



Indian Phytopath News

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From President's Desk

Opportunities and challenges for biologicals in agriculture

Agriculture is one of the oldest labour intensive and environment-based industry, facing a very drastic developmental change. Presently natural and organic farming are becoming more popular around the world, intending to produce healthy, safe, and residue-free food while also ensuring long-term sustainability. Organic farming promotes the use of biopesticides and biofertilizers to reduce the harmful effects of continual use of chemicals and pesticides. Biofertilizers and biopesticides have emerged as potentially environmentally friendly inputs for crop production and seed treatment. In almost all crops, they are used in place of chemical fertilizers and pesticides to improve soil fertility and control a variety of pests, insects, and diseases. As a result, the rising demand for biopesticides and biofertilizers is propelling the market growth. Even the chemical-based industries are now diverting their attentions for biologicals. The development of agricultural biologicals-biostimulants, biopesticides and biofertilizers - is growing as global agriculture looks to move towards more sustainable ways to boost yields and new methods of crop protection. Growers are increasingly looking to agricultural inputs based on microbes to both reduce and complement the use of synthetic pesticides and fertilizers in their fields. Biological controls have been around for years and estimated to grow a compound annual growth rate (CAGR) above 13% over the forecast timeframe and reach a market value of around USD 34,984 million by 2030.



Biological crop protection products, also called "biologicals" represent a broad category of plant protection products that are derived from beneficial organisms, their genes, and/or products, such as metabolites, effective against biotic and abiotic

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stresses for positive responses by the plant. Presently many farmers are using biologicals to complement chemical products in an integrated pest management (IPM) program, or as stand-alone method, for protecting plants from disease, insect pests and competition from weeds. Bioagents represent a living system; they need to be mass-produced and formulated into commercial products with a shelf life of at least two years. Bioagents researched for their antagonism, mycoparasitism, growth promotion, and increased crop yields prior to its release as a product in the market. Presently, academicians and/or industries working on multifaceted microbes (fungi or bacteria based) with various categories such as biocontrol agents, biopesticides, biofungicides, biofertilizers, biostimulants, growth promoters, etc. with a very thin line of difference. The plant biostimulants market, which is one of the categories within the larger plant biologicals market, is currently valued at \$2.5 billion and is expected to grow to over \$4 billion globally by 2025. The terms "plant biostimulants" and "agricultural biostimulants" encompass a diverse group of product technologies, including bacterial or microbial inoculants, biochemical materials, amino acids, humic acids, fulvic acids, seaweed extracts and more. Biopesticides are certain types of pesticides derived from such natural materials as animals, plants, microbes, and certain minerals. Microbial pesticides consist of a microorganism (e.g., a bacterium, fungus,

virus, or protozoan) as the active ingredient. Microbial pesticides can control many kinds of pests, although each separate active ingredient is relatively specific for its target pest(s). For example, there are fungi that control certain weeds and other fungi that kill specific insects.

Plant-Incorporated-Protectants (PIPs) are pesticidal substances that plants produce from genetic material that has been added to the plant. For example, scientists can take the gene for the Bt pesticidal protein and introduce the gene into the plant's own genetic material. Then the plant, instead of the Bt bacterium, manufactures the substance that destroys the pest. The protein and its genetic material, but not the plant itself, are regulated by EPA. Some of the biostimulants and biopesticides are also reported as biofertilizers or growth promoters since they also play an important role in mobilizing or increasing nutrient availability in the soil. Dunham Trimmer projects that the agricultural biologicals market will reach approximately \$14.65 billion by 2023, with an even split between biostimulants and biopesticides.

Species of the multifaceted microbes *viz.*, *Trichoderma*, *Aspergillus*, *Penicillium*, *Mycorrhiza*, *Bacillus*, *Pseudomonas* etc. registered in various formulations (granular/liquid) and marketed in various trade names, are such examples which may be included in any category. Manufacturers and marketing agents are selling diverse range of biologicals for crop protection. The next decade belongs to increased biocontrol agents in crop protection market, provided the speed of innovations, mass fermentation and formulations matched by time bound regulatory responsiveness. Changing roles and new terminologies of microbe(s) based products, is challenging to both, academicians, and regulatory authorities due to extensive procedures and expensive registration. An optimistic hope would be a simplified procedure and less expensive registration in supporting to develop biologicals-based products for growers. Challenges like microbial sustainability, compatibility, application for seed, field, spray without contamination or loss of microbes from mixing with natural resources are the focus of research, academics, and industry.

