging question-and-answer segment where Prof. Raghuvanshi addressed queries related to databases, genome sequencing challenges, and advice for aspiring researchers. His thoughtful responses reflected his depth of knowledge and passion for mentoring newcomers in the field. The event concluded with a heartfelt vote of thanks, where gratitude was expressed to Prof. Saurabh Raghuvanshi for his enlightening lecture, the faculty advisors for their continuous guidance, and the participants for their enthusiastic engagement.

This lecture was a milestone event for the Gargi College Botanical Society, offering an exceptional opportunity to gain insights into the intersection of biology and data science. It succeeded in fostering a deeper understanding of the ongoing data revolution in life sciences and its significance in shaping future research paradigms.

Glimpses of the Event



ONLINE PHOTOGRAPHY COMPETITION

By: Ritika Poswal (Editorial team member)



On 29th January 2025, the Gargi College Botanical Society (TARU) organized an intercollege online photography competition on the theme "Nature's Portrait," open to all undergraduates. The competition aimed to capture the beauty and diversity of nature, focusing on plants, flowers, and botanical elements. With an overwhelming response from students across various colleges in Delhi, the event showcased the creative talents of the younger generation.

Participants were required to submit photographs with titles that added an extra layer of depth and meaning to the images. A panel of esteemed judges, **Dr. Renu Soni** from the Department of Botany, Gargi College and **Dr. Tripti Kumari** from the Department of Chemistry, Gargi College, evaluated the submissions based on technical quality, creativity, and relevance to the theme.

The competition's winners were:

Mayank Verma from Dayal Singh College secured the first position with a captivating photograph that highlighted the intricate details of nature.

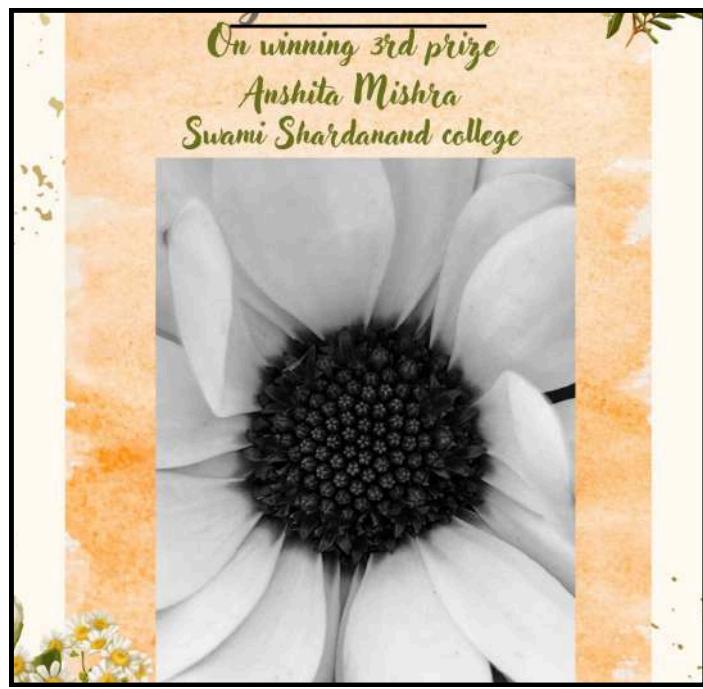
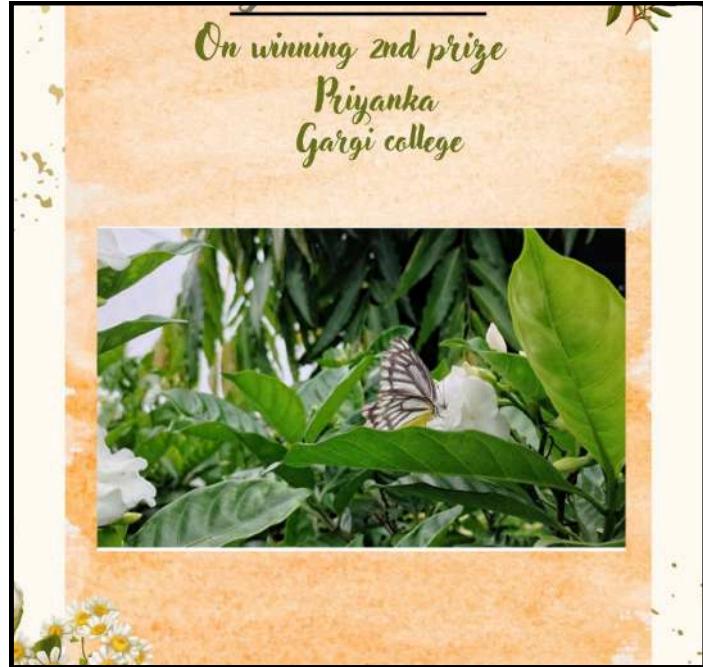
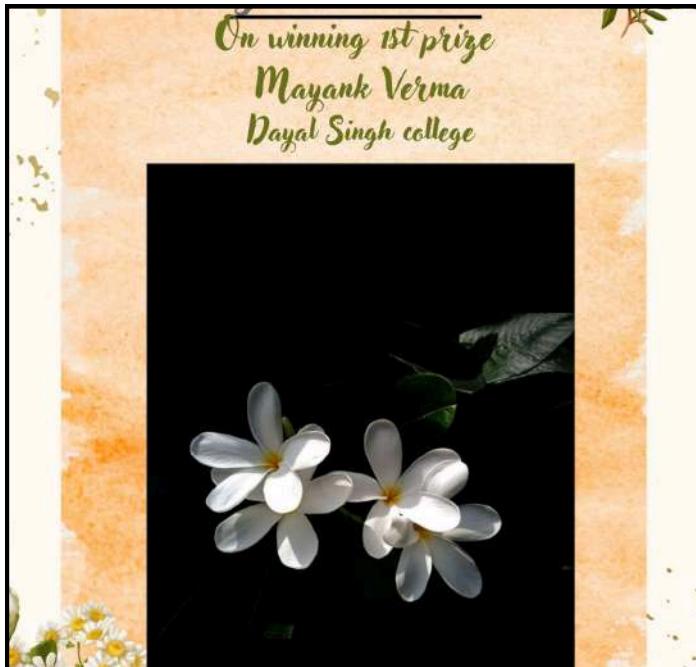
Priyanka from Gargi College bagged the second position with a stunning image that showcased the beauty of botanical elements.

The third position was a tie between **Shiksha** from Gargi College and **Anshita Mishra** from Swami Sharananand College, both of whom presented unique perspectives through their photographs.

The judges appreciated the submissions for their creativity, technical quality, and ability to capture the essence of nature. The competition provided a platform for students to express their artistic side and appreciate the beauty of nature.

The Gargi College Botanical Society extends its gratitude to Dr. Renu Soni and Dr. Tripti Kumari for their valuable time and expertise in judging the competition. We also thank all participants for their enthusiastic response, which made the event a huge success. The society looks forward to organizing more such events in the future to promote creativity and appreciation for nature among students.

Glimpses of the Event





REVERIE 2025

EUNOIA: REDEFINING THE MEANING OF "YOU"

By: Rashi Singh (Editor-in-chief, Anthesis)

At its heart, Eunoia—a word rooted in Greek, meaning “beautiful thinking”—became more than just a theme for Reverie 2025. It was the spirit of the fest. A celebration of self-expression, individuality, and the quiet power of authenticity, Eunoia invited every individual to rise above labels and rediscover their true selves. In a world shaped by expectations and filters, it reminded us that being genuine is an act of courage—and that the only definition we need to live by is our own.

With this vision, Reverie 2025 unfolded as a three-day cultural symphony—a space where creativity knew no bounds, and each moment echoed with the energy of becoming.

Day 1: A Grand Inauguration of Identity and Art

Reverie 2025 was inaugurated on 19th February 2025 in a ceremony filled with elegance and inspiration. The fest was graced by Ms. Vidhi Sharma as the Guest of Honour and the distinguished Ms. Sharon Lowen, celebrated Odissi dancer, as the Chief Guest. Their presence marked a perfect beginning to a fest centered on redefining the self.

The day unfolded into a vibrant celebration of movement, sound, and thought. One of the most enthralling moments was the power-packed performance by Anhad, a renowned dance group, whose electrifying routine captivated the audience and lit up the stage. With every beat and every step, they embodied the energy of Eunoia—fearless, fluid, and expressive. Around the campus, exhibitions and installations transformed spaces into zones of exploration and introspection. Each performance, artwork, and initiative was a reflection of how young minds interpret the idea of identity in ever-changing times.

Day 2: A Canvas of Unfiltered Expression

The second day of Reverie was a kaleidoscope of talent and self-expression. The campus buzzed with a wide range of events that celebrated voice, movement, imagination, and perspective. Literary arts, dramatics, music, fashion, and debate—all became powerful tools through which students explored and redefined their sense of self.

With enthusiastic participation from across the university and seamless execution supported by event partners Diego Event and Turning Stones, every space in Gargi turned into a platform for unapologetic creativity. It wasn't just about competing—it was about connecting, expressing, and allowing your story to be seen and heard.

In every corner, Eunoia lived—reminding us that we are at our most beautiful when we are most ourselves.

Day 3: A Finale Etched in Melody and Meaning

The final day of Reverie arrived not as a conclusion, but as a crescendo. With the same fervor and soul that marked the earlier days, the last stretch of the fest was filled with passionate performances, final rounds of competitions, and vibrant interactions that continued to carry the fest's core message forward.

The evening culminated in a mesmerizing concert by Akhil Sachdeva, whose soulful voice and magnetic stage presence created an atmosphere of joy and unity. The crowd swayed, sang along, and celebrated not just the music, but the journey of the past three days—one that began with self-reflection and ended in collective celebration.

Reverie 2025 was not just a cultural fest—it was a mirror. One that allowed every individual to look within, to question, to express, and to celebrate who they are. Through Eunoia, we learned that authenticity is not a trait but a practice, and self-definition is a form of art.

This extraordinary fest would not have been possible without the dedication of the Student Council, the passion of student volunteers, and the invaluable support of our faculty and administration. Their collective efforts gave shape to an experience that will linger in memory as more than just an event—it was a story, a moment, a revolution.

Glimpses of the Event





NATIONAL SCIENCE DAY: BIOWIZZ QUIZ COMPETITION

By: Tanvi (President, GCBS)

On 28th February 2025, the Gargi College Botanical Society, Taru, successfully organized BIOWIZZ, an engaging online science quiz competition to commemorate National Science Day. The event provided a platform for students from various academic backgrounds to test their knowledge in biology, chemistry, physics, environmental science, and recent scientific advancements.

With 62 enthusiastic participants, the competition was an intense battle of intellect and quick thinking. The quiz was conducted online, allowing students to participate from different locations in a single attempt. The winners, who demonstrated exceptional scientific understanding and analytical skills, were:

Shrija Srivastava (B.Sc. Life Sciences) – 1st place

Rakhi Kumari (B.A. Political Science, Gargi College) – 2nd place

Pulkita Kohli (B.Sc. (Hons.) Botany) – 3rd place

Their impressive performance showcased the power of interdisciplinary curiosity and knowledge beyond specific fields of study. The competition emphasized that science is a universal pursuit, not limited to particular academic streams.

The event concluded with the announcement of winners, who were commended for their outstanding performance. The success of BIOWIZZ highlighted the enthusiasm of students for scientific learning and made it a truly memorable and inspiring celebration of science in the digital space.



NATIONAL SCIENCE DAY

INTER-COLLEGE LOGO MAKING COMPETITION

By: Kashish Arora (Editorial Team member)

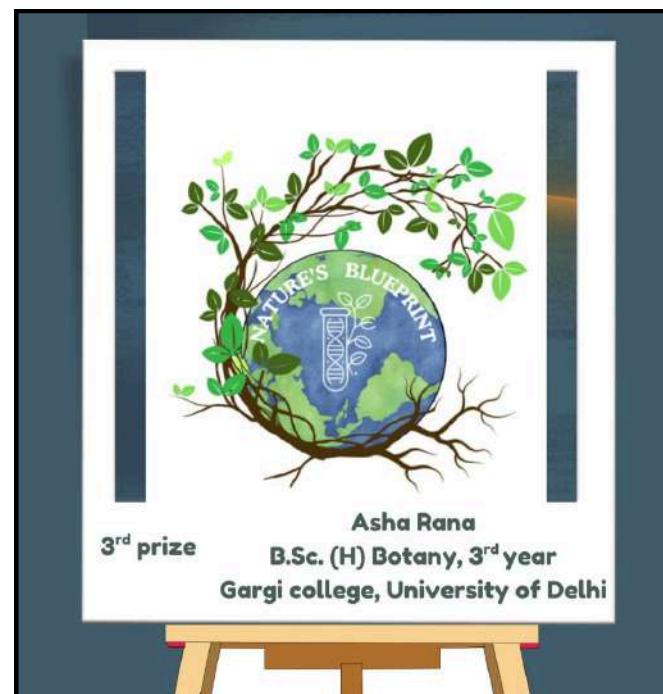
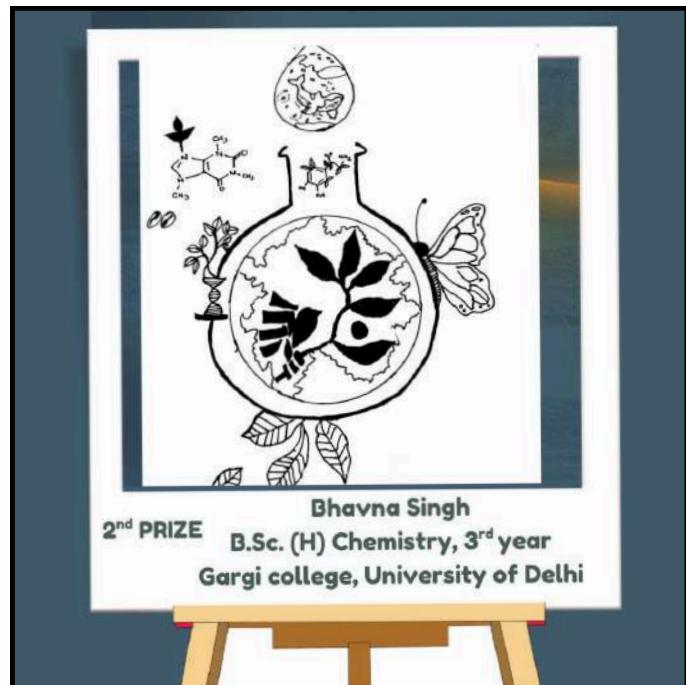
In celebration of National Science Day 2025, the Botanical Society of Gargi College – GCBS Taru – organized an Inter-College Logo Making Competition centered around the thought-provoking theme “Nature’s Blueprint”. Held between 28th February and 7th March 2025, the competition was envisioned as a creative platform to engage students in exploring the intricate relationship between nature, science, and design. The event aimed to encourage participants to channel their artistic abilities to depict the beauty, complexity, and intelligence embedded within natural forms and systems. It invited entries from undergraduate students across various colleges of the University of Delhi, drawing an enthusiastic response that reflected the diverse interpretations and rich creativity of young minds.

Each submitted logo was assessed meticulously by a panel of judges **Ms. Ruchitra Gupta** from the Department of Botany, Gargi College and **Dr. Vineetha Arunachalam** from the Department of Zoology, Gargi College on parameters such as originality, thematic relevance, creativity, visual coherence, and execution. After a rigorous evaluation, the first position was awarded to **Ellapu Hema Roshini, a second-year Botany student from Maitreyi College**, for her compelling artwork that portrayed a pair of nurturing hands cradling an emblem symbolizing natural harmony, framed by delicate botanical motifs. **The second prize was bagged by Bhavna Singh, a third-year Chemistry student from Gargi College**, whose monochromatic design brilliantly merged scientific symbolism with botanical intricacy – a fusion of a laboratory flask blooming with organic elements. **The third position was secured by Asha Rana, a third-year Botany student of Gargi College**, for her unique concept depicting the planet Earth enveloped by a tree whose branches seamlessly transitioned into DNA strands, representing the genetic blueprint of all life forms.

All winners were felicitated with certificates of appreciation, and the winning entry will be proudly featured in *Anthesis*, the official magazine of GCBS Taru, to commemorate their creative excellence. The event was organized under the guidance of the society’s teacher conveners, Dr. Preeti Agarwal and Dr. Neetu Chaudhary, whose mentorship and support helped ensure the competition's success.

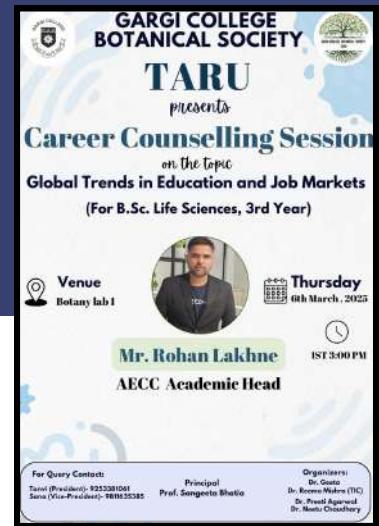
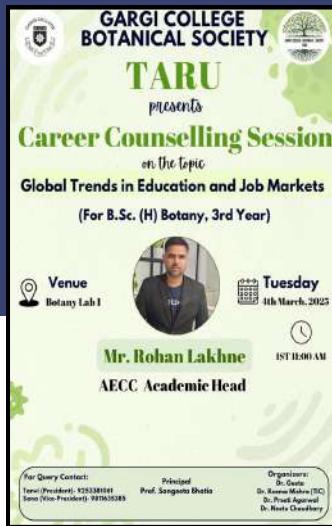
The student council, comprising Tanvi (President) and Sana (Vice-President), played a pivotal role in planning, promoting, and coordinating the event, ensuring smooth execution and widespread participation. Through this initiative, Taru not only celebrated National Science Day in an innovative and inclusive manner but also reaffirmed its dedication to fostering environmental awareness, scientific expression, and aesthetic appreciation among students.

Glimpses of the Event



CAREER COUNSELLING SESSION

By: Tanvi (President, GCBS)



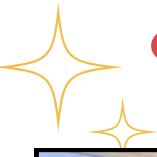
Gargi College Botanical Society-Taru organised an career counselling session for B. Sc. (H) Botany and B.Sc. Life Sciences (3rd year) on "Global Trends in Education and Job Markets" on 4th March and 6th March 2025 respectively. The session was conducted by Mr. Rohan Lakhne, Academic Head at AECC Global, and aimed at providing students with valuable insights into emerging global trends in education and the job market.

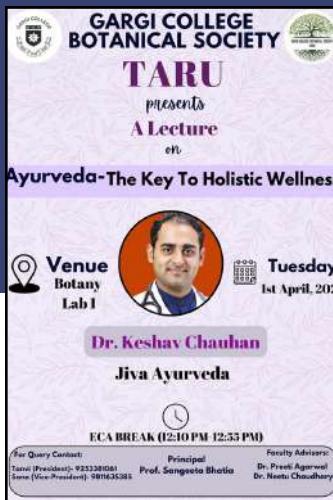
Mr. Lakhne began the session by discussing the diverse career opportunities available to botany graduates, emphasizing fields such as research, biotechnology, environmental science, sustainable agriculture, and academia. He elaborated on the scope of higher education, skill development, and scholarships available for students aspiring to study in India and abroad. Additionally, he provided practical advice on how students could align their academic pursuits with industry demands and future career growth.

The session was highly interactive, with students enthusiastically participating and asking questions regarding postgraduate study options, industry requirements, international research opportunities, and job prospects in both public and private sectors. Mr. Lakhne addressed their queries with real-world examples and shared strategies to help students make informed decisions about their career paths. He also discussed the importance of internships, networking, and skill enhancement in securing desirable career opportunities.

The event concluded with a vote of thanks, expressing gratitude to Mr. Lakhne for his valuable time and insightful guidance. The session left students feeling motivated, well-informed, and equipped with the necessary knowledge to make better career choices. Overall, the counseling session proved to be an enriching experience, helping students gain clarity on their professional aspirations and the steps needed to achieve them.

Glimpses of the Event





AYURVEDA— THE KEY TO HOLISTIC WELLNESS (LECTURE)

By: Rashi Singh (Editor-in-chief, Anthesis)

The Gargi College Botanical Society – TARU organized an insightful guest lecture titled “Ayurveda— The Key to Holistic Wellness” on 1st April 2025. The event featured Dr. Keshav Chauhan from Jiva Ayurveda as the guest speaker, who shared his expertise on the role of Ayurveda in promoting holistic health and wellness.

The event began with a traditional lamp lighting ceremony, symbolizing the pursuit of knowledge and enlightenment. This was followed by a warm welcome and introduction by Tanvi, President of TARU, who briefly familiarized the audience with the activities of the Botanical Society. The guest speaker, Dr. Chauhan, was then felicitated for gracing the occasion with his presence.

Dr. Chauhan's talk explored Ayurveda not just as a medical system, but as a way of life that emphasizes harmony between the body, mind, and environment. He focused on the growing concern around lifestyle disorders, pointing out how Ayurveda differs from modern medicine by targeting the root cause rather than just treating symptoms.

Describing Ayurveda as a behavioral change-oriented science, he emphasized the need for sustainable and conscious lifestyle habits. One of the key highlights of the talk was the concept of Prakriti—an individual's unique constitution based on the three doshas: Vata, Pitta, and Kapha. According to Dr. Chauhan, knowing one's Prakriti is like having a personal instruction manual or GPS for life, guiding choices in diet, daily routine, and emotional balance.

He also introduced the audience to the Teledoc Project launched in 2001—an innovative telemedicine center by Jiva Ayurveda that extends Ayurvedic consultations to people in remote areas. With engaging questions like “Which Ayurvedic character are we?”, Dr. Chauhan encouraged self-reflection and deeper awareness of one's body and lifestyle.

He concluded the session with a powerful quote: “Great science is the science that ceases to be the science”. The talk was followed by an interactive question-answer session where attendees enthusiastically participated and posed insightful queries. The event came to a close with a vote of thanks expressing gratitude to the speaker and everyone who contributed to the success of the session.

The lecture offered a meaningful perspective on holistic health and inspired students to explore the timeless wisdom of Ayurveda in a contemporary context.

Glimpses of the Event





PLANTPRENUER

COMPETITION

By: Mayurakshi (Editorial Team Member)

On 8th April 2025, the Gargi College Botanical Society (GCBS)– TARU hosted the much-anticipated Plantpreneur Competition, an innovative event designed to inspire young minds and foster creativity in the realm of sustainable and plant-based entrepreneurship. The competition's core objective was to empower participants to develop business ideas that not only held economic promise but also emphasized environmental responsibility. The event brought together a diverse group of aspiring entrepreneurs who were challenged to think creatively about plant-based products and sustainability.

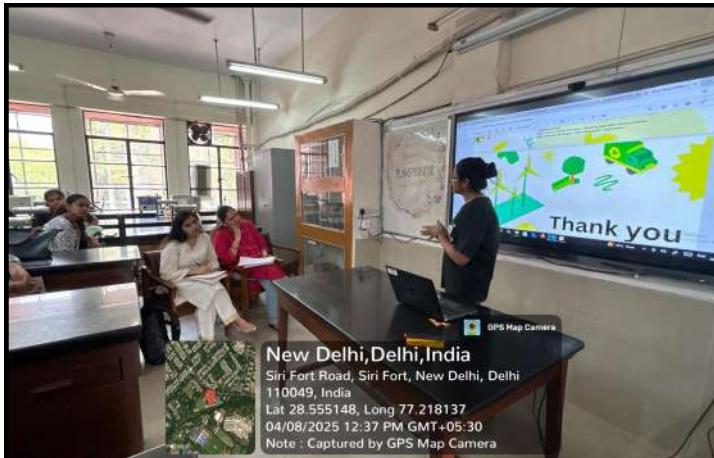
The day began with a warm welcome address by a GCBS member, who set the stage for an afternoon filled with excitement and innovation. The audience was introduced to the esteemed panel of judges, **Dr. Reema Mishra** from the Department of Botany, Gargi College and **Dr. Iti Verma** from the Department of Commerce, Gargi College, who were both commended for their invaluable support and participation. With the formalities in place, the competition commenced with participants presenting their entrepreneurial ideas, which ranged from eco-friendly, plant-based sarees and sustainable products to plant-based food concepts and even plant-derived construction materials. Each pitch was met with an interactive Q&A session where the judges posed insightful questions, pushing participants to further elaborate on the practicality and impact of their concepts. Students in the audience also had the opportunity to engage with the presenters, making the session dynamic and enriching for all involved.

The competition was judged based on several key factors, including creativity, marketing strategy, presentation clarity, audience engagement, and most importantly, sustainability. The judges were impressed by the ingenuity displayed in each presentation and offered constructive feedback to help the participants refine their ideas further. After an engaging round of presentations, the moment everyone had been waiting for arrived—the announcement of the winners. **The first prize was awarded to AquaBloom by Nishika Arora, followed by OatSip by Warisha securing the second prize, and Hempcrete by Vidhi Shoor claiming third place.**

The winners were met with resounding applause and were presented with well-deserved accolades, which recognized their creativity and commitment to sustainability.

As the event concluded, the judges took a moment to applaud GCBS-TARU for organizing such a successful and impactful competition, commending the quality of the pitches and the high level of participation. A heartfelt thank-you note was delivered by the GCBS members, expressing gratitude to everyone who made the event possible, from the judges to the participants and the attendees. To cap off the day, a group photograph was taken, capturing the spirit of collaboration and innovation that had defined the event, leaving behind a lasting memory of the collective effort towards fostering a greener, more sustainable future.

Glimpses of the Event





FAREWELL

2025

By: Juhi Chobey (Editorial Team Member)

The Gargi College Botanical Society (GCBS) – TARU, in collaboration with the Student Council of Gargi College, hosted a memorable farewell on 24th April 2025, for the graduating 3rd-year B.Sc. (Hons.) Botany students.

The event began with heartfelt addresses from the former TIC, Dr. Reema Mishra, and Dr. Renu Soni, who fondly reminisced about their journey with the batch of 2025, from the very first day since students stepped into Department of Botany. They encouraged the students to continue excelling in their future endeavors and to maintain a lasting connection with the department.

The program progressed with speeches by Tanvi, President of GCBS; Rishika, General Secretary of GCBS; and Rafia and Ananya, 3rd-year Botany students. They shared their experiences and treasured memories from their time studying Botany, expressing their deep gratitude for the unwavering support from the department and the teachers. Their speeches were a nostalgic reflection of their time at Gargi College.

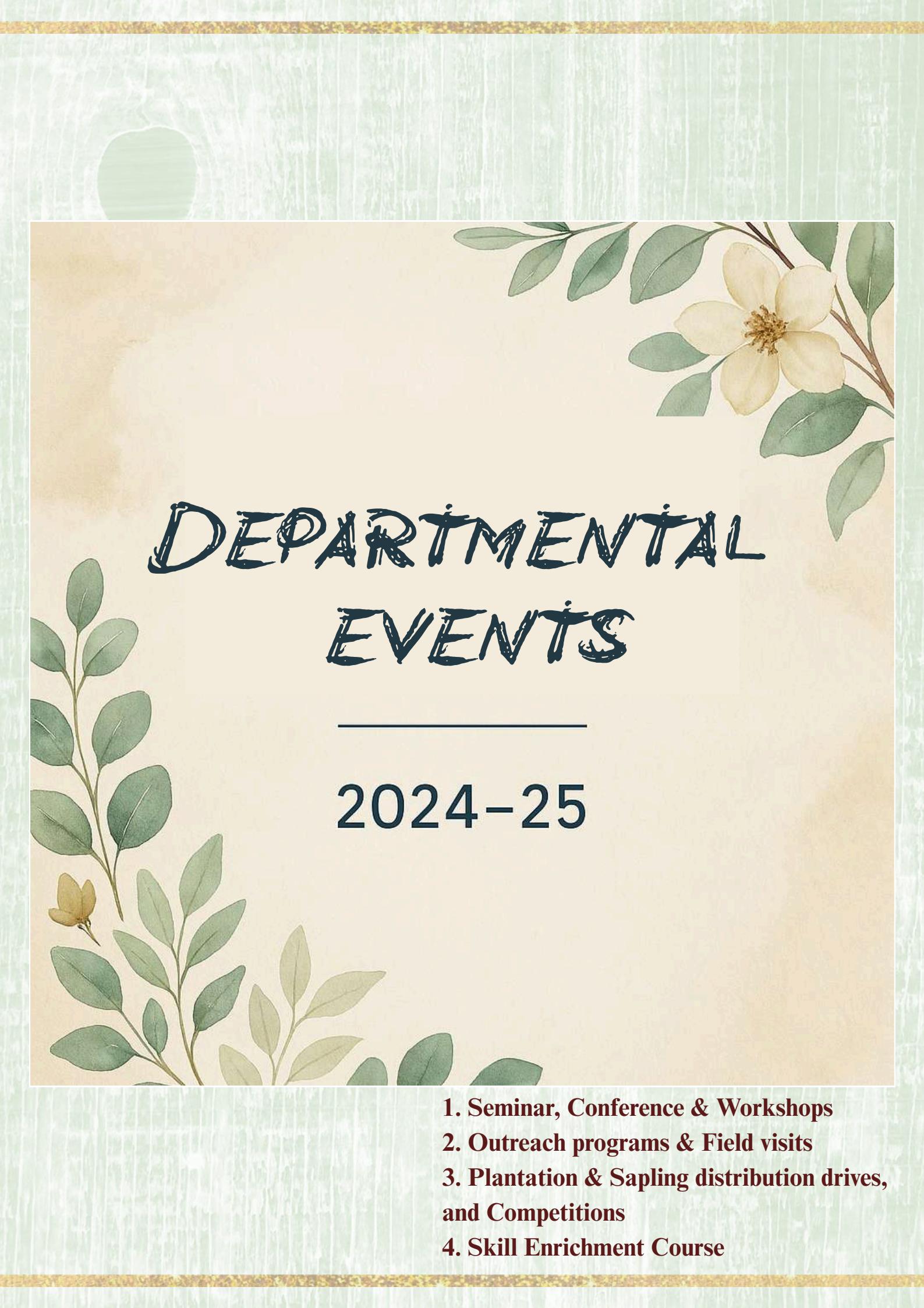
Dr. Vera Yurngamla Kapai, the present TIC, then addressed the students, offering words of motivation and well-wishes for their successful futures. A heartfelt expression of gratitude was shared by all the professors of the Department of Botany, who wished the graduating students the best for their next chapters in life, encouraging them to continue striving for excellence.

The event continued with a video showcase, thoughtfully prepared by the GCBS team, which beautifully captured the nostalgic and unforgettable moments from the past three years.

The farewell concluded with the passing out students expressing their sincere gratitude to their professors, the supportive lab staff, fellow classmates, and the wonderful juniors who helped make the occasion truly memorable. The event was a fitting tribute to their remarkable journey through the Department of Botany.

Glimpses of the Event





DEPARTMENTAL EVENTS

2024-25

1. Seminar, Conference & Workshops
2. Outreach programs & Field visits
3. Plantation & Sapling distribution drives, and Competitions
4. Skill Enrichment Course



National seminar

on

'Mastering Research: Strategies and Tools for Enhancing Your Skills'

By: Kashish Arora and Juhi Chobey (Editorial team members)

In alignment with the vision of the National Education Policy (NEP) and the growing emphasis on undergraduate research, Gargi College's Research and Development Cell, in collaboration with the Departments of Botany and Psychology, hosted a prestigious National Seminar titled "Mastering Research: Strategies and Tools for Enhancing Your Skills" on 27th September 2024. The event catalyzed fostering a culture of research excellence, equipping faculty and students with innovative methodologies, academic rigor, and strategic insights into securing research funding.

The seminar commenced with an illuminating keynote address by Prof. Praveen K Verma from the School of Life Sciences, Jawaharlal Nehru University, New Delhi. His discourse on "Scope for Research and Development and Funding Opportunities" provided a comprehensive overview of how scholars can craft impactful research proposals, navigate grant procurement processes, and uphold academic integrity in a rapidly evolving research landscape. His address resonated deeply with the attendees, instilling a renewed sense of purpose and direction in their scholarly pursuits.

Two highly specialized workshops formed the core of the seminar, offering faculty members from both Sciences and Humanities disciplines a rare opportunity for hands-on learning. Dr. Asani Bhaduri, Assistant Professor at CIC, Delhi University, led the first workshop on Project-Based Learning, introducing innovative pedagogical approaches designed to foster student engagement and critical thinking. His session aligned seamlessly with the NEP's emphasis on experiential learning, equipping educators with the tools to integrate research-driven education into undergraduate curricula. The second workshop, spearheaded by Prof. Kumar Ravi Priya from IIT Kanpur, provided an in-depth exploration of Ethnography and Grounded Theory—two fundamental methodologies in qualitative research. Through interactive exercises and real-world case studies, participants gained a nuanced understanding of how to analyze social structures and cultural dynamics through empirical research.

The seamless execution of this seminar was made possible under the visionary leadership of Prof. Sangeeta Bhatia (Principal, Offg.), with dedicated guidance from RDC Coordinators Prof. Aparajita Mohanty and Prof. Neera Pant. The event was meticulously convened by Dr. Poonam Phogat and Dr. Reema Mishra, supported by a team of passionate faculty members from the Departments of Botany and Psychology, who played a pivotal role in curating an intellectually stimulating experience.

By bridging the gap between theoretical frameworks and practical applications, this seminar charted a definitive course for research integration within undergraduate curricula under the NEP. The expert-led discussions, immersive workshops, and collaborative exchanges provided participants with the acumen to navigate the ever-evolving research ecosystem. As Gargi College continues to champion academic excellence, this seminar stands as a testament to its unwavering commitment to nurturing the next generation of researchers and thought leaders.

Glimpses of the Event



**NATIONAL CONFERENCE
ON**
**ASHWAGANDHA 'A
HEALTH PROMOTER-
FROM FIELDS TO
PHARMACY'**

By: Rashi Singh (Editor-in-chief, Anthesis)



Gargi College, in collaboration with the Departments of Botany, Chemistry, and Life Sciences, organized a national conference titled "Ashwagandha: A Health Promoter – From Field to Pharmacy" on 18th October 2024. The event was sponsored by the National Medicinal Plant Board, Ministry of AYUSH, Government of India.

The conference aimed to bring together medical practitioners, academicians, and students to explore Ashwagandha's multifaceted role in healthcare. The event featured insightful lectures, poster presentations, and networking opportunities for participants.

Inaugural Session

The conference began with a traditional lamp-lighting ceremony, symbolizing the pursuit of knowledge and enlightenment. This was followed by the University of Delhi's Kulgeet and a soulful Saraswati Vandana sung by the students.

Dr. Anjana Rustagi welcomed the guests and introduced the central theme of Ashwagandha in modern and traditional health practices. The Guest of Honour, Prof. Dinabandhu Sahoo, Head of the Department of Botany, University of Delhi, and the Chief Guest, Prof. Mahesh Dadhich, CEO of the National Medicinal Plants Board, Ministry of AYUSH, were felicitated with mementos.

The conference featured two technical sessions, each comprising lectures from esteemed speakers.

The first session, "The Science and Practice in Medicinal Plant Research," included lectures on:

- Ashwagandha's therapeutic benefits and its applications in managing lifestyle-related disorders
- Herbal products development and the importance of quality control in Ayurvedic medicine
- The role of Ashwagandha in promoting physical and mental well-being, with a focus on its adaptogenic properties

The second session, "Integrating Traditional Knowledge with Modern Science," focused on:

- Government initiatives to promote medicinal plants and the importance of conservation and sustainable use.
- Ashwagandha's economic benefits and its potential for contributing to India's healthcare and economy.
- The role of medicinal plants in public health, with a focus on integrating traditional knowledge with modern science.

A national-level poster presentation competition was held, where students showcased their innovative research in Ayurvedic and medicinal plant studies. The posters covered a range of topics, including Ashwagandha's medicinal properties, its applications in healthcare, and the importance of conservation and sustainable use. The competition was judged by a panel of experts, and the winners were awarded prizes. The posters were displayed for attendees to view, providing a valuable opportunity for knowledge-sharing and networking.

The conference concluded with a vote of thanks from Dr. Neha Singh, who expressed gratitude to the dignitaries, speakers, committee members, staff, and volunteers for their efforts in making the event a success.

The conference successfully highlighted the importance of Ashwagandha and medicinal plants in promoting health and well-being, and inspired attendees to continue exploring traditional knowledge in scientific contexts.

