



Indian Phytopath News

A quarterly Newsletter of Indian Phytopathological Society

<http://ipsdis.org/>

Volume 8 • Issue 2-3 • April - September 2025

From President's Desk

ECO-SMART Formulation of Biocontrol Agents to Manage Plant Diseases

Plant diseases incited by fungi, bacteria, viruses, nematodes and others causes significant losses about 20-30 % of total produce at pre-and post harvest stages. Among various methods of plant disease control, biological control is receiving increasing attention as an alternative means of disease control, both pre- and postharvest, especially where disease resistance or chemical control are not available. Recently, "SMART" formulation of bioagents can be interpreted as an approach that integrates Sustainable, Modular, Advanced, Responsive, and Targeted technologies to create superior biopesticide products. It works with the five principles such as stable, maintainable, active, ready-to use and targeted action to perform better. The shift towards SMART biocontrol is driven by the need to reduce reliance on conventional chemical pesticides, which pose risks to the environment and human health. This advanced methodology addresses the limitations of traditional bioformulations, which have issues with inconsistent field performance and limited shelf-life. By making biocontrol agents more effective and easier to use, the SMART approaches can help create a more sustainable and resilient agricultural system. The SMART formulation should be cost-effective which can replace expensive laboratory growth media for large-scale production and increases economic viability while reducing waste. The bioformulation can be created as either single-strain products or as microbial consortia by combining multiple compatible strains of microbes. This modularity allows for the creation of products with broader activity and greater reliability. The key components of SMART formulations are active ingredient [microorganism like bacteria (*Bacillus*, *Pseudomonas*, etc.), fungi (*Trichoderma*, *Chaetomium*,



IN THIS ISSUE

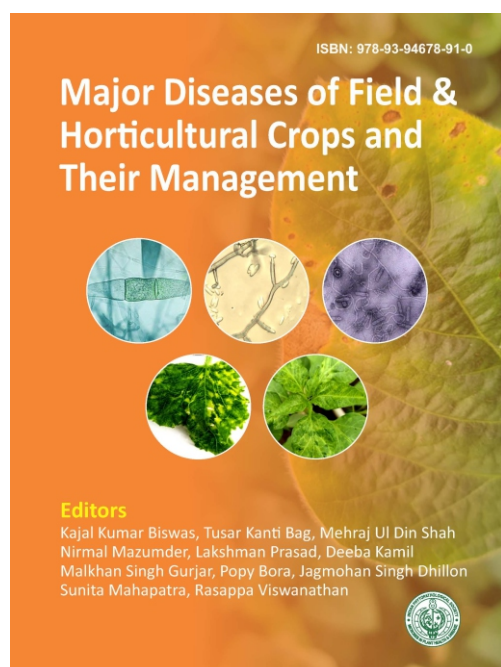
| | |
|------------------------------------|----|
| From President's Desk | 01 |
| Research Highlights | 02 |
| Awards/Honours/Promotion | 04 |
| Symposia/Workshop: Organized | 05 |
| IPS Activities | 05 |
| Book Published | 06 |
| Editorial Board - Newsletter | 06 |

Aspergillus, *Penicillium*, etc.), virus or its secondary metabolites like antibiotics and enzymes], carriers (inert materials that support and deliver the active ingredient to the target site; solid carriers: Peat, lignite, charcoal, coir dust, industrial byproducts, such as molasses, sugarcane bagasse wheat bran, talc, and kaolin; polymeric carriers: Alginate, chitosan, starch and carboxymethylcellulose), adjuvant (additives that improve the formulation's performance), stabilizers (protect against damage from UV radiation, desiccation, and high temperatures), protectants (Enhance shelf life by providing a protective microenvironment for the microorganisms), surfactants (improve product dispersal and nutrients (Support the viability and activity of the microorganisms). The formulation can be developed as solids (powders, granules), liquids, or encapsulated forms, giving manufacturers and user's flexibility in application and storage. For example, water-dispersible granules offer a dust-free and easy-to-mix option. The oil-dispersed liquid formulations disperse microbes in an oil phase, offering improved stability, reduced water content for preventing spore germination, and acting as built-in adjuvant for better penetration and retention. Talc-based formulations are simple yet effective and talc serve as a carrier for solid formulations of biocontrol agents, often incorporating additives like CMC to improve characteristics and aid in drying and packing. The modern tools like genetic engineering (genome editing) to create biocontrol