Pratibha Sharma

President

Indian Phytopathological Society

Editorial

Plant and human health

Infection of plants by pathogens can have serious consequences on plant health, subsequently human health can be affected by one of the several ways. Viruses, bacteria and fungi that infect plants do not usually cause infection in humans. Despite the question about the possible direct effect of plant pathogens on humans, several plant pathogens can affect humans by reducing the available food or by contaminating human food with toxic compounds. Plant diseases are well known to reduce the food available to humans by ultimately interfering with crop yields. This can result in inadequate food to humans which leads to starvation and death in worst cases. One of the most common ways by which plant diseases can affect humans is through the secretion of toxic metabolites 'mycotoxins' by fungi infecting plant products. Although the fungi producing these mycotoxins infect plants but not humans, but the mycotoxins can have direct effects on humans and animals resulting in diseases and death. Ergot is also a disease of several cereals including bread wheat. It is caused by fungi belonging to *Claviceps* genus. Consumption of bread produced from contaminated flour can result in ergotism disease in humans. Ergotism has been reported to result in, loss of peripheral sensation or hallucinations and even death. As mentioned earlier, most plant pathogens do not infect humans, it is advised to avoid consuming rotted or mouldy fruits and vegetables or food contaminated by toxin-producing fungi. Removing diseased parts of fruits may help reduce pathogen inoculum and rotted fruit parts. However, it may not ensure that all contamination has been excluded as some fungi and their toxins can diffuse into symptom-less parts of fruits. Cooking may result in the decomposition of some mycotoxins, some mycotoxins are not destroyed by even high heat. The effects of some mycotoxins can be reduced through the addition of mycotoxin-binding agents or through deactivation. Therefore, more research is required on the direct/indirect effects of plant pathogens and diseases on humans. Special attention should be given to mycotoxin-producing fungi and their presence in human food.



Rashmi Aggarwal

Chief Editor, IPS Newsletter

IPS Zonal Symposia 2021-22

IPS Mid-Eastern Zone Symposium

A virtual symposium on "Recent trends in plant pathology research to address emerging challenges for achieving food security" was jointly organized by ICAR-Vivekananda Parvatiya Krishi Anusandhan Sansthan, Almora, Uttarakhand and the Indian Phytopathological Society (Mid-Eastern Zone) during 20-21 February, 2022.

IPS Eastern Zone Symposium

National Symposium on "Role of Plant Pathology in Global Environment and Food Security" jointly organized by Indian Phytopathological Society (Eastern Zone) and Department of Plant Pathology, BCKV, Mohanpur, Nadia, West Bengal during March 6-7, 2022 (Hybrid mode). The total 58 abstracts were received and 84 participants registered. Total 75 delegates and students attended physically on 6th March and 79 numbers physically participated in the symposium on 7th March 2022. Total lead lectures were 17, oral presentations were 19 and total poster presentation were twenty two in eight thematic areas.



IPS North-Eastern Zone Symposium

School of Crop Protection, College of Post-Graduate Studies in Agricultural Sciences, Central Agricultural University (Imphal), Umiam, Meghalaya organized a two days zonal symposium on "Current Trends in Plant Disease Management for Sustainable Crop Production and Livelihood Security" during 10-11th March, 2022 under Indian Phytopathological Society (North Eastern Zone) at North Eastern Police Academy, Umsaw, Meghalaya. During the two days symposium, a total of 110 participants including faculties, scientists, project staffs, students, farmers were attended.



IPS Central Zone Symposium

Central Zone organized one one-day satellite symposium on "Ameliorate Resilience of Arid Crops" on March 24, 2022 at Sri Karan Narendra Agriculture University, Jobner, Jaipur during the IPS 8th International Conference on "Plant Pathology: Retrospect and Prospects". More than 50 delegates was attended off-line and online mode.



IPS 8th International Conference on "Plant Pathology: Retrospect and Prospects"

IPS 8th International Conference on "Plant Pathology: Retrospect and Prospects" was organized at SKNAU, Jobner-Jaipur, Rajasthan during March 23-26, 2022.