Glimpses of the Event





A VIRTUAL SUMMER WORKSHOP ON 'BIOINFORMATICS FOR BEGINNERS'

Coordinators: Prof. Aparajita Mohanty and Dr. Reema Mishra
Conveners: Dr. S. Hamsa and Dr. Baljinder Singh

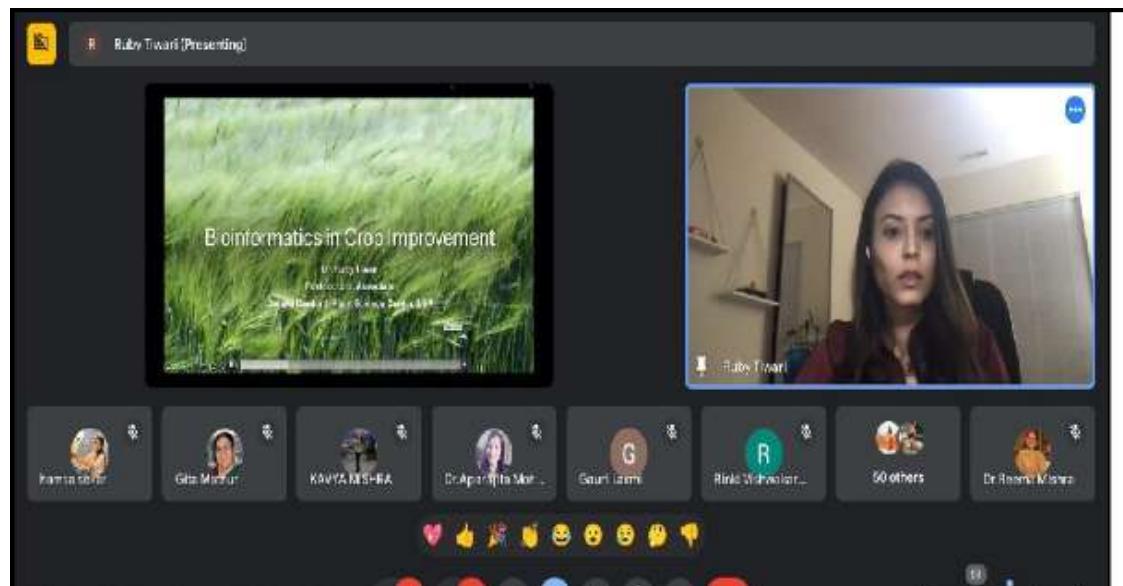
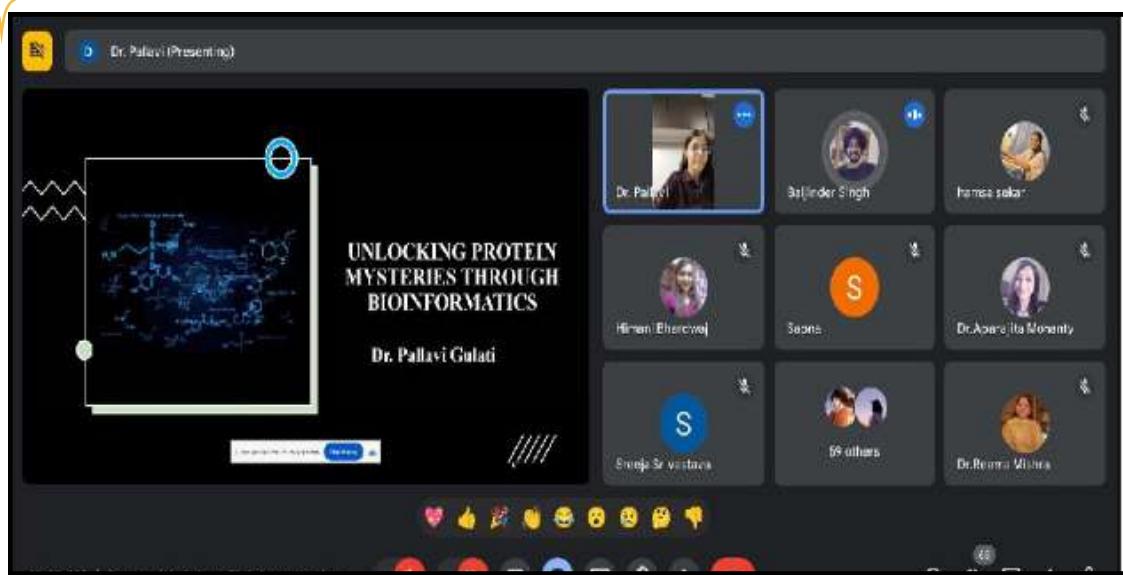
The Department of Botany, Gargi College, University of Delhi, under the aegis of RDC and IQAC, organized a 2-day Virtual Summer Workshop on "Bioinformatics for Beginners" on July 15–16, 2024. The conference was funded by the Department of Biotechnology. The purpose of this workshop was to teach and empower undergraduate students through invited talks and interactive practical sessions. The objective was to make it more learner-centred so that the students could understand and independently perform various analysis using bioinformatics tools and software communicated to them through this workshop.

Day 1 of the workshop commenced with an introduction and brief overview of the topics to be covered in the workshop session, followed by an informative talk by Dr. Pallavi Gulati (Krystelis, New Delhi) on "Unlocking Protein Mysteries through Bioinformatics". After the talk, Workshop Session 1 was conducted by Dr. S. Hamsa. This session included intense hands-on practical sessions where students were taught how to retrieve sequences from the NCBI database, perform alignment by the BLAST tool, analyze the results and search for conserved domains in the protein sequences.

Day 2 started with an insightful presentation by Dr. Ruby Tiwari on "Bioinformatics for Crop Improvement" (Donald Danforth Plant Science Centre, USA). This was followed by Workshop Session II conducted by Dr. Baljinder Singh. This session focused on training students to execute Multiple Sequence Alignment by CLUSTAL and MUSCLE, online as well as in the MEGA software, utilize the alignment files to construct various types of phylogenetic trees and finally annotate the trees in iTOL web-based tool.

The workshop witnessed the active participation of almost 70 undergraduate students from the Department of Botany and Life Sciences, Gargi College. The students showed high enthusiasm by displaying screenshots, asking questions, submitting assignments, providing feedback and actively presenting their work done throughout the workshop.

Glimpses of the Event



Bt crops are now resistant to insect attacks

Non-BT brinjal BT brinjal

Non-BT cotton BT cotton

Non-BT and BT corns

Google Images

azm-jos

Dr. Anjana Rustagi

Tanvi Kathuria

Sejal Kumari

47 others

Dr. Anjana Rustagi

Meno Prasad

Tanvi Kathuria

Gita Mathur

Dr. Renu Soni

Pritam Kaur

neetu chaudhary

Rishika Khandelwal

39 others



THREE DAY ONLINE WORKSHOP ON 'EXPLORING GENOMES: AMPLIFICATION TO POLYMORPHISM'

Coordinators: Prof. Aparajita Mohanty and Dr. Reema Mishra

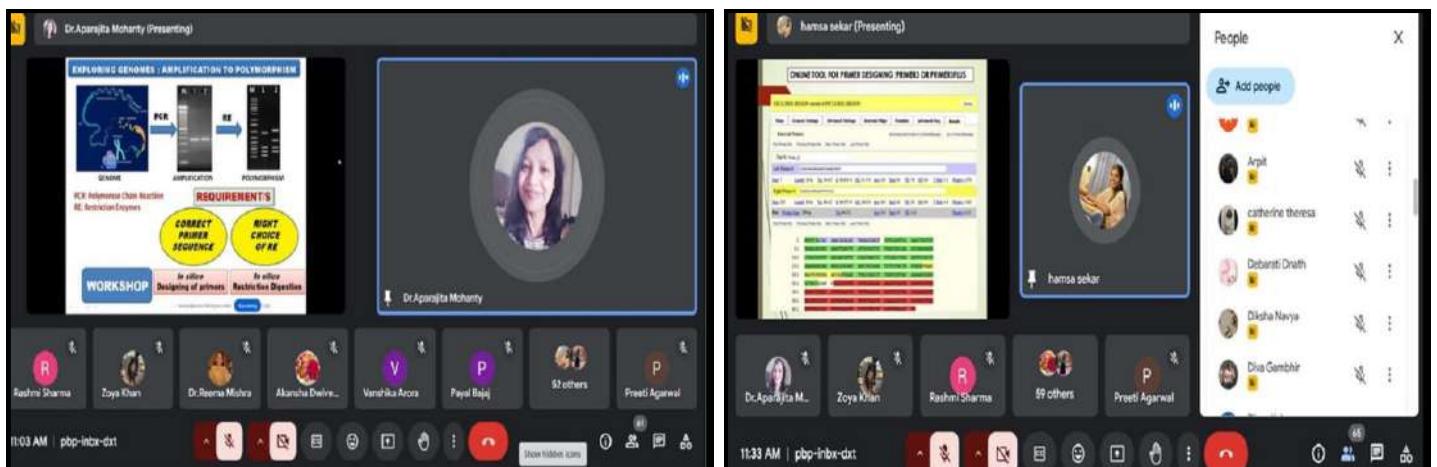
Conveners: Dr. Preeti Agarwal and Dr. Pritam Kaur

Resource person: Dr. S. Hamsa

The Department of Botany, Gargi College, University of Delhi, in collaboration with IQAC and RDC (funded by DBT), organized a 3-day online workshop titled "Exploring Genomes: Amplification to Polymorphism" from November 17–19, 2024. The workshop aimed to equip participants with hands-on experience in genomic research, focusing on techniques for amplification, polymorphism detection, and their applications in genetics and molecular biology. The workshop was attended by over 70 students from various colleges and departments of the University of Delhi. The workshop included both theoretical and practical components, with a focus on engaging students in active learning. The first day of the workshop, 17th Nov 2024, introduced participants to DNA amplification techniques, covering theoretical aspects and practical strategies for in silico primer design and optimizing PCR protocols using both manual methods and online tools. On the second day, 18th Nov 2024, the practical session focused on understanding Restriction Fragment Length Polymorphisms (RFLP). The session included the selection of appropriate restriction enzymes, analysis of amplified products, and the interpretation of polymorphism patterns. Participants learned to use bioinformatics tools for genome data analysis, improving their computational skills to support future laboratory work. The final day, 19th Nov 2024, featured a quiz and assignments designed to assess the participants' grasp of the topics discussed. These activities helped students stay engaged and provided a chance for further learning and discussion.

Overall, the workshop successfully achieved its goal of enhancing students' understanding of genomic research and its applications. The positive feedback and active engagement of students during the workshop highlighted its role in enhancing their understanding and use of bioinformatics tools for future research endeavours.

Glimpses of the Event





Three-day Academic Outreach Workshop

On

EXPLORATION IN BIOLOGICAL SCIENCES: INculcating SCIENTIFIC APTITUDE

The Department of Botany, Gargi College, University of Delhi (Under the aegis of IQAC and the Research and Development Cell), organised a Three-day Academic Outreach Workshop from 18th to 20th July 2024 at Pettigrew College, Ukhrul District, Manipur. The theme of the workshop, "Exploration in Biological Sciences: Inculcating Scientific Aptitude," was designed to promote a deeper understanding of biological sciences and enhance scientific inquiry. The workshop was conducted in a blended mode, combining both virtual and in-person learning experiences to reach a wider audience.

The event comprised a series of hands-on practical experiments and engaging lectures focused on the scientific exploration of plant diversity. Topics covered during the workshop included Plant Taxonomy, Plant Physiology, and Bioinformatics, all of which contributed to enhancing the knowledge base of the participants. The collaboration between the two esteemed institutions significantly broadened the scope and depth of the subject matter, offering participants to explore advanced research and methodologies in the field of plant Science.

Moreover, the workshop facilitated meaningful interactions between faculty members and students from both institutions, creating a platform for knowledge exchange and networking. This collaboration enriched the academic experience, promoted lasting connections beyond institutional boundaries, and advanced scientific knowledge in biological sciences.

Glimpses of the event





OUTREACH PROGRAM

ON

GETTING STARTED WITH BIOINFORMATICS

Coordinators: Prof Aparajita Mohanty and Dr. Reema Mishra
Organizers: Dr. Preeti Agarwal, Dr. Pritam Kaur and Dr. S. Hamsa

The Department of Botany, Gargi College, University of Delhi, under the aegis of RDC and IQAC, organized an outreach program on "Getting Started with Bioinformatics" for higher secondary school students of Rani Jhansi Sarvodaya Kanya Vidyalaya, Railway colony, Tuglakabad, New Delhi on 27th August 2024. The program was funded by the Department of Biotechnology. This program was organised for 12th-grade students to introduce them to the rapidly evolving field of bioinformatics, which involves the intersection of various fields of science, computer science and information technology. The event aimed to spark interest in "Bioinformatics" among young learners, provide them with foundational knowledge in this multidisciplinary field and encourage them to consider pursuing higher studies and careers in this field.

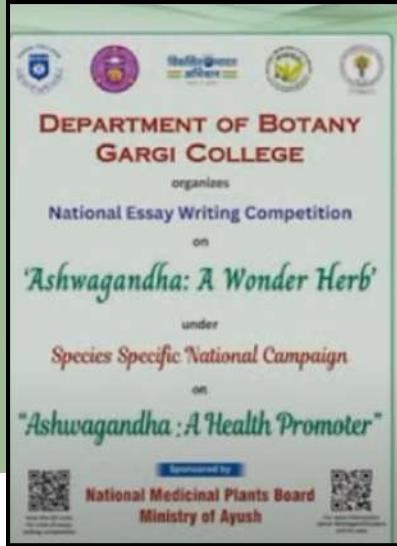
The primary objective of the program was to acquaint students with the basic concepts and applications of bioinformatics, highlighting its significance in scientific research and healthcare. A comprehensive introduction to bioinformatics was provided through a presentation covering fundamental topics like biological data, databases, whole genome sequencing, programming languages, structural bioinformatics, applications and prospects. Moreover, a detailed explanation of how bioinformatics tools are used to analyze biological data and solve complex biological problems was also discussed.

The program also included interactive sessions where students were encouraged to share their doubts and thoughts. A Q&A session followed, where students asked insightful questions about the topics discussed in the presentation. At the end of the program, students were asked to provide feedback on their experience in writing and verbally. The overwhelming response indicated that the students found the program very informative and motivating. Many students expressed a keen interest in exploring bioinformatics further, and some even considered pursuing it as a career option.

Overall, the outreach program highlighted the importance of early exposure to rapidly evolving scientific fields like bioinformatics and demonstrated the potential of such programs to shape the future of young learners.

Glimpses of the Event





Outreach Program on Health Benefits of Ashwagandha

The Department of Botany, Gargi College under species specific national campaign on 'Aswagandha - A Health Promoter', a project sponsored by National medicinal plant board, Ministry of Ayush, government of India, organised an outreach program on health benefits of ashwagandha along with poster making competition and its sapling distribution drive for students of PM Shri KV Moth school on 28th August 24. Around 600 students from class 6th to 9th were benefited from this program. more than 1200 saplings were distributed to staff and students. Around 70 students participated in poster making competition. Certificates and prizes were given to winners.





ACADEMIC VISIT TO **NIPGR**



By: Anushree Sharma (Cultural Secretary, GCBS)



The Department of Botany, Gargi College organized a visit to the National Institute of Plant Genome Research (NIPGR) on 6th September 2024. The visitors included second and third year students, along with faculty members from the department.

The NIPGR is a premier research institution dedicated to plant biotechnology and genomics under Department of Biotechnology, Government of India. The members of the institution warmly welcomed all the visitors and shared insights about their objectives, research projects and the importance of working in plant sciences.

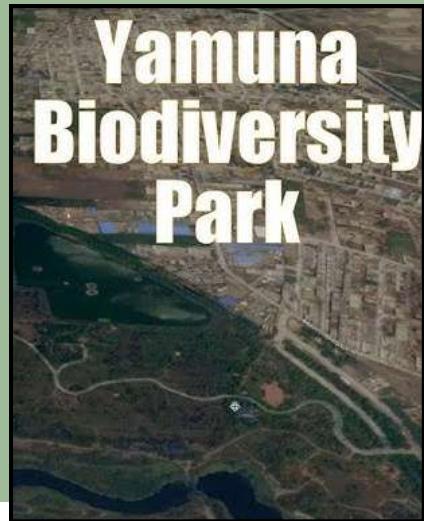
The most remarkable experience was visiting the laboratories where some of the finest experiments were performed. The guided tour of the Tissue Culture Lab and the Biotechnology lab provided students with valuable knowledge in these areas and motivated them to pursue work in these fields. Visitors were also introduced to the exhibits and posters section which showcased the latest developments in plant genomics and their growing importance. The most interesting part was to know the relationship between these emerging developments and artificial intelligence. The focus was on BioAI (Biologically inspired AI). A wonderful lecture was delivered by Dr. Gitanjali Yadav, scientist, NIPGR, on the topic “TRANSFORMING #BioE3 WITH #BioAI” highlighting the importance of BioAI.

The visit to NIPGR was a memorable experience, it not only provided the knowledge related to the emerging field of plant sciences but also inspired the students to pursue their interest in the subject. It also enhanced their understanding of various research developments, with a particular focus on the growing importance of AI.

We are grateful to every member of NIPGR for providing us with this essence of knowledge.

Glimpses of the Event





ACADEMIC VISIT TO YAMUNA BIODIVERSITY PARK

By: Aparna Rawat (Editorial team member)

Department of Botany, Gargi College, University of Delhi, organized an enriching educational excursion for second-year students to Yamuna Biodiversity Park on 1st October 2024. This visit was designed to enhance students' understanding of biodiversity by facilitating direct observation of different groups of plants such as Bryophytes, Pteridophytes, and Gymnosperms. A group of 50 students was accompanied by six faculty members and two laboratory staff.

Upon arrival, the group visited the park's museum, where Mrs. Priti Bohra, the Nature Education Officer, provided an insightful introduction to the park's unique features. It was followed by an engaging session on the significance of biodiversity and humanity's responsibility in environmental stewardship by Mr. Fayad Khudsar, Scientist YBP. In the 157-acre visitor zone students observed various species such as *Manilkara hexandra* and *Phyllanthus reticulatus* in the Conservatory of Fruiting Plants, explored the nursery, and identified indicator species in wetland areas, including *Phragmites* and *Typha*. Their exploration extended to the Alpine Region and concluded at the gene bank fields, where they observed a diverse array of crops, millets, and hybrid varieties.

Students also visited the greenhouse, polyhouse and nursery observing germinated plants such as *Butea monosperma* and *Withania somnifera*, *Barleria prionitis* and *Justicia adhatoda*. The exploration culminated at the medicinal lake, where students collected algae specimens and examined medicinal plants, including *Tylophora indica* and *Bacopa* (Brahmi). The visit culminated with students sharing their observations and reflections over lunch. The visit to YBP offered a valuable, hands-on learning experience, deepening the students' knowledge of biodiversity and conservation and enriched appreciation for the environment and its preservation, making the excursion both educational and memorable.

Glimpses of the Event





ACADEMIC VISIT TO **IARI PUSA**

By: Dhiseka Pawaiya (Co-editor, Anthesis)

A field trip to IARI PUSA was organized by the Department of Botany for the DSE paper “Natural Resource and Management” on 7th October 2024. Students were welcomed by Dr. Shiva Dhar Misra, Scientist, at the Biomass Utilization Unit of IARI. Dr. Misra addressed the students and gave detailed insight into the history and setting up of the Biomass Utilization Unit, information regarding the total organic waste generation and its processing to organic compost. Nearly 30,000 tonnes waste per year is generated at IARI which is converted to 5000 tonnes of compost, used for agricultural purposes at the institute itself and is often sold to farmers generating a net profit of 2 crore rupees. The students were then told about different types of composting: Aerobic and Anaerobic, followed by Microbial Composting and Vermicomposting. Students were given demonstration for three different types of working models of vermicomposting and a demonstration model of aerobic microbial composting. All the students actively participated and gave valuable input to make the practical session an interactive one. The excursion indeed turned out to be informative and interactive which made it a great success.

Glimpses of the Event





ACADEMIC VISIT

TO

MOTHER DAIRY PLANT

By: Gauri Katoch (B.Sc. Life Sciences (Prog.) 2nd Year

On 12th March 2025, the Department of Botany organized a field visit as part of academic visit for DSE course (Industrial and Environmental Microbiology) to the Mother Dairy Plant in Patparganj, Delhi. The visit included students, faculty members Dr. Gladys Muivah and Dr. Preeti Agarwal, and lab staff Mr. Gopal.

During the visit, students gained comprehensive insights into Mother Dairy's milk distribution process, from collection from farmers to safe supply to households in Delhi. Through videos and presentations, they learned about the rigorous procedures in place to ensure the taste, quality, and safety of milk. The students were also shown various tests conducted to detect adulterants such as urea and caustic soda, understanding the importance of quality control in dairy products.

The visit highlighted Mother Dairy's significant role in empowering different sections of society, particularly farmers and local communities, by providing them with a stable market and fair prices for their produce. Additionally, the students gained an understanding of how Mother Dairy contributes to building a healthy community by supplying safe and nutritious dairy products.

The field visit was a valuable learning experience for both students and faculty members. It provided practical insights into the dairy industry's operations, quality control measures, and social impact. The students appreciated the opportunity to observe the processes firsthand and interact with the plant's staff, enhancing their understanding of the subject matter.

Glimpses of the Event





ACADEMIC VISIT
TO
**NATIONAL INSTITUTE
OF IMMUNOLOGY**

On 15th April 2025, the Department of Botany organized a visit to the National Institute of Immunology (NII) for third-year students of B.Sc (Hons) Botany. The students were accompanied by Prof. Aparajita Mohanty, Dr. Reema Mishra, and Dr. Pritam Kaur. At the institute, students were introduced to various research groups of NII.

During the visit, students explored three divisions: Central Instrumentation Facility, Transmission Electron Microscopy Unit, and X-ray Crystallography Facility. At the Central Instrumentation Facility, students were introduced to high-tech instruments, including autoclaves, centrifuges, and a medium-pressure liquid chromatography machine (BioRad NGC). They gained hands-on insight into the working of these instruments.

The Transmission Electron Microscopy Unit provided students with an understanding of microtomes and transmission electron microscopes (TEMs). At the X-ray Crystallography Facility, students learned about protein crystals, their formation, and visualization. The history of X-ray crystallography was also discussed, and they were introduced to the Mosquito crystal machine.

The visit concluded with gratitude to the NII staff for their time and expertise. The experience provided students with valuable insights into cutting-edge research and instrumentation in immunology and related disciplines. The practical demonstrations significantly enriched the students' understanding and sparked a deeper interest in pursuing advanced studies and research in the field of biotechnology.

Glimpses of the Event





GROW A TREE FOR LIFE, AN ENVIRONMENTAL ACTION PROGRAMME (Plantation Drive)

Department of Botany, Gargi College, University of Delhi in collaboration with National Academy of Sciences, India and Microbiologist Society of India launched Tree Plantation Drive Under "Grow a Tree for Life, an Environmental Action Programme" by planting 'Amaltas', 'Gulmohar' and 'Jacaranda' trees on July 26, 2024 under the patronage of Prof. Dinabandhu Sahoo, Head, Department of Botany, University of Delhi.

The Plantation Drive was enthusiastically joined by faculty members and students with the zeal of conserving nature and its asset.

Glimpses of the Event





PLANT4MOTHER CAMPAIGN

Plantation Drive

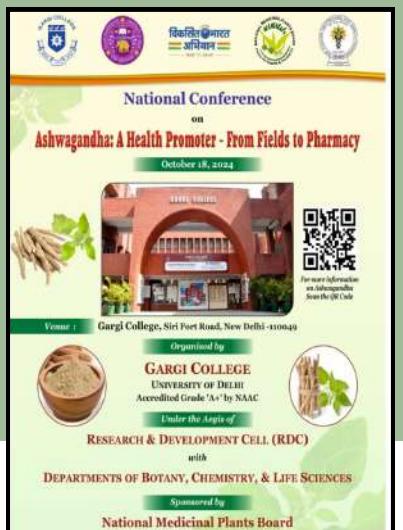
Department of Botany, Gargi College, University of Delhi in association with Botanical Garden Committee organized Tree Plantation Drive Under "Plant4Mother Campaign", on 22nd August 2024.

The Plantation Drive was enthusiastically joined by faculty members, non-teaching staff members and students with the zeal of conserving nature and its assets.

Glimpses of the Event



SAPLING DISTRIBUTION DRIVES
UNDER
SPECIES SPECIFIC NATIONAL
CAMPAIGN ON ASHWAGANDHA-A
HEALTH PROMOTER



Under Species-Specific National Campaign on 'Ashwagandha- A Health Promoter' funded by National Medicinal Plants Board (NMPB), Ministry of Ayush, New Delhi. Ashwagandha sapling distribution drive was carried out to raise awareness about ashwagandha's benefits and applications. On various occasions distribution of ashwagandha saplings was done in Gargi college and other educational and non-educational institutions.

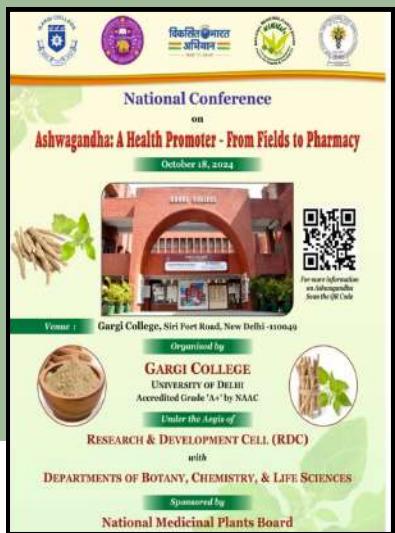
On the orientation day of Gargi college (29th August 2024), Diwali festival 'Zistatva', National Skill Enhancement Conference (12-13th November, 2024), Gargi College's annual festival, Reverie (19-21st February, 2025), one-day national conference on 'Ashwagandha: A Health Promoter - From Field to Pharmacy' (18th October 2024).

Ashwagandha plants were also distributed in various schools and colleges, residents of various RWA's, local markets, temples and social gatherings, Police station staff and their families to disseminate information about its usefulness. Through this campaign, Ashwagandha plants were distributed to students, teachers and non-teaching staff in various educational institutions like Kendriya Vidyalaya Sadiq Nagar, Mata Gujri Public School, Kailash Colony, Kautilya Government Sarvodaya Co-education School, Chirag Enclave, Kendriya Vidyalaya girls school, Mehrauli, Premier school Burari area, North Delhi, Carmel Convent school, Chanakyapuri, Gargi College and Kamala Nehru College, Miranda House College, IARI PUSA campus, etc. through various programs.

In addition, plant distribution campaigns were carried out in a number of RWA colonies in South, North, East and West Delhi, such as Vasant Kunj, Panchsheel enclave, GK1, GK2, Hauz Khas, Vasant Vihar Mehrauli, Ramleela Event, Kishangarh, Cantonment area, Kabul lines, INS building, Central secretariat, Flower show "Palaash 2025," (organised by the DDA authority), East of Kailash, Sabzi Mandi, Police Station Staff GK1, Shiv temple GK1, "Cycling marathon" and 'Free health camp' (hosted by Fortis hospital).

Glimpses of the Event



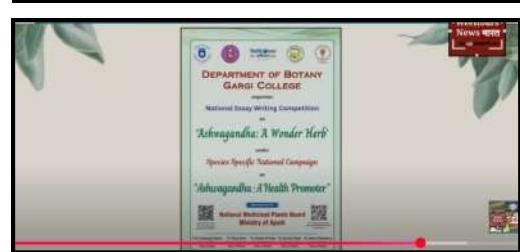


COMPETITIONS UNDER SPECIES SPECIFIC NATIONAL CAMPAIGN ON ASHWAGANDHA -A HEALTH PROMOTER

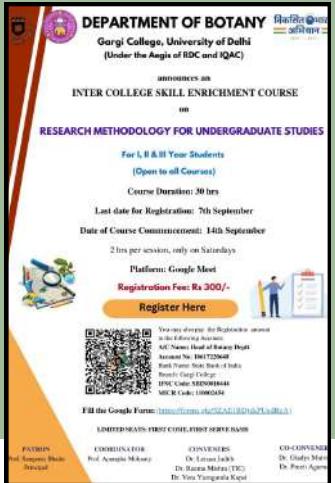
Under Species-Specific National Campaign on 'Ashwagandha- A Health Promoter' funded by National Medicinal Plants Board (NMPB), Ministry of Ayush, New Delhi, various online and offline activities like poster-making, poster presentation, and essay-writing competitions on Ashwagandha were organised at school, college, and university levels to spread awareness among the younger generations.

An outreach program was organized by the Department of Botany, Gargi College, University of Delhi in collaboration with PM Shri KV Masjid Moth School on 28th August, 2024. The event aimed to raise awareness about the numerous health benefits of Ashwagandha (*Withania somnifera*) and educate participants about its cultivation and the importance of Ayurveda in modern healthcare. The program featured two key activities: a poster-making competition and a sapling distribution drive.

Glimpses of the Event



INTER COLLEGE SKILL ENRICHMENT COURSE ON RESEARCH METHODOLOGY FOR UNDERGRADUATE STUDIES



Co-ordinator: Prof. Aparajita Mohanty

Conveners: Dr. Leisan Judith, Dr. Reema Mishra, Dr. Vera Yurngamla Kapai

Co-conveners: Dr. Gladys Muivah, Dr. Samira Chugh, Dr. Preeti Agarwal

The Department of Botany has initiated an Inter-college Skill Enrichment Course on the topic “Research Methodology Course for Undergraduate Studies” under the aegis of Research and Development Cell and IQAC, Gargi College, University of Delhi.

The broad objective of the course was to give insights into the basic concepts required for implementation of a research project. The course is a 30-hour module with the aim to enable the students to identify research areas, learn the tools and techniques for the collection of sample/data analyze and interpret the data and publish the implemented research work.

More than 90 students from various colleges of the University of Delhi, representing diverse streams such as Science, Humanities, and Commerce, actively participated in the course. A total of sixteen lectures, each lasting two hours, have been delivered by distinguished researchers and scientists from renowned universities and institutes. The inaugural lecture was delivered by Dr. Gaurav Kumar, who provided participants with a comprehensive overview of research methodology. The Valedictory Lecture was delivered by Dr. Shashi Tyagi ma'am on various career opportunities that are available after Graduation and how to prepare for it including skills and strategies to achieve their goals.

List of Resource persons and the topics



Sl. No.	Name, Designation and Affiliation of the Invited Speaker	Name of the Event	Event Dates (from – to)
1.	Dr. Gaurav Kumar (Assistant Professor, Department of Botany, Bareilly College, Bareilly)	Skill Enrichment course-Online lecture on the topic- Introduction To Research Methodology	September 13, 2024
2.	Dr. Dwaipayan Sinha (Assistant Professor, Department of Botany, Government General Degree college, West Bengal)	Skill Enrichment course-Online lecture on the topic-Use Of Search Engines For Collection Of Information Effectively	September 28, 2024
3.	Mr. Martin Kamodang (Assistant Professor, Department of Sociology, Jamia Millia Islamia University)	Skill Enrichment course-Online lecture on the topic-Methods of Data Collection and Survey Based Research	October 19, 2024
4.	Dr. Nawin Kumar Tiwary, (Assistant Professor, Department of Environmental Studies, Indraprastha College for Women, University of Delhi)	Skill Enrichment course-Online lecture on the topic- Research Writing Made Easy	October 26, 2024

5.	<p>Dr. Somdutta Sinha Roy (Assistant Professor, Department of Botany, Miranda House, University of Delhi)</p> 	<p>Skill Enrichment course-Online lecture on the topic- Get confidence in your results: Role of chi square, t-test and ANOVA in research</p>	<p>November 8, 2024</p> 
6.	<p>Dr. Monika Jaggi (Principal Scientist, CSIR-NIScPR)</p>	<p>Skill Enrichment course-Online lecture on the topic- Mastering the Art of Popular Science Writing</p>	<p>November 11, 2024</p>
7.	<p>Dr. Rita Sharma (Scientist E, BRIC-NABI, Mohali, Punjab & Associate Professor Department of Biological Sciences BITS Pilani, Rajasthan)</p>	<p>Skill Enrichment course-Online lecture on the topic- The Essentials and Desirables of An Effective Research Proposal</p>	<p>January 11, 2025</p>
8.	<p>Dr. Pooja Gulati, (Associate Professor, Department of Microbiology, Maharishi Dayanand University, Rohtak, Haryana)</p>	<p>Skill Enrichment course-Online lecture on the topic-Reference Management Software for Academic Writing</p>	<p>January 18, 2025</p>

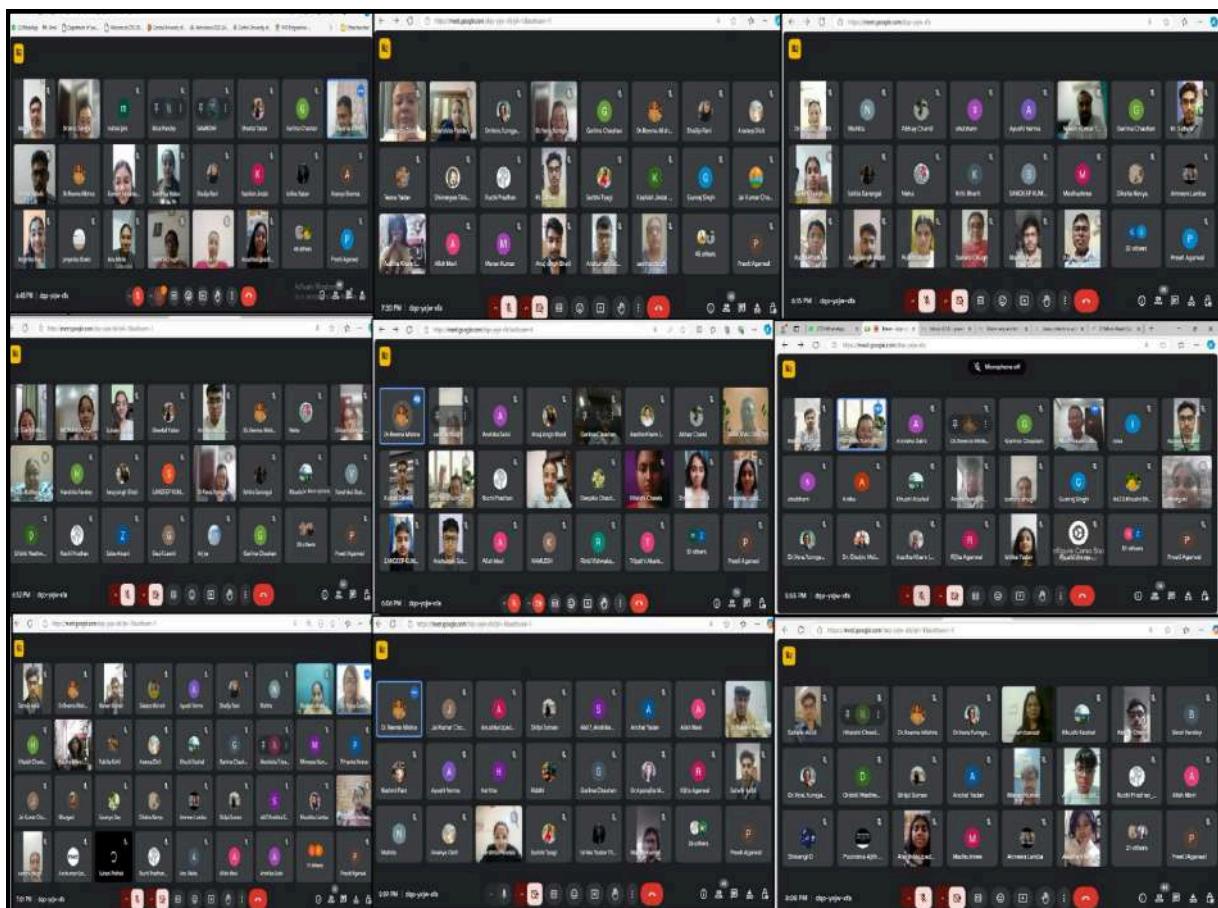
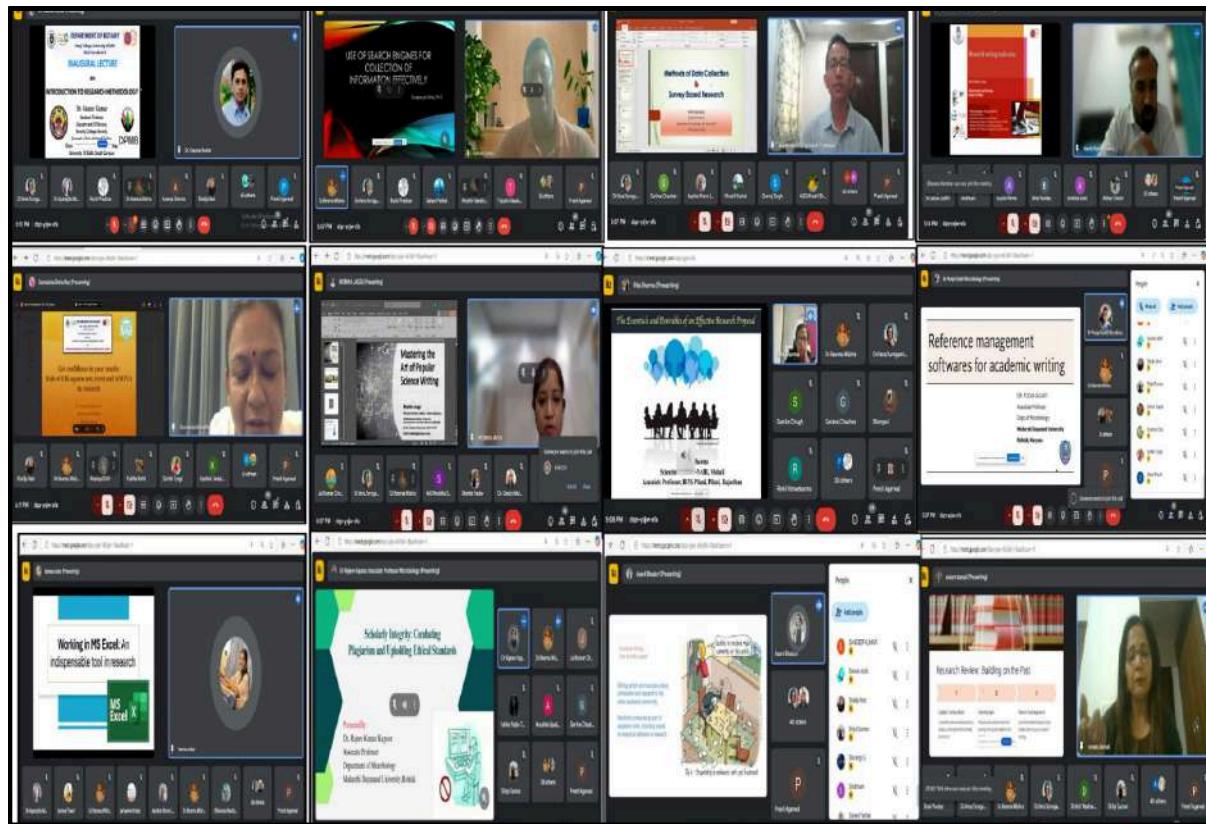
9.	<p style="text-align: right;">Dr. S. Hamsa (Senior Project Associate, BIF, Gargi College)</p>	<p style="text-align: center;">Skill Enrichment course-Online lecture on the topic-Working in MS Excel : An Indispensable Tool in Research</p>	February 1, 2025
10.	<p style="text-align: right;">Dr. Rajeev Kumar (Associate Professor and Deputy Director at the centre for IPR Studies, Maharshi Dayanand University)</p>	<p style="text-align: center;">Skill Enrichment course-Online lecture on the topic-Scholarly Integrity: Combating Plagiarism and Upholding Ethical Standards</p>	February 15, 2025
11.	<p style="text-align: right;">Dr. Asani Bhaduri (Assistant Professor, Cluster Innovation Centre, University of Delhi)</p>	<p style="text-align: center;">Skill Enrichment course-Online lecture on the topic-Journal Metrices and Choice of Journals for Publications</p>	March 4, 2025
12.	<p style="text-align: right;">Dr. Sonam Bansal (Associate Professor, Chairperson of Department of Education, Gurugram University, Haryana)</p>	<p style="text-align: center;">Skill Enrichment course-Online lecture on the topic-AI Tools in Research</p>	March 7, 2025
13.	<p style="text-align: right;">Dr. Manpreet Kaur (Assistant Professor, Department of Mathematics, Gargi College, University of Delhi)</p>	<p style="text-align: center;">Introduction to R: A Beginner's Guide to Data Analysis</p>	March 22, 2025

14.	Dr. Gladys Muivah (Assistant Professor, Department of Botany, Gargi College, University of Delhi)	Canva Tutorial for Beginners	March 29, 2025
15.	Dr. Samira Chugh (Assistant Professor, Department of Botany, Gargi College, University of Delhi); Dr. Preeti Agarwal (Assistant Professor, Department of Botany, Gargi College, University of Delhi)	Academic Writing and Publishing	April 05, 2025
16.	Dr. Shashi Tyagi (Former Principal and Associate Professor, Department of Botany, Gargi College, University of Delhi)	Career opportunities for UG students	April 12, 2025

Glimpses of the event



Glimpses of the event





Letters from the past....