agents with enhanced bio-efficiency and plant growth-promoting traits. Nanobiotechnology is a key pillar of SMART bioformulation which involves combining bioagents with nanoparticles to create next-generation products called nanobioformulations. Nanoencapsulation technology protects active microorganisms from harsh environmental factors like UV radiation, desiccation, and extreme temperatures. Nanoencapsulation of microbes with materials like chitosan, alginate, starch or other biopolymers solve issues with free-form delivery and enable the gradual and targeted release of bioagents and their beneficial metabolites over an extended period. This maximizes their effect at the required site, such as the plant rhizosphere and phyllosphere and enhances their effectiveness against plant diseases. Advanced formulations incorporate materials that release the biocontrol agent in response to specific stimuli (e.g., pH, presence of enzymes, or light), optimizing the release timing for maximum impact on plant disease management. The SMART formulation improves the ease of handling, application, and targeted delivery of the biological agents to the site of action. It also significantly extends the product's shelf-life and improves its viability in the field to manage plant diseases in better way.

Dinesh Singh
President

Indian Phytopathological Society



Research Highlights

Bioprospecting *Trichoderma* spp. for suppression of *Ganoderma*-induced basal stem rot in oil palm

M. Amrutha Lakshmi^{1*}, M. Indraj¹, Udai B. Singh², A.R.N.S. Subbanna¹, G.K. Challa¹, Ritu Mawar³ and W.P. Dauda⁴

¹ICAR-Indian Institute of Oil Palm Research, Pedavegi, Andhra Pradesh India;

²ICAR-National Bureau of Agriculturally Important Microorganisms, Mau, Uttar Pradesh, India; ³ICAR-Central Arid Zone Research Institute, Jodhpur, Rajasthan, India; ⁴Federal University Gashua, Nigeria

*Corresponding author: amruthavvk@gmail.com

Basal stem rot (BSR), caused by *Ganoderma* spp., is the most devastating disease of oil palm, leading to heavy yield and economic losses. The study evaluated 50 *Trichoderma* isolates from diverse agroecological zones of India. Twelve isolates demonstrated strong antagonism (>80% suppression) against *Ganoderma*, with *T. afroharzianum* (UPFBK3) emerging as the most potent (Fig. 1). This strain secreted hydrolytic enzymes (chitinase, cellulase, pectinase), solubilized nutrients, promoted growth (IAA, GA production), and suppressed multiple pathogens. Scanning electron microscopy confirmed direct hyphal damage to *Ganoderma* and root colonization by *T. afroharzianum* (Fig. 2). A consortium of selected *Trichoderma* strains achieved 61.94% disease suppression, reducing foliar and bole severity significantly, while improving plant height (47.59 ± 2.52 cm) and shoot biomass (15.83 ± 0.80 g) (Fig. 3).

This work establishes *T. afroharzianum* as a promising eco-friendly biocontrol agent against BSR, offering a climate-resilient and sustainable alternative to chemical management under the National Mission on Edible Oils–Oil Palm (NMEO-OP). (Source: *Front. Nutr.* 12:1582047. doi: 10.3389/fnut.2025.1582047)



Fig. 1. Antifungal efficacy of *Trichoderma* spp. against mycelial growth of *Ganoderma ellipsoideum* by dual plate technique

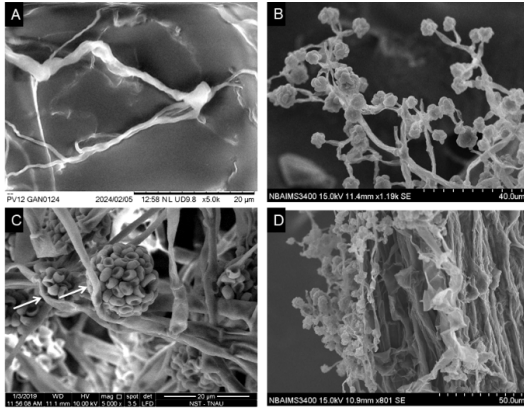


Fig. 2. Scanning electron microscope (SEM) analysis of *Ganoderma ellipsoideum* and *Trichoderma afroharzianum* interactions (A) Healthy tubular hyphae of *G. ellipsoideum* (magnification: 5,000x, scale bar: 20 µm); (B) Morphology of *T. afroharzianum*, showing branched hyphae, flask-shaped phialides, and smooth-walled ellipsoidal to subglobose conidia (magnification: 5,000x, scale bar: 20 µm); (C) hyperparasitism of *T. afroharzianum* UPFBK3, with arrows indicating damage on *G. ellipsoideum* hyphae (magnification: 8,000x, scale bar: 10 µm); (D) Root colonization by *T. afroharzianum*, demonstrating its interaction with the plant root surface (magnification: 5,000x, scale bar: 20 µm)