The conference was inaugurated by Honorable Governor of Rajasthan, Shri Kalraj Mishra as Chief Guest; Prof. C.D. Mayee, Former Chairman, ASRB, Former Agriculture Commissioner as Guest of Honour and Dr. J.S. Sandhu, Vice-Chancellor, SKNAU, Jobner. Total seven IPS publications viz., Abstracts and Souvenir, Indian Phytopathological Society - A journey of seventy-five years, Compendium of Wheat Diseases, Compendium of Vegetable Crops Diseases, Compendium of Plantation Crops Diseases, Compendium of Mushroom Diseases and *Faslo mein Keet Evam Vyadhiyon Ka Samanvit Prabandhan* were released in the inaugural function.



Altogether 642 (Online 257 and offline 385) delegates from 20 countries participated in this mega-event, of which, 41 foreign delegates joined virtually. During the 4 days long (from March 23-26, 2022) conference, 17 technical sessions on different themes were conducted. There were 4 plenary speakers, 9 award lectures, 15 Prof. M.J. Narasimhan Academic Merit Award Contestants, 4 APS Travel Sponsorship Award Contestants, 36 Keynote Lectures, 53 Invited Lectures, 142 Oral Presentations, and 321 posters presented in the conference. In addition, 43 presentations in the Satellite workshop on *Trichoderma* and *Gliocladium*, and 41 presentations in the Central Zone Symposium were completed.

Awards conferred in the international conference

A.P. Misra Lifetime Achievement Award

Dr. D.V. Singh, Former Head (Plant Pathology), ICAR-IARI, New Delhi



IPS Recognition Award

- (i) **Dr. K.D. Srivastava**, Former Professor & Head (Plant Pathology), ICAR-IARI, New Delhi
- (ii) **Dr. S. Gangopadhyay**, Former Dean PGS, SKRAU, Bikaner, Rajasthan
- (iii) **Dr. A.S. Indulkar**, Executive Director, FMC-Cheminova India Ltd., Mumbai, Maharashtra



S.P. Raychaudhuri Award Lecture

Dr. T. Mohapatra, Secretary (DARE) & Director General (ICAR), Krishi Bhavan, New Delhi, India.



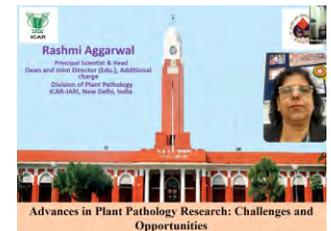
Presidential Address

Dr. Pratibha Sharma, Division of Plant Pathology, SKN Agricultural University, Jobner-Jaipur, Rajasthan, India (Title: Biological Control Strategies: Retrospect and Prospects).



Mundkur Memorial Award Lecture

Dr. Rashmi Aggarwal, Dean & Joint Director (Education) & Head (Plant Pathology), ICAR-Indian Agricultural Research Institute, New Delhi, India (Title: Advances in Fungal Pathology: Challenges and Opportunities).



Sharda Lele Memorial Award Lecture

Dr. Malathi P., Principal Scientist (Plant Pathology), Division of Crop Protection, Sugarcane Breeding Institute, Coimbatore, Tamil Nadu, India (Title: Phylogenetics, Diagnostics, pathogenomics/proteomics, Functional Genomics and potential target sites for the management of *Colletotrichum falcatum* causing Sugarcane Red rot).



Dr. A.N. Mukhopadhyay Oration Award Lecture

Dr. Suseelendra Desai, Former Head (DCS) and Dean, NMIMS-School of Agricultural Sciences and Technology, Shirpur, Maharashtra, India (Title: Climate-Ready Bioinoculants for Sustainable Crop Productivity)



A.K. Sarbhoj Memorial Award Lecture

Dr. R. Thangavelu, Principal Scientist, Department of Plant Pathology, ICAR-National Research Centre for Banana, Tiruchirappalli, Tamil Nadu, India (Title: Current advances in the status of Fusarium wilt of banana in India).



Jeersannidhi Award Lecture

Dr. A. Ramesh Sunder, ICAR-Sugarcane Breeding Institute, Coimbatore, Tamil Nadu, India (Title: Unravelling the enigmatic Sugarcane-fungal pathogen interactions from an "Omics" perspective).