Gargi: The place that sparked my growth



**By: Adithi Rao, Alumni,
(Batch 2023)**

Whenever I think of my life retrospectively, Gargi is a massive part of it. Whether it be the first offline college lecture of our lives after lockdown or just the madness and chaos just before any event hosted by GCBS, it all flashes in front of my eyes in a second. And I have a big smile, reminiscing all these beautiful memories. I would love to share how Gargi has had a significant role in shaping the person I am today, academically and otherwise.

The first day of offline classes was a memorable one. All the names we knew from the online classes were then connected to beautiful faces on campus. New friend groups were made in no time, not knowing these would be cherished forever. Before we could process anything, full-fledged classes were being held, and it was the time of our first offline exams. And this time was honestly the best. Studying together in groups, sharing notes, and clarifying each other's doubts was the first time I was doing group studies, and they were so much fun. We taught each other topics and learnt difficult things with cute mnemonics we made for each other. And just like that, our 4th semester was also over.

Honestly, my final year at Gargi was the best thing that happened to me. I became the General Secretary of GCBS, Taru, which changed me in ways I could have never imagined. I found myself talking to strangers much more, getting to know their experiences and struggles, and just putting myself out there a little more. From the girl who used to speak to just 2 friends in school, I was now this girl who had a huge 10 girls' squad in college, was running around college minutes before an event only to come home and realise I had an assignment due the next day. I realised I loved organising and doing all the back-end work of the events only after working in Taru. Our lovely seniors and amazing juniors helped us throughout. I learned leadership skills, event management, and last-minute troubleshooting all in this one year, and I am so grateful I did. All those experiences have helped me grow and become who I am today.

I found the best friend group anyone could have ever imagined, and we have roamed around almost the whole of Delhi in the last year. Now, with each of us living in different cities across the globe, the only thing connecting all of us are the memories we hold on, from the home we called Gargi. I am immensely thankful for being able to come here and spend the most exceptional 1.5 years on the Gargi campus. Thank you so much to all the teachers, students, and friends I bumped into in Gargi! All those conversations, laughter, and tears on campus ultimately make sense today and are so important to me!

From Roots to Blossoms: Parallels in Plants and Human Lives

By: Suhani Choudhary, Alumni,
(Batch 2024)

College, a beautiful chapter in our lives that brings with it new opportunities, newly founded freedom, new responsibilities and new people at the same time reminding us to stay deeply rooted and affirmed to our basic values and foundation just like a plant as it grows and grows to herb, shrub and a tree. College life and experience mirror the fascinating world of plants in profound ways, revealing shared themes of growth, adaptation, and resilience.



Root Development: Foundations of Growth

The knowledge and relationships established in college are synonymous to the roots of the plant, helping anchor us firmly in the professional world. The meristematic zone of a root tip which consists of actively dividing cells represents the dynamic learning phase of our academic journey and the mentorship, college fests, societies are like nutrients which help us grow our tree of life. The laboratory has helped me learn various skills especially patience, the classroom lectures helping me in higher studies (and when I say nobody connects to you more than our professors it's true!) and of course the fests and events living as a core memory in my heart have surely set my roots firm.



Stem and Leaves: Support and Energy

Plants have stem to support and transport nutrients and leaves to capture energy from the sun to help make food; we students have professors, friends and family to cater to our growth and learnings. The various activities held in Gargi are lessons outside the classroom.

A key takeaway here is to surround yourself with people and activities that help you learn and grow as a plant too thrives in the right environment. The departmental events helped me learn and grow a lot. My professors faith in my abilities, as reflected in the responsibilities entrusted to me serving as the Coordinator of The Journal Club and a Student Volunteer for the Alumni Lecture Series, have been instrumental in my growth, providing valuable experience and paving the way for greater responsibilities as I progress in both my academic and personal journey.



Flowering and Fruiting: Milestones and Achievements

Flowers symbolize a plant's readiness to contribute to its ecosystem, just as college marks the milestones of creativity and productivity. Each bloom represents moments of success; graduations, projects, and personal achievements that lead to the fruits of our efforts. Gargi is like an eternal bloom in my tree of life, bringing a big smile and warmth to my heart every time I look at it.



Adaptation and Resilience

A plant's ability to adapt to challenges like drought, pests or competition with remarkable resilience comes from care it was given. Similarly, in college and life we face our own trials. The deadlines, assignments and shift from regular school timings to extended college timings have surely helped in learning how to balance personal and professional life. Whether managing stress or finding solutions to unexpected problems, resilience enables us to thrive, just as a cactus survives in the desert or a vine climbs toward the sun. Challenges are opportunities to adapt and grow stronger.



Interdependence: Ecosystems and Communities

Plants have surely taught us that no organism can exist in isolation; ecosystems thrive on interconnectedness. Similarly, humans flourish in communities, relying on collaboration and shared purpose. From group projects, to the lifelong friendships, echo the symbiosis seen in nature. Another key takeaway: fostering 'Mutualistic' interactions help one grow, ones like 'Amensalism' or 'Predation' will lead to downfall.

By observing the lives of plants, we gain insight into our own journeys. College is a microcosm of life—a time to root, grow, adapt, and bloom. It's not just about CGPA or exclusively fun rather it's about new experiences, learning from mistakes, exploring talents and balancing personal and social conflicts.

Gargi surely has helped me transform into a completely new and confident young woman, changing my views on life, living up to its mission statement, "*....that every student who passes through the portals of the college emerges as a wholly developed individual symbolising the spirit of enterprise and inquiry that characterises Gargi.*"



THEMED ARTICLES

THE CONSCIOUS FLORA

This segment delves into the fascinating abilities of plants to respond to environmental stimuli, adapt to changes, and engage in intricate chemical communication, showcasing their complex roles within ecosystems.



REIMAGINING PLANT INTELLIGENCE AND AGENCY

SEGMENT 1

PLANTS IN PERIL

This segment explores the link between plants and natural disasters, focusing on their adaptability and resilience. It highlights how plants recover from wildfires and act as barriers against further damage.



NATURE'S STRUGGLE WITH DISASTERS

SEGMENT 2

LIFE'S PARALLELS

This segment includes an analysis of the similarities and differences between plants and humans, focusing on shared biological fundamentals, processes, adaptations, and mechanisms, enhancing our understanding of both life forms.



THE INTRIGUING CONNECTIONS BETWEEN PLANTS AND HUMANS

SEGMENT 3

ANTHESS
2025



THE CONSCIOUS FLORA

SEGMENT 1

This segment includes analysis of the natural abilities of plants to respond to environmental stimuli, adapt to changes, and engage in chemical communication, showcasing their roles within ecosystems.



REIMAGINING PLANT INTELLIGENCE AND AGENCY



The Role of Plant Hormones in Decision Making and Growth Regulation

By: Tanvi Arora, B.Sc. (H) Botany
(3rd year)

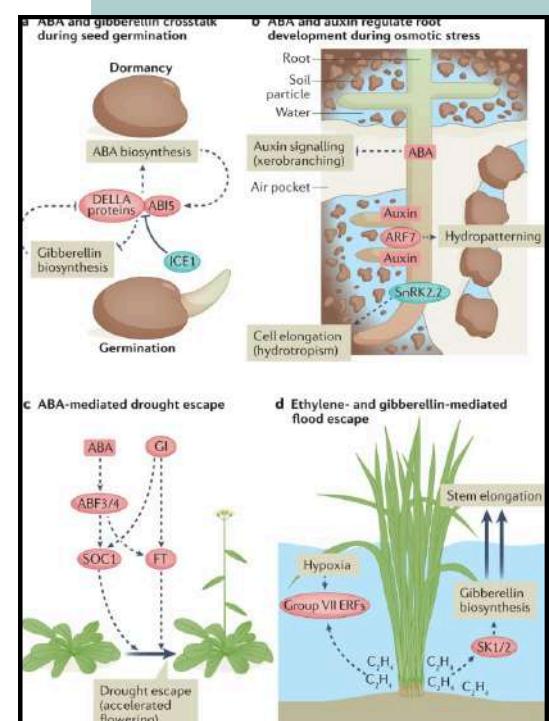
A range of physiological processes (like cell division, apical dominance, growth, differentiation and stress responses) in plants are carried out by pivotal chemical messengers called Plant hormones also called phytohormones. Plants grow throughout their life because of the meristematic tissue present in them. This tissue has plant hormones which play a crucial role in balancing stem cell maintenance and organ development. Studies from different plant species gave a detailed understanding of the role of plant hormones and genetic regulators and to ensure optimal growth and development to the plants with respect to the environment.

There are 5 major phytohormones present in plants contributing in specific physiological activities such as Cytokinins, Auxin, Abscisic Acid, Gibberellins, Ethylene. Along with these few more phytohormones are present brassinosteroids, jasmonates, salicylic acid and Nitric acid; these also enhance the growth and development of plants. These phytohormones are required by plants in very small quantities ,nanomolar or micromolar concentration.

1. Cytokinins: Master Regulators of Cell Division

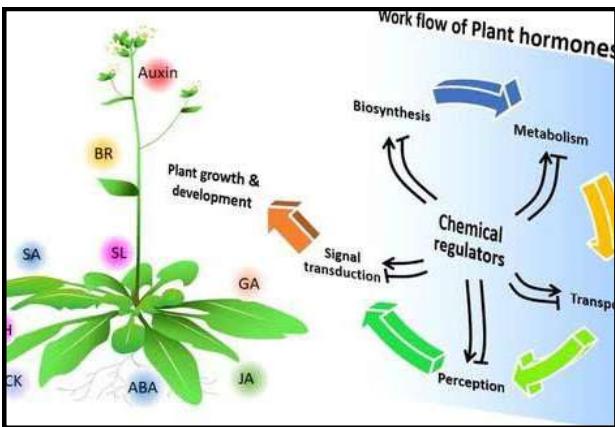
Cytokinins play a crucial role in sustaining the cells of Shoot Apical Meristem. An expression is induced by the transcription factor WUSCHEL (WUS) of the SAM organising centre.

WUS expression is triggered by high cytokinin, which leads to the specification of stem cell identity. These hormones promote cell division and differentiation, delay leaf senescence, and influence nutrient mobilization. Cytokinins interaction with auxins help to balance root and shoot growth and development.



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2. Auxins: Catalysts of Organogenesis



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Auxin, a key plant growth regulator, plays a critical role in stress tolerance, nutrient deficiency responses, and abiotic stress adaptation. It influences cell elongation, root architecture, and lateral root development, interacting with stress signals like calcium and ROS to help plants adapt to various stress conditions. Under nutrient deficiencies, auxin modifies root growth to improve nutrient uptake, affecting responses to nitrogen, potassium, phosphorus, and other mineral deficiencies. In drought stress, auxin mediates root hydrotropism, promoting resilience by regulating genes like IAR3 and ARF.

3. Gibberellins: Modulate Stress Responses

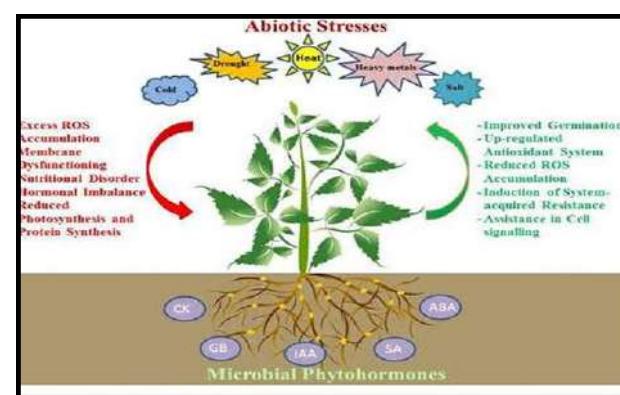
Gibberellins (GAs) are essential phytohormones regulating plant growth. Their biosynthesis involves entkaur-16-ene, produced by ent-CPP and entkaurene synthases. Mutations in ent-kaurene synthase cause dwarf phenotypes in *Arabidopsis* and rice. Oxidation by enzymes like entkaurene oxidase (KO) and entkaurenoic acid oxidase (KAO), both P-450 monooxygenases, converts ent-kaurene to GA12 via intermediates. GAs promote cell elongation and division, contributing to stem and root growth, and are key regulators of bolting in rosette plants. They also influence flowering time by interacting with other hormones and environmental signals. In fruit development, gibberellins contribute to size enhancement and parthenocarpy (fruit formation without fertilization).

4. Abscisic Acid: Suppress flowering

Abscisic acid (ABA) regulates plant growth and stress responses with concentration-dependent effects. While high ABA levels inhibit seedling and root growth, low levels can promote growth in certain plants like tomato and pea roots. ABA also influences dormancy, gravitropism, and water plant morphogenesis. It generally suppresses flowering but promotes flowering in some short-day plants. ABA aids in embryo development by inducing proteins like dehydrin, which protect against desiccation, and regulates genes like Rab16 in rice, crucial for stress adaptation. Additionally, ABA enhances cold and freezing tolerance when applied before low-temperature exposure.

5. Ethylene: Ripening of Fruits

Ethylene influences leaf growth and development, with its effects varying by concentration and species. Low ethylene levels can promote leaf elongation in slow-growing species, while higher levels inhibit growth. Ethylene-insensitive mutants show no increase in leaf area compared to controls, while treatments like ethephon can enhance leaf expansion. In closed environments, high ethylene levels in lettuce reduce leaf area due to epinasty and decreased CO₂ assimilation. Ethylene also interacts with ROS and nitric oxide, further regulating leaf expansion.



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6.Jasmonic acid, Salicylic Acid, and Nitric oxide

Jasmonic acid, Salicylic Acid, and nitric oxide are key signaling molecules in plant defense and growth regulation. Jasmonates helps defend against herbivores and pathogens, regulates reproductive processes, and inhibits root growth under stress. Salicylic Acid is central to immunity, promoting resistance against biotrophic pathogens and influencing growth through oxidative stress regulation. Nitric Acid acts as a signal in seed germination, root development, and stomatal regulation, interacting with reactive oxygen species (ROS) and other phytohormones to fine-tune plant growth and stress responses.

DECISION MAKING BY PHYTOHORMONES

All the phytohormones have distinct decision making aspects which regulate the growth, development and stress response, for example Auxin helps in cell elongation and root growth, Cytokinin controls division of cell, gibberellins stimulate flowering and cell elongation. Abscisic Acid regulates Stress Responses and Ethylene manages ripening respect to the stress situation. Jasmonic acid (JA) and salicylic acid (SA) stimulate defense mechanisms in response to pathogens and herbivores. Jasmonic Acid has a crucial role in defending the plant from different injuries and wounds, while Salicylic Acid is crucial for systemic acquired resistance. Nitric oxide is important in signaling molecule, and it influences various processes such as seed germination, root development, and stress responses by involving and interacting with other phytohormones.

To conclude this phytohormones are crucial for enhancing growth, development, and environmental responses and performing as key decision-making molecules that regulates physiological processes. By coordinating cellular activities such as cell division, elongation, and differentiation, phytohormones ensure plants adapt to changing conditions. Hormones like auxins, cytokinins, gibberellins, and abscisic acid stimulates growth and stress responses, while jasmonic acid, salicylic acid, and nitric oxide acts as defense mechanisms. The interaction between these hormones helps plants to prioritise growth, resource allocation, and defense, optimizing survival and reproduction in dynamic environments.

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Nature's Pharmacy: Unleashing the Power of Plant-Based Pharmaceuticals

By: Akansha Dwivedi, B.Sc. (H) Botany
(2nd year)

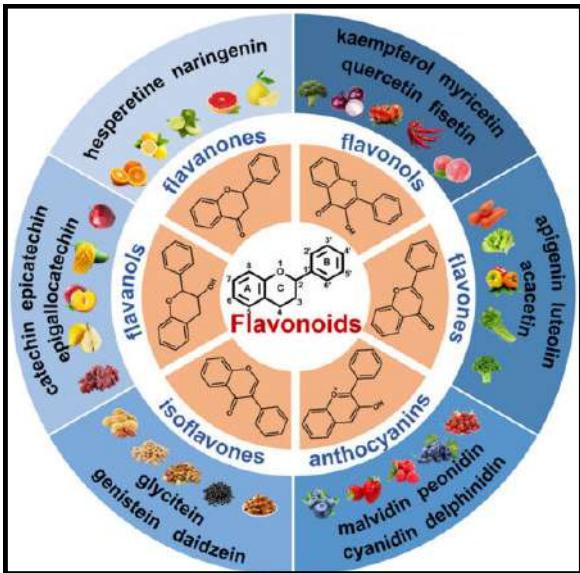
Plant-based pharmaceuticals have played a crucial role in medicine for centuries, offering bioactive compounds that serve as the foundation for many modern drugs. These natural compounds, derived from plants, exhibit diverse mechanisms of action and provide therapeutic benefits for a wide range of diseases. Key classes of bioactive compounds include alkaloids, flavonoids, terpenoids, glycosides, and polyphenols. Alkaloids, such as morphine from the opium poppy, interact with receptors in the nervous system to relieve pain, while quinine from the cinchona tree effectively combats malaria by targeting parasites.

Flavonoids, found in various fruits and vegetables, act as powerful antioxidants, reducing oxidative stress and preventing chronic diseases like cancer and cardiovascular disorders. Similarly, terpenoids, found in plants like eucalyptus, exhibit antimicrobial and anti-inflammatory properties by disrupting microbial membranes or modulating signaling pathways. Glycosides, such as digoxin from the foxglove plant, enhance heart function by regulating cardiac cell activity, while polyphenols like resveratrol and green tea catechins combat inflammation and cancer by modulating cellular pathways.

These plant-based compounds have been applied across numerous medical fields, addressing some of the world's most pressing health challenges. In cancer therapy, compounds like paclitaxel from the Pacific yew tree and vincristine from the Madagascar periwinkle disrupt cancer cell division and inhibit tumor growth. Cardiovascular health benefits from compounds like resveratrol, which reduces cholesterol and prevents arterial plaque, and allicin from garlic, which helps lower blood pressure. Plant-derived antimicrobial agents, such as neem and tea tree oil, offer natural alternatives to synthetic antibiotics, combating bacterial, fungal, and viral infections. For diabetes management, plants like bitter melon and fenugreek contain compounds that regulate blood sugar by enhancing insulin sensitivity and inhibiting carbohydrate-digesting enzymes.



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Neurological disorders also benefit from plant-based pharmaceuticals; for instance, *Ginkgo biloba* improves blood flow in the brain and alleviates symptoms of Alzheimer's and dementia. Anti-inflammatory agents like curcumin from turmeric have proven effective in managing arthritis and other inflammatory conditions by inhibiting pro-inflammatory cytokines.

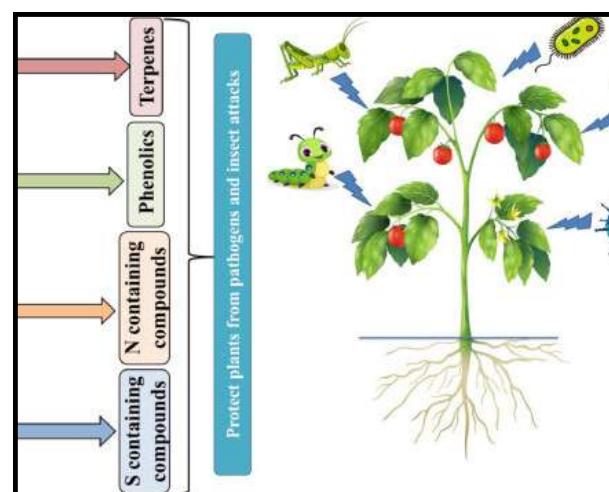
Technological advancements have revolutionized the production and application of plant-based pharmaceuticals. Genetic engineering enables researchers to enhance the production of key bioactive compounds by modifying plant genomes. For example, metabolic engineering of *Artemisia annua* has increased the yield of artemisinin, a crucial

antimalarial drug. Plant cell culture technology allows the production of pharmaceutical compounds in controlled environments, ensuring consistent quality and reducing reliance on natural resources. This method has been employed for compounds like paclitaxel and shikonin. Nanotechnology has also enhanced the efficacy of plant-based drugs by improving their bioavailability and targeted delivery. Nanoformulations of curcumin and resveratrol, for example, have shown greater effectiveness in treating cancer and inflammatory diseases. Additionally, synthetic biology integrates engineering principles with biology to synthesize plant-derived compounds in microbial systems, reducing dependence on traditional farming. This approach has been used to produce opioids and other pharmaceuticals.

Despite their potential, plant-based pharmaceuticals face challenges such as variability in compound concentrations, resource limitations, and environmental concerns. Consistent quality control, sustainable farming practices, and advancements in biotechnology are addressing these issues. In the future, artificial intelligence and big data analysis are expected to expedite the discovery of plant-based drugs by identifying promising compounds from plant genomes and bioactive compound databases. These technologies could lead to the development of novel plant-derived therapies.

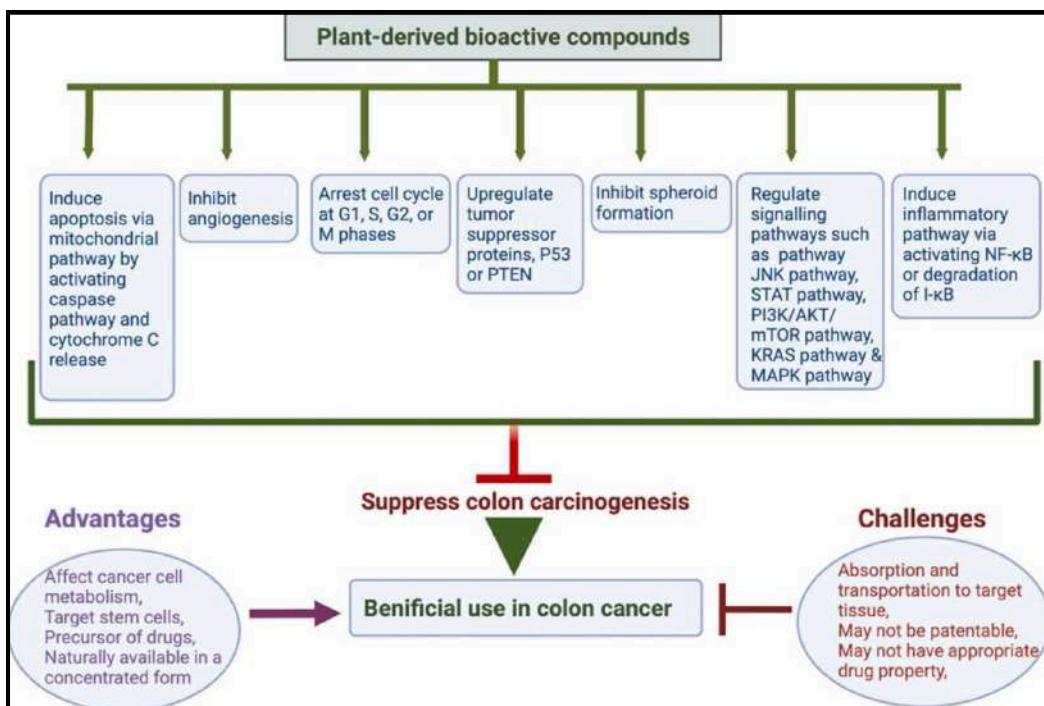
Plant-based pharmaceuticals offer immense promise in advancing global healthcare. Their diverse mechanisms of action and wide-ranging applications make them invaluable in treating diseases such as cancer, cardiovascular disorders, diabetes, neurological conditions, and infections.

By leveraging cutting-edge technologies like genetic engineering, nanotechnology, and synthetic biology, researchers can overcome existing challenges and unlock the full potential of plant-based medicines.



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As the exploration of plant-derived compounds continues, they hold the key to sustainable, effective, and innovative solutions for modern healthcare, paving the way for a healthier and more resilient future.



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Revolutionizing Botany: Implications of Plant Intelligence on Science and Technology



By: Sana Bhateja, B.Sc. (H) Botany
(2nd year)

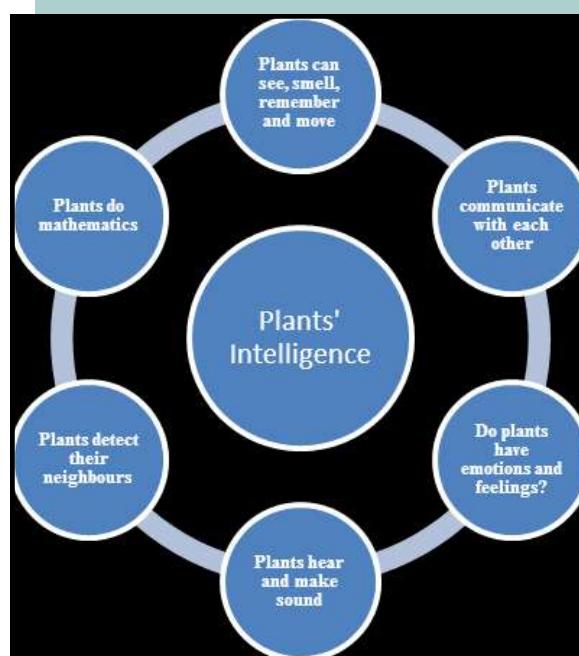
Bringing chains to the idea of how a plant should be viewed, there is a hidden movement for the understanding of plant intelligence waiting to emerge from beneath the ground. For centuries, entities classified as plants have always taken a backseat, mostly serving as food, oxygen, and economic shelter for humanity. But the studies researchers are conducting oh so carefully show that plants are not passive entities, more like protagonists: they are striving, able to solve problems, remember, and communicate! This transformation of thought calls for a change in the view of all greatness being satisfactory-centered, where flora is instead looked at as being one of the main great things in the intricacy of life.

What if these seemingly quiet organisms are capable of changing an entire industry or a few, such as robotics, architecture, and bioengineering? The only thing that appropriate civilianization has to do is accept that these innovations are taken from nature to be used, so don't cross the boundary; innovation with nature does not exist in today's society.

The Undeniable Smarts of Plants

Plants don't have a brain or central nervous system, but they act in ways that make us think twice about what we call smart. Plants communicate, adjust, and respond to their environment in clever ways. For example, they send chemical alerts through the air to other plants to warn them about threats.

Plants also seem to have a type of "memory." They respond to repeated stimuli in a way that looks like learning. The *Mimosa pudica* stands out as a good case. This plant closes its leaves when you touch it. But it can "learn" to ignore touches that happen often and pose no threat. This saves energy for real dangers. This shift shows that the plant can process information and change its behavior based on what it experiences.



https://www.researchgate.net/figure/Fig-1a-Plants-intelligence-different-aspects-1b-Sir-Jagadish-Chandra-Boses_fig1_331035752



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Biomimicry: Nature-Inspiring Robotics Through Plant Intelligence

Robotics has a long history of finding inspiration in nature, but the complex behaviors of plants represent an entirely new frontier. Plants, unlike animals, move slowly and intentionally, designed to survive and obtain resources. And roboticists have begun to look to tropisms—the directional growth of plants in response to external stimuli, such as light and gravity—for the engineering of adaptive, energy-efficient robots. For instance:

- **Soft Robotics:** Looking to the way climbing plants cling to their climbing hosts, scientists are developing robots with soft, flexible appendages that can perform delicate, fine handling tasks.

- **Root-Inspired Systems:** The roots of plants are particularly

good at finding their way around obstacles while seeking nutrients. Robotics engineers are mimicking these behaviors to create search-and-rescue robots that can climb debris or slip through narrow spaces.

Architectural Palaver—Reimagining Architecture with Plant Wisdom

Fundamentally, architecture is about designing spaces that sync up with the environment. As natural architects, plants are phenomenal optimizers of structure and energy. Through their growth models and adaptive elements, architects are creating biophilic structures integrated into nature.

- **Living Buildings:** Vertical gardens and green roofs based on climbing plants mitigate urban heat, filter out pollutants, and provide habitats for biodiversity. Milan's Bosco Verticale (Vertical Forest), for example, is now home to more than 900 trees, illustrating how the agency of plants can modify urban landscapes.
- **Self-Healing Materials:** Forests year after year come with freshly restored tree bark or leaves, and so are researchers devising materials for buildings that heal cracks or damage, prolonging their lifespan and making them more sustainable.

Plants are schooling architects to build spaces that are functional and regenerative, aligning human habitation with ecological principles.

Biological Engineering: Using Knowledge of Vegetal Intelligence for Sustainability

In recent years, there has been an explosion of interest in plants as partners for solving global challenges, especially in the field of bioengineering. Their ability to absorb sunlight and turn it into energy, sequester carbon, and generate oxygen establishes them as natural partners in sustainability. Awareness of plant agency is driving innovations like these:

- **Plants-as-sensors:** Engineers are installing micro-sensors on the plants to observe the atmospheric conditions. These "cyborg plants" can also sense pollution, monitor climate changes, or indicate drought, providing live data about the state of the ecosystem.



<https://images.app.goo.gl/s3VbJUgDrdUysLAn8>

- Synthetic Biology: With plants as biofactories, scientists are constructing plants that synthesize pharmaceuticals, biofuels, and biodegradable materials. For example, algae-based bioplastics offer potential alternatives for products derived from petrochemicals.

Ethical Considerations: A Call for Symbiosis

How shall we ethically reconcile human achievements with the freedom of plants? This inquiry compels us to adopt a symbiotic approach—one that respects the intrinsic value of plants while leveraging their abilities for technological and ecological advancements.

Plants, as cognitive flora, impose on us their important role in supporting the fragile equilibrium of the Earth. Their intelligence, expressed in communication, adaptation, and memory, places them not as targets to manipulate but, instead, as partners in sustainable development. E.g., innovations stemming from plants (e.g., robotics, architecture, bioengineering) should strive towards ecological coherence and not alter ecological disruption.

The ethical dilemma is to overcome the proclivity to view plants as mere instruments for human gain. Rather, they must be protected from being compromised by instituting a mutually reinforcing relationship. Examples, such as the concepts of regenerative agriculture and green biomimicry, illustrate this equilibrium, where human action streams promote ecological health and biodiversity.

By respecting plant agency, we go beyond exploitation and achieve collaboration, towards a technological advance seamlessly integrated with the natural environment. This call for symbiosis reminds us that human ingenuity must coexist with nature's wisdom to create a truly sustainable world.

As we stand on the cusp of this botanical renaissance, one question lingers: How far can we go when we allow nature to guide us? The answer, perhaps, lies in the gentle yet profound agency of the plants themselves—our silent partners in a future reimagined.

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Green Intelligence: The Amazing World of Plant Signaling and Adaptation

By: Somya Tiwari, B.Sc. (Prog.) Life Sciences
(2nd year)

Plants have long been a fascinating enigma. They stand tall, their leaves rustling in the breeze, and it's easy to assume they're static. But the truth is, plants are buzzing with life. They communicate, adapt, and respond to their surroundings—all without a brain or nervous system. So, how do they do it?

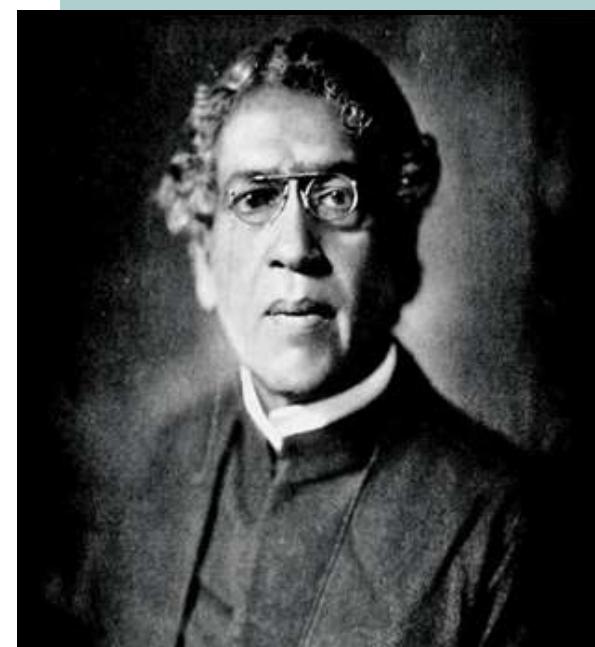
The journey begins with stimuli received on the plant surface, releasing neurotransmitter-like chemicals that bind to specific receptors. This triggers a response, releasing a second messenger. For instance, glutamate acts as a first messenger, binding to its receptor and triggering an increase in intracellular Ca^{2+} ion concentration. Ca^{2+} is the second messenger, transmitting signals to various cellular compartments and initiating an impulse.

Other chemicals, like cAMP, play a crucial role in regulating stomatal movement, triggered by the first messenger, abscisic acid (ABA). ¹ Plants have evolved unique ways to generate action potentials, crucial for their survival and adaptation. Three main mechanisms trigger action potentials: electrical signaling, hormone signaling, and hydraulic signaling.

Electrical signaling involves activating ion channels,⁴ creating calcium waves. Hormone signaling relies on controlling hormonal activities through neurotransmitter-like receptors. Hydraulic signaling generates signals through changes in turgor pressure, as proposed by Wilhelm Pfeffer and Gottlieb Haberlandt's hydromechanical transmission theory.³

When a plant receives a stimulus, it triggers an influx of positively charged ions, guided by Ca^{2+} and Cl^- ions. This depolarizes the cell, creating an action potential that generates an electrical

impulse. As the signal spreads, repolarization occurs through H^+/K^+ ATPase pumps. Interestingly, action potentials in plants are slower, have longer refractory periods, and are long-lasting. The generated impulse is transmitted through protoplasmic excitation,⁸ involving movement across protoplasts and plasmodesmata. This slower process allows plants to respond to environmental stimuli in a tailored way. Signals are transmitted to phloem tissue specifically sieve



<https://www.dnaindia.com/analysis/column-scientist-jagadish-chandra-bose-back-in-popular-currency-2691392>



Mimosa pudica – Leon Levy Native Plant Preserve

cells, for long distance transport. This is vital for plants with limited mobility, needing to coordinate responses across different parts.

In conclusion, plant signaling mechanisms are fascinating processes showcasing plant biology's complexity and adaptability. Discoveries by Jagadish Chandra Bose, who demonstrated the role of protoplasmic signaling in cell-mediated transmission, and Gottlieb Haberlandt, who showed that signal transmission occurs through phloem tissue in *Mimosa pudica*, have advanced our understanding. Staining methods reveal action potentials have the largest amplitude near phloem tissue, specifically sieve cells.

These findings highlight electrical signaling's importance and its role in physiological needs like hormone regulation, photosynthesis, and reproduction.¹² By exploring these mechanisms, we gain a deeper appreciation for plant biology and their ability to thrive.

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"The Intelligent Botanica: Understanding Plant Agency and Awareness"

By: Radhika Singhal, B.Sc. (H) Botany
(1st year)

Plants evolved over millions of years, starting from simple, single-celled organisms in the oceans. Over time, some of these early plants began to develop the ability to photosynthesize, turning sunlight into energy. As plants moved onto land, they faced new challenges, like drying out and standing upright. To cope, they developed roots to anchor themselves and absorb water, stems for support, and leaves to capture sunlight. Over time, they also evolved flowers and seeds to reproduce more efficiently. This gradual evolution helped plants thrive in a variety of environments, shaping the lush and diverse plant life we see today.

Plants have evolved impressive ways to sense and respond to their surroundings, displaying a type of intelligence that helps them survive. For example, plants can detect light and grow toward it through a process called phototropism. Studies on plants like *Arabidopsis thaliana* show that plants use special sensors to detect light direction and intensity, allowing them to maximize their energy for photosynthesis (Kozuka et al., 2010). Similarly, plants can sense gravity, causing their roots to grow downward and their stems to grow upward, ensuring they access water and light efficiently. These behaviors help plants make the best use of their environment to live.

Plants also communicate with each other, sometimes in surprising ways. A well-known example is the Mycorrhizal network, an underground system where fungi connect plant roots, allowing them to share nutrients and even information.

Research has shown that plants can pass nutrients like nitrogen and water to each other, especially in times of need (2003). When plants are under attack by herbivores, they release chemical signals called volatile organic compounds (VOCs) that warn neighboring plants. These nearby plants then activate their defenses, such as producing chemicals that make them less appealing to herbivores (Karban et al., 2000). This communication helps plants cooperate and protect one another.