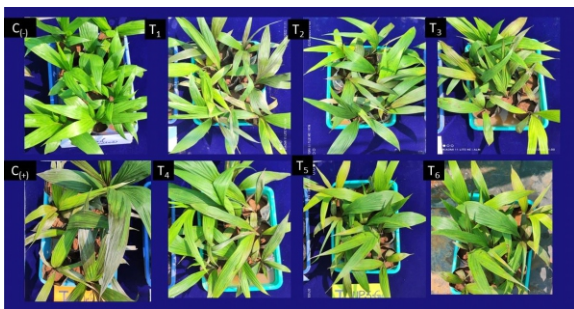


Fig. 3. Effect of *Trichoderma* spp. on basal stem rot (BSR) disease suppression in oil palm seedlings (C₋) Negative control: Healthy seedlings without *Ganoderma* inoculation; (C₊) Positive control: Seedlings inoculated with *Ganoderma* sp. without *Trichoderma* treatment; T₁: *Trichoderma asperellum* UPFBK4; T₂: *Trichoderma longibrachiatum* AZNF1; T₃: *Trichoderma virens* ANFHR10; T₄: *Trichoderma afroharzianum* UPFBK3; (T₅) *Trichoderma atroviride* UPFBK1; T₆: Combination treatment

Early and onsite detection of *Ganoderma*-induced basal stem rot in oil palm using recombinase polymerase amplification-lateral flow assay (RPA-LFA)

M. Amrutha Lakshmi^{1*}, A.I. Bhat², P. Malavika², M. Indraj¹, B. Kalyana Babu¹, A.R.N.S. Subbanna¹ and K. Suresh¹

¹ICAR-Indian Institute of Oil Palm Research, Eluru, Andhra Pradesh, India; ²ICAR-Indian Institute of Spices Research, Kozhikode, Kerala, India

*Corresponding author: amruthavvk@gmail.com

Basal Stem Rot (BSR), caused by *Ganoderma* spp., is the most destructive oil palm disease, responsible for yield losses of up to 68.73% globally. A major challenge in managing BSR is its long asymptomatic phase, during which the pathogen silently colonizes palm tissues. By the time bracket fungi (basidiocarps) appear-the only

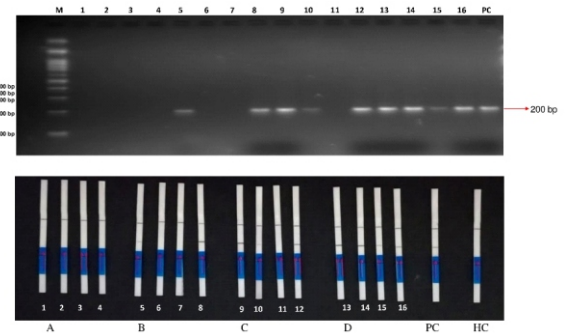


Fig. 1. Validation of RPA-LFA concerning sampling source and degrees of disease severity-Healthy palms(a), Asymptomatic palms (b); Palms with skirting (c) & Palms with brackets (d); Lanes: M: 100 bp DNA marker; 1: Root crude DNA; 2: Stem crude DNA; 3: Rhizosphere crude DNA; 4: Root pure DNA; C (+): *Ganoderma* pure fungal DNA; C (-): Water control

conclusive visual symptom-infection is irreversible and the palm is near death. Here, we report the development and validation of a rapid, highly sensitive Recombinase Polymerase Amplification-Lateral Flow Assay (RPA-LFA) for onsite *Ganoderma* detection, including at asymptomatic stages. The assay, optimized at 41°C for 30 minutes, was 1000 times more sensitive than PCR, detecting as little as 1 pg/µL DNA (Fig. 1). It distinguished 10 *Ganoderma* species without cross-reactivity and worked directly with crude root extracts. Field trials on 25 palms confirmed detection in asymptomatic and early symptomatic cases (Fig. 2). Results were visually interpretable within 60 minutes, enabling timely plantation-level disease management (Fig. 3). (Source: *Folia Microbiol (Praha)*. 2025 Jun 17. doi: 10.1007/s12223-025-01270-8)

