PHYTOPIA

REAP life

(An extended publication of Vegetos)

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A Newsletter of

SOCIETY FOR PLANT RESEARCH

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SPR-PHYTOPIA

SPR PARADOX: FOUNDER'S REPORT

Like any other society and journal, we also encountered many hurdles but our dedicated team of Executive Body, Councilors, Editors and well-wishers encouraged us. Being Founder, my responsibility was to nurture SPR and the journal to a respectable place. I feel privileged to have some dedicated great companions across the journey of more than 35 years because of which the journal VEGETOS and SPR are now global synonyms.

Running a society and the journal with sustainable growth, academic excellence and global acceptability was a big challenge but we all could do this endeavour fairly well despite several stresses.

Last year we launched a Newsletter under the aegis of SOCIETY FOR PLANT RESEARCH with the name PHYTOPIA which has taken good shape and is an e-newsletter of SPR. Though new but experienced team of editors under the leadership of Prof Ashish Bhatnagar as Chief Editor, PHYTOPIA is looking after its contents and publication.

Like any new venture, this newsletter is also struggling for its periodicity because of many other assignments of editorial board members but I am confident that their dedicated efforts will bring out 2-4 issues a year.

This newsletter has very informative sections covering most of the interesting news. I am very confident that it will be widely read by our young students, researchers and academicians besides sending their articles, news clippings and other material of public interest for inclusion.

I wish a great success to the entire team of editors in bringing out the second edition of PHYTOPIA.

INFOCUS-THE EDITORS' PEN

Philosophies that men frame to live, determine the standard of living and the sustainability of life. Words like human conquest over nature, calling ourselves humane and the rest of the animals as inhuman, and phrases like winning over Everest and exploiting resources (using something for business or profit or economic growth) have instilled a psyche that makes us think that nature is our enemy. A psyche that teaches us to ram down our own house as it bars us from the outer world. This very psyche also guided our quest in science and technology.

The requirement of food lead us to make fertilizers, a discovery that served well the immediate mankind but has now placed us on the verge of loss of organic matter and consequent loss of sustaining the nutritional ability of soils. The process to prevent spoilage of crops and food made us pour toxins into the environment that are now returning to us and manifesting havoc in a multitude of ways. The perishability of material made us create non-degradable monsters of plastics that are ultimately rolled down in the oceans and are now affecting even the capacity to generate oxygen for the continuance of the oxic life of this planet. Ease to move and do lead us to burn fuels generating CO_2 in excess that has already started showing its effect.

Thus, the need of the hour is to design it green i.e., a lifestyle more sensitive to nature, our only home than to the man himself, and a technology for material and services that takes into account: its life cycle, the possibility of recycling or upcycling, ecological footprint and its reduction to sustain the life on earth. The discoveries in Biscope focus on these aspects in this issue. We have also started with the first article in FaultLine to help imprintable minds design, analyze and express their findings in a faultless manner. Regular features are available in updated form. Hope the issue serves you the right kind of food for thought.

Do Mushrooms have a language??

A recent news made headlines stating that mushrooms use a language of electrical signals with sentences as complex as having 50 words (Mesa 2022, Geddes 2022, Taylor 2022, Volkov 2022, Brown 2022) based on a paper communicated in the journal Royal Society Open Science by Prof. Andrew Adamatzky of the Unconventional Computing Laboratory at the University of the West of England, Bristol. The author measured activity spiking in electrical signals of 4 different fungi by inserting pairs of subdermal needle electrodes 1-2cm apart in the substrates colonized by the mycelia and the sporocarps. All four fungi generated different spectra of electrical impulses. Assuming these electrical signatures as words the authors applied an algorithm to compare the communication pattern and found them similar to the human words in English and Swedish languages. They also hypothesized that these fungal words were grouped into sentences, some of which could be as long as having 50 words.

The study showed that these impulses spike when the hyphae of wood-digesting fungi approach wooden blocks, suggesting that an electrical "language" is being shared about food or injury with distant parts or hyphae-connected with partners such as trees. The author agrees that fungi may not be saying anything as when the electrically charged propagating mycelial tips pass in a pair of differential electrodes, it causes a spike in the potential difference. However, this did not appear to be random.

Assessment of the claims

Communication is the sharing of information between sender and receiver. It exists amongst sub-atomic particles also through quantum entanglement even when separated by billions of light years of space. At higher levels of organization, communication begins with signaling, which may be through physical or chemical means and requires a sensor or signal receiver. Only on receiving a signal, the receiver will activate a response that requires mapping of the information. This is a basic setup for all communications. Expanding realms of linguistics to the level of physico-chemical languages (if they exist) is a dream to be realized and perhaps one day information science may make it true.

The present article, however, lacks the basic tenets in the sense that it is assuming every change in the electric potential in the substrate or in sporocarp is a part of linguistic communication in fungi. This is equivalent to assuming that instead of being a consequence, weather is a mode of communication for the planet. Although it is apparent that the atmosphere (substrate in which the planet earth is suspended) on earth repeats cycles of weather with different intensities because of the sum of plethora of activities happening on earth and in its surroundings. What weather is for the earth and its creatures, redox potential is to the surroundings of everything that is immersed in water, be it organelles, organs, or organisms. Any change in redox potential will

change potential difference and thus the electrical signals, but that is a resultant of any chemical reaction and/or any minutest metabolic activity. However, redox potential, being a master variable would lead to a reaction affecting states and status of many radicals in an aqueous medium. This dynamism is the basis of cosmic activity which cannot be called communication as 1. There is no sender of the signal, 2. It is a generalized reaction affecting all molecules of the cell envelope carrying charge and exposed to the medium, and 3. No single receiver for this signal has been deciphered.