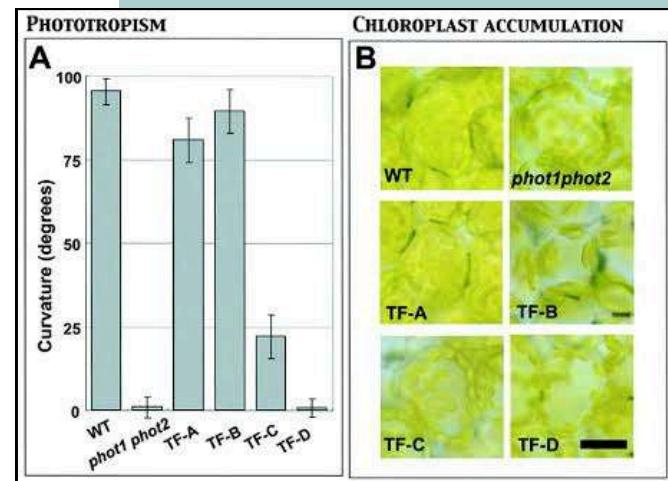
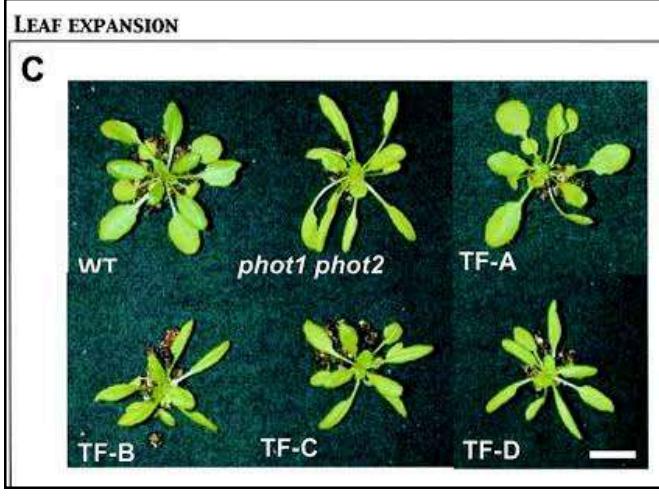


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[Image source: https://images.app.goo.gl/AAk6Q51Uz4YUuAXP7](https://images.app.goo.gl/AAk6Q51Uz4YUuAXP7)

Plants also show signs of memory and decision-making, which are important parts of intelligence. A study on the *Mimosa pudica*, a plant with leaves that fold when touched, found that if the plant is repeatedly disturbed in a harmless way, it stops responding over time. This ability to "learn" and conserve energy is called habituation, showing that plants can remember past events and adjust their reactions. This ability to adapt based on experience helps them save resources and avoid unnecessary responses, making them more efficient in their survival strategies.

Finally, plants are also capable of adapting to changing conditions, further showing their intelligent behavior. In a study on drought tolerance, researchers found that plants exposed to dry conditions developed deeper roots to find water more effectively. This ability to change behavior based on environmental stress demonstrates that plants can process information, make decisions, and act in ways that improve their survival. These studies reveal that while plants do not have brains, they possess a unique form of intelligence that helps them thrive in diverse and changing environments.



[Image source: https://images.app.goo.gl/boyMgvycdoN32jcA](https://images.app.goo.gl/boyMgvycdoN32jcA)

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Delicate Yet Dynamic: The Touch-Sensitive Mystery of *Mimosa pudica*

By: Ayushi Patel, B.Sc. (H) Botany
(1st year)

"Plants may lack brains, but they do not lack intelligence. They solve problems, communicate, and adapt in ways we are only beginning to understand."

– Stefano Mancuso

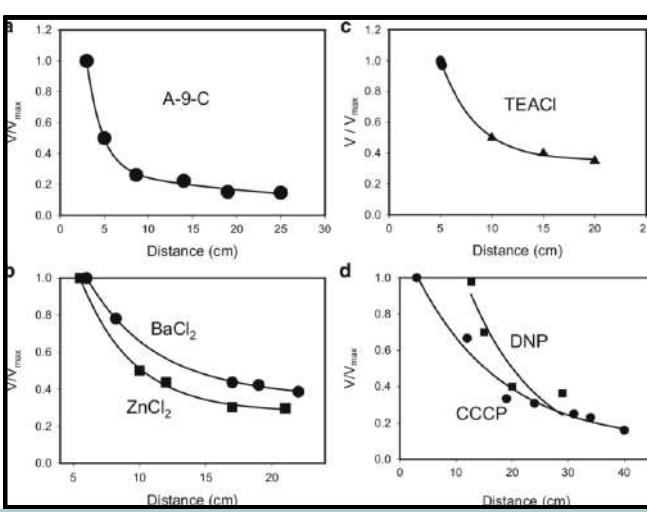
What if I told you a plant could 'feel' your touch and respond almost instantly? *Mimosa pudica*, also known as the sensitive plant, is a botanical enigma that blurs the lines between instinct and intelligence, showcasing nature's most fascinating defense mechanism.

Mimosa pudica, commonly known as the sensitive plant or touch-me-not, thrives in tropical and subtropical regions worldwide, particularly in South and Central America, its native range. It is commonly found in open and disturbed areas such as roadsides, grasslands, and waste grounds, as well as along riverbanks and forest edges where sunlight is abundant. This adaptable plant prefers light, sandy, or loamy soils that drain well and can even grow in nutrient-poor soils thanks to its nitrogen-fixing ability through symbiotic bacteria in its roots. *Mimosa pudica* flourishes in warm climates with temperatures ranging between 20–35°C and areas with moderate to high rainfall. However, it is sensitive to frost and cold conditions.

Mimosa pudica is a small, herbaceous plant that grows 15–50 cm tall with trailing, flexible stems. Its stems are covered with fine hairs and prickles for protection. The plant features bipinnate feathery leaves that fold inward when touched, a behavior facilitated by specialized swollen structures called pulvini at the leaf bases. One of the most remarkable features of this plant is its ability to respond rapidly to touch, a behavior known as thigmonasty. This is a type of non-directional movement triggered by mechanical stimuli, such as touch or vibration. Unlike other plants that may grow toward or away from a stimulus, *Mimosa pudica*'s response is not based on direction but on the intensity of the touch.



https://i0.wp.com/botany.one/wp-content/uploads/2019/08/Mimosa_pudica.jpg?ssl=1



https://www.researchgate.net/figure/Dependence-of-a-normalized-speed-V-V-max-of-mechanical-response-propagation-in-Mimosa-fig4_270572126

When its leaves are disturbed, they fold inward and the petiole droops, almost instantly.

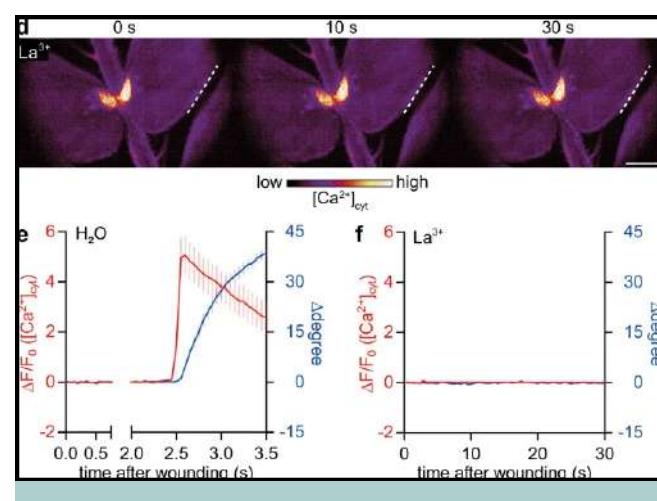
This swift reaction is governed by mechanosensitive cells at the base of the leaflets. When touched, these cells release calcium ions, which trigger an electrical signal that rapidly propagates throughout the plant. This leads to a dramatic loss of turgor pressure in the pulvini—specialized, swollen structures at the base of the leaves—causing the plant's cells to collapse and the leaves to fold. After a few minutes, the plant restores its turgor pressure by actively pumping ions back into the pulvini cells, allowing water to flow back in. This reverses the folding, and the leaves return to their original position.

This unique reaction helps the plant protect itself from potential threats, particularly herbivores. By folding its leaves and drooping its stems when touched, *Mimosa pudica* mimics the appearance of a damaged or dying plant, potentially deterring animals that may consider it a source of food. In addition to defense, the leaf movement also helps the plant reduce water loss in extreme conditions. In environments with strong winds or heavy rain, folding the leaves can minimize the impact of these elements, preventing mechanical damage and excessive water loss.

Ecologically, *Mimosa pudica* plays a vital role in its native habitats by contributing to soil health and supporting biodiversity. The plant is a nitrogen fixer, meaning it forms a symbiotic relationship with nitrogen-fixing bacteria in its roots, enriching the soil with nitrogen. This process improves soil fertility, benefiting other plants in the surrounding ecosystem. *Mimosa pudica* also supports various species of insects, which may use it as a habitat or a food source. The unique behavior of *Mimosa pudica* has inspired numerous innovations, particularly in biomimicry and robotics. Its rapid leaf movement has led to the development of smart materials and soft robots that mimic the plant's responsive abilities for delicate tasks like medical surgeries and environmental monitoring. Additionally, the plant's sensitivity to environmental stimuli has inspired adaptive sensors for monitoring changes in temperature, humidity, and pollution. In agriculture, its role in nitrogen fixation is being studied to improve soil fertility and pest control methods.

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Biofertilizers: A Sustainable Approach to Soil Health

By: Anushree Sharma, B.Sc. (H) Botany
(3rd year)

In today's world, rising human needs have increased the demand for food and shelter. These growing needs have led to the degradation of natural ecosystems and a decline in forest areas. Environmental challenges, combined with population growth, have highlighted the need for sustainable methods to address these issues. Agriculture has always been essential for ensuring food security. However, conventional farming practices, although effective in increasing crop yields, have caused harmful environmental effects such as soil erosion, water pollution, and climate change. In traditional farming, chemical fertilizers are the primary source of nutrients for the soil, helping to enhance food production quickly and efficiently. However, chemical fertilizers also contribute to environmental and health issues, including soil and food contamination with heavy metals and radioactive substances. Air pollution caused by gases like NO, NO₂, and N₂O, along with water pollution from nitrates and soil degradation due to pH and structure changes, are major concerns.

An environmentally friendly and sustainable solution to improve soil fertility and crop production is the use of biofertilizers. These are a viable alternative to chemical fertilizers. Biofertilizers are defined as substances that contain living microorganisms (such as bacteria, fungi, or algae) which, when applied to seeds, soil, or plant surfaces, colonize the rhizosphere or enter the plant itself and enhance growth by increasing nutrient availability. Biofertilizers commonly include beneficial bacteria like *Pseudomonas*, *Azospirillum*, *Bacillus*, and *Rhizobium*, among others. Some of these bacteria convert atmospheric nitrogen into forms that plants can use, reducing the dependence on synthetic nitrogen fertilizers. These bacteria typically form symbiotic associations with leguminous crops such as peas, soybeans, and pulses. *Rhizobium* is the most well-known symbiotic nitrogen-fixing bacteria. Other nitrogen-fixing bacteria like *Azotobacter*, *Azospirillum*, and cyanobacteria live freely in the soil and do not require a host plant. Microorganisms in biofertilizers, especially phosphate-solubilizing

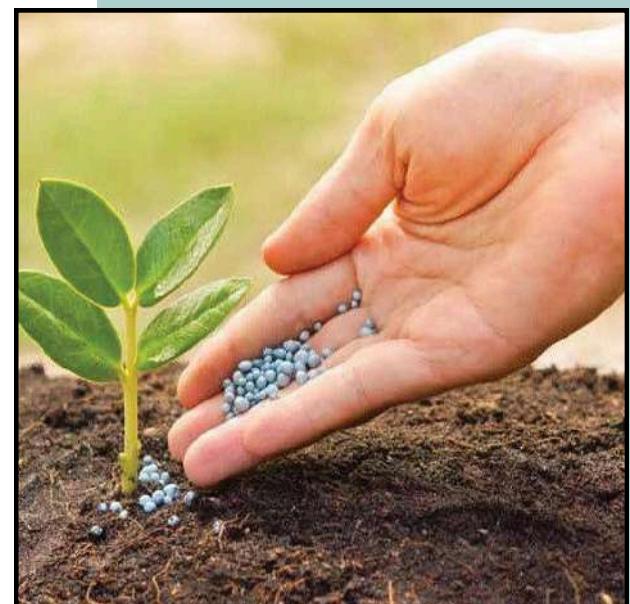
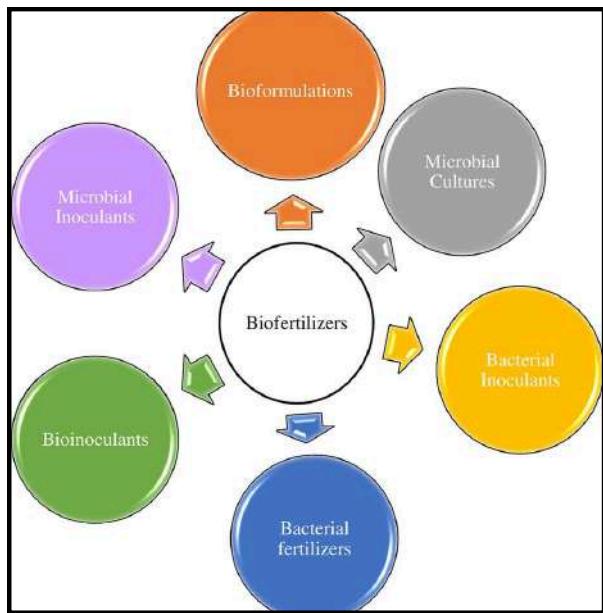


Image source:
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bacteria (PSB), are vital in making phosphorus more accessible to plants. These PSB secrete organic acids such as gluconic, oxalic, and lactic acids, which react with insoluble phosphorus in the soil.

Endophytic biofertilizers, derived from bacteria and fungi, offer a holistic approach to boosting agricultural productivity and sustainability. These microbes support plant growth through nitrogen fixation, the production of plant hormones, and enhanced tolerance to stress. Micronutrients like iron (Fe), copper (Cu), boron (B), zinc (Zn), chlorine (Cl), silicon (Si), cobalt (Co), and molybdenum (Mo) are crucial for healthy plant development. Iron uptake is facilitated by siderophores, low molecular weight compounds that bind to Fe^{3+} in the soil and

convert it into soluble forms that plants can absorb. Bacteria use various mechanisms to obtain iron, depending on their environment. Zinc deficiency is a common problem that causes symptoms like root necrosis and reduced plant growth. Zinc-solubilizing microorganisms (ZSB) act as biofertilizers by increasing the availability of zinc in the soil. These bacteria, found commonly in genera such as *Bacillus* and *Pseudomonas*, have proven effective in improving crop productivity by making zinc more plant-accessible.

Algae, including both eukaryotic species and prokaryotic cyanobacteria, are photosynthetic organisms with diverse structures and biochemical capabilities that support plant development. Research on algal biofertilizers has increased, especially focusing on cyanobacteria and microalgae as effective biofertilizers and soil enhancers. Microalgae are grouped into categories like Chlorophyta (green algae), Rhodophyta (red algae), Phaeophyta (brown algae), and Euglenophyta, among others. These microalgae act as biological factories, converting sunlight, carbon dioxide, and nutrients into compounds that improve soil and plant health. Blue-green algae (BGA) possess traits such as fast reproduction, high water retention, nitrogen fixation, and resilience to harsh conditions. Their presence in the soil enhances porosity, increases the secretion of growth-stimulating substances like amino acids, vitamins, and hormones (gibberellins and auxins), improves moisture retention, reduces soil salinity, controls weed growth, and enriches the soil after decomposition. BGA enrich soil nitrogen content, providing a low-cost nutrient source while enhancing fertility and productivity. The use of BGA in rice farming, a process known as algalization, promotes eco-friendly and energy-saving agricultural practices.

Fungi have also become essential components of biofertilizers, playing a major role in improving plant growth and soil health. Recent developments in fungal biofertilizer application on farmlands have shown positive effects on soil quality. Phosphorus-solubilizing fungi help release bound phosphorus in the soil, making it available to plants. These fungi improve crop yields through solubilization and mineralization of phosphorus. Using such fungi instead of traditional phosphorus fertilizers helps increase soil fertility, reduce water pollution, and decrease



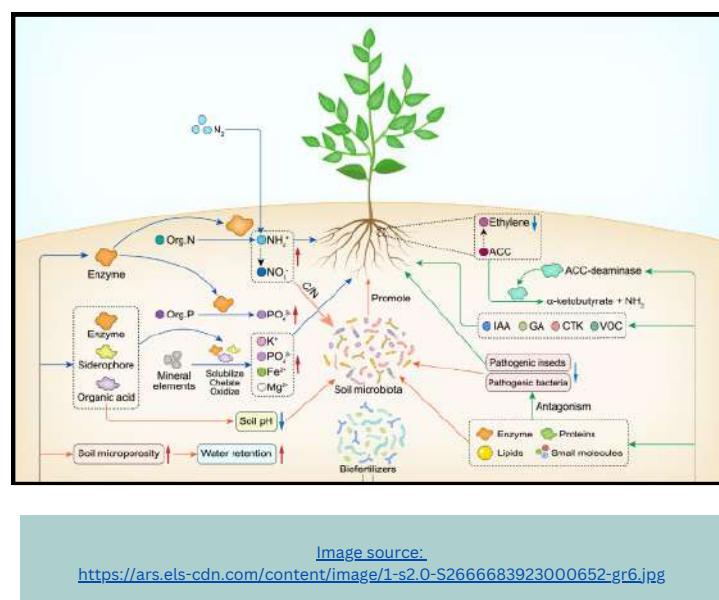
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the buildup of harmful waste. Mycorrhizal fungi form symbiotic relationships with plant roots, aiding in the uptake of nutrients like phosphorus, nitrogen, zinc, copper, iron, and sulfur. Many types of plants—including herbs, shrubs, and trees—develop mutualistic relationships with mycorrhizal fungi.

Conclusion

The future of biofertilizers in agriculture offers tremendous potential to bring about lasting changes. These eco-friendly solutions, powered by beneficial microbes, can help solve global challenges like environmental degradation, climate change, and the overuse of harmful chemical inputs. Biofertilizers are a game-changer for sustainable farming. By leveraging microbial processes, they enhance soil quality, improve crop yields, and reduce the need for chemical fertilizers. This supports environmentally responsible agriculture while promoting healthier, more resilient farming practices.

Their widespread success depends on better awareness among farmers, supportive policies, and continued research. Education on proper usage and benefits is essential, along with regulatory systems to ensure quality and effectiveness. Ongoing innovation and investment will lead to even more advanced and efficient biofertilizer products. With the right support and cooperation, biofertilizers can transform modern agriculture—ensuring food security, sustainability, and better livelihoods for farmers around the world.



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Do Plants Make Decisions? Insights from Behavioral Botany



By: Rashi Singh, B.Sc. (H) Botany
(3rd year)

For centuries, plants have been perceived as passive organisms, responding to environmental conditions without exhibiting the complexity of decision-making. However, recent research in behavioral botany challenges this notion, revealing that plants actively assess their surroundings and adjust their growth and development accordingly. This article explores how plants make strategic choices regarding resource allocation, competition, defense, and survival.

Decision-Making in Plants: A Rooted Perspective

Unlike animals, plants lack a central nervous system, yet they display sophisticated behaviors that suggest an ability to make decisions.

Decision-making in plants can be defined as a process where they evaluate multiple environmental cues and respond with the most adaptive course of action. Recent research suggests that plants engage in complex information processing akin to bacterial decision-making systems (Calvo & Friston, 2023). The ability to integrate signals from their environment and choose optimal responses reflects a rudimentary yet functional form of cognition.

Motor Cognition in Climbing Plants

A recent study on *Pisum sativum* (pea plants) demonstrated that climbing plants exhibit goal-directed behavior by detecting and grasping supports based on their thickness and stability. This suggests that plants can assess environmental cues and modify their motor actions accordingly (Baluska et al., 2023). Such findings challenge the traditional notion of plant behavior as purely reactive, highlighting their ability to make strategic decisions in response to changing environmental conditions.

Shade Avoidance: Prioritizing Light Over Energy Conservation

One of the most well-documented examples of plant decision-making is the shade avoidance response. When plants detect a reduction in the red-to-far-red light ratio—an indication of potential shading by neighbors—they accelerate stem elongation to outgrow competitors.



<https://gobotany.nativeplanttrust.org/species/pisum/sativum/>



<https://www.britannica.com/plant/dodder>

However, this response is a trade-off; excessive elongation can weaken structural integrity and reduce investment in root growth. Studies have shown that *Arabidopsis thaliana* modulates this response through phytochrome-mediated signaling, optimizing its growth strategy (Casal, 2013).

Kin Recognition: Cooperation Among Relatives

Plants can recognize and modify their behavior depending on the identity of neighboring plants. Studies on *Impatiens pallida* have demonstrated that when grown alongside kin, plants reduce competitive root growth, allocating more resources to shoot development. In contrast, when surrounded by non-relatives, they increase root competition (Murphy & Dudley, 2009). This kin recognition suggests that plants can differentiate between self, kin, and strangers, adjusting their growth accordingly to optimize survival.

Dodder's Host Selection: A Parasitic Plant's Strategic Choice

The parasitic plant *Cuscuta* (dodder) does not photosynthesize and relies on host plants for nutrients. Remarkably, dodder seedlings can assess potential host plants and selectively attach to the most nutritious ones. Experiments show that dodder exhibits preference based on volatile organic compounds emitted by plants, choosing hosts with higher nitrogen content and growth potential (Runyon et al., 2006). This selection process implies an active evaluation of options before commitment.

Root Communication: Avoiding Competition

Root systems of plants engage in complex belowground communication to regulate competition. For instance, *Arabidopsis* plants exhibit avoidance behavior by directing root growth away from neighboring roots, reducing competition for water and nutrients. This response is mediated by root-secreted signaling molecules that allow plants to sense and respond to the presence of others (Falik et al., 2005). This form of decision-making prevents overcrowding and maximizes resource acquisition.

Memory and Learning: Do Plants Remember?

Emerging evidence suggests that plants can "remember" past experiences and adjust their future responses accordingly. In *Mimosa pudica*, a plant known for its rapid leaf-folding in response to touch, researchers found that after repeated non-harmful stimuli, the plant stopped responding, indicating a form of learned behavior (Gagliano et al., 2014). Even more remarkably, this learned response persisted for weeks, suggesting an ability to retain and recall information—an essential component of decision-making. A recent study (Calvo & Friston, 2024) discusses how plants engage in goal-oriented behaviors, learning, and memory through complex information processing systems. The authors argue that plants demonstrate cognitive-like abilities by utilizing intricate signaling mechanisms to adaptively process environmental information.



<https://www.discovermagazine.com/planet-earth/is-plant-communication-a-real-thing>

This further supports the idea that plants are not merely reactive entities but active participants in decision-making processes. The study of plant decision-making challenges traditional views of intelligence and cognition. If plants can assess situations, weigh trade-offs, and adjust their behavior dynamically, this necessitates a reevaluation of how we define intelligence in biological systems. Understanding these mechanisms could also have practical applications in agriculture, forestry, and ecological conservation.

As research in behavioral botany advances, it is becoming clear that plants are not merely passive organisms but active participants in their ecosystems. The ability to make decisions, albeit without a brain, highlights the remarkable adaptability and agency of the plant kingdom. The question is no longer whether plants can make decisions—but rather, how far their capabilities extend.



<https://www.gardenia.net/plant/mimosa-pudica-sensitive-plant-grow-care-guide>

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Emotions: From a perspective of plant kept on your study table



By: Juhi Chobey, B.Sc. (H) Botany
(3rd year)

In going through the rollercoaster ride of human emotions, we sometimes forget the emotional existence of other living creatures. Plants are specially one of those living creatures and are seen as immovable objects with no feelings and emotions. However, research from some time now suggests that plants actually do possess the ability to experience emotions but in a distinctive and interesting way.

In this article, we will discuss the emotional lives of plants, their experiences, perceptions, and reactions to their surroundings. We will also discuss the implications of plant emotions on our knowledge of the natural world and our relationship with the plants that surround us.

The Emotional Lives of Plants

Plants are living, dynamic beings that react to the environment in complex and multifaceted manners. They have a special kind of intelligence known as "plant neurobiology." This kind of intelligence allows plants to:

- Sense their environment via sensory organs
- React to stimuli via hormonal signals
- Adjust to changes in the environment via epigenetic changes

Although plants lack a central nervous system or brain, they can sense emotions in their own manner. These emotions tend to be based on their basic drives, including:

- The requirement for light, water, and nutrients
- The drive to reproduce and scatter seeds
- The need to react to environmental threats and stressors

Plant Emotions: A Spectrum of Experience

Similar to humans, plants feel a variety of emotions, ranging from positive to negative. These include:

- Joy and contentment: Plants show signs of joy and contentment when they are given sufficient light, water, and nutrients. They react by growing, flourishing, and reproducing.



<https://nchschant.com/18523/showcase/surprising-benefits-of-household-plants-around-the-house/>



Anxiety and fear: Plants are capable of feeling anxiety and fear when they are subjected to environmental stresses, e.g., drought, high or low temperature, or predators. They react by triggering defense systems, e.g., emitting chemical signals or changing growth habits.

Loss and sadness: Plants can feel loss and sadness when they are removed from their supportive environmental systems, e.g., transplanting or being taken away from their native environment.

The Implications of Plant Emotions

The discovery of the emotional lives of plants has far-reaching implications for how we understand the natural world and how we interact with plants. Here are some of them:

Reassessing our relationship with plants: Through an understanding of the emotional lives of plants, we are nudged to embrace a more respectful and empathetic approach to caring for and managing plants.

Rethinking plant intelligence: Plant emotions force us to rethink our conventional understanding of plant intelligence, revealing the complexity and sophistication of plant behavior.

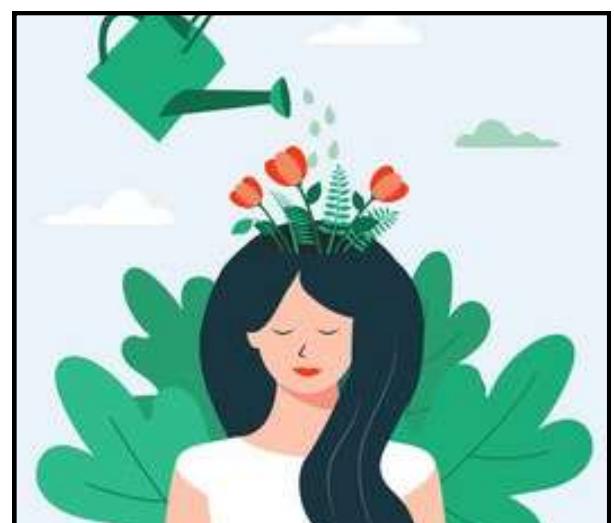
Exploring plant-human connections: The emotional lives of plants encourage us to explore the deeper human connections with plants, such as the emotional, spiritual, and ecological connections that bind us.

As we delve into the emotional lives of plants, we are reminded of the complex web of connections that links us to nature. Through acknowledging the feelings and experiences of plants, we are able to deepen our appreciation of the richness and beauty of life on our planet.

Ultimately, the emotional existence of plants teaches us to have a more expansive and empathetic relationship with nature. As we nurture our gardens, forests, and ecosystems, we are not merely tending to plants – we are sustaining the very weave of life.

The feelings from a plant's eye is really a new outlook to the human world. Even after all the resources offered by the plants, humans have only utilized them and when it came to be detrimental the conservation started. Conservation of plants is done because they give us the resources and not because we love them or because we feel that injuring every other aspect of nature is wrong.

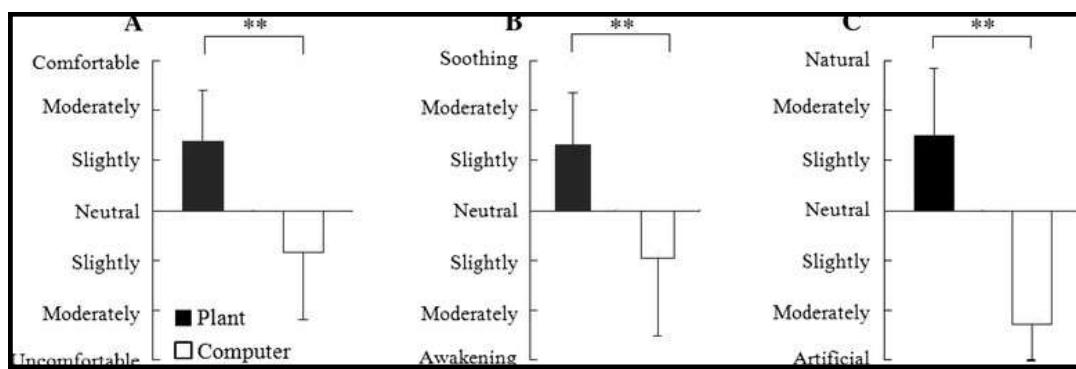
This is the mindset we must alter, we live in a world where we are not even empathetic with our own kind, and this must be changed in order to save our world and to save ourselves.



<https://www.shutterstock.com/image-vector/psychology-mental-health-concept-flowers-plants-1986784487>

We must consider the plants as our friends, as our family. We must take care of them the same way we take care of our pets, we must love them the same way we love ourselves. The emotional bond with the plants must be established.

At the end I ask you all to remember the plants in your garden when you are busy and forget to water them, remember them when you are unable to go to your garden for two days, and bear in mind that the plants in your garden care for you and you should care for them too. This way we can both attain sustainability and forgotten humanity.



<https://doi.org/10.1186/s40101-015-0060-8>

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The Silent Resilience: Natural Adaptation of plants to Environmental Changes

By: Dhiseka Pawaiya, B.Sc. (H) Botany
(3rd year)

In the constantly evolving nature, plants perform an act of survival. They do not hasten away from predators and seek shelter from storms, instead possess a profound ability: the power to adapt. Rooted at a place, they have developed intricate strategies to endure, evolve, and even thrive amid changing environments.

Evolution in Green

Plant adaptation is a legacy of evolution extending its roots over a million of years. From the redwoods rainforests to the deserts, they have evolved a suite of traits tailored to their habitats. These adaptations are not random instead are responses to environmental stresses such as temperature, moisture, sunlight, soil conditions, water availability, etc.

Genetic Flexibility

These adaptations as a response to external stresses are stimulated genetic flexibility. Any organism has a capability to modify its genetic structure to survive according to the changing environment. For instance, when exposed to drought, many plants ramp up the production of abscisic acid, a hormone that triggers stomatal closure to reduce water loss. Some plants even alter their root architecture to seek out scarce water or nutrients more efficiently. Scientists have discovered that certain genes can be "turned on" or "off" depending on external stress. This epigenetic regulation allows plants to quickly respond to challenges without waiting for long-term evolutionary changes.

Phenotypic Plasticity

phenotypic plasticity refers to the observation that a given genotype expresses different phenotypes in different ecological settings. At its most basic level, the concept applies to any differences in trait means between environments.



<https://biodiversityrevolution.wordpress.com/2016/04/26/plant-adaptation-under-a-changing-climate/>



<https://news.climate.columbia.edu/2022/01/27/how-climate-change-will-affect-plants/>

A common example is how a plant might grow broader leaves in the shade to capture more sunlight or develop thicker leaves in direct sun to reduce water loss. This plasticity is vital for survival in unpredictable climates. It gives plants a flexible game plan, allowing them to make real time adjustments without any need to change their genetic code.

Mutualism and Symbiosis

Plants never adapt in isolation. They often form relationships with other organisms to enhance survival. Mycorrhizal fungi, for instance, form symbiotic relationships with plant roots, extending the plant's ability to absorb water and nutrients. In turn, the plant provides the fungus with its food produced through photosynthesis. Such partnerships enhance resilience to stressors like poor soil conditions or drought.

Dormancy and Deciduousness

In environments with extreme seasons, some plants often go in dormancy. Trees in temperate zones shed their leaves in autumn to conserve energy and prevent water loss during winters. Bulbs and tubers lie dormant underground during unfavorable conditions, springing to life when the climate improves.

A Lesson in Resilience

As climate change accelerates and ecosystems face unprecedented pressures, understanding how plants naturally adapt is more crucial than ever. Their silent resilience offers not only insights into survival strategies but also inspires innovation in fields like agriculture, conservation, and biotechnology. Modern researchers are harnessing this knowledge to breed climate resilient crops and develop sustainable farming practices.

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SEGMENT

FINAL



Biohacking with Plants: Harnessing Nature's Genius



Biohacking with Plants: Harnessing Nature's Genius



By: Somya
(Co-editor, ANTHESIS)

As humanity faces the accelerating impacts of climate change, pollution, and resource depletion, the drive for sustainable solutions becomes increasingly urgent. Biohacking with plants is a promising avenue in which researchers delve into plant behaviors, responses, and structures to inspire new technologies. The fundamental concept behind biohacking plants is the idea of *The Conscious Flora*—plants possess intrinsic intelligence, a form of environmental awareness, and an adaptive ability to optimize their survival. This explores how the brilliance of Conscious flora can inspire cutting-edge solutions to global challenges.

Self-Healing Materials Inspired by Plant Tissues

Plants exhibit an extraordinary ability to heal themselves after injury, ensuring their survival in dynamic and often hostile environments. When a plant is wounded, it triggers a complex set of biochemical responses. These include the activation of phytohormones like auxins, which coordinate cellular growth, and jasmonic acid, which signals the defense response. Concurrently, structural components such as lignin and cellulose are synthesized to rebuild the plant's tissues and form protective barriers to ward off pathogens.

Inspired by this, researchers at the University of Colorado Boulder developed a self-healing material inspired by *Delosperma cooperi*, a succulent known for its natural wound-sealing ability. This polymer can autonomously repair cuts and tears, making it ideal for applications like soft robotics and wearable electronics.

Air and Water Purification via Phytoremediation Systems

Plants naturally purify their environment through phytoremediation and transpiration, processes that remove toxins from air and water. Their capacity to sense pollutants and activate detoxifying responses demonstrates environmental intelligence. A notable initiative by the University of Sheffield in London introduced vertical gardens in urban spaces. These living walls absorb pollutants like particulate



Succulent plant *Delosperma cooperi* (left) and a leaf showing a healed injury (right)

Image source:
[https://www.cell.com/chem/fulltext/S2451-9294\(18\)30234-1](https://www.cell.com/chem/fulltext/S2451-9294(18)30234-1)

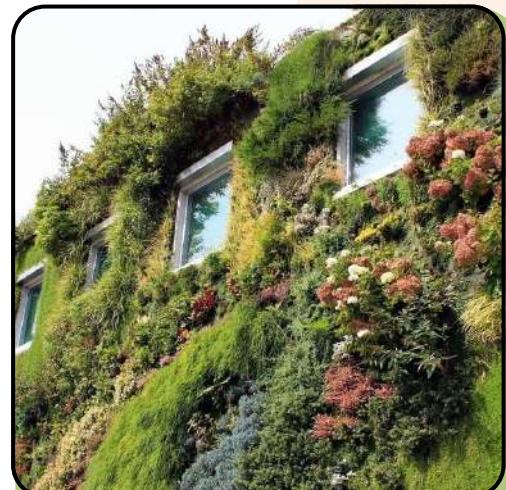


Image source:
https://citygreen.com/wp-content/uploads/2022/04/9847071103_d39660944e_b.jpg

matter and volatile organic compounds, reducing airborne toxins by up to 30%. Equipped with sensors, they also allow real-time monitoring of air quality improvements. Such systems not only combat pollution but also promote urban biodiversity and aesthetic enhancement.

Biometric Structures Inspired by Plant Architecture

Plants like bamboo and sunflowers exhibit structural efficiency. Bamboo's lightweight yet strong framework and the Fibonacci-based spiral of sunflower seeds reflect nature's engineering brilliance. At ETH Zurich, researchers studied bamboo's structure to create modular housing materials. Lightweight and durable, these materials are ideal for disaster-prone regions and are easy to transport and assemble. By embracing plant-inspired design, architects and engineers can build more sustainable, resilient structures with lower material use.



Image source:

<https://s.muz.li/go/?link=https://www.designboom.com/architecture/eth-zurich-digital-fabrication-bamboo-pavilion-02-06-2021/>

Sustainable Energy Generation through Biohybrid Solar Cells

Photosynthesis—plants' method of converting sunlight into chemical energy—is among nature's most efficient energy systems. Researchers aim to replicate this process to create renewable energy solutions. At Cambridge University, scientists integrated photosynthetic proteins from spinach into biohybrid solar cells. These cells improve light absorption and energy conversion, offering clean energy options for remote or off-grid locations. By mimicking nature's energy strategy, biohybrid cells may reduce reliance on fossil fuels and pave the way for sustainable power systems. These solar solutions offer greener alternatives to silicon-based systems and hold promise for portable, wearable, and off-grid power generation.

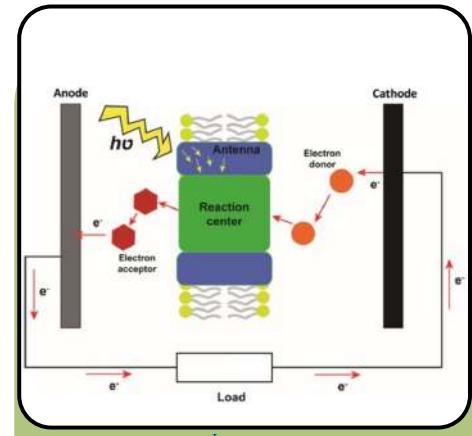


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Responsive Robotics Using Plant Tropisms

Plants respond dynamically to environmental stimuli. Tropisms: like phototropism (light response), gravitropism (gravity sensing), and thigmotropism (touch sensitivity) enable them to grow and orient themselves for optimal survival.

The FiloBot, developed by researchers at the Italian Institute of Technology, is a plant-inspired robot that mimics climbing plants by responding to light and gravity. Using 3D-printing technology, it grows like a plant root and wraps around supports, just as vines do in nature. This allows it to navigate complex, unstructured environments—ideal for tasks like search and rescue where wheeled robots struggle. In a parallel breakthrough, engineers at EPFL (École Polytechnique Fédérale de Lausanne) designed a thigmotropic robot that responds to touch like a *Mimosa* plant. It curls or unfolds based on environmental contact, mimicking plant-like adaptability and sensitivity.