D.P. Misra & R.N. Pandey IPS Best Women Scientist Award Lecture

Dr. Ritu Mawar, ICAR-Central Arid Zone Research



Institute, Jodhpur, Rajasthan, India (Title: Ganoderma basal rot mortality: An emerging threat for greening Indian desert).

M.K. Patel Memorial Young Scientist Award Lecture

Dr. Susheel Kr. Sharma, Scientist (Plant Pathology), ICAR Research Complex for NEH Region, Manipur Centre, Lamphelpat, Imphal, Manipur, India (Title: Development and Field Validation of Robust Diagnostics for Emerging Virus and Virus-like Pathogens Infecting Major Horticultural Crops in North East India).



B.N. Chakraborty and Usha Chakraborty IPS Best Teacher Award

Dr. S. Umesh, Professor, Department of Studies in Biotechnology, University of Mysore, Mansagangotri, Mysuru, Karnataka.



Fellow of Indian Phytopathological Society (FPSI) – 2020

- (i) **Dr. Bishnu M. Bashyal**, Senior Scientist (Plant Pathology), ICAR-IARI, New Delhi
- (ii) **Dr. J. Jayaraj**, Professor (Biotechnology and Plant Microbiology), Dept. of Life Sciences, The University of the West Indies, Trinidad and Tobago
- (iii) **Dr. R.D. Prasad**, Principal Scientist (Plant Pathology), ICAR-IIOR, Hyderabad, Telangana
- (iv) **Dr. R. Ramesh**, Principal Scientist, ICAR-CCARI, Old Goa, Goa
- (v) **Dr. Shaik Ameer Basha**, Associate Professor (Plant Pathology), CoA, PJTSAU, Hyderabad, Telangana
- (vi) **Dr. Narendra Singh**, Associate Professor, AINP on Arid Legumes, ARS, SKRAU, Bikaner, Rajasthan
- (vii) **Dr. M.R. Khan**, Professor, Dean (Plant Protection), Faculty of Agricultural Sciences, AMU, Aligarh, Uttar Pradesh
- (viii) **Dr. Dharmendra Kumar**, Professor (Plant Pathology), BUA&T, Banda, Uttar Pradesh
- (ix) **Dr. Gireesh Chand**, Professor, CoA, CAU (I), Pasighat, East Siang, Arunachal Pradesh
- (x) **Dr. Chinmay Biswas**, Principal Scientist (Crop Protection), ICAR-CRIJAF, Barrackpore, Kolkata, West Bengal

(xi) **Dr. Pramod K. Gupta**, Scientist (Plant Pathology), JNKVV, Jabalpur, Madhya Pradesh

Prof. M.J. Narasimhan Academic Merit Award 2021-22

A total of 15 nominations were received from 8 zones. Of these, 12 candidates contested for Prof. M.J. Narasimhan Academic Merit Award 2022. The judging committee has recommended the following names for this award.

Winner

Ms. Lipa Deb, Central Agricultural University (Imphal), Umiam, Meghalaya (Title: Exploring plant disease antagonistic behavior of fungal entomopathogen *Beauveria bassiana* (Balsamo) Vuillemin against *Rhizoctonia solani* Kuhn causing sheath blight disease of rice)

Commendation certificate

Mr. Kuleshwar Prasad Sahu, ICAR-IARI, New Delhi (Title: Structural and functional analysis of rice phyllospheric bacteria for their antimicrobial properties and defense elicitation against blast disease)

Mr. Firoz Mondal, ICAR-IARI, New Delhi (Title: Evaluation of resistance behaviour of Ty-Gene(s) containing donor lines of tomato and indexing of naturally occurring begomoviruses infecting them)

APS-IPS Travel Sponsorship 2021-22

Total 6 nominations received from 4 zone, 4 candidates presented their research achievements in the APS-IPS Travel Sponsorship Award 2021-22. The committee has recommended the following names for this award. The name of final winner will be selected by American Phytopathological Society, USA.

Mr. Ankush Kumar, Dept. of Plant Pathology, CCSHAU, Hisar, Haryana (Title: Variability and management of maydis leaf blight of maize incited by *Bipolaris maydis* (Nisikado and Miyake) Shoemaker)

Ms. Arti Kumari, School of Crop Protection, CPGS-AS, CAU (Imphal), Umiam, Meghalaya (Title: Synthesis of green engineered copper nano-formulation and its use as a component of IDM for management of leaf blight of turmeric (*Curcuma longa* L.))