Any stress, for example that of salt or temperature, triggers a certain set of activities in the cell. The cell is responding through a set chemical language or pattern generated inside it, but can we say that the surrounding environment had communicated it to do so?

The setup has been questioned for the lack of controls too as high impedance electrodes pick up all electrical disturbances in the mv range. What were the signals in medium without the mycelium, with dead mycelium or other uninoculated media? Do the young fungus and old fungus generate the same responses under the controlled conditions, that is, whether the so-called word and sentence sizes match with the age and stage of growth? The article does not mention if the cultures were axenic or not, if not then what about bacterial activity and in that case how was it ascertained that this electrical impulse pattern was a linguistic communication of fungi and not bacteria?

Though ingenious in the concept, the article leaves many potholes for believing the claims.

References: Mesa N, 6 April 2022. Can Mushrooms “Talk” to Each Other? The Scientist. https://www.the-scientist.com/news-opinion/can-mushrooms-talk-to-each-other-69885

Geddes L. 6 April 2022. Mushrooms communicate with each other using up to 50 'words', scientist claims https://www.theguardian.com/science/2022/apr/06/fungi-electrical-impulses-human-language-study

Taylor L. 14 April 2022 If Fungi Could Talk: Study Suggests Fungi Could Communicate in Structure Comparable to Humans. Discover.https://www.discovermagazine.com/planet-earth/if-fungi-could-talk-study-suggests-fungi-could-communicate-in-structure

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Brown S. 17 May 2022. Can Mushrooms Speak to Each Other? Scientists Think it's Possible. ALTA. https://www.altalang.com/beyond-words/mushrooms-communicate/

The article assessed: Adamatzky A. 2022. Language of fungi derived from their electrical spiking activity. Royal Society Open Science. 9: 211926. https://doi.org/10.1098/rsos.211926

Scientists in US succeed in engineering enzyme to degrade a class of plastics

Less than 10% plastics are recycled every year. Poly (ethylene terephthalate) (PET) is used to make many consumer-packaging, from textiles to food grade material to bottles and accounts for 12% of global waste. Theoretically it is expected that PET can be degraded by rapid enzymatic depolymerization followed by repolymerization or conversion/valorization into other products. However, PET hydrolases are not much use due to several reasons.

Recently, Lu et al. at the University of Texas at Austin in USA used a structure-based, machine learning algorithm to engineer a PET hydrolase able to work at 30-50°C and a range of pH levels. They called it FAST-PETase (functional, active, stable, and tolerant PETase) which contains five mutations and shows that all untreated, postconsumer-PET from 51 different plastic containers, 5 different polyester fibers and fabrics and water bottles could be degraded almost completely in a week. After completing degradation cycle, the team was able to resynthesize PET from the recovered monomers.

Source: Lu, H., Diaz, D.J., Czarnecki, N.J. et al. Machine learning-aided engineering of hydrolases for PET depolymerization. Nature 604, 662–667(2022).

https://doi.org/10.1038/s41586-022-04599-z

Nield David 1.5.2022. Engineers Create an Enzyme That Breaks Down Plastic Waste in Hours, Not Decades. Sciencealert.com

Plastic eating beetle grubs

Grubs of Darkling beetles- Zophobas morio are found to have enzymes in their gut that help it feed and grow on polystyrene plastics. Dr Chris Rinke and associates at the University of Queensland discovered this phenomenon and suggested that the enzyme is produced by a symbiotic bacterium in the gut. (Grub is the technical term for the larvae of the beetles).

Source: Sun J, Prabhu A, Aroney STN and Rinke C. 2022. Insights into plastic biodegradation: community composition and functional capabilities of the superworm (Zophobas morio) microbiome in styrofoam feeding trials. Microbial Genomics 8(6):

ttps://doi.org/10.1099/mgen.0.000842

Manage your mood with microorganisms

Mood, cognition, and memory have been proven to have a connection with the gut-brain axis wherein gut flora releases molecules that affect these activities. Timothy Dinan and John Cryan at the University College, Cork (Ireland) are working on these psychobiotics, i.e., biological molecules affecting our psychological health. They authored a book published by National

Geographic and titled 'The Psychobiotic revolution'. The amount of these psychobiotics can be managed by varying the number of such microorganisms. Two groups of probiotic bacteria turn to be the most important -Lactobacilli and Bifidobacteria. Specially, Lactobacillus helveticus, Lactobacillus plantarum, Lactobacillus rhamnosus, Bifidobacterium longum, and Bifidobacterium breve as psychobiotics. Faecalibacterium prausnitzii and Akkermansia muciniphila also show psychobiotic effects.

Psychobiotic substances also include some prebiotics, i.e., the food for probiotic microorganisms such as flavonoids and oligosaccharides (especially fructans and galactans)—indigestible for us but are consumed by the microorganisms in gut. Thus, diet containing these prebiotics help indigenous beneficial flora to flourish. Foods like curd have been demonstrated to improve attitude and bringing about beneficial physical changes in brain.

Psychobiotics have been shown to heal the gut by producing butyrate that both nourishes and heals the gut lining whenever inflamed and wounded, allowing the brain to function optimally and free of anxiety and depression. Bifidobacteria in specific calm down our hyper-immune responses. Growing up reduces the numbers of these bacteria but it can be replenished by feeding on fermented foods like curd, buttermilk, kimchi, kombucha, sauerkraut, kefir etc. Surprisingly, microbes also produce neurotransmitters such as dopamine, serotonin, and GABA. They use them to communicate not only with other microbes but also with us and directly affect our appetite, food cravings and mood.