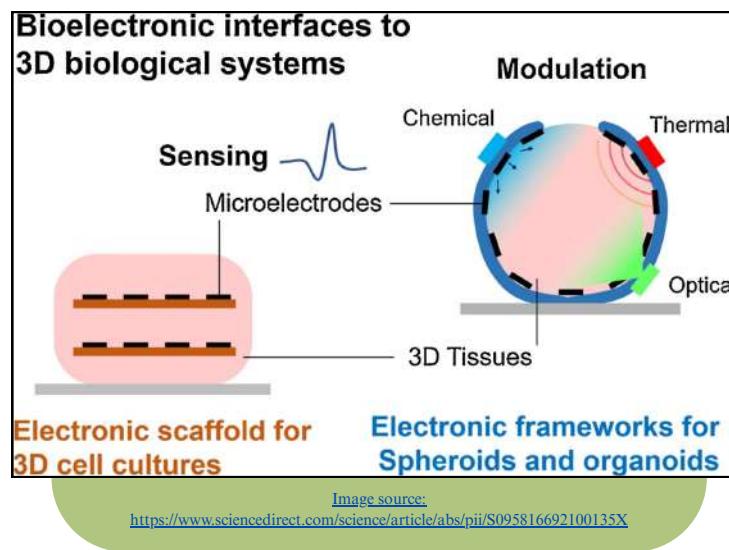
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<https://www.nature.com/articles/d43978-024-00015-4>

Information Processing in Plants & Bioelectronic Interfaces

While plants lack a nervous system, they still transmit electrical signals via phloem and respond to external stimuli in complex ways. Researchers now explore how these bioelectrical networks can be used in plant-based sensors and computing interfaces.

At MIT Media Lab, scientists have embedded electrodes into plant leaves to detect pollutants or changes in humidity, turning plants into living environmental sensors. Similarly, Swedish researchers developed electronic circuits that grow inside plants using polymer-based conductive materials—laying the foundation for biohybrid systems that integrate biological and digital components. This fusion may one day allow real-time communication with plant systems, leading to breakthroughs in agriculture, urban planning, and even wearable tech.



Biohacking with plants invites us to rethink the boundaries of intelligence, design, and sustainability. Whether it's mimicking the self-healing power of tree bark, the energy-harvesting ability of a leaf, or the structural genius of bamboo, nature offers elegant solutions to human problems. As we face mounting environmental challenges, turning to Conscious Flora not only offers technological inspiration—it fosters a deeper alignment with the ecosystems we depend on. By embracing the lessons encoded in plant biology, we unlock pathways toward a greener, smarter, and more resilient future.

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WHAT'S NEW IN BOTANY?

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Plants' Impact on the Human Brain—Exploring the Neuroprotective and Neurotoxic Potential of Plants

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PLANTS IN PERIL

SEGMENT 2

This segment explores the link between plants and natural disasters, focusing on their adaptability and resilience. It highlights how plants recover from wildfires and act as barriers against further damage.



NATURE'S STRUGGLE WITH DISASTERS



The Invasive Species Crisis: How Non-Native Plants are Choking Out Native Species in India

By: Jahanvi Khokhar, B.Sc. (H) Botany
(3rd year)

What are Invasive Species?

An invasive species is an introduced species that harms its new environment. Invasive species cause ecological, environmental, and/or financial harm by negatively influencing habitats and bioregions. The phrase can also refer to native species that, as a result of human changes to their food chain, become detrimental to their natural habitat. Invasive species have grown to be major global environmental, social, and economic hazards during the 20th century.

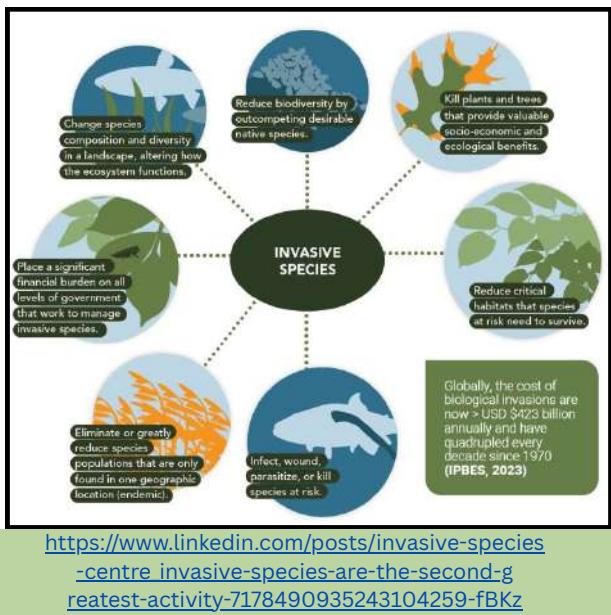
Indian Biodiversity and Invasive species:

India is home to a rich tapestry of biodiversity because of its varied environments, which include alpine meadows and tropical rainforest. However, invasive plant species pose a serious and expanding threat to this thriving ecosystem. Intentionally or unintentionally introduced, these non-native plants are outcompeting local flora, spreading quickly, and having detrimental effects on the environment, the economy, and society. This article examines India's invasive species problem, how it affects indigenous biodiversity, and how urgently effective management measures are needed.

When foreign species are purposefully or inadvertently brought outside of their natural habitats into new places where they exhibit the ability to establish, invade, and outcompete native species, they can become invasive. According to the International Union for Conservation of Nature and Natural Resources (IUCN), an alien invasive species is one that establishes itself in a natural or seminatural habitat, causes change, and endangers the biological diversity of the host species. These invasive species are found worldwide in a wide range of environments and encompass all types of living things. However, insects, plants, and mammals make up the majority of prevalent forms of alien organisms that are invasive in



<https://www.fairfaxcounty.gov/publicworks/invasive-species/alternative-plants>



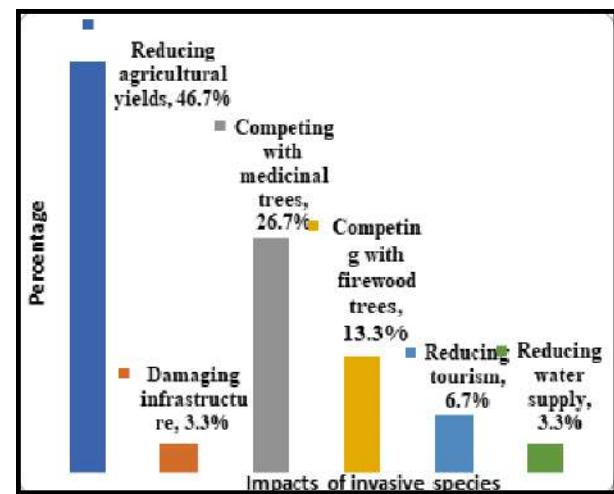
https://www.linkedin.com/posts/invasive-species-centre_invasive-species-are-the-second-greatest-activity-7178490935243104259-fBKz

terrestrial settings. The degradation of habitat is thought to be the biggest threat to biodiversity, followed by invading alien species. Encroaching species lead to changes in hydrology and ecosystem function, as well as extinctions of species and a reduction in biodiversity. Soil structure, profile, decomposition, nutrient content, moisture availability, and other factors may alter as a result of the requirements and modes of resource acquisition and consumption of native and invasive plant species differing. Because they have major negative effects on the products and services that ecosystems provide, invasive species pose a serious threat to biodiversity conservation and sustainable use.

Non-Native nightmare of India:

Several invasive plant species have profoundly impacted India's ecosystems. *Lantana camara*, introduced as an ornamental plant, has spread across India, from forests to agricultural lands. It forms impenetrable thickets, suppressing native vegetation and making areas inaccessible for humans and wildlife. *Parthenium hysterophorus*, known as Congress grass, is a fast-growing weed that has invaded agricultural fields, grazing lands, and urban areas. Its toxic chemicals harm native plants, livestock, and human health. The water hyacinth, often termed the "blue devil," has clogged water bodies across India. It reduces oxygen levels in water, leading to the death of aquatic life and affecting livelihoods dependent on fishing. Initially introduced for afforestation and to combat desertification, *Prosopis juliflora* now dominates dryland ecosystems. Its thorny thickets hinder human and animal movement, while its deep roots deplete groundwater resources. Approximately 25% of the alien species that make up India's flora are invasive (Kavita Gupta; National Bureau of Plant genetic resources. The Central Institute of Medicinal and Aromatic Plants' R. R. Rao and R. Murugan talked about the diversity of Indian flora and gave a list of the main preventive weeds, which included Asteraceae weeds like *Galinsoga parviflora*, *Ageratum conyzoides*, *Mikania micrantha*, *Eupatorium adenophorum*, *Eupatorium odoratum*, etc.

The exotic tropical American species *Parthenium hysterophorus* L., which was first discovered in India in 1951 in Maharashtra, has naturalized most of India due to its strong invasive potential. It is an aggressive colonizer of degraded areas with poor ground cover and exposed soil, such as roadsides, fallow wastelands, and overgrazed pastures. It typically does not establish itself in areas with undisturbed vegetation or in vigorous pastures, and there is a marked inverse relationship between the density of native weeds and the amount of plant cover. *Lantana camara*, a native of tropical and subtropical America and one among the top 10 weeds in the world, was the subject of three presentations. Between AD 1809 and 1810, the species was



https://www.researchgate.net/figure/Negative-impacts-of-invasive-species-on-local-communities-Source-Makhambera-and-Shah-fig2_332672545

Alien Invasion in Central India:

The vast tropical deciduous forests of Central India, which mostly consists of the three states of Madhya Pradesh, Chhattisgarh, and certain areas of Maharashtra, are well-known for their resilience to modern stresses such plant invasion. Alien invasive plants can enter new environments by a variety of routes and have special characteristics that enable them to overcome obstacles there, where a variety of causes may be at play. Once established, they could have a significant effect on the ecosystem that was invaded. Relatively few research have addressed plant invasion; the majority of Central Indian studies have concentrated on floristics, forest structure, the effects of disturbances, etc. The Asteraceae (17.3%) and Fabaceae (14.5%) groups comprise the majority of Central India's 179 invasive taxa. The most are herbs (69%), and the majority originate from Tropical America (52%).

Conclusion

Managing invasive plant species in India requires a multi-pronged approach involving prevention, control, and restoration. Prevention involves strengthening quarantine measures to prevent the introduction of new invasive species and raising public awareness about the dangers of invasive plants. Developing monitoring systems to identify and address invasions at an early stage and encouraging community participation in reporting invasive species outbreaks are crucial for early detection and rapid response. Control measures include mechanical removal, such as cutting, uprooting, or mowing invasive plants, biological control by introducing natural predators or pathogens, and chemical control using herbicides, though with caution to avoid environmental harm. Restoration efforts focus on reintroducing native species and improving habitat conditions to promote natural regeneration. Engaging local communities in restoration efforts ensures sustainable outcomes.

The invasive species crisis in India represents a serious threat to the country's ecological balance, biodiversity, and socio-economic well-being. Addressing this challenge requires immediate and sustained action at multiple levels. By preventing new introductions, managing existing invasions, and restoring native ecosystems, India can protect its unique natural heritage for future generations. The fight against invasive species is not just an ecological imperative but a shared responsibility to safeguard the nation's environmental and economic future.

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Rooted in Fire

**By: Asmita Banik, B.Sc. (H) Microbiology
(3rd year)**

The air smelled smoky, and the forest was gone, replaced by ash and silence. But amidst the wreckage, one tree stood tall: the Eucalyptus. Its bark was burnt, and its leaves were singed, but it didn't look defeated. It almost looked... proud? As if to say, "Fire? Been there, done that." But one couldn't help but wonder—was this tree a hero, or had it been part of the destruction all along?

Eucalyptus trees, originally from Australia, are like that one friend who moves to a new city and suddenly takes over. They've spread to California, India, and Africa, thanks to the humans planting them for their fast growth and benefits. These trees grow like crazy, shooting up to 60-100 feet tall in just a few years. People loved them because they provided timber, fuel, and essential oils that could soothe coughs or keep mosquitoes away.

Now, here's the weird part: Eucalyptus trees like fire. They're not just flammable—they're practically like fire enthusiasts. Their leaves have oils that make them smell nice but also make them burn like crazy. And their bark? It peels off and piles up around the base of the tree, creating a perfect little bonfire setup. When a fire starts, the oils in the leaves vaporize, and BOOM—the fire spreads faster. But here's the kick: Eucalyptus trees actually benefit from this. Fires crack open their seed pods, scattering the seeds into the nutrient-rich ash. So, while the other plants are toast, eucalyptus trees are already planning their comeback.

In Australia, this works fine because the ecosystem is used to it. But in California, where Eucalyptus groves are thick and unmanaged, it's a disaster waiting to happen—like the Oakland Hills fire in 1991, which was made worse by eucalyptus trees. In India, Eucalyptus trees were introduced for reforestation and their wood and oil. They grow quickly and survive in tough conditions. But here's the problem: Eucalyptus trees are thirsty. Their deep roots suck up a lot of groundwater, leaving the soil dry and other plants struggling.



Image source:
https://en.m.wikipedia.org/wiki/Eucalyptus#/media/File%3ATasmania_logging_08_Mighty_tree.jpg



Image source
https://en.m.wikipedia.org/wiki/File:Eucalyptus_tetragona_-glaucous_leaves_close.jpg

Plus, Eucalyptus has this sneaky little trick up in its sleeve. It releases chemicals into the soil that basically tell other plants, “Nope, you’re not growing here.” This clever move is called allelopathy, and while it’s advantageous for eucalyptus (fewer competitors, more resources for itself), it’s pretty bad news for biodiversity. Farmers also complained that eucalyptus plantations can lower crop yields.

The oils in Eucalyptus leaves are full of terpenes—compounds that are highly flammable. These terpenes are why Eucalyptus leaves burn so easily. Interestingly, these oils have medicinal uses. Eucalyptus oil contains eucalyptol, which is used in cough syrups, mouthwashes, and even as an insect repellent. So, while the oils can fuel fires, they also have therapeutic benefits.

So, are Eucalyptus trees saviors or invaders? Well the answer isn’t so simple.

Eucalyptus trees are survivors, no doubt. But let’s be real—survival isn’t always pretty. They’re a bit of a paradox, healing and harming, protecting and sometimes chaotic. Their resilience? It’s both their superpower and also their Achilles’ heel.

The trick is to find a sweet spot. In wildfire-prone areas, thinning out eucalyptus groves and cleaning up all that flammable bark and leaves could really help. And in dry regions where water is a big deal, maybe planting fewer Eucalyptus trees—or swapping them for native plants that play nicer with the environment—could make a difference. Love them or hate them, you’ve got to give it to Eucalyptus trees—they’re tough as nails. They’ve figured out how to not just survive but thrive, even in rough conditions. Heck, they even use fire to their advantage. But all that toughness? It sometimes comes at a cost, especially when they start messing with the local ecosystem.

Next time you walk past a Eucalyptus tree, take a second to think about it. It’s not just another tree—it’s a living reminder of how clever and tough nature can be. Maybe there’s a lesson in there for us too: to be resilient like the Eucalyptus, but also be mindful of the footprints (or root prints?) we leave behind.

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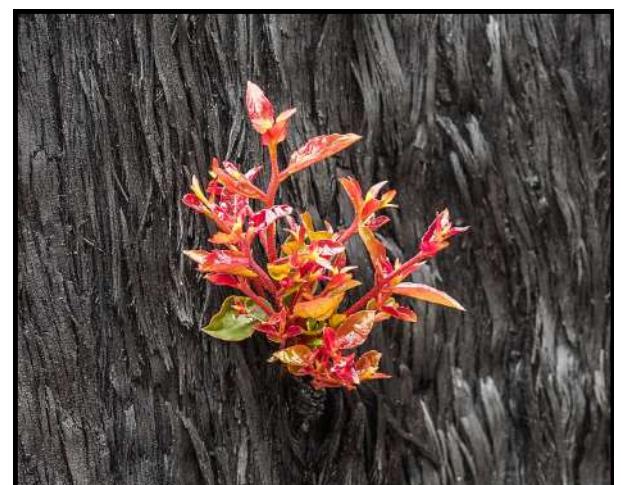


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Oil Spills and Their Effects on Coastal Vegetation

By: Plavita, B.Sc. (H) Botany

(1st year)

Oil spills are among the most damaging environmental disasters, leaving long-lasting effects on ecosystems worldwide. Coastal vegetation, such as mangroves, salt marshes, and seagrasses, often bears the brunt of these spills. These habitats play a crucial role in maintaining ecological balance, acting as carbon sinks, protecting shorelines from erosion, and supporting biodiversity. However, exposure to crude oil and its derivatives disrupts their functioning and survival, causing profound ecological consequences.

When oil coats the surface of coastal vegetation, it creates a physical barrier that interferes with essential physiological processes. For instance, mangroves rely on aerial roots, known as pneumatophores, for gas exchange. Oil smothering these structures prevents oxygen uptake, leading to hypoxia and eventual plant death. Similarly, in salt marshes and seagrasses, oil reduces the ability of plants to photosynthesize by obstructing sunlight and damaging leaf surfaces.

Oil toxicity compounds these physical impacts. Hydrocarbons in crude oil are highly toxic to plant tissues. They infiltrate the soil, contaminating root systems and altering soil chemistry. This leads to nutrient imbalances, reduced water uptake, and a build-up of harmful substances like sulphides. Over time, these changes degrade plant health, inhibit growth, and cause widespread die-offs in affected areas.

The loss of coastal vegetation due to oil spills has cascading effects on ecosystems. Mangroves, for example, provide critical habitats for marine and terrestrial species, including fish, crustaceans, and birds. When these plants die, the associated fauna lose their homes and food sources, disrupting food webs. In salt marshes, vegetation loss accelerates shoreline erosion, leaving coastal communities more vulnerable to storms and rising sea levels.



<https://www.itopf.org/knowledge-resources/library/image-library/oiled-mangrove/>



Image source
<https://eos.org/research-spotlights/oil-residues-accelerate-coastal-wetland-losses>

The persistence of oil in the environment exacerbates these challenges. Unlike open waters, where oil may dissipate more quickly, the sheltered nature of coastal zones allows oil to linger in sediments for years. This prolongs the recovery period for vegetation, as new plants struggle to establish themselves in contaminated soils. Some studies suggest that even decades after a spill, traces of oil can still be found in coastal sediments, hindering full ecosystem recovery.

Case Studies

Historical oil spills highlight the devastating impact on coastal vegetation. The 2010 Deepwater Horizon spill in the Gulf of Mexico, one of the largest in history, severely affected salt marshes along the Louisiana coastline.

Research indicated widespread die-off of marsh grasses, with recovery efforts still ongoing more than a decade later. Similarly, the 1989 Exxon Valdez spill in Alaska caused extensive damage to coastal ecosystems, with lingering oil residues continuing to affect plant and animal populations decades later.

Mitigation and Restoration Efforts

Efforts to mitigate the effects of oil spills on coastal vegetation focus on both prevention and restoration. Preventative measures include stricter regulations on oil transportation, improved spill response technologies, and the use of double-hulled tankers to reduce the likelihood of accidents.

When spills occur, rapid response is critical to minimize damage. Techniques such as mechanical removal, bioremediation, and chemical dispersants are employed to clean affected areas. However, these methods have limitations. For example, dispersants may themselves harm coastal vegetation, raising questions about their widespread use.

Restoration efforts for damaged vegetation involve replanting native species, improving soil quality, and monitoring ecosystem recovery. In some cases, introducing bioengineered plants with higher tolerance to contaminated soils has shown promise. However, restoring coastal vegetation is a slow process, requiring careful planning and significant resources.

The Way Forward

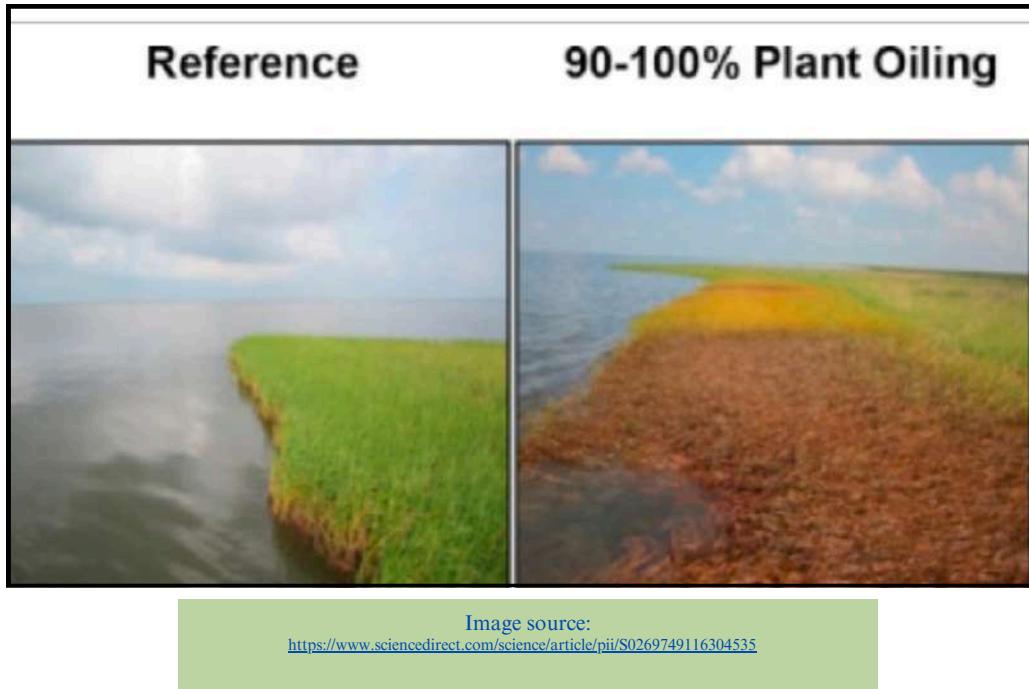
The impact of oil spills on coastal vegetation underscores the importance of prioritizing environmental protection. Reducing reliance on fossil fuels, transitioning to renewable energy, and enhancing international cooperation on spill prevention can significantly lower the risk of such disasters. Additionally, investing in research to develop more effective and eco-friendly spill response strategies will improve the ability to mitigate damage when spills occur.

Coastal vegetation is a vital component of global ecosystems,



<https://cen.acs.org/safety/industrial-safety/learn-Deepwater-Horizon-disaster/98/i35>

and its preservation is essential for environmental and human well-being. By addressing the threats posed by oil spills, we can ensure these habitats continue to thrive, providing their invaluable services for generations to come.



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DISASTER-STRICKEN ECOSYSTEMS: The Role of Plants in Resilience and Recovery

By: Aparna Rawat, B.Sc. (H) Botany
(2nd year)

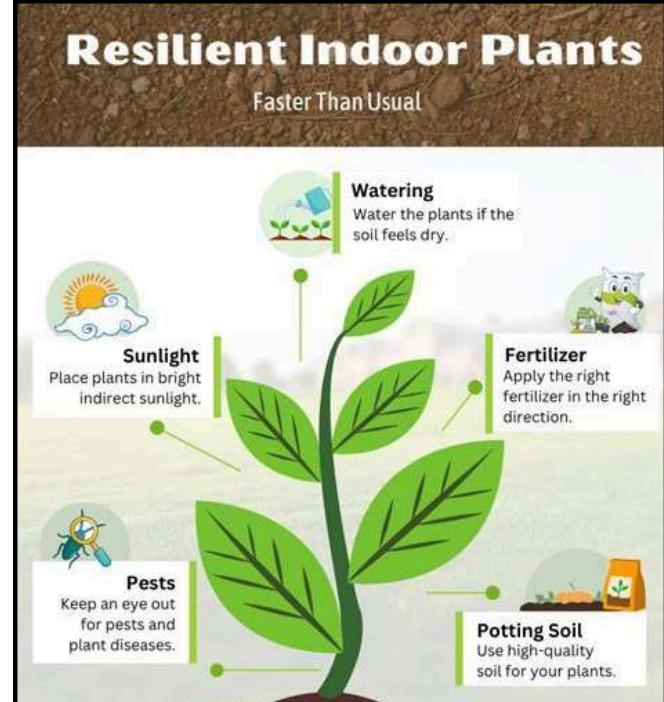
Natural disasters, such as floods, hurricanes, wildfires, and earthquakes, can devastate ecosystems, leading to biodiversity loss, soil erosion, and the disruption of critical ecological processes. Despite these challenges, plants play a pivotal role in restoring balance and promoting the recovery of disaster-stricken environments. This article explores the essential roles plants play in the resilience and recovery of ecosystems, particularly in soil stabilization, water regulation, nutrient cycling, biodiversity restoration, and carbon sequestration.

Soil Stabilization and Erosion Control

One of the most immediate threats following natural disasters is soil erosion. When plant cover is lost, the soil becomes vulnerable to erosion from wind and water, leading to further environmental degradation. Plants with extensive root systems like grass, shrubs, and trees are crucial in anchoring the soil. Deep-rooted plants, such as trees, are especially effective in stabilizing soils in mountainous areas prone to landslides. Groundcover plants, like grass and low shrubs, quickly stabilize the soil, preventing erosion and promoting water absorption. These plants help restore long-term soil stability and accelerate recovery in flood- or hurricane-affected regions.

Water Regulation and Quality Improvement

Plants also contribute significantly to regulating water flow and improving water quality. Wetland plants, for example, act as natural filters, removing pollutants and excess nutrients from water, thereby aiding in the restoration of aquatic ecosystems. Mangrove forests play a crucial role in coastal areas, acting as natural barriers that reduce the impact of storm surges and prevent coastal erosion. These plants help restore hydrological balance and maintain the resilience of both terrestrial and aquatic habitats following a disaster.



<https://www.navajoclimatechange.org/adaptation-plan>

Characteristics Of Resilient Plants



<https://www.navajoclimatechange.org/adaptation-plan>

Plant Adaptations for Post-Disaster Recovery

Plants possess several adaptive mechanisms that enable them to survive and regenerate in disaster-affected environments. These mechanisms not only help plants recover but also support ecosystem recovery.

- 1. Seed Dormancy and Germination:** Many plants produce seeds that can remain dormant until favorable conditions return. This ability allows plants to survive extreme conditions like fires, floods, or droughts and regenerate once the environment stabilizes.
- 2. Vegetative Resprouting:** Some plants can regenerate from surviving root systems or rhizomes, making them resilient in fire- or flood-prone areas. These plants rapidly resprout after disturbances, thanks to their protected root systems.
- 3. Phenotypic Plasticity:** Plants can adjust their physical traits to environmental stress. For instance, during droughts, some plants develop deeper roots or modify their leaves to minimize water loss, enhancing their chances of survival and recovery.

Carbon Sequestration and Climate Mitigation

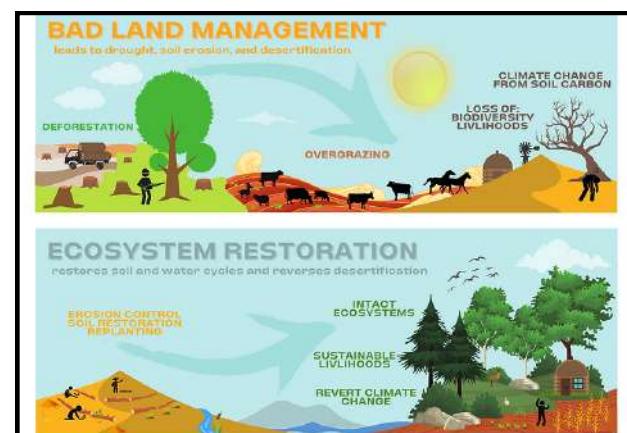
Plants also play a critical role in mitigating climate change through carbon sequestration. Through photosynthesis, plants absorb carbon dioxide, reducing atmospheric greenhouse gases. Forests, in particular, act as significant carbon sinks, storing large amounts of carbon in their biomass. After disturbances like wildfires, which release large amounts of carbon, restoring vegetation helps re-establish carbon sequestration processes, contributing to global climate mitigation efforts.

Nutrient Cycling and Soil Fertility

After a disaster, nutrient cycling can be disrupted, leaving the soil depleted and hindering plant recovery. Plants are essential for restoring soil fertility by facilitating organic matter decomposition and nitrogen fixation. As plants shed leaves or die, their organic material decomposes, enriching the soil with nutrients. Decomposers like fungi and bacteria break down this organic material, returning vital nutrients to the soil. Certain plants, especially legumes, fix nitrogen from the atmosphere, enriching the soil with this essential nutrient and accelerating plant community recovery.

Biodiversity Support and Habitat Restoration

Plants are central to biodiversity restoration in post-disaster ecosystems. The regrowth of native vegetation creates habitats for various species, promoting the return of insects, birds, mammals, and other organisms. Pioneer species—those first to colonize disturbed areas—play a crucial role in stabilizing the environment and preparing the soil for the growth of more complex plant communities. As these plant communities regenerate, they provide food and shelter, re-establishing food webs and supporting biodiversity recovery.



<https://www.navajoclimatechange.org/adaptation-plan>

Additionally, plants' relationships with pollinators help restore essential ecological processes, such as pollination and seed dispersal.

Human Intervention and Restoration Projects

Human efforts, such as reforestation, wetland restoration, and invasive species removal, are crucial for accelerating ecosystem recovery. These restoration projects can significantly enhance ecosystem resilience and expedite recovery by replanting native species and restoring natural processes. Successful examples include mangrove restoration projects in Southeast Asia after the 2004 Indian Ocean tsunami and reforestation efforts in California following wildfires. These projects highlight the positive impact of plant restoration on ecosystem recovery.

Conclusion

Plants are vital for the resilience and recovery of ecosystems affected by natural disasters. Their roles in soil stabilization, water regulation, nutrient cycling, biodiversity restoration, and climate change mitigation are crucial for ecological restoration. As natural disasters become more frequent and severe due to climate change, understanding and supporting the recovery of plant life will be essential for managing and restoring vulnerable environments. By investing in plant recovery and ecosystem resilience, we can ensure the long-term health and stability of ecosystems impacted by disasters.

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<https://globalplatform.undrr.org/sites/default/files/2022-02/The%20role%20of%20ecosystems%20in%20disaster%20risk%20reduction.pdf>



Rooted in Crisis: The Unseen Struggle of Plants During Natural Catastrophes

By: Anushka Singh, B.Sc. (H) Botany
(2nd year)

Plants are silent, immobile creatures that stand in their surroundings with the ability to grow without much alteration. However, when nature strikes through hurricanes, floods, wildfires, or droughts, plants face gigantic challenges. Although plant life is the most resilient, the power of nature cannot be resisted. The article deals with how plants struggle against natural disasters and how they fight for survival in the hidden battles.

Hurricanes and Storms: Winds Uproot and Overlie

Hurricanes and severe storms can be among the most destructive agents of nature's fury and thus cause much harm to plant lives. High speeds can uproot trees, let branches break loose, and then flood the ground. On coasts, where mangroves could protect the interior from storm surge, even they have their tolerable limits on salt. Strong winds and rising sea levels can erode the soft mud that anchors their roots, causing the whole ecosystem to become unstable. The saltwater from the storm surge can also poison the plants, causing them to become unable to take in water and eventually die.

Some of the worst cases are the ones that have really shallow roots. These plants get severely overtapped, especially when winds strengthen because it loses its anchor. Sometimes all the forests and habitats are ravaged so some species hardly see another day in their lives.



Image source:
<https://warnertreeservice.com/wp-content/uploads/2021/11/hurricanetreedamage2-1024x683.jpeg>

Flooding: A Fight for Oxygen and Nutrients

For longer periods of immersion in flooding, drowning due to lack of oxygen in water-submerged plant roots could finally lead to its demise. Depending on the conditions of flooding, plants would soon exhaust all the available oxygen for them to live further. The fact that plants can not live under soaked soils with limited air supply indicates the struggle many faces, the most prominent rice among the major examples, though others could do quite much better as illustrated below:



Image source:
<https://images.app.goo.gl/oADKgrEJNHKUr6qOA>

Flooding also removes the soil, which is necessary for the growth of plants. As floodwaters carry away the soil, plants lose their necessary nutrients, making it harder for them to regrow. In agriculture, crop failure results, leading to food supply loss and a long period of recovery.

Wildfires: Resilience in the Flames

Wildfires are becoming a serious threat to plants and entire ecosystems. Although some plants, especially those in fire-prone areas, have evolved to survive fire, intense heat and the destruction caused by these events can still be overwhelming.

For instance, some trees, such as certain species of pine, rely on fire to help their seeds grow. Heat from a fire opens up their cones, and the seed falls and gives new life; the aftermath

of a wildfire is usually harsh though. The soil is bare afterwards, without the nutrients that the plants need to grow again. Since most of them lack this resource, many plants fail to regrow; the ecosystem takes a long time to heal.

Besides, repeated wildfires, especially those intensified by global warming, can destroy plant populations that are not fire-resistant. This makes it difficult for some species to recover and can even drive them to extinction.

Droughts: The Struggle for Water

Droughts are common in changing the climate and create rigorous pressure on plants. When rainfall is scarce, it may not be possible to find enough water for survival in the plants. Some plants, such as cacti and succulents, have developed ways of storing water and staying alive for a long time without water. They have thick tissue storing water or deep roots that can gain water stored underground.

However, drought-tolerant plants also have limitations. When droughts become too long, the soil water dries up and threatens to destroy plant survival. Farm crop failures may be found in stunted corn, wheat, or rice growths, leading to a food deficiency. Drought also sets the ecosystem at higher risk for wildfires, which again destroy plants.

Conclusion: The Silent Struggle to Stay Alive

The perspective of most plants is that they are regal and unbothered. However, this is very far from the truth as they put forth so much effort trying to survive in an unforgiving world that is very erratic.

Many elements, such as the impressive gales from hurricanes, in addition to waterlogging of their roots, excessive heat from wildfires, and even soil droughts are all consistently working towards wiping out green life.



Image source:
<https://d.ibtimes.co.uk/en/full/1477469/californian-drought.webp?w=736&f=cd5f827418721ef2f6a5d67485dd114e>

A large number of natural disasters have a higher risk now due to climate change and plants that have managed to create survival tactics are in danger and there is a dire need to safeguard plant species and comprehend the undisclosed issues with these plants.



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Dynamic Nature of Plants with Wildfire

By: Joolie Jha, B.Sc. (H) Botany
(1st year)

Plants are the primary source of energy for all the living forms as all the living organisms directly or indirectly depends on plants for their survival so any threat to plants is also a survival threat to all the life forms present on the mother planet Earth. Plants play a crucial role in maintaining as well as stabilizing the ecosystem, they are the contributors of biodiversity. Natural disasters are the unpleasant events that occur naturally and can destroy the established ecosystem. For instances Wildfires, most often these wildfires are due the Human activities but some of them occur naturally. Plants share a dynamic relationship of vulnerability and resilience with Wildfires. As these Wildfire often damage the plant ecosystem and in response plants show a remarkable adaptability and resilience, they not just help the ecosystem to recover from the threatening event but also serves as a barrier to prevent the further damage.

Impact of Wildfire on Nature [Negative]

It destroys the plant diversity and along with plants, wildfires also leads to death of life form . Change and highly disrupts the nutrients present in soil as most the nutrients get lost in ashes .It causes soil erosion and alters the soil composition, structure as well as the properties like pH and organic matter. It contributes to Global Warming by releasing Greenhouse gases like carbon dioxide into the Atmosphere.



<https://images.app.goo.gl/FNzuQLbqQE2mSifD9>

Plants Adaptability and Response: Fire Followers

Pinus Bankasiana: commonly known as Jack pine and certain other species of plants produces cones which require fire to open and release seeds so due to wildfire they release seeds and seeds germinate to form new plant body.



<https://images.app.goo.gl/cZ9XUVGFgZbTV237>

Yellowstone national park in America

CASE STUDY: *Pinus contorta* regenerate and within few years the forest began to flourish again. **Smoke Stimulated Germination:** Seeds of certain species like Asteraceae and Proteaceae get stimulated by components present in smoke which leads to their germination promoting recovery in post fire environment. Wildfire in Southern California in 2019 leads to bloom of plants like *Lipinus succulentus*, *Dichelostemma capitatum*, *Castilleja exserta*, *Eucalyptus*: These species posses the ability to regenerate from the basal buds after being scorched by fire. **Fertilizer:** Forest fire also tend to stimulate the flowering and fruiting in many plants because the wood ash is one of the best fertilizer. **Tuber:** Certain plants have underground tuber which tend to grow when the fire stops.

Plant as Barriers against wildfire

Fire resistant plant: certain plants like Hardwood trees have thick bark with high moisture content that resist fire. Ecosystem Recovery: Post fire regeneration of plants stabilize the soil and help in making a suitable habitat for returning wildlife.

Conclusion

Wildfires are destructive but still very essential and integral part of survival and regeneration of many plant species. Plants has attained the adaptative qualities to overcome the wildfire and maintain their species diversity in the immediate environment. These adaptations help the plants to flourish again and make the habitat appropriate for wildlife return. Plants in fire prone regions has developed the mechanisms like serotinous cones, smoke stimulated germination, resprouting. Fire serves as natural way to clean old vegetation but the increasing frequency of fires driven by human activities can lead to vulnerability ecosystems like Amazon Rain Forest as they lack the evolutionary mechanism. Recognizing the intricate relationship between plants and wildfire is key to fostering a sustainable future of our planet.

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Plants in peril : Nature's struggle with disaster

By: Arpita Nayak, B.Sc. (H) Microbiology
(3rd year)

“To be without trees would, in the most literal way, mean to be without our roots”

-Richard Mabey

We often consider flora as silent protectors of nature. They not only provide us with basic resources such as food, fuel and shelter but also safeguard us from natural disasters. Whether it's their enduring ability in the midst of all the chaos or their ability to bring life where once there was only soil are some facts that inspire us to survive and live our life contentedly. But over time, their adaptability and resilience against natural disasters is a major research area and many scientists are conducting research all over the world to find out how plants survive against natural disasters and further act as barriers against them.