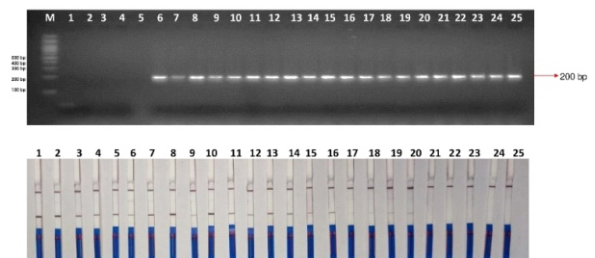


Fig. 2. Field performance of RPA-LFA: 1-5: Healthy palms; 6-10: Asymptomatic palms; 11-20: Palms with skirting; 21-25: Palms with brackets

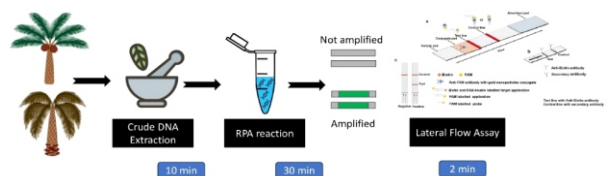
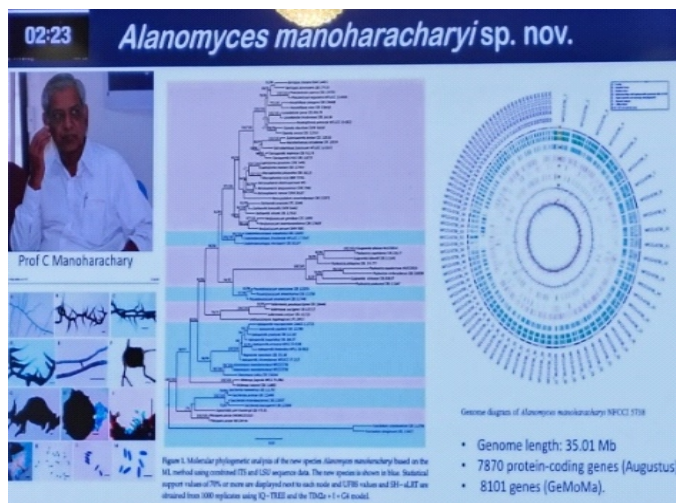


Fig. 3. Schematic representation of RPA-LFA as sensitive and rapid early diagnosis system for *Ganoderma* induced basal stem rot in oil palm

Discovery of *Alanomyces Manoharacharyi*

A novel fungus identified using genome sequencing and metabolomic analysis : Authored by Shiwali Rana and Sanjay K. Singh published in *Journal of Fungi*: <https://doi.org/10.3390/jof10110791>

*Corresponding author: sksingh@aripune.org



Awards/Honours/Promotion

- **Dr. C.D. Mayee**, Former Chairman, ASRB has been selected as the ICAC Researcher of the Year 2025. This prestigious award is a tribute to his outstanding contributions to cotton science and his lasting impact on the global agricultural community.
- **Dr. C.D. Mayee**, Former Chairman, ASRB has been honoured with the ICAC Researcher of the Year 2025 award for his transformative contributions to cotton science and smallholder farming. His 54-year career shaped Bt cotton adoption, boosted yields, and improved farmer livelihoods.
- **Prof. C. Manoharachary**, Former President, Indian Phytopathological Society, New Delhi & NAAS, Senior fellow has been felicitated on attaining 80 years by NAAS at New Delhi on 05 May 2025.
- **Prof. M.K. Naik**, Former Vice Chancellor, K.S.N. University of Agricultural & Horticultural Sciences, Shivamogga & Professor (Higher Academic Grade) University of Agricultural Sciences, Raichur, Karnataka honoured by Forum of Former Vice-Chancellors of Karnataka for Government Nomination to Karnataka Science & Technology Academy.
- **Dr. Mamta Sharma**, Principal Scientist & Lead of the Legumes Pathology Program and the Climate Change Research for Plant Protection at ICRIASAT, has been honoured with the prestigious M.S. Swaminathan–Grow Further Award for her outstanding contributions to agricultural research benefiting smallholder farmers in Asia and Africa. Award is jointly launched by the M.S. Swaminathan Research Foundation (MSSRF). Award was announced in the MS Swaminathan Centenary International Conference held in New Delhi from 7-9th August 2025.
- **Prof. N.K. Dubey**, Professor and Coordinator (Applied Microbiology), Centre of Advanced Study in Botany, Banaras Hindu University, Varanasi, Uttar Pradesh received Clarivate Web of Science Research Award 2025. Prof. Dubey has been named among the World's Top 2% Scientists in the field of Plant Sciences, as per the prestigious global ranking compiled by Stanford University researchers.
- **Prof. (Dr.) Robin Gogoi**, former Secretary, IPS has joined Assam down town University (AdtU), Guwahati in August, 2025 as the Professor and OSD to the Faculty of Science. Earlier, he served as the Professor and Head (Acting) in the Division of Plant Pathology, ICAR-IARI, New Delhi and superannuated in December 2024.
- **Dr. Baby Summuna**, Assistant Professor/Junior Scientist (Plant Pathology), Directorate of Research, SKUAST-Kashmir, Jammu & Kashmir has been honored with the Distinguished Scientist Award at the 6th Global Agriculture Conference, HARVEST 2025. The conference was jointly organized by the Royal Society of Agriculture, India; Southern Federal University, Russia; and the University of Tehran, in collaboration with ICAR, New Delhi.
- **Dr. Ritesh Kumar**, Assistant Professor at the M.S. Swaminathan School of Agriculture, Centurion University of Technology and Management, Odisha, has been honored with the *Young Plant Pathologist Award* at the 6th Global Agriculture Conference, HARVEST 2025. The conference was jointly organized by the Royal Society of Agriculture, India; Southern Federal University, Russia; and the University of Tehran, in collaboration with ICAR, New Delhi.