It is essential to harbour diverse microflora for resilience and stability of this micro-ecosystem which can be promoted by adding diverse and fermented foods to the diet.

Source: Anderson SC. July 18, 2022. The microbial heroes of the gut-brain axis. Psychology Today. The Microbial Heroes of the Gut-Brain Axis | Psychology Today

Do spikes lead antimicrobial activity in complexes of Cu–polysaccharide?

Antimicrobial activity of polysaccharides is known for long and is supposed to help overcoming antibiotic resistance but the mechanism of such activity is yet to be deciphered Several scientists have shown involvement of various surface nanostructures such as Cell Impedance, Penetration and Induction of Oxidative Stress (Jenkins et al. 2020), Cell Elasticity and Adhesion Forces (Elbourne et al. 2019) and nanospikes (Luan et al. 2019, Arias et al. 2020).

Recently Israeli scientists Yehuda et al. (2022) developed a substance that contains “nano needles” that “prick bacteria to death”. It has shown 90% effectiveness in killing antibiotic-resistant bacteria in lab conditions. It is a Cu2O–PS complex that brings together the antimicrobial properties of Cu2O and the nanostructure of the sulfated cell-wall polysaccharide of Porphyridium sp. When compared to conventional active materials, polymers show fast redox chemistry and adjustable solubility, which is an important factor in the performance of a battery.

Redox-active polymers may be designed to result in spike height, cytoplasm spilling and growth inhibition in addition to the antibiofilm activity. These spikes—via membrane disruption—may cause death of the bacteria.

References: Arias, S.L.; Devorkin, J.; Spear, J.C.; Civantos, A.; Paul Allain, J. Bacterial Envelope Damage Inflicted by Bioinspired Nanospikes Grown in a Hydrogel. ACS Appl. Bio Mater. 2020, 3, 7974–7988.

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Source: Yehuda, Nofar, Levi A. Gheber, Ariel Kushmaro, and Shoshana (Mails) Arad. 2022. "Complexes of Cu–Polysaccharide of a Marine Red Microalga Produce Spikes with Antimicrobial Activity" Marine Drugs 20, no. 12: 787. https://doi.org/10.3390/md20120787

Rodents increase by 120-year cycle mast seeding of dwarf bamboo (Sasa borealis) in Japan

Researchers at Nagoya University, Japan reported that the large-scale flowering, seeding, and dying (referred to as “mast seeding”) of dwarf bamboo (Sasa borealis), an event occurring in 120 years in central Japan, affected ecology and population dynamics of rodents. It especially increased populations of Apodemus speciosus and A. argenteus by creating unusually rich food availability.

Source: Hanami Suzuki, Haruka Kashiwagi, Hisashi Kajimura. How does the 120-year cycle mast seeding of dwarf bamboo affect the rodent population? Ecological Processes, 2022; 11 (1) DOI: 10.1186/s13717-022-00385-x

FOOTPRINTS – SCIENCE IN INDIA

Fast brain communication studies: Method developed at IISc

Devarajan Sridharan and his team at the Indian Institute of Science (IISc) developed a unique algorithm called Regularized, Accelerated, Linear Fascicle Evaluation, or ReAl-LiFE that can help better prediction of connectivity between different regions of the brain. The machine-learning algorithm is based on a new Graphics Processing Unit chip (GPU). It is capable of >150 times faster analyses of the scans produced by (dMRI) then possible by the existing algorithms. The paper has been published in Nature Computational Science.

Source: India Today Web Desk June 28, 2022. How do neurons converse inside brain? Indian researchers find new way to look inside. How do neurons converse inside brain? Indian researchers find new way to look inside - India Today

Reference: Sreenivasan, V., Kumar, S., Pestilli, F. et al. GPU-accelerated connectome discovery at scale. Nat Comput Sci 2, 298–306 (2022). https://doi.org/10.1038/s43588-022-00250-z

Two new species of fungi found associated with basal stem rot

Two new species of fungi have been identified belonging to the genus Ganoderma by the research scholars from Kerala that are associated with coconut stem rot disease.

- The two fungi species are Ganoderma keralense and G. pseudoapplanatum.
- The infection begins at the roots, but symptoms include discolouration and rotting of stem and leaves. In the later stages, flowering and nut set decreases and finally the coconut palm (Cocos nucifera) dies.
- A reddish-brown oozing is seen that has been reported only in India. Once infected, recovery of the plants is not likely, and this causes a huge loss. Another sign of infection is presence of shelf-like “basidiomata,” which are the fruiting or reproductive structures of the fungus, on the tree trunks.

Source: Castillo SY, Rodríguez MC, González LF, Zúñiga LF, Mestizo YA, Medina HC, Montoya C, Morales A, Romero HM, Sarria GA. Ganoderma zonatum Is the Causal Agent of Basal Stem Rot in Oil Palm in Colombia. J Fungi (Basel). 2022 Feb 26;8(3):230. doi: 10.3390/jof8030230. PMID: 35330232; PMCID: PMC8953267.