Diversity is the key

A study by the National Research Institute for Agriculture, Food and Environment (INRAE) showed that the forest is most resilient to storms if there is a greater diversity of tree species and is dominated by slow-growing species with high wood density such as oaks. This positive effect of tree diversity contributing to the resilience factor was found to be more pronounced under extreme climatic conditions such as hot-dry or cold-wet conditions. During hot temperature extremes, broad leaves help reduce adverse local effects of climate change as claimed by ETH Zurich, WSL and MeteoSwiss.

Trees combating Wildfires

Wildfires are a growing threat to our environment and communities, causing severe damage to ecosystems. Research published in the American Physical Society's Physical Review Fluids, revealed that a forest canopy creates its own wind currents and turbulence, and that wildfire behavior can shift depending on a canopy's dimensions. The lower branches of taller plants, once self pruned are less likely to act as fuel as they reduce wind speed and fire severity.



image source:
https://upload.wikimedia.org/wikipedia/commons/0/05/Burnout_ops_on_Mangum_Fire_McCall_Smokejumpers.jpg



Image source:
https://www.theguardian.com/science/2023/dec/26/greener-trees-warning-volcanoes-plant-health?CMP=share_btn_url#img-1

Trees act as natural firebreaks by reducing the intensity of wildfires, blocking the wind and breaking up fuel sources. Diverse species of trees in that region contribute to diverse ecosystems which are less susceptible to catastrophic fires. Hence the diversity lost can be restored by planting more trees. Species such as lodgepole pine rely on fire to release seeds from their resin sealed cones, this ensures regeneration in the aftermath of destruction. In Savannas, which are fire prone regions, grasses there regenerate faster from underground roots taking advantage of the nutrient rich ash left behind. The process of transpiration increases humidity and reduces the likelihood of wildfires.

Greener trees : sign of volcanic awakening

In the areas of active volcanoes, greener plants serve as an

indicator when a volcano is about to erupt. Researchers were able to show that plants became greener in the locations where volcanic activity was building due to the extra carbon dioxide helping in plant growth, followed by brown when the volcanic activity peaked indicating the release of sulphur dioxide and rise in temperatures leading to death of the plants with the help of the satellite images from Yellowstone national park in the US, 1984-2022.

Mangrove trees acting as sentinel against tsunamis

Mangrove trees safeguard communities against floods, tsunamis, hurricanes and cyclones.

Their roots become intertwined to generate a dense network which reduces the height, velocity and force of incoming waves. They distribute water among their canals and creek which reduces the level of inundation and also the above ground roots of mangrove slow down water flows, encouraging deposition of sediments and reducing erosions.

Bamboo as resilient construction material

Another strategy involves the use of bamboo against floods, its roots stabilise the soil and catch silt which prevents riverbanks from collapsing. Bamboo has spreading roots which hold the soil tightly and allows water to still pass through while keeping check of speed and strength. This flood defense strategy is widely used in Uganda.

Bamboo is also known to be resilient to earthquakes, its strength to weight ratio helps housings made of bamboo to be subject to lower forces during earthquakes. Its flexibility allows it to bend and absorb the effects of tremors. As bamboo is made of lignin and vascular bundles which aids to dampen vibrations.

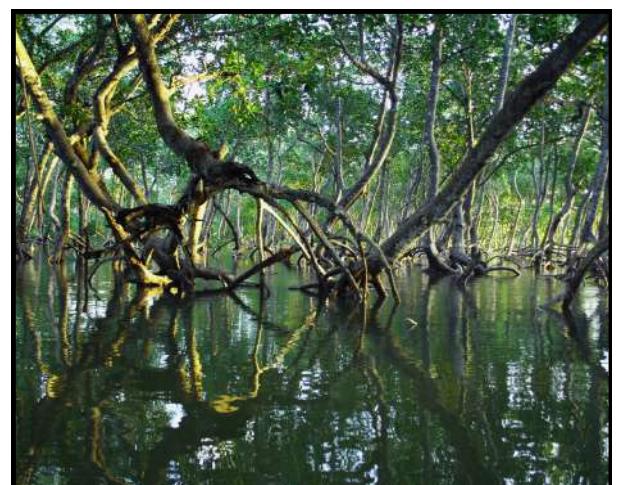


Image source:
<https://www.theleafcharity.com/blog/benefits-of-mangroves-flood-protection>

Above studies and research explore the intricate relationship between plants and natural disasters. Their resilience is a testament to nature's capacity for renewal, reminding us of the importance of protecting and preserving these silent guardians of our environment.



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Roots of Wisdom: The World Beneath the Surface

By: Susmita Chakraborty, B.Sc. (H) Botany
(2nd year)

The world beneath our feet is often overlooked, yet it is a hub of connection, resilience, and wisdom. Roots, though unseen, play a crucial role in sustaining life, teaching us valuable lessons about interconnectedness, growth, and balance. Let's explore the scientific, ecological, and cultural significance of roots and why they deserve more attention.

Roots: More Than Just Anchors

Roots are not merely structures that anchor plants—they are dynamic systems essential for survival. Scientists have discovered that plants communicate through their roots using a network of mycorrhizal fungi, often referred to as the “wood wide web.”

For example, Douglas fir trees in North American forests use this network to share nutrients and even warn neighboring trees of potential dangers like pest attacks. This underground system mirrors human communities, where collaboration is the key to resilience and growth.

Roots as Protectors of Ecosystems

Roots are nature's unsung heroes, vital for maintaining soil health and preventing erosion. In the Sundarbans, mangroves with their complex root systems shield coastal areas from cyclones and floods while supporting rich biodiversity.

Similarly, in grasslands like the Deccan Plateau, deep-rooted native grasses improve soil fertility and act as natural carbon sinks, helping mitigate climate change. These ecosystems thrive because of the intricate underground networks created by roots.



Image source:
<https://images.app.goo.gl/y5NZ7ZMztLKr5tHb6>

Cultural Significance of Roots

Roots hold profound symbolism across cultures. In India, the banyan tree is celebrated for its sprawling roots that form new trunks, symbolizing immortality and connection. During Pongal, crops like turmeric and sugarcane, which grow from robust roots, are honored as a symbol of prosperity and sustenance.



Image source:
<https://images.app.goo.gl/JLcvcCLG4DYFKXWU7>

Globally, the Tree of Life represents interconnectedness, with its roots grounding us in our heritage while its branches stretch toward growth and aspirations.

What Roots Teach Us

The underground world of roots offers valuable lessons. Roots work in collaboration with fungi, bacteria, and other organisms, demonstrating the power of interdependence. They also remind us to stay grounded—just as a tree stands tall because of its deep roots, we need strong foundations to thrive.

But roots are not invincible. Deforestation, urbanization, and unsustainable agriculture are putting immense pressure on these systems. For instance, the Amazon rainforest's root networks, critical for global biodiversity,

are under constant threat due to logging and land conversion.

Conclusion: A World Worth Protecting

Roots, though hidden, are at the heart of life. They teach us about connection, collaboration, and resilience. As we strive towards sustainability, let's remember to protect this unseen world beneath us, for it holds the key to life's enduring beauty and balance. By cherishing and preserving the roots of our ecosystems, we can ensure a thriving planet for generations to come.

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Image source:
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Carbon Shock: How Wildfires Are Undermining Plant-Based Carbon Sequestration

By: Somya, B.Sc. (H) Botany
(3rd year)

Terrestrial ecosystems, particularly forests and peatlands, are vital to the global carbon cycle, acting as powerful carbon sinks by absorbing atmospheric carbon dioxide (CO₂) through photosynthesis and storing it in plant biomass and soils. However, the increasing frequency and severity of wildfires—driven by climate change and land-use alterations—pose a growing threat to these ecosystems. Once considered infrequent disturbances, wildfires are now causing persistent ecological damage and significant carbon emissions. In this article, we explore the ways in which wildfires alter carbon sequestration patterns, often transforming carbon sinks into net sources of CO₂, and discuss the broader implications for climate stability and ecosystem resilience.

Wildfires as Carbon Sources

Wildfires contribute directly to atmospheric carbon levels by combusting plant biomass, which releases stored carbon as CO₂, methane, and other greenhouse gases. The intensity and scale of recent wildfires have resulted in emissions comparable to those from industrial sectors. For instance, boreal forest fires alone accounted for 23% of global fire emissions in 2021, a dramatic increase from their average contribution of 10% in previous years. Combustion affects all layers of vegetation, from surface litter to canopy trees. In high-severity fires, root systems and organic soil layers can also be consumed, leading to further loss of belowground carbon stores. This is particularly alarming in ecosystems like peatlands, where centuries of accumulated organic matter are rapidly lost in a single fire event.

Impaired Carbon Sequestration After Fire

Beyond immediate emissions, wildfires compromise the long-term carbon sequestration potential of ecosystems. Plant regrowth following fire is often delayed, especially in areas that experience repeated or high-severity burns. Recovery of photosynthetic activity and primary



Image source:
<https://www.wired.com/story/the-bizarre-peaty-science-of-arctic-wildfires/>

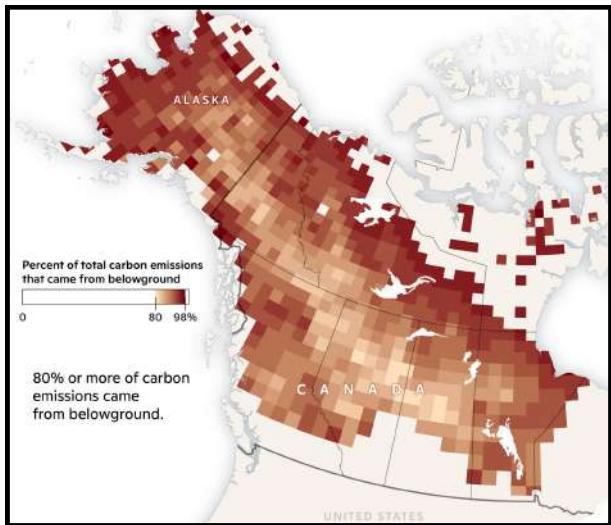


Image source:
<https://www.woodwellclimate.org/boreal-fires-climate-change-4-graphics/>

productivity can take decades. In a study conducted on California ecosystems, it was observed that large forest fires significantly reduced gross primary productivity, with full recovery estimated to take over 20 years in some cases (Stephens et al., 2023).

Moreover, fires can alter species composition and forest structure. Fire-tolerant or opportunistic species often dominate post-fire landscapes, potentially storing less carbon than the original vegetation. Additionally, frequent fires can shift forests toward grassland or shrubland states, which store less aboveground carbon overall.

Case Studies

- **Boreal Forests**

Boreal forests, covering large areas of Canada, Alaska, and Eurasia, are major global carbon reservoirs. These ecosystems are highly sensitive to warming trends, which have lengthened fire seasons and increased lightning strikes—one of the primary ignition sources. The 2021 fire season in Siberia alone emitted an estimated 970 megatonnes of CO₂ (Nature Geoscience, 2024), rivaling annual emissions of major industrial nations. Compounded by slow vegetation recovery in cold climates, boreal forests are at serious risk of becoming persistent carbon sources.

- **Arctic and Subarctic Peatlands**

Peatlands store nearly one-third of the world's soil carbon despite covering only 3% of Earth's land area. Fires in Arctic peatlands, often driven by thawing permafrost and increasing dryness, can smolder for weeks and reignite after winter. These "zombie fires" release massive quantities of ancient carbon and damage the hydrology required for peat formation and future carbon accumulation (Wired, 2019). As warming continues, fire-prone peatlands are becoming hotspots of irreversible carbon loss.

Fire Management and Climate Mitigation

To prevent carbon shock from wildfires, integrated fire management strategies must become a core component of climate action.

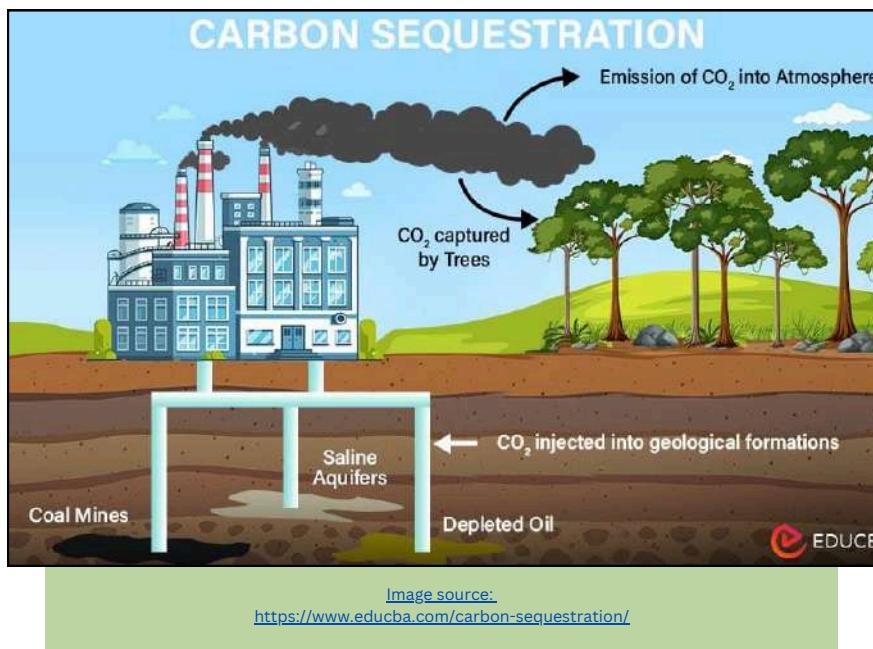
While fire suppression alone is unsustainable, especially in fire-adapted ecosystems, practices like prescribed burning can reduce fuel loads and prevent catastrophic fires. Research from the University of Cambridge (2021) suggests that well-managed low-intensity burns may stabilize soil carbon levels and even promote the growth of deep-rooted native vegetation. In parallel, restoring fire-damaged ecosystems through reforestation and assisted regeneration is crucial. Prioritizing native, fire-resistant species can accelerate the return of carbon sequestration function while enhancing ecosystem resilience.



Image source:
<https://www.ioes.ucla.edu/article/controlled-burns-help-prevent-wildfires-climate-change-is-limiting-their-use/>

Conclusion

Wildfires, once natural agents of renewal, have become powerful accelerants of carbon imbalance in the Anthropocene. As climate change fuels more frequent and intense fires, ecosystems that have long served as carbon sinks are tipping into becoming sources. This shift not only threatens biodiversity and landscape stability but also undermines global efforts to limit atmospheric CO₂ concentrations. Understanding and mitigating wildfire impacts is no longer optional—it is imperative for sustaining the planet's carbon balance and ecological integrity.



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SEGMENT

FINALE



Black Fungus: Nature's Remedy for Chernobyl's Nuclear Radiation

Black Fungus: Nature's Remedy for Chernobyl's Nuclear Radiation



By: Rashi Singh

(Editor-in-chief, ANTHESIS)

"Radiation is a powerful tool—dangerous, yes, but also full of potential. Nature, as always, finds ways to use it." — Dr. Arturo Casadevall

On April 26, 1986, Reactor No. 4 of the Chernobyl Nuclear Power Plant in northern Ukraine erupted during a late-night safety test that unleashed unprecedented amounts of radiation into the atmosphere. This catastrophe turned Pripyat, a once-thriving Soviet city, into an abandoned ghost town. The surrounding Red Forest turned into a radioactive wasteland, where pine trees turned reddish-brown and wildlife started to face extreme genetic mutations.

This disaster led to the evacuation of over 100,000 people and left a 30 kilometre exclusion zone around the plant, which remains largely uninhabited to this day. While humans were forced to flee, something unexpected began to flourish. In the heart of Chernobyl's reactor ruins, black fungi were not just surviving but thriving—absorbing radiation as an energy source. This discovery, first made in 1991, is rewriting what we know about biological resilience.

Radiation-Resistant Fungi: The Science Behind the Discovery

Five years after the accident, in 1991, scientists observed black fungus growths extending across the containment walls and cooling pools of the reactor. These fungi, which were eventually identified as *Cladosporium sphaerospermum*, *Cryptococcus neoformans*, and *Wangiella dermatitidis*, seemed to be exploiting radiation to fuel their metabolism, in contrast to most life forms that experience DNA damage in high-radiation conditions.

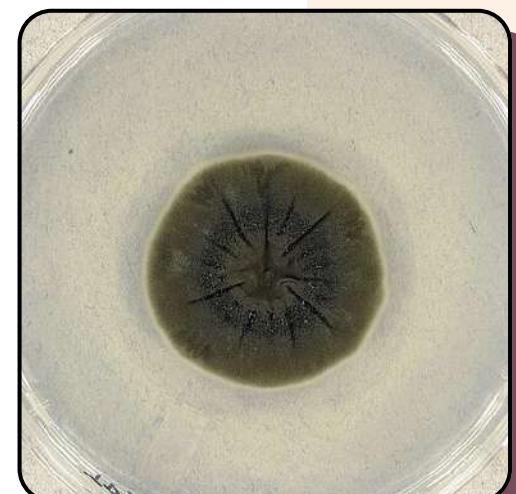


Image source:

https://en.m.wikipedia.org/wiki/Cladosporium_sphaerospermum

This phenomenon, now known as radiosynthesis, was first studied in detail by Dr. Ekaterina Dadachova and colleagues at the Albert Einstein College of Medicine in 2007. Their research showed that:

- Melanin in fungi undergoes structural changes when exposed to radiation.
- These changes enhance electron transfer, much like chlorophyll does in photosynthesis.

The growth rate of melanized fungi was almost 3 times higher under exposure to ionizing radiation than the growth of non-melanized strains (Dadachova et al., 2007, PLoS ONE).

"The idea that fungi can use radiation as an energy source is extraordinary and opens up new frontiers in biotechnology and space exploration," Dr. Dadachova remarked in an interview.

The Role of Melanin: A Natural Radiation Shield

Unlike in human skin, where melanin protects against UV rays, in fungi, it functions as an energy-harvesting pigment that converts gamma radiation into a usable form. This ability is linked to:

- Electron delocalization in melanin molecules, enabling them to capture ionizing radiation.
- Increased ATP production, indicating active energy conversion (Casadevall et al., 2017, *mBio*).
- Protective adaptation, allowing fungi to thrive in extreme radiation zones.

A 2016 study in *Frontiers in Microbiology* showed that melanized fungi could also bind to radioactive isotopes like cesium-137 and strontium-90, reducing their environmental spread (Dadachova et al., 2016).

From Chernobyl to Space: Practical Applications of Radiation-Absorbing Fungi

1. Bioremediation of Nuclear Waste Sites

Given their ability to neutralize radiation, these fungi could be used to decontaminate areas affected by nuclear disasters. Researchers are exploring their potential for treating Fukushima Daiichi's radioactive soil and developing fungal-based biofilters for nuclear facilities.

"Harnessing the natural abilities of melanized fungi could revolutionize how we handle radioactive contamination," stated microbiologist Dr. Arturo Casadevall.

2. Radiation Shielding for Space Missions

Cosmic radiation remains one of the biggest risks for Mars colonization. In 2020, a study published in bioRxiv tested the radiation-blocking potential of *Cladosporium sphaerospermum* on the International Space Station (ISS). A thin layer of fungal biomass reduced radiation exposure by nearly 2%, proving its potential as a self-regenerating, lightweight shield (Shunk et al., 2020).

NASA researchers are now investigating melanin-based coatings and fungal biofilms as a protective measure for astronauts.

"Imagine astronauts growing their own fungal bio-shields on Mars instead of relying on heavy metal shielding," suggested a NASA scientist.

Life Adapts: A New Perspective on Resilience

Chernobyl, once a symbol of disaster, is now a living laboratory for some of the most radiation-resistant life forms on Earth. The black fungi growing within its ruins are not just survivors but pioneers, showing us how nature can adapt in ways we never imagined.



Image source:
<https://www.britannica.com/event/Chernobyl-disaster>



Image source:
<https://edition.cnn.com/2022/03/11/europe/gallery/chernobyl-disaster/index.html>

As research continues, these fungi may hold answers to some of our biggest challenges—from cleaning up nuclear contamination to protecting humans in deep space. Their story is a testament to life’s ability to turn catastrophe into opportunity.

The very force that devastated Chernobyl may now hold the key to future survival—not just for fungi, but perhaps for humans as well.

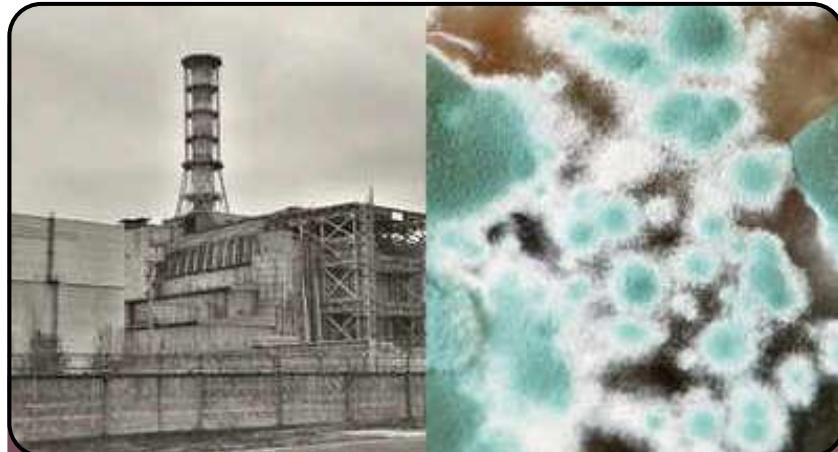


Image source:

<https://timesofindia.indiatimes.com/etimes/trending/a-black-fungus-is-healing-chernobyl-by-absorbing-nuclear-radiation/articleshow/112190335.cms>

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WHAT'S NEW IN BOTANY?

Pioneer tree species accelerate restoration of tree-related microhabitats in 50-year-old reserves of Białowieża Forest, Poland

<https://PMC10316124.html#:~:text=Our%20findings%20underline%20the%20importance,quicker%20than%20long%20lived%20tree>

Rarely garnering public concern, thousands of native-plant species are at risk of extinction.

<https://www.nwf.org/Magazines/NationalWildlife/2020/AprilMay/Conservation/Endangered-Plants>

Research Progress on Plant Responses to Stress Combinations in the Context of Climate Change

[https://www.researchgate.net/publication/378020540 Research Progress on Plant Responses to Stress Combinations in the Context of Climate Change?hl=en-US](https://www.researchgate.net/publication/378020540)

UN Report: Nature's Dangerous Decline 'Unprecedented'; Species Extinction Rates 'Accelerating'

<https://www.un.org/sustainabledevelopment/blog/2019/05/naturedeclineunprecedented-report/>

Sustainable protection of rapidly subsiding coastline with mangroves

<https://www.wetlands.org/sustainable-protection-of-rapidly-subsiding-coastlines-with-mangroves.html#:~:text=Mangroves%20offer%20coastal%20protection%20by,waves%20moving%20to%20the%20coast>

What Are the Grand Challenges for Plant Conservation in the 21st Century?

<https://www.frontiersin.org/journals/conservationscience/articles/10.3389/fcosc.2020.600943/pdf>

Corpse flowers are threatened by spotty recordkeeping

<https://www.sciencedaily.com/releases/2025/04/250403122948.htm>

LIFE'S PARALLELS

This segment includes an analysis of similarities and differences in plants and humans, focusing on shared biological fundamentals, adaptations, enhancing our understanding of both the life forms.



THE INTRIGUING CONNECTIONS BETWEEN PLANTS AND HUMANS



Ethnobotany- The intricate Human- Plant Relationship

By: Rishika Khandelwal, B.Sc. (H) Botany
(3rd year)

Plants and humans have had an association for aeons. Plants with their plethora of benefits have been instrumental in laying the foundation of human civilization - from the food we eat to even the air we breathe. This relationship between plants and human civilization is studied under the field of Ethnobotany. Ethnobotany, often defined as the interface of natural and social sciences, is a discipline that addresses the relationships between humans and plants. The term was coined by American botanist John William Harshberger in 1895.

The field combines the discipline of anthropology and botany to understand the complex relationship humans have shared with plants in different civilizations, aiding us in understanding how plants have shaped human societies.

The foundation of Ethnobotany can be traced back to ancient civilizations. Humans have used plants from as early as the Indus valley Civilization. The analysis of plant remains from the Harappan civilization reveals the use of plants for vegetables and culinary and medicinal purposes. A range of medicinal plants were known by the ancients Chinese, Egyptians, Indians, Greeks, Romans and the Old Slavs. Most information about uses of plants have been found in the down through generations often found in text forms like the Charak Samhita, an ancient text on Ayurveda, a traditional Indian system of medicine that lays out a wide variety of plants for their role in promoting health and wellness. The text provides information on important disease and treatment. The "Ebers Papyrus" from Egypt, is another old medical text that lists numerous plants and their applications in healing.

The modern emphasis on ethnobotany has brought into light many hidden gems of nature like the *Withania somnifera* (Ashwagandha), *Azadirachta indica* (Neem), *Catharanthus roseus* etc. This emphasis of phytopharmacology in ethnobotany has been instrumental in drug discovery facilitating research for treatment of various diseases.



Image source:
<https://www.fs.usda.gov/wildflowers/ethnobotany/index.shtml>

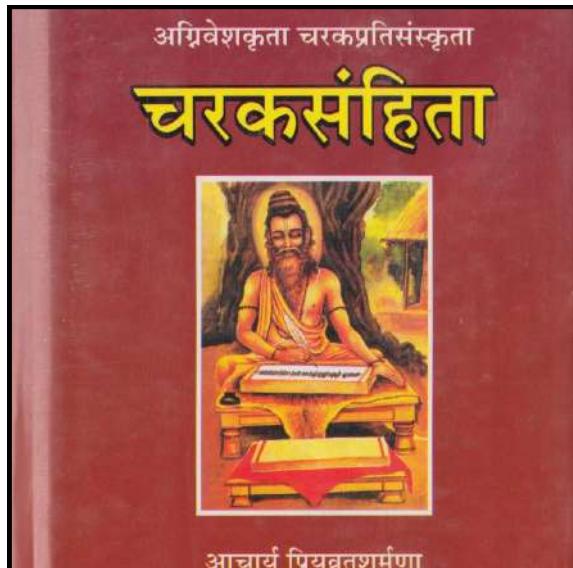


Image source:
https://archive.org/details/charakasamhitaagnivesapriyavratacharmachowkamba_928_c/page/n12/mode/1up

Today, it's gaining even more importance in skincare and wellness as people are increasingly understanding importance of plants. Apart from their use in phytopharmacology, plants have been gaining importance in other areas. Plants have always been the backbone of human nutrition.

Humans have always depended on plants as their primary source of nutrition. With the increasing popularity of networking, the knowledge of native use of various indigenous plants is travelling to other regions. More plants have been increasingly used in cuisines as people continue to gain knowledge about different cuisines and plant benefits for nutritional purposes.

Today, it's gaining even more importance in skincare and wellness as people are increasingly understanding importance of plants. Apart from their use in phytopharmacology, plants have been gaining importance in other areas. Plants have always been the backbone of human nutrition. Humans have always depended on plants as their primary source of nutrition. With the increasing popularity of networking, the knowledge of native use of various indigenous plants is travelling to other regions. More plants have been increasingly used in cuisines as people continue to gain knowledge about different cuisines and plant benefits for nutritional purposes. The knowledge drawn from Ethnobotany has also influenced agricultural patterns. Sustainable and eco-friendly practices have been brought into light and encouraged. Ethnobotany also delves into plants in cultural and spiritual uses of plants. Plants have been considered sacred in many cultures. For instance Peyote Cactus is an essential part of spiritual ceremonies of Native American tribes. Mango leaves (*Mangifera indica*) is a vital part of ceremonies in Hinduism. The understanding of these uses has been instrumental in conserving plants from the consequences of modern day anthropological activities. Sacred groves are found across the country that is considered the abode of deities.

Ethnobotany extends beyond the mere use of plants; it reflects the intricate and profound relationship between humans and flora. This field stands as a testament to the indispensable role plants play in human survival and cultural evolution. As research progresses, ethnobotany continues to uncover vast reservoirs of botanical knowledge, reinforcing the necessity of preserving this wisdom for future generations.

From food and medicine to culture and tradition, plants remain intertwined with human life in countless ways. As civilizations evolve, so too does the role of plants, adapting to new needs, discoveries, and understandings. The study of ethnobotany, therefore, remains an ever-expanding field, continuously shaped by the changing dynamics of human-plant interactions.



Image source:
https://doi.org/10.1007/978-981-13-9566-6_1

With ongoing scientific advancements and a growing awareness of the value of traditional plant knowledge, ethnobotany continues to bridge the past with the future. It provides insights not only into ancient practices but also into potential innovations that can contribute to health, sustainability, and cultural heritage. As we navigate the complexities of a rapidly changing world, the deep-rooted connection between humans and plants will continue to shape societies, ensuring that the wisdom of the past remains relevant for generations to come.

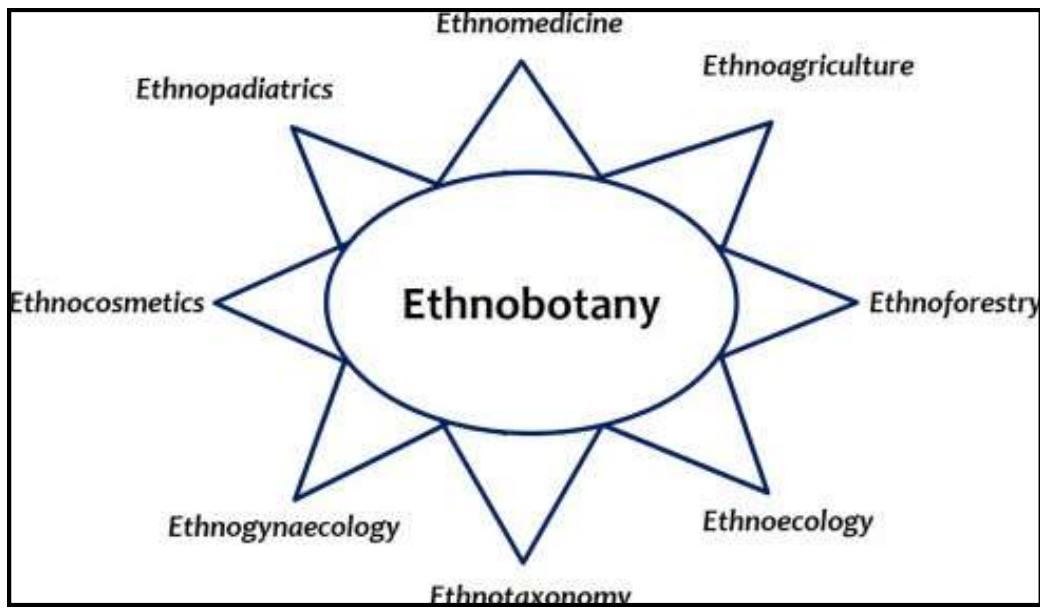


Image source:
https://www.researchgate.net/figure/Schematic-presentation-of-prominent-utility-patterns-of-ethnobotany-in-various-fig1_349867397

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From Plate to Pill: The Dual Role of Plants in Nutrition and Medicine

By: Ananya Singh, B.Sc. (H) Botany
(3rd year)

Plants exemplify nature's deep generosity, providing a dual gift of medicine and nutrition to humanity. From the very beginning of human civilization, plants have served as a primary source of both nutrition and medicine. Humankind shares a fascinating bond with plants. Plant-based products and medications are becoming essential resources in today's age, characterized by fast food consumption and the shortcomings of allopathic medicine. The connection between humans and plants tells an incredible tale of harmony and restoration. Plants have become allies that encourage us to embrace contemporary wellness advocacy in today's world.

They have become the essence of Indian culture and captivated the world with their enchanting qualities. Both modern allopathic medicines and traditional systems like Ayurveda obtain their remedies from plants because of the comprehensive approach they offer to healthcare.

FLORA AND DISH: DISCOVERING THE HIDDEN LINK

Plants have always been central to human nutrition, not only offering essential macro- and micronutrients but also providing bioactive compounds that support overall health. From everyday staples to unique sources like *Laminaria* and *Spirulina*, plants form the foundation of a well-balanced diet.

Staples: The Cornerstone of Nutrition

Grains such as rice, wheat, and millets are consumed worldwide and serve as primary sources of energy. Rich in carbohydrates, fiber, vitamins, and antioxidants, they aid digestion, boost energy levels, and assist in eliminating toxins from the body.

Fruits and Vegetables: A Colourful Spectrum of Nutrients

Fruits and vegetables are packed with minerals and antioxidants, offering anti-inflammatory properties and supporting immune function. Leafy greens, in particular, are rich in vitamin K, iron, and calcium—nutrients vital for strong bones and a healthy cardiovascular system.



Image source:
<https://images.app.goo.gl/EDozm7jOZMg21j7w8>



Image source:
<https://images.app.goo.gl/tCnajedHL3OjaoZaA>

Legumes, Nuts, and Seeds: Protein and Healthy Fat Reservoirs

Legumes serve as excellent sources of plant-based proteins, crucial for tissue repair and overall body function. Nuts and seeds, including almonds, chia, flax, and cashews, are high in healthy fats and omega fatty acids that promote heart health and reduce inflammation.

Herbs, Spices, Beverages, and Oils: Functional Additions to the Diet

Herbs and spices like turmeric, ginger, garlic, and cinnamon are not only flavor enhancers but also possess immunity-boosting and anti-pathogenic properties. Beverages such as chamomile tea and green tea offer relaxation and stimulation, while oils like .

mustard, coconut, and sesame are used in cooking and skincare, contributing to both nutrition and wellness. Less common sources such as edible seaweeds like *Laminaria* are high in iodine and protein. Natural sweeteners like honey, derived from nectar, are considered healthier alternatives to refined sugar. These lesser-known plant products enrich the diet and offer additional health benefits.

PLANTS AND PILLS: THE THERAPEUTIC CONNECTION

The apprehension regarding the use of plants for therapeutic reasons is increasing beyond solely providing sustenance for humans. Medicinal plants account for approximately 50% of the pharmaceutical industry. They are regarded as a valuable source of bioactive substances derived from diverse plant components like flowers, leaves, seeds, roots, stems, etc. Their popularity is gradually increasing globally because they tend to have fewer adverse effects compared to conventional medicines.

Plant Name	Scientific Name	Part Used	Uses in Disease
Neem	<i>Azadirachta indica</i>	Seed	Used in skin diseases, lice, and malarial fever.
Aloe (Gwarpatha)	<i>Aloe barbadensis</i>	Leaves	Skin burn treatment, ulcers, and facial creams.
Tulsi	<i>Ocimum sanctum</i>	Leaves	Used for cough, cold, ulcers, and immunity boosting.
Kali Haldi	<i>Curcuma caesia</i>	Rhizomes	Treats sprains, bruises, and internal injuries.
Safed Musli	<i>Chlorophytum spp.</i>	Roots	Tonic for general weakness, aphrodisiac, and vitality.

Bioactive substances such as flavonoids, alkaloids, terpenoids, glycosides, and phenolics aid in enhancing immunity, addressing infections, supporting gut health, and managing persistent chronic conditions. They also help reduce stress, insomnia, ease pain, and function as sedatives. Through their comprehensive treatment approach, they improve skin health, detoxify the body, and support hormonal balance within our system.

Plants act as an essential source of medicines and drugs and constitute the foundation of traditional practices. Harmonizing traditional medicine with modern science will realize the complete potential of plants soon, supporting advancements in biotechnology, nanotechnology, and genomic research for the creation of plant-derived vaccines.

Plants have consistently provided benefits to humans in various forms, including food, medicine, forest resources, and textiles. They have consistently provided us with intriguing products that simplify our lives even more. Recent instances of Covid highlight the reality that medicinal herbs are growing in global popularity, and India is the origin of herbs such as ashwagandha, neem, tulsi, giloy, and ginger, which serve not only as effective remedies but also as part of a balanced diet that aids in combating infectious diseases. Additionally, plant-based vegan foods act as natural remedies and shield us from illnesses by boosting our immune system, reducing the need for excessive medication. As we progress daily, it's crucial to utilize the potential of plants in a sustainable manner.

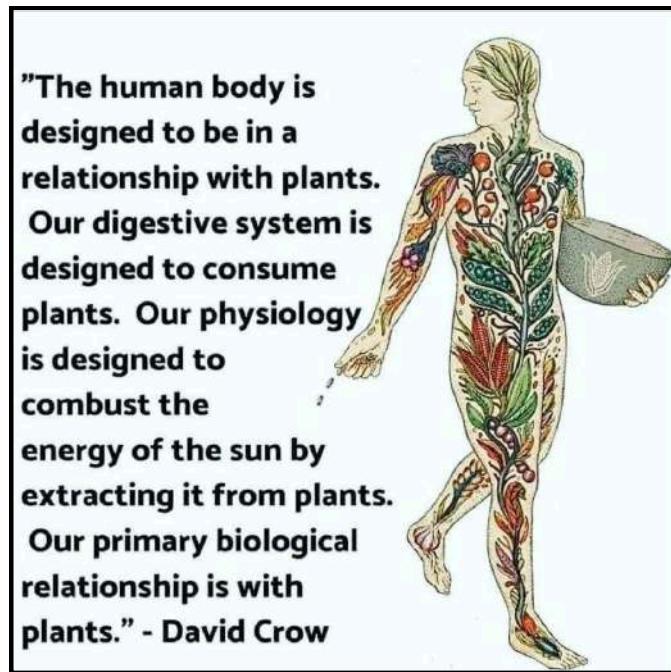


Image source:
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Growth Rings: Mirroring Human Life

By: Haritha P., B.Sc. (H) Botany
(3rd year)

While taking a stroll through the lush greens of an abandoned forest or passing by a deforested land, one might happen to see the concentric patterns on the cut trunks of trees. The patterns might seem, but they also tell us the story of its life, the trials and tribulations it had endured, the changing world, and a mirror to the lives of human beings.

Growth rings, or annual rings, are formed in the heart of tree trunks. They form concentric bands, each marking a year of life. The light bands represent the earlywood, which is formed during summer and spring, and the dark ones show the latewood formed during fall and winter.

These rings represent the environmental conditions and climate changes ranging from rainfall to drought and seasons to seasons. The color and width of the bands tell us what they might have experienced. A favorable year is marked by wide rings, and a narrow ring signifies a year of hardship and stress. This mirrors the life of humans at that particular period of time. Spring and summer are related to growth and vitality, the period in which human life prospers.