Symposia/Workshop: Organized

The IRise: Youth Skilling Program in Agriculture, organized in collaboration with the Syngenta Foundation-India, was held at the Department of Plant Protection, Faculty of Agricultural Sciences, Aligarh Muslim University, Aligarh, on 23rd July 2025. The training program aimed to empower rural youth and enhance their role in the future of Indian agriculture. The event was attended by over 150 participants, including special guests. Prof. Mujeebur Rahman Khan served as the Course Director, with Dr. Ziaul Haque as the Course Coordinator.

IPS Activities

IPS forth-coming conferences

Special National Conference: December 11-12, 2025, ICAR-National Institute of Biotic Stress Management, Raipur, Chhattisgarh (Title: Novel Strategies for Biotic Stress Management in Crop Plants)

IPS Zonal Conferences

Southern Zone: December 18-19, 2025, Karaikal, Pondicherry (Title: Transforming Plant Health Management: Integrating Traditional Practices with Modern Innovations for Global Food Security)

Western Zone: December 16-17, 2025, Department of Plant Pathology, CoA, VNMKV, Parbhani, Maharashtra (Title: Integrating crop care for sustainable health in changing climate scenario)

Central Zone: November 17-18, 2025, Tirupati, Andhra Pradesh (Title: Integrated approaches for managing emerging and re-emerging plant pathogens)

Delhi Zone: November 04, 2025, New Delhi (Title: Integrating Pathogenomics and Eco-Friendly Approaches for Sustainable Plant Health)

Mid-Eastern Zone: November 13-14, 2025, ICAR-NBAIM, Mau, Uttar Pradesh, (Title: Pathogens, Microbes and Plant Defense: Bridging Research and Applications)

Eastern Zone: December 18-20, 2025, Bhagalpur, Bihar (Title: Smallholder-linked Integrated, Eco-friendly and Long-term Disease Management)

Northern Zone: November 20-21, 2025, PAU, Ludhiana (Title: Frontiers in Plant Health Management: Integrating research, technology and sustainability)

Announcement of IPS Award Applications (2025)

The online award application portal for the various awards of the Society is open from October 15, 2025 (<https://ipsdis.org/awards>). The last date for submission of the online application is November 30, 2025. Interested members are requested to apply for an award of their choice. Please go through the instructions available on the website before the online application (<https://ipsdis.org/award-guidelines>).