Millets: A climate smart crop for nutritional security and sustainable agriculture

Millets are group of small, grained cereal food crops that are often called Nutri-cereals. The earliest meals consumed by humans were millets, which may also be the first cereal grain to be domesticated. Millets have been categorized into major and minor millets. Sorghum (jowar), finger millet (ragi) and pearl millet (bajra) are considered major millets and little millets (kutki), foxtail millet (kakun), proso millet (cheena), barnyard millet (sawa), and kodo millet (kodon) as minor millets. They are rain-fed, hardy grains which have low requirements of water and fertility when compared to other popular cereals. Due to ease in growing they have also been called as a lazy man's crop. Being highly tolerant to drought and other extreme weather conditions, resistant to pests and requiring no fertilizer, they can be categorized as climate smart crops. Due to these traits, they have been also termed as “poor man's crop”. Being grown in more than 130 countries at present, millets are essential staple and traditional food for more than half a billion people across Asia and Africa offering nutrition, resilience, income and livelihood for farmers as food, feed, fodder, brew and biofuels.

Millets contain higher protein and a more balanced amino acid profile than wheat and rice and thus are nutritionally superior to them. They are also rich sources of carbohydrates, dietary fibre, good-quality fat, minerals like calcium, potassium, magnesium, iron, manganese, zinc, and B complex vitamins. They possess anti-inflammatory and anti-oxidative phytochemicals.

Millet production in India: India is the largest producer and fifth-largest exporter of millets in the world. All the nine commonly known millets are produced in India. Most of the states in India grow one or more millet crop species. Rajasthan, Uttar Pradesh, Haryana, Gujarat, Madhya Pradesh, Maharashtra, Karnataka, Tamil Nadu, Andhra Pradesh, and Telangana are the major millets producing states.

International Year of Millets (IYM) 2023 and role of India

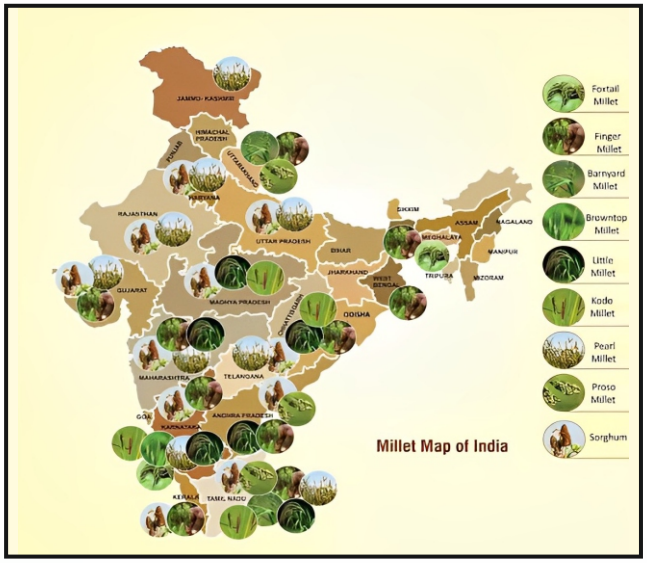
The diversity of millets has dropped from 20% to 6% of the total food grain basket. Therefore, the Government of India prioritized millets due to their huge potential and alignment with numerous UN Sustainable Development Goals (SDGs). To increase marketing and demand generation, year 2018 was named the National Year of Millets in India after rebranding and notification of the coarse cereals-Millets as Nutri-Cereals due to their high nutritional value. Recently United Nation's General Assembly (UNGA) declared 2023 as International Year of Millets (IYM) on 5thMarch, 2021, a proposal mooted by India and supported by 72 countries.

According to FAO, IYM aims to:

- Elevate awareness of the contribution of millet to food security and nutrition.
- Inspire stakeholders to improve sustainable production and quality of millets.
- Draw focus on enhanced investment in research and development and extension services

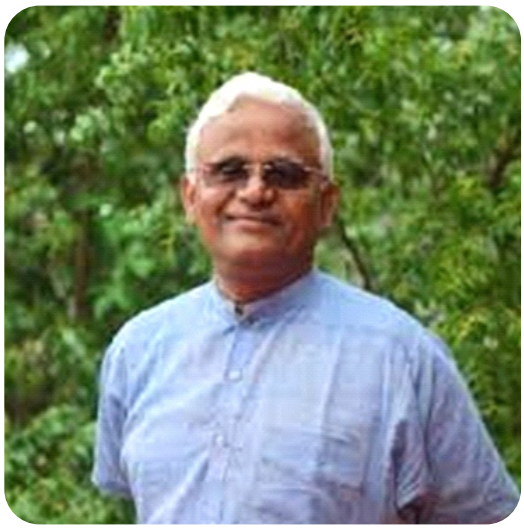
Government of India has decided to celebrate IYOM, 2023 to make it peoples' movement so that the Indian millets, recipes, and value-added products are accepted globally. Next in the series, prior to the year-long celebration of 'International Year of Millets (IYM) 2023', a major initiative was taken by the Union Ministry of Agriculture and Farmers Welfare to promote millets in the country and the world by organizing Special Millets Lunch for the Members of the Parliament in the Courtyard of Parliament on 22 December 2022.

To achieve the goal of IYM 2023 and spread Indian millets around the world, the Department of Agriculture & Farmers Welfare has adopted a proactive multi-stakeholder engagement approach (involving all the central government ministries, states/UTs, farmers, start-ups, exporters, retail businesses, hotels, Indian Embassies, etc.). Targeted and focused months in 2023 have been allocated to various ministries, states, and Indian embassies to conduct a variety of IYM-related activities and raise public awareness of the advantages of millets for consumers, farmers, and the environment. The Indian Diaspora will be involved in IYM side events in 2023 that will be held by Indian embassies in more than 140 different countries, including exhibitions, seminars, speeches, and panel discussions. In G-20 meetings millets the attendees and delegates will get a full millet experience via tasting, meeting farmers and engaging discussions with start-ups and FPOs.