Winter and autumn are associated with challenges and stagnation in life. Both plants and the lives of human beings are largely dependent on plants. The oxygen we breathe, the food we consume, medicines, and a wide range of everyday requirements are dependent on plants. Thus, the events in a plant's life reflect the conditions human beings have faced. And growth rings serve as a record of the life history of the plant and humans.

Dendrochronology is the study of growth rings and is applied in various disciplines, from archeology to climate science.

The construction dates of many architectural creations of such as the Church of the Nativity in Bethlehem or cliff dwellings at Mesa Verde National Park, which signifies the culture and evolution of humans, are estimated by this.



Image source
<https://naturalsciences.org/calendar/news/science-at-home-tree-rings/>

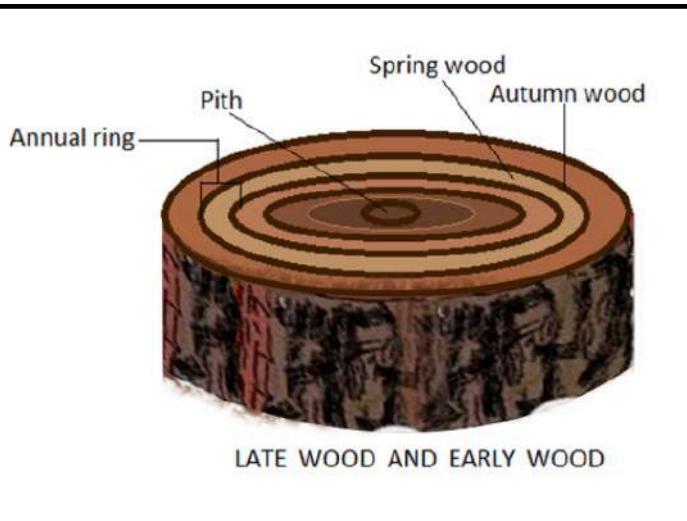


Image source
<https://images.app.goo.gl/SdguvNHCoYj9bzIu6>

The data derived from tree rings is also useful in understanding what regional and global paleoclimate looked like. The amount of carbon present in the tree samples can give a look into the changes in climate and vegetation. Growth ring data is used to understand the drought and temperature patterns, which in Southwest America indicated a prolonged period of drought in the 1200s.

Humans and plants are interconnected in the cycle of life and seasons. Plants undergo stages of dormancy and growth; likewise, human beings go through phases of activity and rest. The annual rings preserve this history of adaptability and resilience of both life forms. But life doesn't always follow a singular rule.

Alder and pine tend to skip a year of growth or may sometimes show repeated rings; trees in high elevations show declined rings; similarly, human life also experiences erratic changes and instability. Growth rings draw parallels to the life of mankind and its surroundings. They leave anecdotes of persistence, distress, life, and death. They are Mother Nature's way of documenting her journey.

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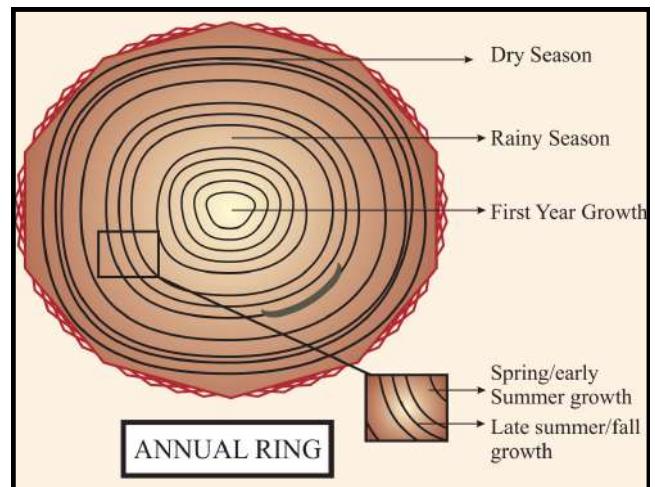


Image source
<https://prepp.in/news/e-492-annual-rings-environment-notes>



Ginkgo biloba: A Pharmaceutically Useful Fossil Plant

By: Ritika Poswal, B.Sc. (H) Botany
(2nd year)

Ginkgo biloba, commonly known as the maidenhair tree, is a unique species that has been on the planet for over 270 million years. This ancient plant has survived through the ages, earning the nickname "living fossil." Not only is *Ginkgo biloba* an interesting relic of the past, but it also holds significant pharmaceutical value, making it a valuable resource in modern medicine.

History and Evolution

Ginkgo biloba is believed to have originated during the Early Jurassic period, around 200 million years ago. Fossil records show that the plant has remained largely unchanged since the time of the dinosaurs. Its ability to adapt and survive in various environments has allowed it to thrive for millions of years. *Ginkgo biloba* was once widespread across the globe, but its range has decreased significantly over time. Today, it is primarily found in China, where it is considered a sacred tree.

Pharmaceutical Properties

Ginkgo biloba's pharmaceutical properties are attributed to its unique composition of flavonoids, terpenoids, and bilobalide. These compounds have been shown to have antioxidant, anti-inflammatory, and neuroprotective effects, making *Ginkgo biloba* a valuable resource in the treatment of various health conditions.

Some of the most significant pharmaceutical applications of *Ginkgo biloba* include:

1. Memory and Cognitive Function: *Ginkgo biloba* extract has been shown to improve memory and cognitive function in individuals with dementia and Alzheimer's disease. The flavonoids present in *Ginkgo biloba* have been shown to improve blood flow to the brain, which may contribute to its cognitive-enhancing effects.



Image source:
<https://en.m.wikipedia.org/wiki/File:GINKGOBAUM-2.jpg>



Image source:

https://en.m.wikipedia.org/wiki/File:Ginkgo_Biloba_Leaves_-_Black_Background.jpg

and Huntington's. *Ginkgo biloba* may also have a role in the treatment of depression and anxiety disorders.

Traditional Medicine and Modern Research

Ginkgo biloba has been used in traditional medicine for thousands of years, particularly in China. The plant was used to treat a variety of health conditions, including respiratory problems, digestive issues, and skin conditions. Modern research has validated many of these traditional uses, and *Ginkgo biloba* is now recognized as a valuable resource in modern medicine.

In recent years, there has been a significant amount of research into the pharmaceutical properties of *Ginkgo biloba*. Studies have shown that *Ginkgo biloba* extract can improve cognitive function, memory, and blood flow, making it a potential treatment for a range of health conditions.

Commercial Production and Standardization

Ginkgo biloba is commercially produced in many countries, including China, the United States, and Germany. The plant is typically harvested in the fall, and the leaves are dried and processed into a standardized extract.

Standardization is an important aspect of *Ginkgo biloba* production, as it ensures that the extract contains a consistent amount of active compounds. Look for products that are standardized to contain 24% flavone glycosides and 6% terpene lactones.

2. Antioxidant and Anti-Inflammatory Effects: The flavonoids and terpenoids present in *Ginkgo biloba* have antioxidant and anti-inflammatory properties, which can help protect against cell damage and reduce inflammation. This may be beneficial in the treatment of conditions such as arthritis, diabetes, and cancer.
3. Cardiovascular Health: *Ginkgo biloba* has been shown to improve blood flow and reduce blood pressure, making it a potential treatment for cardiovascular disease. The flavonoids present in *Ginkgo biloba* may also help to reduce the risk of heart disease by preventing the formation of blood clots.
4. Neuroprotection: The bilobalide present in *Ginkgo biloba* has neuroprotective effects, which can help protect against neurodegenerative diseases such as Parkinson's

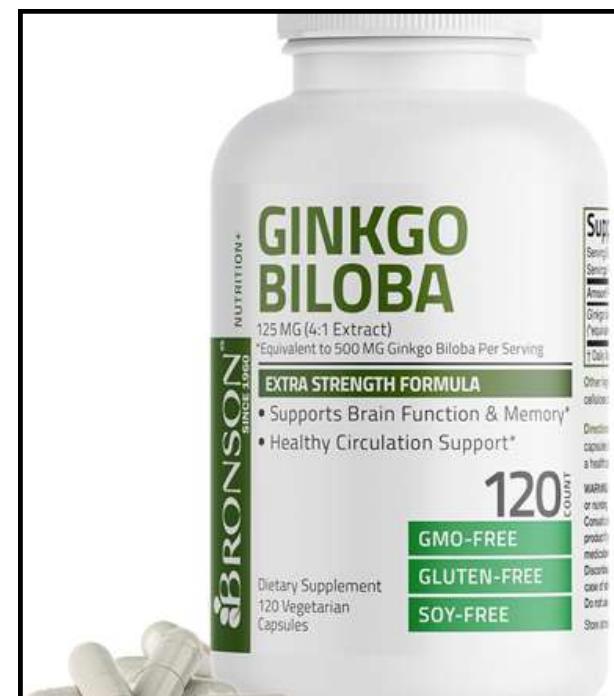


Image source:
<https://images.app.goo.gl/AKmhuP52wjQvVTHz8>

Conclusion

Ginkgo biloba is a unique and fascinating plant that has been on the planet for over 270 million years. Its pharmaceutical properties make it a valuable resource in the treatment of various health conditions. *Ginkgo biloba* is likely to remain an important part of modern medicine for years to come.



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The interrelation between plants and humans

By: Amrita Rao, B.Sc. (H) Botany

(1st year)

Nature often holds a mirror to human existence, and the study of plants reveals striking parallels between these two seemingly different forms of life. Plants and humans, though distinct in biology, share fundamental processes and adaptations that underline our interconnectedness. From cellular similarities to social behaviors, the intricate tapestry of life showcases the universal principles that govern all living organisms.

Cellular Similarities: A Shared Blueprint

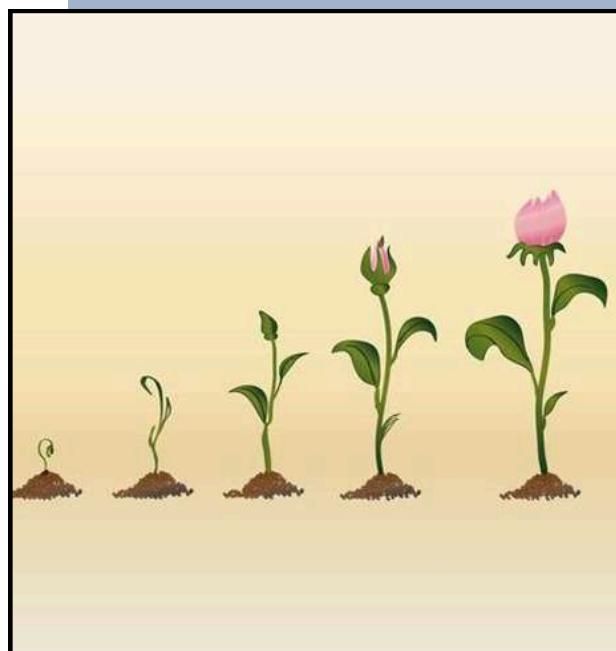
At the cellular level, humans and plants are surprisingly alike. Both are made up of eukaryotic cells containing a nucleus and other organelles. DNA, the molecule that carries genetic information, operates similarly in both plants and humans, coding for proteins essential for survival. Photosynthesis in plants and cellular respiration in humans are complementary processes. Plants convert sunlight into energy, producing oxygen as a byproduct, while humans consume oxygen and release carbon dioxide, creating a symbiotic relationship that sustains life on Earth.

Growth and Development

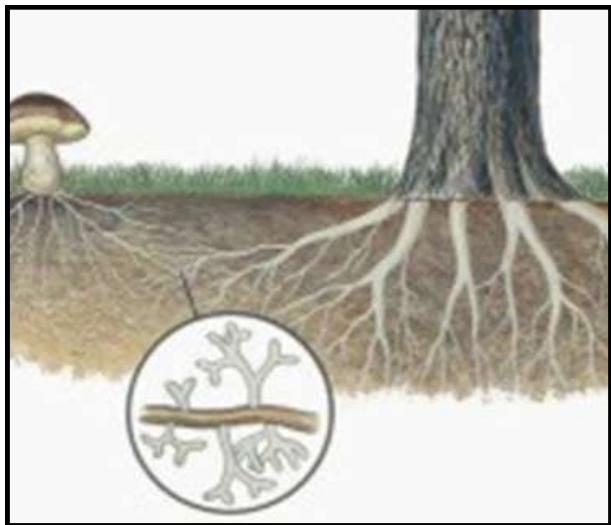
Plants and humans exhibit growth patterns regulated by hormones. For instance, plants rely on auxins and gibberellins for elongation and development, while humans depend on growth hormones like HGH. Similarly, both species undergo programmed cell death, or apoptosis, to maintain homeostasis and remove damaged cells.

Communication and Social Behaviours

Plants and humans both engage in intricate communication. Through a network of chemical signals, plants warn each other of danger, attract pollinators, or fend off predators. For example, the release of volatile organic compounds (VOCs) by stressed plants is akin to humans using verbal or non-verbal cues to signal distress.



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Forest with interconnected tree roots and fungal networks. Moreover, plants form communities through root systems and fungal networks, akin to human societies. The “Wood Wide Web,” a term coined to describe underground fungal networks connecting trees, mirrors the human reliance on digital and social networks.

Adaptation and Resilience

Plants and humans exhibit remarkable adaptability to their environments. Plants develop structural modifications like thorns, waxy leaves, or deep roots to survive in harsh conditions. Similarly, humans adapt through technological innovation and physiological changes to thrive in diverse habitats.

Both also exhibit resilience. After damage, plants can regenerate tissues, much like human healing processes. Some plants, like the Venus flytrap, have evolved unique mechanisms for survival, echoing human ingenuity in overcoming challenges.

Emotional and Mental Connections

Though plants lack a brain, studies suggest they respond to external stimuli in ways that resemble human emotions. For instance, plants show growth responses to touch (thigmotropism) and can differentiate between harmful and harmless interactions.

Humans, in turn, have a deep psychological connection to plants. Biophilia, the innate human tendency to connect with nature, highlights this bond. Gardening, forest bathing, and simply being around plants have been shown to reduce stress and improve mental health.

The Interwoven Web of Life

The parallels between plants and humans remind us of the profound interconnectedness of all life. By understanding and appreciating these connections, we foster a greater respect for nature and our place within it. Recognizing that plants are not merely resources but partners in the ecosystem can inspire sustainable practices and deepen our sense of stewardship toward the planet.

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The Timeless Symbolism And Significance Of The Lotus Flower

By: **Mayurakshi, B.Sc. (H) Botany**
(1st year)

The Lotus Flower, a captivating aquatic bloom, rising from the muddy depths to bloom above the surface. The majestic flower holds a profound symbolic meaning across various cultures, particularly in eastern religions and philosophies. The lotus flower has been a symbol of spiritual growth, purity and enlightenment for thousands of years, transcending cultures and civilizations. It is a potent symbol of purity, enlightenment, and resilience, often featured in art, literature, and religious practices.

In this article, we will know the rich symbolism and significance of the lotus flower, exploring its cultural, spiritual and philosophical significance. In Buddhism, the lotus is most revered, it symbolises Purity, enlightenment, compassion. It represents the purity of body, speech, and mind. The Lotus flower is often associated with purity and innocence, as it remains untouched by the impurities of the surrounding water. Different colours of the lotus hold specific meanings: white lotus represents spiritual purity and enlightenment. Pink Lotus symbolises the Buddha and the highest state of spiritual perfection. Blue lotus represents wisdom and overcoming illusion. Red Lotus represents love, compassion and devotion.

In Hinduism, the Lotus is associated with various deities, Gods, including Vishnu, Brahma, and Lakshmi, Saraswati. It symbolises creation, fertility, and beauty. In Hindu cosmology, the universe is said to have emerged from a golden Lotus that sprouted from the navel of The Lord Vishnu. In Hindu tantra, the lotus is associated with the chakras, the energy centers of the body. The lotus flower is a powerful and multifaceted symbol in Hinduism, representing a wide range of spiritual and philosophical concept.

In ancient Egypt, the lotus flower held significant religious and symbolic meaning. The Lotus flower was closely associated with the creation myth. It was believed that the Sun God Ra emerged from a primordial lotus flower at the dawning of creation.



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The daily opening and closing of the lotus flower mirrored the daily cycle of the Sun, symbolising rebirth and renewal. It was often depicted in funerary art, symbolising the hope for eternal life in the afterlife. Lotus flower were used extensively in religious ceremonies, often as offerings to the gods.

The lotus's ability to bloom in muddy waters symbolises the potential for spiritual growth and enlightenment amidst the impurities of the world. Its upward growth against all odds represents the power of hope, perseverance, and the ability to overcome challenges. The lotus's delicate beauty and serene presence serve as a reminder of the importance of inner peace and tranquillity. In many spiritual traditions, the lotus symbolises the unfolding of consciousness and the journey

towards self-realisation. The Lotus flower, with its captivating beauty and profound symbolism, has captivated human imagination for centuries. It serves as a powerful reminder of the potential for growth, transformation, and spiritual awakening even in the face of adversity.

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Roots of Change: A Theoretical Model of Human-Plant Co-Evolution

By: Ananya Kumari, B.Sc. (H) Botany
(1st year)

Human plant co-evolution refers to the interrelated evolutionary relationship between humans and plants over years. From early humans relying on plants for basic survival needs to the complex agriculture and genetic advancements of today, this relationship has shaped both human societies and plant species. The evolutionary pressures exerted by humans on plants, and vice versa, have led to innovations in agriculture, medicine, culture, and technology, while also facing significant challenges. If we look into the ancient time, humans gathered wild plants for food. They chose plants that were tasty, easy to collect, or nutritious. Humans began cultivating certain plants around 10,000 years ago during the Neolithic Revolution.

Plants such as wheat, barley, rice, and maize were domesticated. Archaeological Evidence says that domesticated wheat was found at early farming sites around ~10,000 years ago. Domestication resulted in genetic changes. For example, seeds became bigger or fruits got sweeter. Some plants became dependent on humans. Some seeds can no longer spread on their own and need people to plant them. Plants started to grow traits humans liked, like being less bitter or having more fruit. Maize (corn) was domesticated from Teosinte leading to formation of larger, non-shattering cobs.

Map of Southwest Asia showing the main archaeological sites of the Pre-Pottery Neolithic period, c. 7500 BCE, in the "Fertile Crescent"

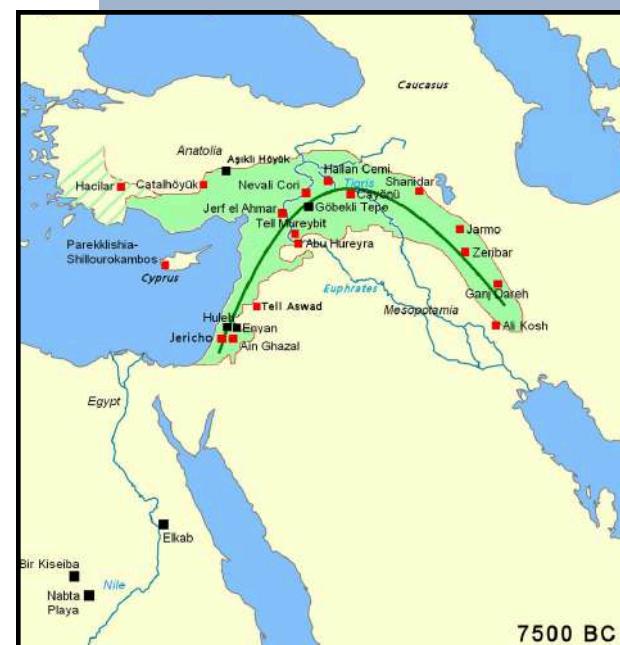


Image source:
https://en.m.wikipedia.org/wiki/File:Fertile_crescent_Neolithic_B_circa_7500_BC.jpg

As we know Getting full nutrition is essential therefore eating plants changed human bodies. People who ate a lot of starchy foods, like rice, got better at digesting them. The use of plants as medicines shaped human immune systems and cultural practices, leading to the selection of traits beneficial for survival. Plants such as willow, containing salicin, provided the basis for early medicines. Farming made humans settle in one place, leading to the first villages and cities. Humans began breeding plants to grow better crops. This gave us bigger corn, sweeter fruits, and tastier vegetables. Plants like coffee, tea, and tobacco became important for trade and culture.



Image source- <https://en.m.wikipedia.org/wiki/Willow>

With widespread development of modern technologies, Humans now directly modify plant genomes, accelerating co-evolution by bypassing natural selection. Crops like Bt cotton and Golden rice are examples of human-directed plant evolution, enhancing pest resistance and nutritional value. As climate shifts, both humans and plants must adapt. Humans are breeding drought-resistant crops, while some plants evolve to survive urban and agricultural environments. Humans have transported plants globally, introducing species to new habitats and creating opportunities for hybridization. The Columbian Exchange introduced potatoes, tomatoes, and maize to Europe and wheat and sugarcane to the Americas.

Human-plant co-evolution is ongoing, with both natural and technological forces continuing to shape this mutual relationship, influencing food systems, biodiversity, and ecosystems globally. It underscores the deep connection between human survival and the natural world. As humans continue to influence plant evolution, it is essential to approach this relationship with care, respect, and an awareness of the environmental and social responsibilities that accompany it. The future of this co-evolutionary partnership will depend on our ability to adapt to changing circumstances, embrace sustainable practices, and preserve the diversity and resilience of the plant species that have supported human civilization for years.

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Plants and Humans : Diverse Yet United by the Threads of Life

By: Amreen Lamba, B.Sc. Life Sciences (Prog.)
(2nd year)

Plantae and Homo sapiens- seem more like two species struggling to battle their survival in this world filled with loads of nasty pathogens.

If any layman looks at both a Plant and a Human, he would say with surety that no similarity could possibly exist between the two. But a scientific analysis would paint a different picture.

We all have heard about the concept of evolution and how complex organisms have evolved from seemingly similar ones. If we take a closer look, life on earth started as a single celled organism and slowly through advancements new species evolved giving rise to various kingdoms- Monera, Protista, Fungi, Plantae and Animalia.

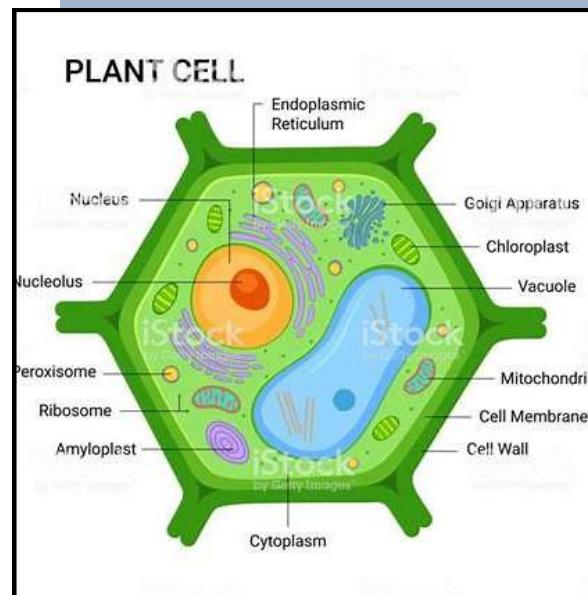
One major distinction that exists between humans and plants is that former is capable of locomotion while latter not. In terms of structural aspects, animal cells have variable shapes like oval, rod shape etc and plant cells are comparatively larger, rectangular in shape and possess a cell wall. Another difference arises in the share of space both give to vacuoles. In plants, vacuoles occupy roughly 90% of space whereas in animals the vacuoles are small and remain scattered.

However, despite having different shapes and vacuole distribution both have membrane bound organelles, i.e. both possess eukaryotic cell characteristics. These include having well developed nucleus and other fundamental organelles like mitochondria, ribosomes and endoplasmic reticulum among many others.

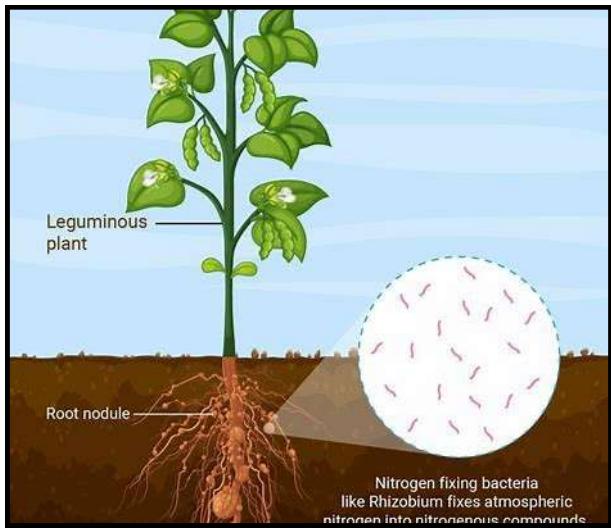
Just like humans have hair to protect themselves from UV rays or environmental conditions, plants also have defensive structures like microscopic hair-like structures called trichomes. that serve a variety of purposes.

We all are aware that plants take up nutrients in the form of dissolved minerals from the soil through roots with the help of osmosis. Some nutrients like iron and potassium can be directly taken up from the soil. Whereas, some other nutrients like nitrogen cannot be acquired directly and have to be converted in forms that can be absorbed by the plant easily.

Hence, some plants from family Fabaceae (legumes) initiate symbiotic relationships with a group of nitrogen fixing bacteria called Rhizobia.



<https://www.stocksy.com/illustration/4576338/plant-cell-anatomy>



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group of nitrogen fixing bacteria called Rhizobia. These bacteria secrete nitrogenase enzyme which form ammonia from atmospheric nitrogen. Humans also have similar strategies for uptake of nutrients, they take in food which may be simple or complex in nature. Complex ones are broken into simpler ones through the action of various enzymes at each step of digestion. For e.g. The very first process of digestion which begins in the mouth is starch (complex molecule) being broken to simpler sugars by the action of salivary amylase. Most of the nutrients from the food are absorbed through villi (increase surface area like root hairs in plants) in small intestine. Some bacteria in the small intestine also help in digestion of carbohydrates. Bacteria in large intestine also help in breakdown of remaining nutrients and make vitamin K.

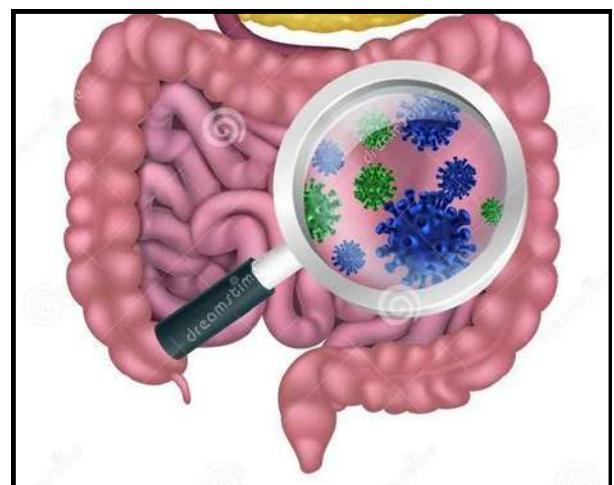
Chemicals play an essential role in various processes. For instance, when a pollen germinates how do you think it reaches the ovule? Is the male germ unit already born with an inbuilt map? According to a study, specialized proteins called lure proteins are secreted by the synergid cells of the ovule that lead the path towards the female gamete which eventually leads to fertilization. Without these guide proteins, continuation of plant species may simply not be possible.

Similar is the case in humans, cells of corona radiata surrounding the female ovum secrete chemicals to attract the male sperm. Plant and humans also share similar growth patterns. A seed when provided with nourishment grows into a little sapling and then continues to grow to a big tree. Similarly, human growth also starts in the form of a fertilized zygote, then embryo that grows into a small baby in its mother's womb. The baby then grows to become an adult individual as the cells keep dividing rapidly.

Despite distinctions, we can see such beautiful connections between plants and humans, and it reminds me of a quote "Vasudhaiva Kutumbakam", this means "the earth is one family". Indeed, all living organisms may differ in some aspects yet we can find some connecting links between them and that indicates that are all part of the same family.

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The Psychology of Green: How Plants Influence Human Emotions and Behavior

By: Anshima Sinha, B.Sc. (H) Botany
(3rd year)

Have you ever felt your stress melt away while walking in a park or watering a houseplant? And wondered why I felt this way? Let me answer this for you. Humans have a natural connection to nature, known as biophilia, which explains why plants and greenery have such a profound effect on our emotions and behavior. But we live in a world which needs scientific evidence for everything so there is a detailed explanation regarding this phenomenon.

Research has repeatedly shown that spending time in nature reduces stress and promotes relaxation. In Japan, the practice of shinrin-yoku or forest bathing has gained popularity for its calming effects. Research in 2010 found that even 20 minutes in a forest significantly reduced hormones which cause us stress like cortisol, lowers the heart rates, and improved blood pressure compared to urban environments (Park et al., 2010).

Indoor plants, too, can have a calming effect. Another research in 2015 observed that caring for plants helped lower blood pressure and gave a sense of peace and relaxation to the people (Igarashi et al., 2015). If you have heard of a beautiful plant called peace lily (*Spathiphyllum*), let me tell you that it is used for its calming effects.

Plants can also make you more productive and mentally sharp. A study in the Journal of Experimental Psychology revealed that offices with plants saw a 15% increase in productivity compared to sterile workspaces (Nieuwenhuis et al., 2014).

Spending time with nature enhances memory retention. A study by the University of Michigan found that participants experienced a 20% improvement in memory after walking in a natural environment (Berman et al., 2008) Caring for plants isn't just a hobby, the plants are not there just for aesthetic appeal they are for your mental health as well as for your physical well-being During the COVID-19 pandemic, people turned to indoor gardening for comfort



<https://artofhealthyliving.com/wp-content/uploads/2023/02/Managing-Stress-and-Anxiety-How-Indoor-Plants-Boost-Your-Mental-and-Emotional-Health.jpeg>



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A research in Urban Forestry & Urban Greening reported that those who engaged with plants during lockdowns experienced lower levels of anxiety and a greater sense of well-being (Pouso et al., 2021). This aligns with research published in Frontiers in Psychology showing that nurturing plants promotes mindfulness and reduces symptoms of anxiety and depression (Cheng et al., 2020). The simple act of watering to a plant can instill a sense of purpose and grounding and help us to deal with anxiety and depression.

In our culture we were always told that the plants and nature are not for individuals, they are present for our community, similarly the positive effects of plants occur on the whole community. They influence the society as a whole.

Green spaces encourage eco-friendly habits. A research in 2009 found that people who spend more time in nature are more likely to engage in sustainable practices like recycling and energy conservation (Nisbet et al., 2009).

Plants are not just for decorations; they are essential to our emotional and physical health. They clean the air we breathe, removing toxins like formaldehyde as demonstrated in NASA's Clean Air Study (Wolverton et al., 1989)—and promote peace, happiness, focus, and overall well-being of life. In an increasingly urbanized and industrial world, incorporating plants into our homes, workplaces, and public spaces isn't a luxury; it's a necessity.

From now on whenever you water your plant take a moment to appreciate it, to thank it, to love its beauty. It's more than just a living organism, it's a living source of calm, connection, and clarity.

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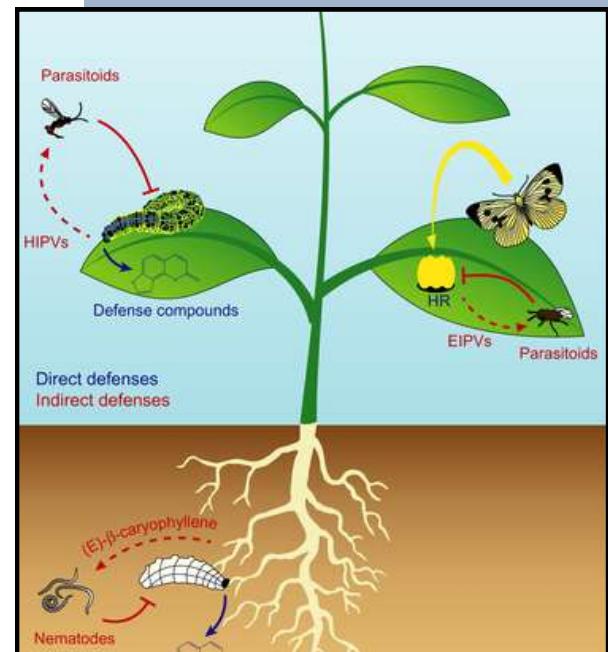
Mirrored Immunity: Plant-Animal Parallels in Defense Mechanism

By: Kashish Arora, B.Sc. (H) Botany
(2nd year)

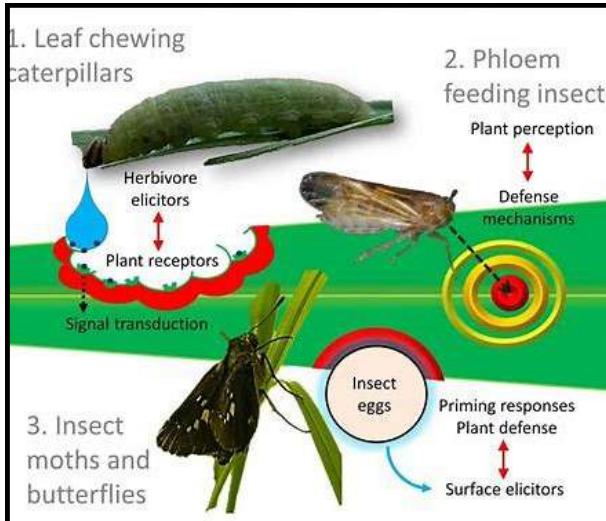
Despite their differences, plants and animals share noticeable similar approaches to defending against harmful agents, most of which includes pathogens causing deadly diseases. While plants lack an adaptive immune system, their innate immune mechanisms are highly developed, enabling them to detect and respond to microbial threats effectively. The core of this system are NLR (Nucleotide-binding domain and Leucine-rich Repeat-containing) proteins, which play a comparable role in the immune systems of animals by identifying intracellular dangers and triggering the immune responses.

In plants, the NLR proteins act as intracellular sentinels, recognizing virulence factors or that infiltrate inflammasomes—complex structures that recruit and activate caspases like Caspase-1. Inflammasomes amplify immune defenses by releasing inflammatory cytokines, including IL-1 β and IL-18, and can trigger pyroptosis, which is a type of programmed cell death, which basically kills the infected cells and the surrounding cells so the infection does not spread. These processes work in unison to eliminate infections, promote inflammation, and signal neighboring cells, ensuring a well-coordinated immune response.

In animals, these proteins function similarly by detecting pathogen-derived or host-generated danger signals and activating immune pathways that lead to inflammation or cell death. Both direct and indirect interactions between NLRs and pathogens are crucial for immune responses. Plant NLRs use their LRR domains to bind directly to pathogen effectors, triggering a series of defensive actions. In animals, NOD-like receptors bind to pathogen-associated molecules oligomerize, and recruit adaptor proteins to stimulate downstream signaling which eventually destroys the pathogens and protects us from many deadly diseases. Indirectly, NLRs in both plants and animals serve as vigilant "guards," detecting



<https://onlinelibrary.wiley.com/doi/10.1111/tpj.13773>



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eliminate infections, promote inflammation, and signal neighboring cells, ensuring a well-coordinated immune response. The shared mechanisms in plant and animal immune systems reflect the remarkable evolutionary strategies organisms have developed to counter microbial threats. Comparative immunology continues to reveal these extraordinary parallels, shedding light on how distinct life forms have converged on similar solutions to ensure survival.

pathogen-induced modifications in host proteins. This surveillance can activate immunity or deploy decoys to misdirect pathogens eventually protecting the systems. In animal systems, specific NLR family members, such as NAIPs, directly bind bacterial elements. Upon activation, NLRs assemble into inflammasomes.

Inflammasomes are complex structures that recruit and activate caspases like Caspase-1. Inflammasomes amplify immune defenses by releasing inflammatory cytokines, including IL-1 β and IL-18, and can trigger pyroptosis, which is a type of programmed cell death, which basically kills the infected cells and the surrounding cells so the infection does not spread. These processes work in unison to

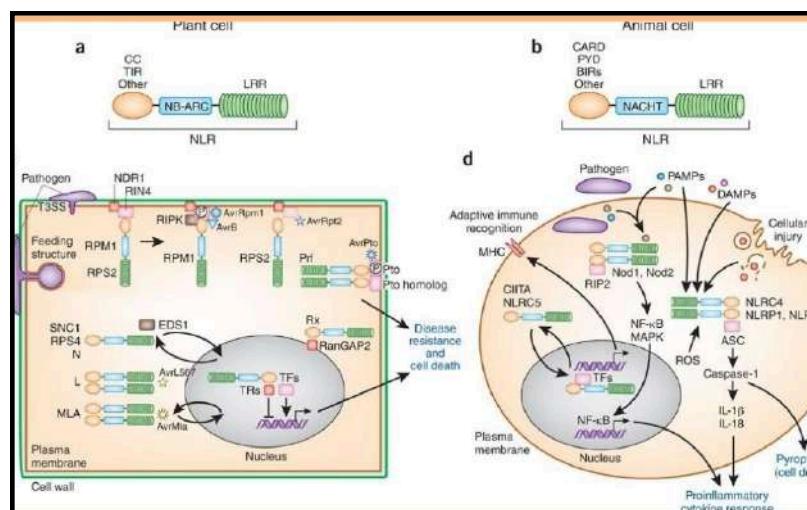


Fig: Mechanism of Activation of Immune response through NLRs in Plants and Animals

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Nature's Blueprint : How photosynthesis Mirrors Human Metabolism

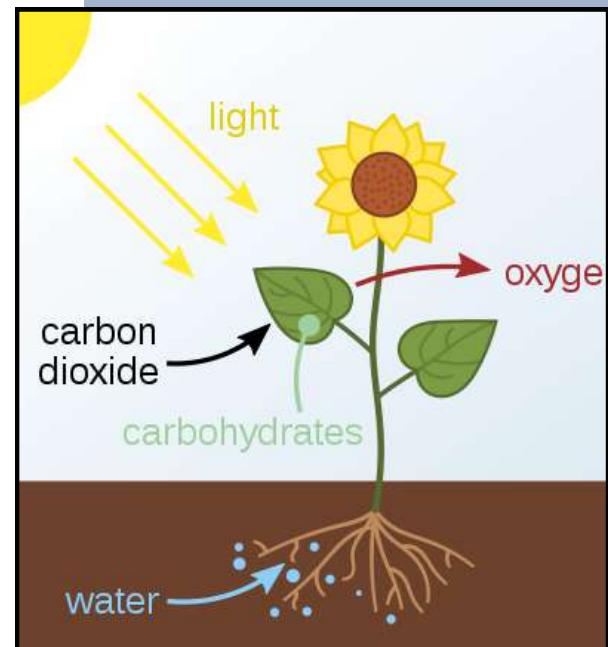
By: Nishtha Bhardwaj, B.Sc. (H) Botany
(2nd year)

In the intricate tapestry of life, the connection between plants and humans reveals a profound biological harmony. Though we often view ourselves as separate from the natural world, the processes that sustain our lives—photosynthesis in plants and metabolism in humans—are beautifully intertwined. At the heart of this connection lies a symbiotic exchange of energy and gases that forms the basis of life on Earth. Photosynthesis is the process by which green plants, algae, and some bacteria convert sunlight into chemical energy.