Ms. Pinki Devi Yadav, Department of Plant Pathology, RARI, Durgapura, SKNAU, Jobner-Jaipur, Rajasthan (Title: Management of sesame (*Sesamum indicum* L.) phyllody through date of sowing and inter cropping)

Ms. Pooja Yadav, Department of Plant Pathology, RARI, Durgapura, SKNAU, Jobner-Jaipur, Rajasthan (Title: Integrated disease management approaches for alternaria leaf blight of carrot caused by *Alternaria alternata*)

IPS Award Result 2022

The award result for the year 2022 is as follows:

A.P. Misra Lifetime Achievement Award: Prof. S.S. Chahal, Former VC, MPUAT, Udaipur

S.P. Raychaudhuri Memorial Lecture: Dr. U.S. Singh, IRRI, New Delhi

IPS Recognition Award

(i) **Dr. N. Iboton Singh**, Former Dean, CoA-CAU, Imphal, Manipur

(ii) **Dr. B.N. Chakraborty**, Former Professor, NBU, Siliguri, West Bengal

(ii) **Dr. R. Sridhar**, former Principal Scientist, ICAR-NRRI, Cuttack, Odisha

(iv) **Dr. A.P. Suryawanshi**, Professor, VNMAU, Parbhani, Maharashtra

S.N. Dasgupta Memorial Award: Dr. T. Makesh Kumar, Principal Scientist (Plant Pathology), ICAR-CTCRI, Thiruvananthapuram, Kerala

K.C. Mehta and Manoranjan Mitra Award: Dr. Ashwani Kumar Basandrai, Former Dean, College of Agriculture & Basic Sciences (CSKHPKV, Palampur), Kangra, Himachal Pradesh

J.P. Verma Memorial Award: Dr. T.S.S.K. Patro, Principal Scientist and Head, Agricultural Research Station, ANGR Agricultural University, Gajularega, Vizianagaram, Andhra Pradesh

J.F. Dastur Memorial Award: Dr. Prabhu Dayal Meena, Principal Scientist (Plant Pathology), ICAR-DRMR, Bharatpur, Rajasthan

Sharda Lele Memorial Award: Dr. Rajendra M. Gade, Director of Extension Education, Dr. PDKV, Akola, Maharashtra

S. Sinha Memorial Award: Dr. B. Parameswari, Senior Scientist, ICAR-NBPGR, Regional Station, Hyderabad, Telangana

M.K. Patel Memorial Young Scientist Award: Dr. Amalendu Ghosh, Scientist (Senior Scale), Division of Plant Pathology, ICAR-IARI, New Delhi

Fellow of Indian Phytopathological Society (FPSI) - 2021

- (i) **Dr. Bholanath Mondal**, Assistant Professor, Sriniketan, Visva-Bharati, Santiniketan, West Bengal
- (ii) **Dr. Jitender Singh**, Associate Professor, SVPUAT, Meerut, Uttar Pradesh
- (iii) **Dr. Malkhan Singh Gurjar**, Scientist (Senior Scale), Division of Plant Pathology, ICAR-IARI, New Delhi
- (iv) **Dr. Palash Deb Nath**, Professor (Plant Pathology), AAU, Jorhat, Assam
- (v) **Dr. Pankaj Sharma**, Principal Scientist (Plant Pathology), ICAR-DPMR, Bharatpur, Rajasthan
- (vi) **Dr. R.Z. Sayyed**, Professor and Head (Microbiology), PSGVP Mandal's ASC College, Shahada, Maharashtra
- (vii) **Dr. Raj K. Mishra**, Principal Scientist (Plant Pathology), ICAR-IIPR, Kanpur, Uttar Pradesh
- (viii) **Dr. S.S. Veena**, Principal Scientist (Plant Pathology), ICAR-CTCRI, Thiruvananthapuram, Kerala
- (ix) **Dr. Sachin Gupta**, Assistant Professor (Plant Pathology), SKUAST-J, Chatha, Jammu & Kashmir
- (x) **Dr. Satish Kumar Sain**, Principal Scientist (Plant Pathology), ICAR-CICR, RS, Sirsa, Haryana
- (xi) **Dr. Tasvina Rahman Borah**, Scientist (Plant Pathology), ICAR RC for NEHR, Umiam, Meghalaya
- (xii) **Dr. Zaki A. Siddiqui**, Professor (Botany), AMU, Aligarh, Uttar Pradesh