(Source: International year of millets (IYOM)-2023 National Conference on Kharif Campaign, 19th April 2022 Ministry of Agriculture & Farmers Welfare

The Millet Man of India Padma Shri (2023)-Dr Khadar Valli Dudekula



During 74th Republic Day celebrations on Thursday, January 26, 2023, India's 'Millet Man' Dr Khadar Valli Dudekula was awarded Padma Shri, Dr. Khadar Valli had a comfortable US job that he left to return to India and worked extensively for over 20 years to revive the millets. As per The Better India, Dr Valli woke up to the problem of diet-related consequences in society around 1986-87 when he came across the case of a girl who had started menstruating at 6 years of age. Shocked by this, he decided to return to his country in 1997 and settled in Mysuru to work towards a healthy society rather than in a foreign nation.

Dr Valli is an independent scientist and food expert and a leading advocate of Millet cultivation and use. In his pioneering work, he revived five types of disappearing millets. Born in a humble background in Kadapa District of Andhra Pradesh, he pursued his BSc and MSc in Education at Regional College of Education, Mysuru before earning a PhD in Steroids from the Indian Institute of Science, Bengaluru. After completing education in India, he joined as a postdoctoral fellow in Environmental Science at Beaverton, Oregon. For four years, he worked as a scientist at Central Food Technological Research Institute (CFTRI) and then joined DuPont. He discovered medicinal properties of grains during his research and named 5 specific types of grains that he prescribed as “Siridhanyalu”. Besides being an agricultural scientist, he is also a homoeopath.

THE BIG WINDOW

1. M S Swaminathan Research Foundation is inviting applications for various posts of senior scientists- biological sciences. For details log on to https://www.mssrf.org/careers-2/

2. ISMPP 42nd Annual Conference and National Symposium Plant Health Management: A way Forward for Food Safety, Security and Sustainability

Theme	Research and Innovation in Chemical, Pharmaceutical and Biological Sciences
Venue	B.A. College of Agriculture, Anand Agriculture University, Anand, Gujarat India
For Registration Click at	https://forms.gle/ndbYVRAZWAK4y5XdA
Dates	May 10-12, 2023
Email	ismppphm2023@gmail.com

3. International Conference on Biochemical and Biotechnological Approaches for crop Improvement

Venue	NASC Complex, New Delhi, India
Contact	01125842038, 91-9868664533
Dates	30th October to 01 November, 2023
Email	icbbaci@gmail.com

4. 3rd International Conference on Frontiers in Biological Sciences-InCoFIBs-2023

Venue	Rourkela 769008, Odisha
Contact	0661-2462682, 91-7077277756, 9777458089
Dates	5th -7th October, 2023
Email	IncoFIBS.2023@gmail.com, www.incofibsnitr.com

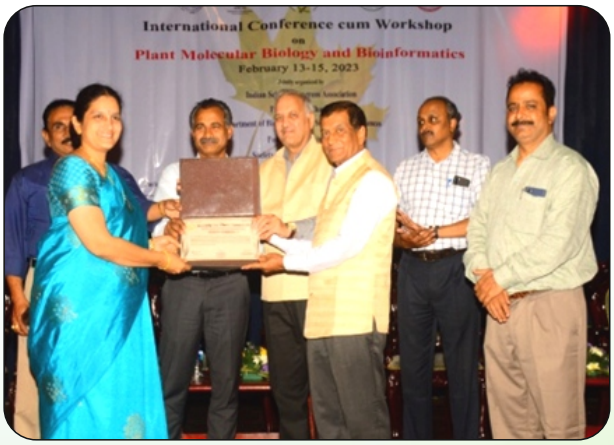
5. 5th International conference Climate Change and Its Impact (CCI-2023)

Venue	Sher-e-Kashmir University of Agricultural Sciences and Technology of Kashmir (SKUAST-K), Srinagar, J&K., India
Contact	+91 7004942581, 7677466479, 9682114438, 9412970088
Dates	June 9-11, 2023
Conference Registration Link	https://tinyurl.com/registrationCCI2023
Email	cciconference2023@gmail.com