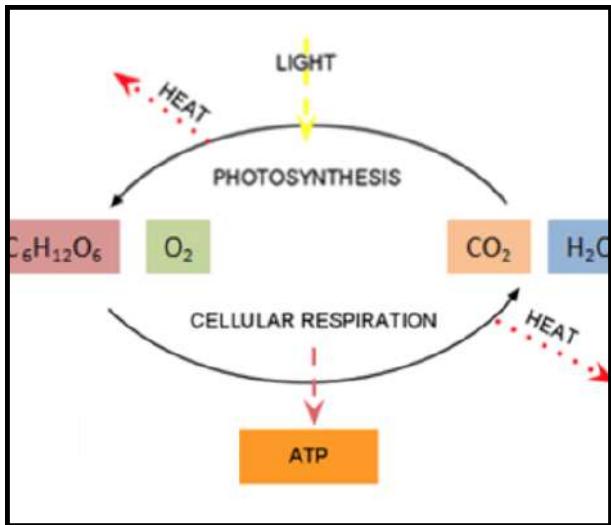
Using sunlight, water, and carbon dioxide, plants create glucose and release oxygen as a byproduct. This process is not only responsible for nourishing the plants themselves but also for producing the oxygen that all aerobic organisms, including humans, depend on. Through this seemingly simple act, plants become the primary producers in the ecosystem, capturing and storing solar energy in a form that fuels nearly every other living thing.

Human metabolism, particularly the process of cellular respiration, complements photosynthesis in a remarkable way. When we consume food—especially carbohydrates such as glucose—we break it down in the presence of oxygen to produce energy, releasing carbon dioxide and water in the process. This chemical reaction mirrors photosynthesis in reverse, effectively completing a biological cycle. The oxygen that plants produce becomes the vital element we breathe, and the carbon dioxide we exhale returns to the atmosphere as a crucial ingredient for the next round of photosynthesis.

This reciprocal exchange illustrates a deeper truth: humans and plants are locked in a continuous, life-sustaining dialogue. Every breath we take is connected to the breath of a tree. Every bite of food links us to the energy captured in green leaves by sunlight. Even the structures within our cells reflect this connection—plants rely on chloroplasts to convert



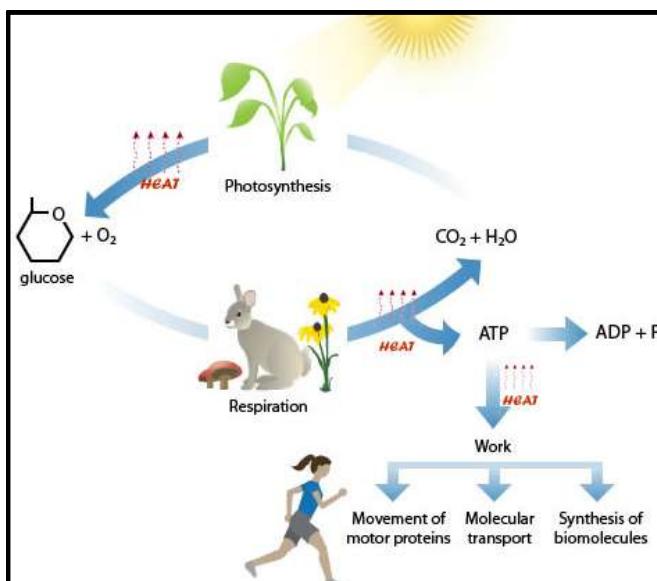
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sunlight into energy, while our cells use mitochondria to transform that stored energy into usable fuel. Both of these organelles trace back to ancient symbiotic organisms, emphasizing our shared evolutionary history. Recognizing this elegant relationship carries philosophical and ecological significance. It reminds us that we are not apart from nature but deeply embedded within it. The balance of gases in our atmosphere, the food we eat, and the energy that powers our bodies all depend on the quiet work of plants. This interdependence makes the destruction of forests and plant life not just an environmental issue, but a direct threat to human well-being.

<https://pressbooks.library.vcu.edu/biol217vcu/chapter/3b-photosynthesis-and-metabolism/>

In essence, photosynthesis and human metabolism are more than scientific phenomena—they are complementary forces that embody the unity of life. They represent a natural harmony in which each form of life supports the other, a cycle of giving and receiving that sustains the entire planet. In understanding this connection, we gain a deeper appreciation for the living world and our place within it.



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SEGMENT

FINALE



Breathe in, Relax, Rejuvenate:
The Healing Power of
Aromatherapy

Breathe in, Relax, Rejuvenate: The Healing Power of Aromatherapy



By: Dhiseka Pawaiya
(Co-editor, ANTHESIS)

“Smell is the primordial sense, more powerful, more primitive, more intimately tied to our memories and emotions than any other. A scent can trigger spiritual, emotional or physical peace and stimulate healing and wellness.” – Donna Karan

A soothing and refreshing smell has the capability to interact with the brain's limbic system and give a calming effect to your body and mind. Defining the potency of a good smell for reducing stress for a therapeutic effect on the body and mind to heal your body without any mechanical or chemical incorporation is the aromatherapy. Aromatherapy is introduced amongst the most ancient healing arts of the world explored long back in the 4500 BC. These were the times when the Egyptians and Greeks started using aromatic substances in medications, scented massages and aromatic baths respectively.

It is the holistic healing treatment, an alternative medicine which is inhaled and not ingested and uses oils which are naturally extracted from various parts of a plant or tree such as flowers, bark, stem, leaves, and roots to enhance the physical and emotional well-being of an individual.

Aromatherapy is one of nature's greatest gifts to humanity. This alternative therapy not only rejuvenates the body but also provides a deep sense of fulfillment and satisfaction, uplifting the spirit. While it may not be a cure for specific diseases, it plays a vital role in managing and controlling various health conditions. The essential oils, which are the cornerstone of this therapy, offer a natural and holistic approach to healing that is often far superior to synthetic treatments. Aromatherapy is a timeless practice, deeply rooted in ancient civilizations, and continues to be a valuable tool for well-being.

Some Common Plants used in Aromatherapy

Eucalyptus: Eucalyptus (*Eucalyptus globulus*) belonging to the family Myrtaceae is well-known for its antioxidant, anti-inflammatory, antibacterial, and anti-proliferative properties. It is commonly used in treating cold, cough, and asthma, while also helping to boost the immune system and relieve muscle tension. The



Image source:
<https://thenewgait.com/blog/the-most-effective-aromatherapy-essential-oils-for-brain-injury/>



Image source:
<https://www.indiamart.com/proddetail/eucalyptus-essential-oil-4883564948.htm>

essential oil of eucalyptus is especially effective for respiratory support and soothing sore muscles.

Geranium: Geranium (*Pelargonium graveolens*), from the Geraniaceae family, is known for its anti-diabetic, anti-cancer, anti-bacterial, and anti-microbial properties. The oil extracted from this plant is widely used in natural perfumes, as well as in the making of soaps and detergents, due to its pleasant fragrance and therapeutic benefits.

Lavender: Lavender (*Lavandula officinalis*) belongs to the Lamiaceae family and boasts antibiotic and antifungal properties. Lavender essential oil is commonly used for treating abrasions, burns, stress, headaches, skin issues, and muscle pain, offering a calming and soothing effect on both the body and mind.

Lemon: Lemon (*Citrus limon*) from the family Rutaceae shows antiseptic and detoxifying properties, making it an effective agent for stimulating the immune system and helping to protect the body during flu season or illness. Its refreshing scent and healing qualities also make it a popular choice for cleansing the body.

Peppermint: Peppermint (*Mentha piperita*) from the family Lamiaceae is known for its wide range of therapeutic properties, including anti-inflammatory, analgesic, anti-infectious, antimicrobial, antiseptic, antispasmodic, astringent, digestive, carminative, and fungicidal effects. It is also a nervine stimulant, vasoconstrictor, and decongestant. Peppermint oil is commonly used for digestive support and as a flavoring in tea, ice cream, and chewing gum.



Image source:
<https://www.netmeds.com/health-library/post/geranium-essential-oil-a-highly-underrated-natural-infusion-for-smooth-skin-and-mental-health>



Image source:
<https://www.news-medical.net/news/20240108/Itchy-skin-Possible-atopic-dermatitis-Lavender-essential-oil-might-be-just-what-you're-looking-for.aspx>

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<https://doi.org/10.1016/B978-0-12-416641-7.00079-1>



Image source:
<https://www.istockphoto.com/photos/lemon-essential-oil>

WHAT'S NEW IN BOTANY?

Plant science decadal vision 2020–2030: Reimagining the potential of plants for a healthy and sustainable future

<https://onlinelibrary.wiley.com/doi/full/10.1002/pld3.252>

Menstruation and plant science: A symbiotic relationship

<https://doi.org/10.33545/27072827.2023.v4.i2b.99>

Impacts of biodiversity on the emergence and transmission of infectious diseases

<https://www.nature.com/articles/nature09575>

Plant immune responses may offer insights into human brain diseases

<https://www.news-medical.net/news/20250219/Plant-immune-responses-may-offer-insights-into-human-brain-diseases.aspx#:~:text=Researchers%20have%20discovered%20that%20the,shared%20by%20ants%20and%20humans.>

Meat or veg? Plant-based protein is linked to a longer life, research shows

<https://www.sciencedaily.com/releases/2025/04/250415144002.htm>

Other Intelligences: Investigating the Plant-Human Relationship in Domestic Spaces

<https://www.mdpi.com/2409-9287/9/6/176>

On Camera: Scientists Capture Plants "Talking" To Each Other For The First Time

<https://www.ndtv.com/science/on-camera-scientists-capture-plants-talking-to-each-other-for-the-first-time-4916301>



→

Storm Your Brain

→

Botany Search

P	Q	D	J	C	A	L	L	E	L	O	P	A	T	H	Y	G	R
H	Y	G	B	Y	J	G	Z	L	I	S	T	O	M	A	T	A	G
Y	H	G	U	Z	H	R	M	M	C	I	L	A	S	M	Y	W	K
T	C	U	T	I	C	L	E	Y	W	D	R	J	J	Q	U	K	A
O	Y	D	T	T	P	G	U	T	T	A	T	I	O	N	R	V	R
C	J	R	H	I	Z	O	S	P	H	E	R	E	S	J	B	Q	V
H	B	Q	Q	W	D	O	R	M	A	N	C	Y	F	J	C	H	D
R	A	N	C	H	E	M	O	T	R	O	P	I	S	M	N	N	C
O	G	X	R	W	D	N	N	K	H	C	T	L	Y	N	R	W	Q
M	P	L	A	S	M	O	D	E	S	M	A	T	A	H	Y	H	O
E	U	M	B	T	E	T	H	Y	L	E	N	E	H	C	O	G	H
M	O	X	I	M	F	Y	N	S	Z	L	R	R	U	W	N	D	D

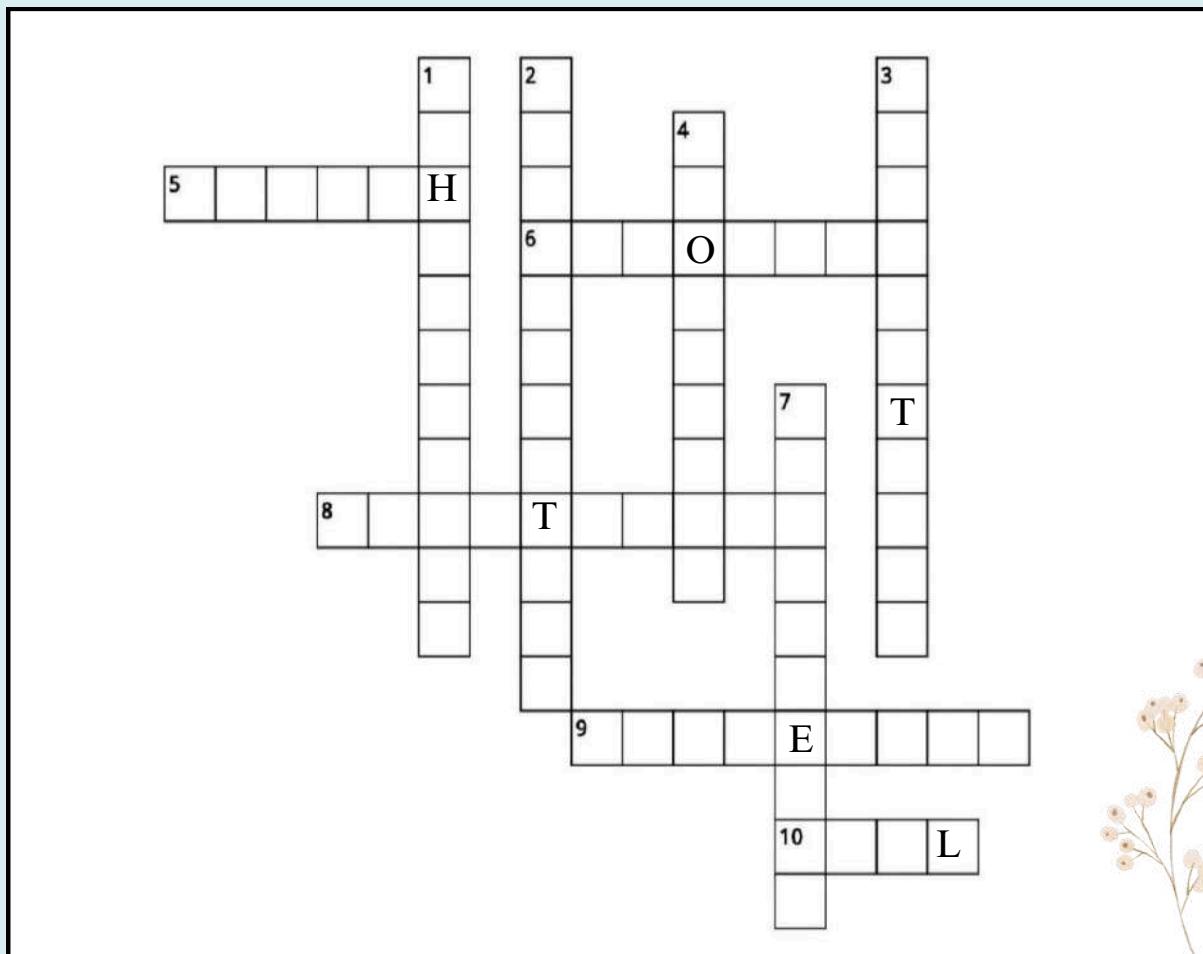
HINTS:

1. Light-sensitive pigment regulating plant development. (P_ _ T_ _ _ R_ _ _)
2. Chemical interaction between plants affecting growth. (A_ L_ _ _ _ _ T_ _)
3. Soil region influenced by root secretions and microbes.(R_ _ _ _ S_ _ _ R_)
4. Growth movement directed by chemical stimuli. (C_ _ M_ _ _ _ P_ _ _)
5. Microscopic channels enabling plant cell communication.(P_ _ _ M_ _ _ _ _ T_)
6. Water droplets exuded from leaf edges due to root pressure. (G_ _ T_ _ _ _ N)
7. A gaseous hormone involved in fruit ripening and stress responses.(E_ _ Y_ _ _ _)
8. Tiny leaf pores controlling gas exchange and water loss.(S_ _ _ _ T_)
9. Temporary metabolic slowdown for survival in harsh conditions. (D_ _ _ _ N_ _)
10. Protective waxy layer reducing water loss in plants.(C_ _ _ _ E)

[\(Click here to find the answers\)](#)

Botanique Puzzle

Uncover How Plants and Humans Mirror Each Other in Life Processes



Across

5. Process that leads to an increase in size; plants grow through meristems, humans through a form of cell division.
6. Organelle responsible for protein synthesis; functions similarly in both plants and humans.
8. Adaptive changes that help survival; plants develop drought resistance, humans adjust to climate.
9. Protective outer layer; in plants, it prevents water loss, in humans, it forms skin.
10. Basic unit of life; present in both plants and animals, performing similar functions.

Down

1. Field of study focused on how plants are utilized in human medicine, culture, and daily life.
2. Process involved in creating new life; plants use seeds, humans use fertilization.
3. Process of maintaining internal balance; plants regulate water via stomata, humans through sweating.
4. Programmed cell death; helps shape leaves in plants and removes damaged cells in humans.
5. Natural aging process; in plants, involves the shedding of leaves, in humans, it involves cellular deterioration.

[\(Click here to find the answers\)](#)

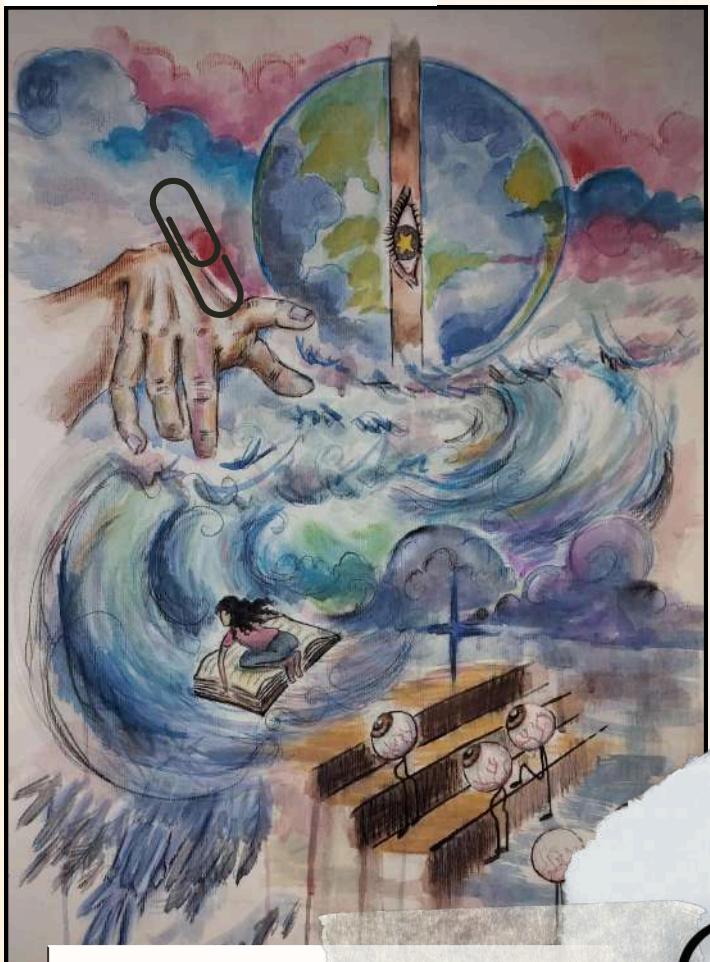
Our Achievers

STUDENT'S NAME	COMPETITION DETAILS	POSITION
Ananya Singh	Photography and writing competition on fungal focus, Capturing nature's wonders organised by Department of Microbiology, Gargi College and Microbiologist Society, India(MBSI), Delhi unit in association with National Academy of Sciences, India (NASI), Delhi Chapter.	3rd Position
Rashi Singh	Botanical illustration Competition by Medini- The Botanical Society of Kirori Mal College.	3rd Position
Usha	Quiz Competition held by sports department under Gargi Olympiad.	1st Position
Romal Kushwaha	Paper Presentation, International Conference of Bioinformatics, Gargi College.	1st Position
Usha	Interstream Cricket League	2nd Position
Usha	4×400 Relay at Shiv Nadar University, Noida	3rd Position
Simaran Kots, Anavya Yadav	Department of Botany: Habit Act	3rd Position
Sheetal	Gargi College Interstream Cricket League	2nd Position

STUDENT'S NAME	COMPETITION DETAILS	POSITION
Sneha,Riya, Radha	Photography and writing competition on fungal focus, Capturing nature's wonders organised by Department of Microbiology, Gargi College and Microbiologist Society, India(MBSI), Delhi unit in association with National Academy of Sciences, India (NASI), Delhi Chapter.	1st Position
Akshita	Squid game in Delhi, Institute of Management	3rd Position
Vandita Singh	DU culture counciling Inter College Rangoli Competition	1st Position
Sheetal	Gargi College Interstream Cricket League	2nd Position
Zeba Ansari	Interstream Dodge Ball Competition	3rd Position
Akshita, Aditi, Priyadarshini	Department of Botany: Habit Act	2nd Position
Romal Kushwaha	Social Case Competition, Motilal Nehru College	1st Position
Romal Kushwaha	Poster Presentation, Gargi College	1st Position
Romal Kushwaha	Presentation Competition, Microbiologist Society of India	1st Position
Romal Kushwaha	National Presentation Competition, Microbiologist Society of India	1st Position

STUDENT'S NAME	COMPETITION DETAILS	POSITION
Romal Kushwaha	Social B-plan Competition Deshbandhu College	2nd Position
Romal Kushwaha	National level Case Competition, Green Terre Foundation	2nd Position
Romal Kushwaha	Poster Presentation, Department of Botany, Gargi College	Best Speaker
Romal Kushwaha	Social B-plan Competition, Dr. B.R.Ambedkar College	3rd Position
Romal Kushwaha	National Case Competition, Unbounded Solutions	3rd Position

Vandita Singh (3rd year)



From Ashes To Green

The Planet craves
for pure Zephyr,
but got it nowhere.

Waiting for pure
all goes in vain,
but no one notices the pain.

It feels so good
to reminisce the past,
can someone make it re-broadcast.

Then a hope came,
to change the game,
makes nature to happily exclaim.

Then a hope came,
to change the game,
makes nature to happily exclaim.

Now, trees dance,
air is breezed,
again it's pure, and it's green.

This serene and clean planet
no one ever had seen.

Bhanu (1st year)

Art Corner

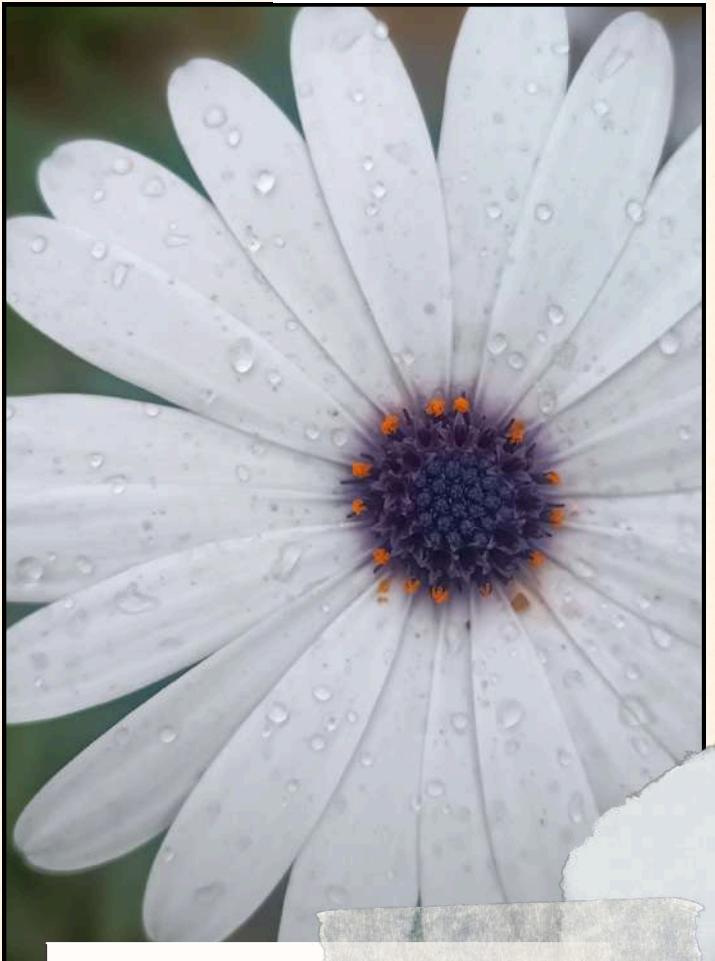


Ayushi Patel (1st year)



Kirti Vashishtha (3rd year)

Somya (3rd year)



Concordia Nature: Plants, Peril and Human Parallel

In silent woods where green hearts beat,
where roots run deep beneath our feet,
A song is sung in leaf and bough—
of peace, of pain, of sacred vow.

The plants, they speak in subtle tones,
in fragrant air and mossy stones.
They bloom with hope, endure with grace,
yet peril looms in every place.

fires range where cool winds blow,
skies once clear now choked in hue.
A balance breaks with every tree,
A mirror cracked of you and me.

For what are we but branching forms,
with veins like roots through inner storms?
We rise, we fall, we seek the sun,
just like the flowers — every one.

But greed has made our gardens thin,
we trade their breath for smoke and sin.
Still nature pleads, with quiet might,
to heal the dark, to guard the light.
So let us walk with gentler tread,
Revive the green, respect the dead.
In every leaf, a lesson dwells —
of Concordia's tale that nature tells.

Ayushi Gaur (1st year)



Mayurakshi (1st year)

*Art
Corner*



Payal Bajaj (1st year)

Botanisearch

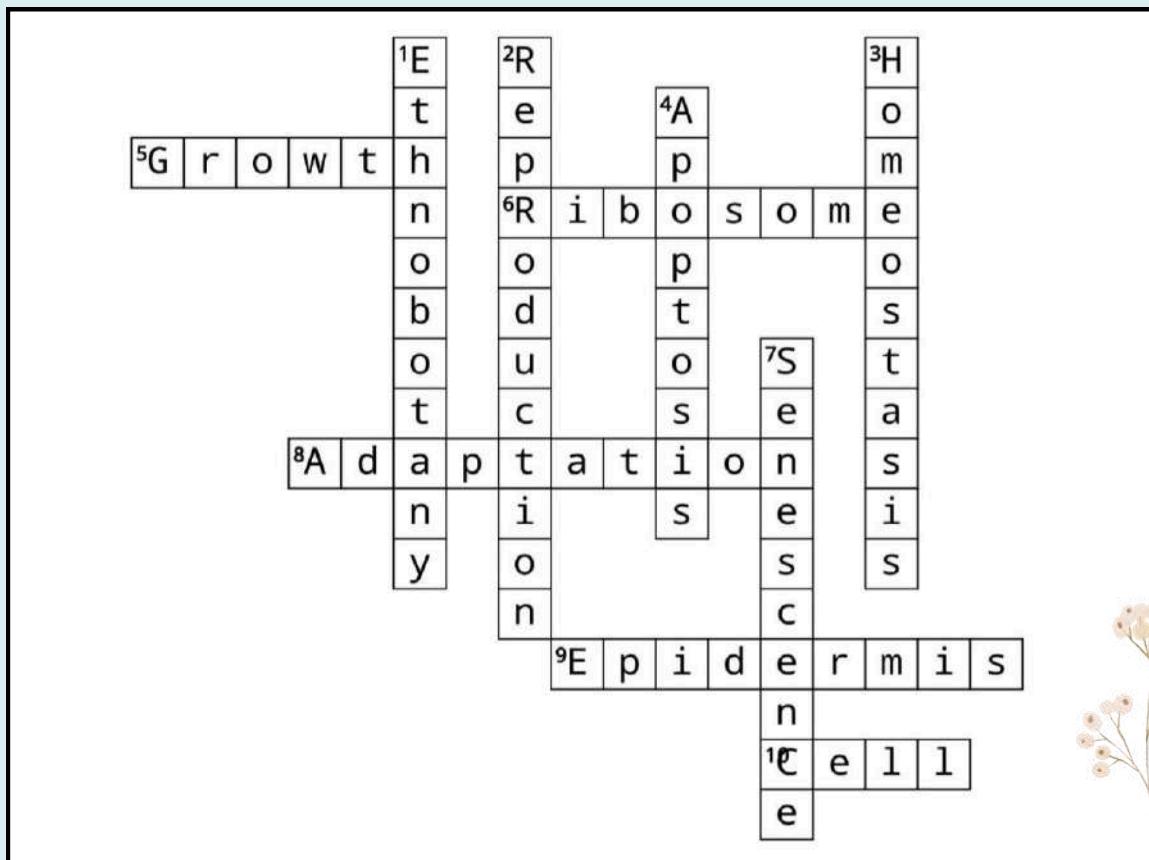
ANSWERS:

P	A	L	L	E	L	O	P	A	T	H	Y	.	.	
H	S	T	O	M	A	T	A	.
Y	
T	C	U	T	I	C	L	E	
O	.	.	.	.	.	G	U	T	T	A	T	I	O	N	.	.
C	.	R	H	I	Z	O	S	P	H	E	R	E	.	.	.	.
H	.	.	.	.	D	O	R	M	A	N	C	Y	.	.	.	.
R	.	.	C	H	E	M	O	T	R	O	P	I	S	M	.	.		
O	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
M	P	L	A	S	M	O	D	E	S	M	A	T	A	.	.	.		
E	.	.	.	.	E	T	H	Y	L	E	N	E	.	.	.	.
.		

1. Phytochrome
2. Allelopathy
3. Rhizosphere
4. Chemotropism
5. Plasmodesmata
6. Guttation
7. Ethylene
8. Stomata
9. Dormancy
10. Cuticle

Botanique Puzzle

ANSWERS:



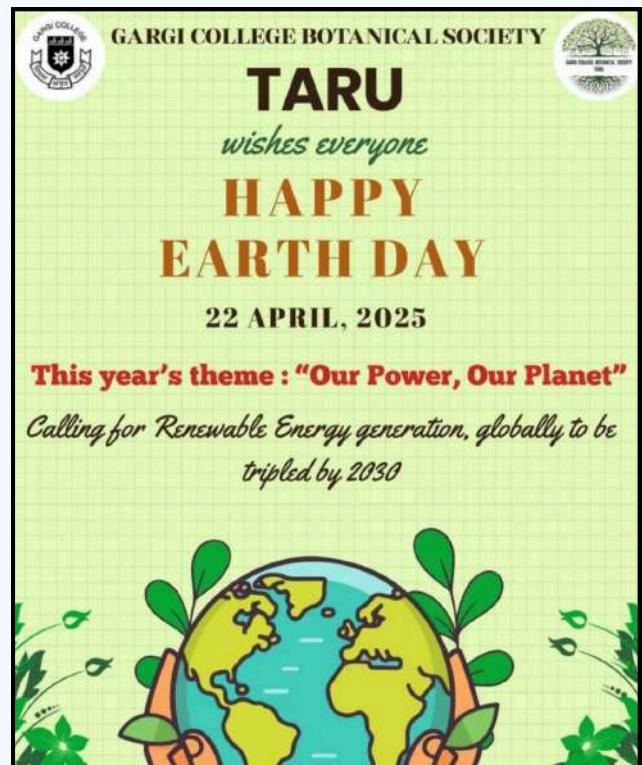
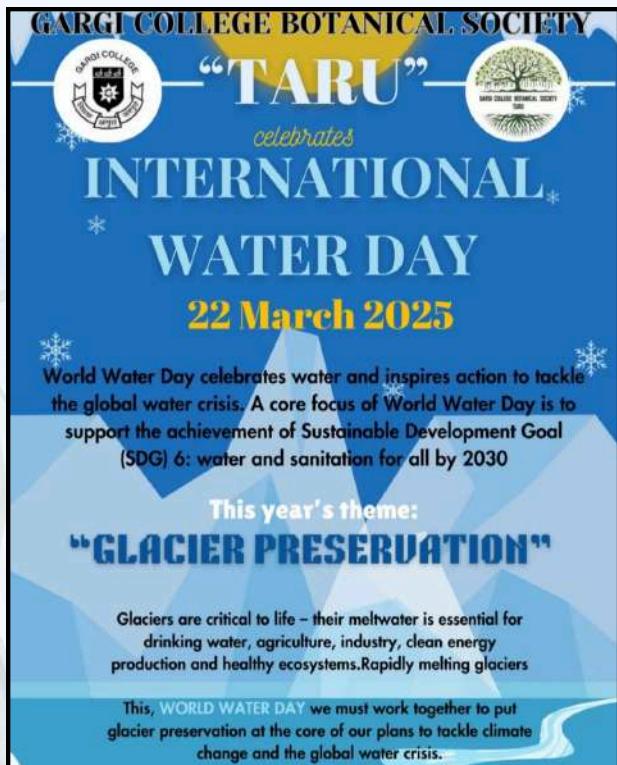
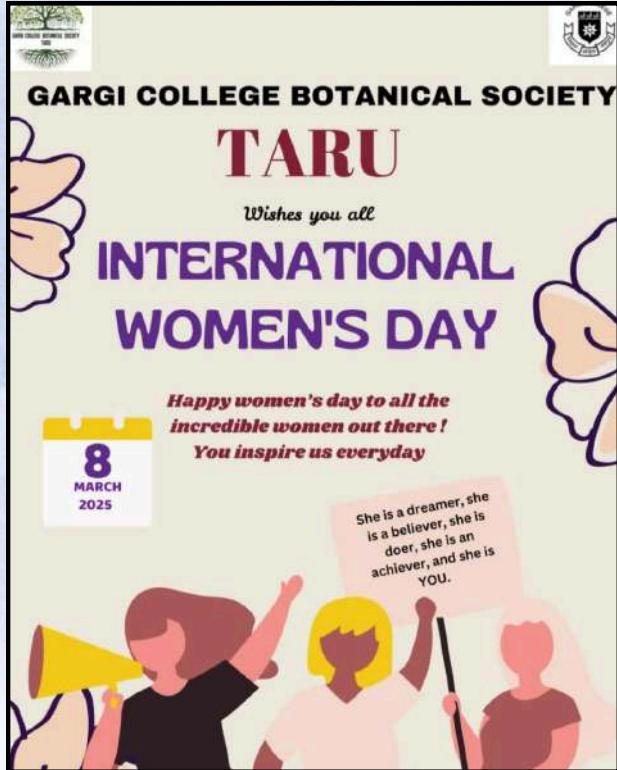
ACROSS

- 5. Epidermis
- 6. Adaptation
- 8. Apoptosis
- 9. Ribosome
- 10. Homeostasis

DOWN

- 1. Ethnobotany
- 2. Reproduction
- 3. Growth
- 4. Senescence
- 7. Cell

GCBS: Celebrating Special Days



President's note

Ms. Tanvi



With immense pride and gratitude, I share with you the 20th volume of *Anthesis*, the annual magazine of the Department of Botany, Gargi College. This milestone volume is a testament to the collective spirit, dedication, and creativity of our *Anthesis* team and the Botanical Society, TARU.

This edition is not just a compilation of articles—it is a vibrant tapestry of scientific curiosity, artistic expression, and an enduring love for the plant world. Curating this special issue has been a journey marked by collaborative efforts, thoughtful discussions, late-night brainstorms, and a shared commitment to excellence. Every page reflects the voices of our students, teachers, and alumni, coming together to celebrate the wonders of botany and beyond.

As we celebrate the 20th year of *Anthesis*, we have worked to blend tradition with fresh ideas, ensuring that this edition both honours the rich legacy of our department and embraces new perspectives. The *Anthesis* team has played a pivotal role in bringing this vision to life, with their relentless hard work, creative inputs, and editorial excellence.

I sincerely thank the *Anthesis* editorial team, the contributors, the faculty mentors, and all members of TARU for their unwavering support. Your passion and efforts have made this edition truly special. Here's to celebrating the journey so far and looking ahead to many more chapters of growth, learning, and inspiration.

Warm regards,
Tanvi
President, Gargi College Botanical Society (TARU)
Department of Botany
Gargi College

Ending note

In a world of tangled roots and fragile blooms, Anthesis blossoms again, this time under the theme Concordia Naturae: plants, perils and human parallels. As the 20th edition unfolds, we find ourselves reflecting not just on nature, but on ourselves, how our ecosystems mirror our emotions, how our survival intertwines with the smallest seed, and how the world speaks if we are quiet enough to listen.

This edition is not merely a compilation of creative and academic effort, it is a chorus of reflections exploring harmony, vulnerability, and resilience. We've journeyed through the perils facing the planet, the power of regeneration in plants, and the quiet metaphors that connect natural rhythms to human lives. Each page stands as a reminder that nature is not separate from us, it is within us.

None of this would have been possible without the unwavering dedication of our editor-in-chief, co-editors, and the editorial board members, whose commitment shaped this volume with care, insight, and an enduring sense of purpose. We extend our heartfelt gratitude to all those who have joined us on this journey, your presence added meaning to every step.

A sincere thank you to our faculty mentors, Dr. Preeti Agarwal and Dr. Neetu Chaudhary, for being our roots, grounding us with trust and guiding us with clarity. Their steadfast support has allowed us to grow with confidence and creativity.

The process of creating Anthesis is much like tending to a garden. There are seasons of doubt, storms of deadlines, and sudden blossoms of inspiration that make it all worthwhile. What has grown from this collective effort is more than a publication, it is a space to pause, question, and connect. As we turn the final page, we invite you to carry this edition beyond its cover. Let it remind you of the delicate links between nature and self, of the perils we must confront, and of the hope we must continue to plant.

May we keep nurturing, questioning, and blooming together.

Team Anthesis

ANNUAL PUBLICATION OF GARGI COLLEGE BOTANICAL SOCIETY

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