Announcement of IPS Election (2025)

The online nominations are invited from members of the Society having voting right for the following office bearers in the Executive Council of the Society as mentioned below:

- President Elect (2026)
- Secretary (2026 to 2028)
- Joint Secretary (2026 to 2028)
- Treasurer (2026 to 2028)
- Zonal President (2026)
- Zonal Councillor (2026)

The schedule is as follows:

| | |
|---|--|
| Start date of Preliminary nomination | : Nov. 03, 2025 (Monday) |
| Last date of Preliminary nomination | : Dec. 15, 2025 (Monday) |
| Counting of Preliminary nomination | : Dec. 16, 2025 (Tuesday) |
| Letter/Email to nominees for consent | : Dec. 17, 2025 (Wednesday) |
| Last date for receipt of consent/withdrawal of nomination | : Dec. 31, 2025 (Wednesday) |
| Start date of voting | : Jan. 01, 2026 (Thursday) |
| Last date of voting | : Feb. 16, 2026 (Monday) |
| Counting of Final Votes | : Feb. 17, 2026 (Tuesday) |
| Declaration of result | : In Annual General Body Meeting (February 2026) |

Book Published

Biodiversity, Bioengineering, and Biotechnology of Fungi

Editors: C. Manoharachary, H.B. Singh, H.K. Singh and Yashpal Sharma

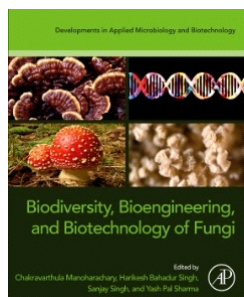
Publisher: Elsevier and AP Academic Press

Year of Publication: 2025

Page Count: 763

ISBN: 9780443138560 (Paperback);

9780443138577 (eBook)



Compendium of Phytopathogenic Microbes in Agro-Ecology

Editors: Natarajan Amaresan and Krishna Kumar

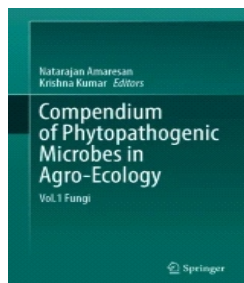
Publisher: Springer Cham

Year of Publication: 2025

Page Count: 966

ISBN: 978-3-031-81769-4

(Paperback); 978-3-031-81770-0 (eBook)



Innovative Biotic Stress Management Strategies in Crops

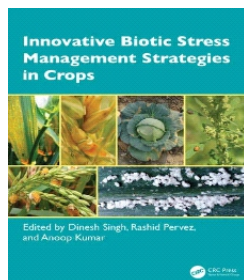
Editors: Dinesh Singh, Rashid Pervez and Anoop Kumar

Publisher: CRC Press

Year of Publication: 2025

Page Count: 434

ISBN: 9781032631547



Nematode Disease Complexes in Agricultural Crops

Editor: Mujeebur Rahman Khan

Publisher: CABI, UK

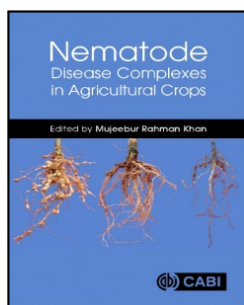
Year of Publication: 2025

Page Count: 434

ISBN: 978-1-80062-520-4

(Paperback); 978-1-80062-521-1

(eBook)



Editorial Board - Newsletter



Dr. P.K. Chakrabarty
Chief Editor
pranjibc@gmail.com



Dr. Kajal Kumar Biswas
Ex-officio
drkkbiswas@yahoo.co.in



Dr. Malkhan Singh Gurjar
Managing Editor
malkhan_jari@yahoo.com

Editors



Dr. M.K. Jyothna
mk.jyothna@angrau.ac.in



Dr. Pradeep Manyam
m.pradeep@angrau.ac.in



Dr. Ashish Kumar
ashish.pathology@gmail.com



Dr. M.K. Khokhar
khokharmk3@gmail.com



Dr. Abhijeet Ghatak
ghatak11@gmail.com



Dr. A. Srinivasaraghavan
sraghavan3628@gmail.com



Dr. H.V. Singh
drharsh2006@rediffmail.com



Dr. A.S. Kashyap
abhijeet4497@gmail.com



Dr. Ritu Bala
rituraje2010@pau.edu



Dr. Yogita Bohra
yogitabohra@pau.edu



Dr. Gireesh Chand
drgcbau@gmail.com



Dr. Amit Kumar Singh
geneamit@gmail.com



Dr. C. Jeyalakshmi
drcejaya@gmail.com



Dr. P. Balabaskar
chalappan@yahoo.co.in



Dr. V.M. Gholve
vikramgholve@rediffmail.com



Dr. G.P. Jagtap
drgpjagtap@gmail.com

Published by
Indian Phytopathological Society

New Delhi, India

E-mail: ipstdis@yahoo.com, website: <http://ipstdis.org>