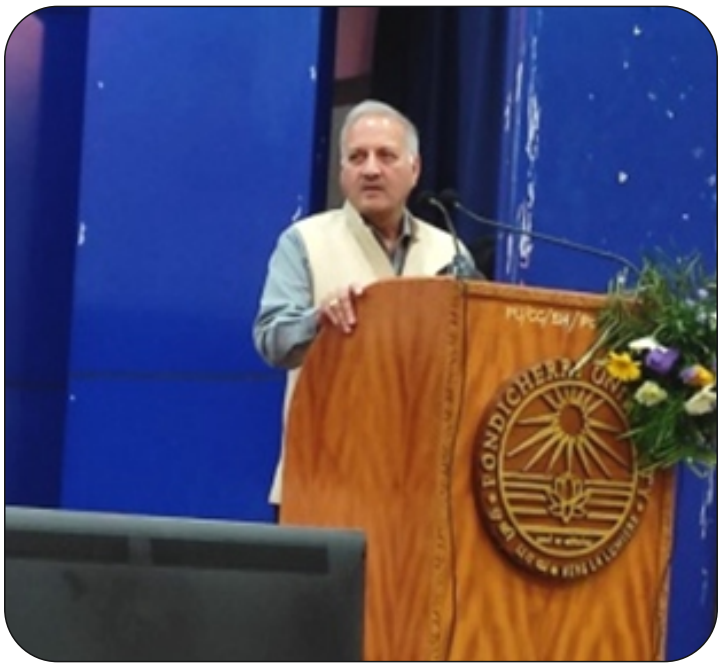
SPR TIDINGS

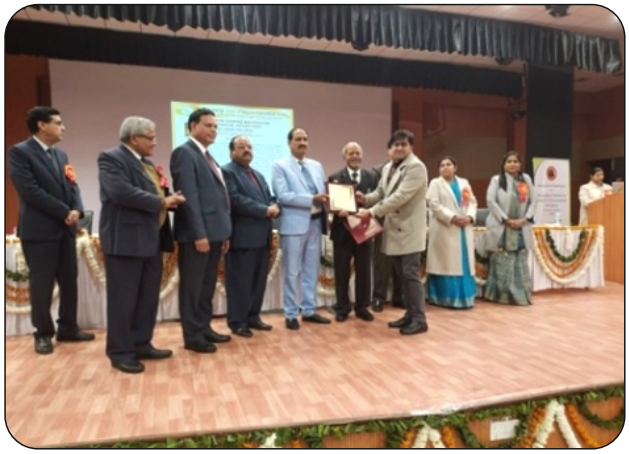
Society for Plant Research and Vegetos continued with its academic activities regularly to keep active on all fronts besides very regular publication of its journal Vegetos. Perfect coordination of Dr Mamta Kapila, Executive Publisher (Life Sciences) Springer Nature with Prof (Dr) S K Bhatnagar, Editor in Chief, Vegetos made the task easy. Editor in Chief reframed the entire Editorial Board for the years 2023-2024 based on performance. Many new editors have been inducted while few older one were continued with promoting their editorial duties. As of today, Vegetos has more than 50 editors on board who are assisting the journal. The Cite score of Vegetos has raised from 0.5 to 1.9 and NAAS score is 5.27 for 2023. Our efforts are to get the journal into SCI very soon. During this period various webinars and programs were organized. Progress so far made by the journal VEGETOS was largely appreciated and measures for its further growth were suggested. The information in brief about the various seminars, webinars, and workshops during the year 2022-2023 is as follows:

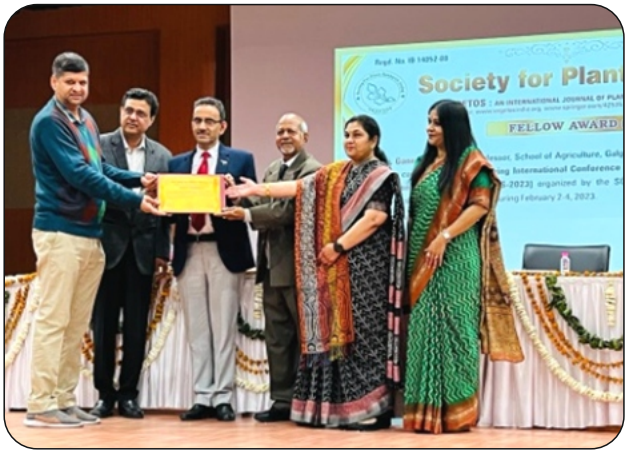
- "Vegetos-Springer: Editor Meet" on July 8, 2022
- "Felicitation Ceremony, Honorary Fellows" in the Department of Botany, Delhi University on August 25, 2022
- "Brain storming Session, United States of America zone" on November 11, 2022
- "International conference on emerging trends in plant and environmental sciences" during Feb 2-3, 2023, at University of Rajasthan, Jaipur under the leadership of SPR-President (North zone) Prof Ved Pal Singh in association with SPR-Secretary (North zone) Prof Anjuli Agarwal and the Organizing Secretary Prof G P Singh.
- SPR (South zone) organized an "International conference cum workshop on Plant Molecular biology and Bioinformatics" during Feb 13-15, 2023, at the Central University, Pondicherry which was graced by the Founder Chairman, SPR Prof (Dr) S K Bhatnagar, SPR- President Prof R R Hanchinal, SPR-South zone President Prof K Muthuchelian and SPR-South zone Secretary Prof S D S Murthy in association with the Organizing Secretary Prof Dinakar Rao. During both conferences, various awards were conferred. An award in the honour of Founder Chairman, SPR and VEGETOS has also been inducted in his name "Professor Subodh Bhatnagar Innovation Award-2022 which was conferred to Dr Sheikh Adil Edrisi.

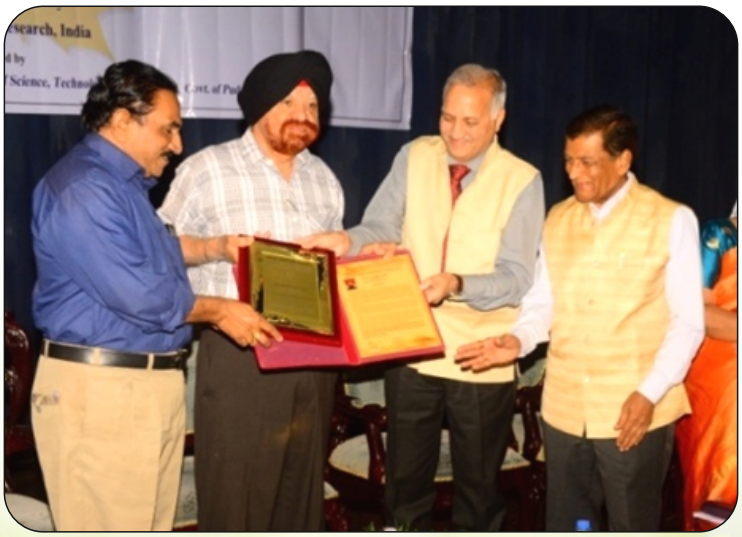


- "Editor's Virtual Conclave: VEGETOS (2023-24)" was organized on March 24, 2023, which was attended by 34 editors and was addressed by the Editor in Chief, Prof (Dr) S K Bhatnagar and the Executive Publisher (Springer Nature) Dr Mamta Kapila.