Awards/Honours/Recognition

- **Dr. Kalyan K. Mondal**, Principal Scientist, Division of Plant Pathology, ICAR-IARI, New Delhi awarded Fellow from National Academy of Botanical Sciences (NABS) and from two Societies, namely Societies for Advancements of Research on Pomegranate (SARP) and Association of Rice Research Workers (ARRW).
- **Dr. Robin Gogoi**, Secretary, IPS was honoured with 18th Prof. S.R. Bose Memorial Lecture Award 2021 by Indian Mycological Society (IMS), Kolkata, and he delivered a lecture on "Strategic Management Tactics for Soil-borne Diseases of Maize" on 24th December, 2021.

IPS Election Result 2022

Election result of the Society for the year 2022 is as follows:

President-Elect 2022: Dr. S.C. Dubey, Assistant Director General (Plant Protection & Biosafety), Indian Council of Agricultural Research (ICAR), Krishi Bhawan, New Delhi

Zonal President (Central Zone): Dr. Sessa Kiran Kollipara, Senior Scientist, Horticulture Research Station, Madanapalli Bayyappagaripalle, B. Kothakota, Chittoor, Andhra Pradesh

Zonal Councillor (Central Zone): Dr. Jyothsna M.K., Associate Professor (Plant Pathology), Programme Coordinator, Krishi Vigyan Kendra, Kalikiri, ANGRAU, Chittoor, Andhra Pradesh

Zonal President (Delhi Zone): Dr. Bikash Mandal, Principal Scientist (Plant Pathology), ICAR-IARI, New Delhi

Zonal Councillor (Delhi Zone): Dr. Anirban Roy, Principal Scientist (Plant Pathology), ICAR-IARI, New Delhi

Zonal President (Eastern Zone): Dr. Sanjay Kumar Singh, Professor cum Chief Scientist (Plant Pathology), Dr. RPCAU, Pusa, Samastipur, Bihar

Zonal Councillor (Eastern Zone): Dr. Dinesh Rai, Assistant Professor (Plant Pathology), Dr. RPCAU, Pusa, Samastipur, Bihar

Zonal President (Mid-Eastern Zone): Dr. Kamal Khilari, Professor & Head (Plant Pathology), SVBPUA&T, Modipuram, Meerut, Uttar Pradesh

Zonal Councillor (Mid-Eastern Zone): Dr. Jitender Singh, Associate Professor, Dept. of Immunology & Defense Mechanism, College of Biotechnology, SVBPUA&T, Modipuram, Meerut, Uttar Pradesh

The following names were approved for the zonal president and councillor in the AGBM 2022.

Zonal President (North-Eastern Zone): Dr. Palash Deb Nath, Professor & Head (Plant Pathology), AAU, Jorhat, Assam

Zonal Councillor (North-Eastern Zone): Dr. Poppy Bora, Assistant Professor (Plant Pathology), AAU, Jorhat, Assam

Zonal President (Northern Zone): Dr. Mehraj-Ul-Din Shah, Associate Professor/Senior Scientist, SKUAST, Srinagar, Jammu & Kashmir

Zonal Councillor (Northern Zone): Dr. Sajad Un Nabi, Scientist, ICAR-CITH, Srinagar, Jammu & Kashmir

Zonal President (Southern Zone): Dr. S. Chandra Nayaka, Professor, University of Mysore, Mysore, Karnataka

Zonal Councillor (Southern Zone): Dr. Niranjan Raj S., Chairman, Department of Studies in Microbiology, Karnataka State Open University, Mysore, Karnataka

Zonal President (Western Zone): Dr. K.B. Rakholiya, Head (Plant Pathology), NAU, Navasari, Gujarat

Zonal Councillor (Western Zone): Dr. Priya John, Associate Professor (Plant Pathology), NAU, Navasari, Gujarat

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Glimpses of IPS IPSCONF2022



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