Distinguished Leadership award-2023 by SPR to Pro. Gurmeet Singh, Vice Chancellor, Pondicherry University

Professor Krishna Sahai Bilgrami:

An architect of the modern Indian Botany

Professor Krishna Sahai Bilgrami, popularly known as architect of the modern Indian Botany was born on 09 July 1933 at Bilgram, District Hardoi, Uttar Pradesh, INDIA. He was a brilliant teacher, dedicated researcher, excellent orator and possessed immense organizational and leadership qualities. He was extremely modest, soft spoken and generous to fellow workers. He strived and was popular in elites of society and the downtrodden poor masses as evidenced by his close association with NGO's, Civic bodies, and welfare organizations. He left for his heavenly abode on Dec 31., 1996 due to cardiac arrest at Lucknow leaving great void to Indian Science particularly botany.

Education: Dr. Bilgrami obtained his DPhil (1956) and DSc (1962) degrees from the University of Allahabad. His areas of specialization were fungal physiology, mycotoxicology and ecology. He was recalled as a very quiet, intelligent, and enthusiastic student by his teachers. According to his teacher and supervisor, late Prof. R.N. Tandon, his quest for knowledge was superabundant and exhibited and investigative zeal. He was a perfectionist and innovative. Soon after joining the doctorate programme he developed new chromatographic methods for investigating nutrition of fungi and processes of pathogenicity. He was awarded U.P. Govt. Scholarship (1954-55); Govt. of Indian Research Training Scholarship (1955-56) and INSA Research Fellowship (1956-57).

Career: Prof. Bilgrami started his career as Lecturer at the University of Allahabad (1957-62) Later, he moved on to Associate Professor, Jodhpur University (1963-69); Professor and Head, University Department of Botany, Bhagalpur University (1970-93); Dean, Faculty of Science (1973-75, 1982-84); and acting Vice-Chancellor, Bhagalpur University (1978-79). After retirement in July 1993, he became Emeritus Scientist and held that position till the end.

Academic and Research Achievements: Prof. Bilgrami had shown, for the first time, the significance of transglycosidation in breakdown and utilization of complex carbohydrates by fungi. He continued his interest in fungal pathology at Jodhpur and Bhagalpur where he developed a strong school for research in mycology and plant pathology. Here he also synthesized his concepts in his book entitled “Physiology of Fungi”. As his career advanced, he also developed a great concern for environmental pollution. He studied the impact of industrial and urban effluents on biodiversity of River Ganga and thermal springs in Bihar. He also did

extensive work on the effect of various mycotoxins on important physiological and biochemical processes of animals and plants, their biological significance and management. His views on saving Ganga from undesirable contaminants were widely accepted and were regularly telecasted by “Doordarshan”.

Other Contributions: Prof. Bilgrami guided 36 PhD students and inspired and motivated all students who came in his contact. He published more than 200 research papers, 22 monographs and technical reports and six university-level books. He was chief editor of Biological Bulletin of India and was on Editorial Board and Executive Committees of more than a dozen scientific committees. He was a Member of Ganga Project Directorate Research Committee; Agricultural Research Committee, Lower Ganga Region (Planning Commission); Wetland Management Committee, Government of Bihar; ICMR Task Force Committee; Project Advisory Committee (Plant Sciences) of DST; and Member, Research Council of CIMAP. He served on the Post-Harvest Technology Panel of ICAR. He edited the proceedings of eight UGC-sponsored symposia and conducted more than 20 major research projects sponsored by various National and International Agencies.

Awards and Honours: Bilgrami was honoured by award of Professor Panchanan Maheshwari Gold Medal of Indian Botanical Society (1983); Saligram Sinha Memorial Gold Medal of National Academy of Science (India), Allahabad; SK Shome Memorial Lectureship of Mycological Society of India (1985); BB Mundkur Memorial Lectureship of Indian Phytopathological Society (1985); SN Banerjee Lectureship of Indian Mycological Society (1987); Parija Memorial Lectureship of Utkal University (1990); Platinum Jubilee Lectureship of Indian Science Congress (1991); and Kajale Memorial Lectureship of Indian Botanical Society (1991). He was elected Fellow of Indian National Science Academy, National Academy of Science, India, National Academy of Agriculture Sciences, Indian Botanical Society, and Indian Phytopathological Society. He was President of Indian Science Congress (Bangalore, 1987) and President of Indian Botanical Society (Tiruchirappalli Session, 1989).

The academic tradition carved by him is greatly inspiring for coming generations and scientists. Several agencies and societies have instituted awards in his name. Few to name are Krishna Sahai Bilgrami Memorial Medal by Department of Science and Technology, Government of India; Prof K S Bilgrami Memorial Award by Society of Plant Research and Krishna Sahai Bilgrami Memorial Award of Indian Botanical Society.

आज के द्रोणाचार्य : एक लघु कथा

अपनी सोसायटी के पार्क में घूमते हुए मेरी नजर किनारे पड़ी एक बेंच पर शांत मुद्रा में बैठे एक वयोवृद्ध, निर्मल, शांत चित्त व्यक्ति पर पड़ी जो आज के अखबार में छपी किसी खबर को तल्लीनता से पढ़ रहे थे। मैंने नजदीक जाकर उनसे पूछा क्या आप मुझे पहचानते हैं ?

अनायास पूछे गए इस प्रश्न पर थोड़ा आश्चर्य से मेरी ओर देखते हुए उन्होंने ने 'ना' में उत्तर दिया और मेरी जिज्ञासा को भांपते हुए मुझे अपने नजदीक ही बेंच पर बैठने का इशारा किया। मेरीओरअपनीअनुभवीआंखो से निहारते हुए वह पुनः बोले बेटा मैंने तुम्हें पहचाना नहीं। इस उम्र में याददाश्त भी कम हो जाती है ना।

मैं उनके सरल और स्नेहपूर्ण स्वभाव के वशीभूत उनसे बतियाने लगा। मैंने उन्हें बताया कि सर, मैं आपका पुराना छात्र हूं और आपको बैठे देखा तो आशीर्वाद लेने चला आया।

अच्छा, अच्छा। उनके चेहरे पर एक संतोष भरी चमक उभर आई और उन्होंने स्नेह से पूछा कि आजकल कहां हो और क्या कर रहे हो ?

प्रत्युत्तर में मैंने कहा कि सर मैं टीचर हो गया हूं और एक कॉलेज में पढ़ाता हूं।

अरे वाह, बहुत खूब। उन्होंने संतोष पूर्वक कहा।

जी सर, मैं आपकी प्रेरणा के कारण ही टीचर बना क्योंकि आपने ही मुझे एक अध्यापक बनने के लिए प्रेरित किया।

ऐसा क्या हुआ कि तुमने एक टीचर बनने की सोची। आज के दौर में तो ना जाने कितने नए नए अवसर मौजूद हैं। उन्होंने स्वाभाविक प्रश्न किया।

जी सर । कह कर मैंने उन्हें अपने छात्र जीवन की एक छोटी सी घटना की याद दिलाई और यह व्रतांत सुनाया:-

एक दिन मेरा एक दोस्त बिल्कुल नई, खूबसूरत घड़ी लेकर क्लास में आया और मुझसे बोला, यह देख, मेरे चाचा स्विट्जरलैंड से लाए हैं मेरे लिए। कैसी है ? मैंने कहा बहुत सुंदर । लेकिन मन ही मन उस घड़ी को हासिल करने की योजना बनाने लगा और मौका मिलते ही चुपचाप उस के बैग से मैंने वह घड़ी निकाल ली थी। जैसे ही उसे घड़ी के खोने के बारे में पता चला तो उसने टीचर से इस बात की शिकायत की। वह टीचर आप ही थे सर ।

आप ने क्लास के सभी बच्चों को चेतावनी दी कि तुम्हारे एक साथी की नई घड़ी खो गई है, अगर किसी ने ली है तो उसे वापिस कर दो।

फिर भी मैंने वह घड़ी वापिस नहीं की क्योंकि मेरा इरादा उसे अपने पास रखने का था और वह घड़ी मुझे बहुत पसंद आ गई थी। तभी आपने क्लास रूम का दरवाजा बंद कर के हम सभी को एक गोल घेरे में खड़े होने का आदेश दिया और एक एक की जेबों की तलाशी के लिए सबको अपनी अपनी आंखे बंद करने को कहा। हम सभी ने अपनी आंखे बंद कर लीं थीं और आपने सभी की जेबों की तलाशी शुरू कर दी और मेरी जेब से आपको वह घड़ी मिल गई। फिर भी आपने बाकी बचे छात्रों की तलाशी जारी रखी और बाद में आपने सबसे आपने अपनी आंखे खोलने को कहा और घड़ी के मिलने की घोषणा की।

आपने उसके बाद ना तो मुझसे कभी कुछ कहा और ना ही किसी से इस प्रकरण का जिक्र किया। सर हालांकि आपने उस दिन मेरे आत्मसम्मान को एक नया जीवन दान दिया, लेकिन मेरे लिए वो सबसे शर्मनाक दिन था। लेकिन उसी दिन मैंने यह प्रण भी किया कि मैं कभी बुरा आदमी नहीं बनूंगा और ना ही इस तरह की ओछी हरकत करूंगा। आपने ना तो मुझे इस हरकत पर डांटा और ना ही कोई सजा दी लेकिन आपका संदेश मेरे अंतर्मन में गहराई तक उतार चुका था। सर, आपने उस दिन मुझे एक सही शिक्षक से रूबरू करवाया और मुझे एहसास हुआ कि वास्तविक गुरु कैसा होना चाहिए। वोह मेरे जीवन का निर्णायक दिन था और मैंने आपके पद चिन्हों पर चलते हुए एक आदर्श शिक्षक बनने की ठान ली।

क्या आपको वह घटना याद आई सर ।

हां हां बिल्कुल याद आ गई। उन्होंने हां में सहमति दी और बोले कि तलाशी के समय मुझे याद नहीं कि वोह घड़ी किसकी जेब से निकली क्योंकि मैंने भी अपनी आंखे बंद कर रखी थीं। मेरा उद्देश्य किसी को अपराध बोध दिलाना नहीं था बल्कि उसके जीवन को सुधारना था।

जीवन में ऐसे शिक्षक का मिलना परम सौभाग्य है सर। यह कहकर मैंने उनके चरण स्पर्श किए और उनका सहज आशीर्वाद लेकर विदा ली।

प्रो (डॉ.) सुबोध भटनागर

अधिष्ठाता, जैव प्रौद्योगिकी (सेवा निवृत्त), कृषि विश्वविद्यालय, मेरठ