



Indian Phytopath News

A quarterly Newsletter of Indian Phytopathological Society

<http://ipsdis.org/>

Volume 9 • Issue 2 • April - June 2026

From President's Desk

Varietal degeneration jeopardizes sustainable cane production: Need for a clear understanding of the phenomenon

Bacterial, viral and phytoplasma pathogens cause setback to cane cultivation in India. Many elite varieties possessed resistance to major diseases like red rot and smut but failed under field conditions due to their susceptibility to these pathogens.



Furthermore, systemic accumulation of these pathogens in the stalks slowly reduces the vigour of the plants referred to as 'varietal degeneration', and this leads to reduced cane yield in the plant as well as subsequent ratoons. The major diseases associated with varietal degeneration are yellow leaf disease (YLD - sugarcane yellow leaf virus [SCYLV - *Polerovirus sacchari*]), mosaic (*Sugarcane mosaic virus* [SCMV-*Potyvirus sacchari*] and *Sugarcane streak mosaic virus* [SCSMV-*Poacevirus sacchari*]), ratoon stunting disease (RSD) caused by a xylem-limiting bacterium *Leifsonia xyli subsp. xyli* (Lxx) and sugarcane grassy shoot (SCGS – Phytoplasma). Further, it is believed that sugarcane grows normally in absence of stalk-infecting pathogens causing red rot, wilt, smut or fungal diseases. Although degeneration occurs in sugarcane due to systemic build-up of non-fungal pathogens, the canes are harvested as healthy canes. As this generation happens over a period of time, the negative impact caused by the pathogens is ignored or not noticed.

Such systemic infections of these viruses and bacteria gradually reduce metabolic activities of the cells, movement of photosynthates and ultimately plant vigour is reduced. Such affected plants show significant reductions in photosynthesis, transpiration/stomata conductance and CO₂ assimilation. This leads to reduction in plant growth and cane yield parameters

IN THIS ISSUE

From President's Desk	01
Editorial	02
Research Highlights	03
Awards/Honours/Promotion	04
Book Published	06
Obituary	06
Editorial Board - Newsletter	06

such as cane length, cane girth, number of internodes, and eventually Juice yield also. Overall, under field conditions, the degenerated canes show 30-50% reduction in cane weight and a similar loss in juice yield. Even though the physiological yield potential of sugarcane is more than 300 t/ha, but an average cane yield of only 84 t/ha is achieved in India. There could be some genetic factors also involved as cane is vegetatively propagated but, varietal degeneration caused by these non-fungal pathogens is a major constraint to the yield gap and is largely ignored under field conditions. Varietal degeneration is not a new phenomenon; it has been observed earlier also, or without recognising the impact, many varieties were withdrawn from cultivation. , More than 60% area of the 5.5 M Ha sugarcane area in the country under ratoon crop experiences more severe impact of degeneration, leading to poor cane yield and low income.

The popular sugarcane cvs Co 740 and CoC 671 that were grown in about 1 mha in Maharashtra and North Karnataka have disappeared from cultivation, and the newly released cv Co 86032 has replaced the area during 2000. Similarly, another popular variety, Co 419, widely grown in the tropical states especially in Karnataka, became a victim of degeneration due to RSD and YLD. The problem is not limited to tropical regions, but is in the subtropical region also. The popular cvCoS 767 grown in about 1mha has degenerated due to RSD, YLD and mosaic after 2000. Whereas the cv Co 0238

with high vigour and yield potential has replaced the affected variety within few years of its commercial release during 2009.

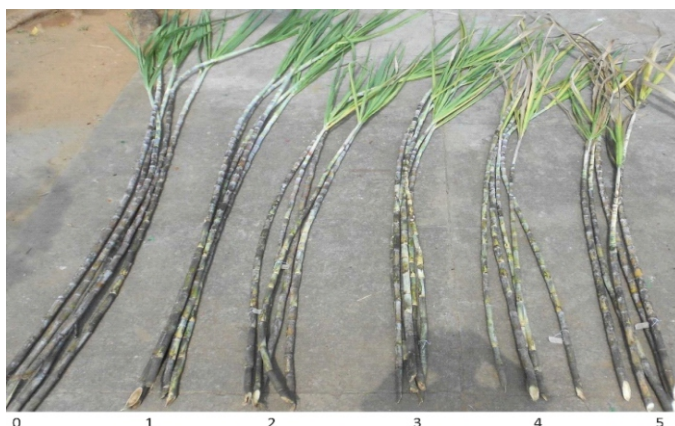


Fig. 1. Representative canes exhibit YLD severities of grades 0 (healthy) to 5 in the sugarcane cv Co 11015. A progressive decline in cane vigour is seen from healthy to severity grade 5. Simultaneous increase in YLD severity is seen on the leaves

To circumvent varietal degeneration in sugarcane, a clean seed programme through meristem tip culture combined with molecular diagnostics for the designated viruses was developed and demonstrated to the farmers and sugar mills. This approach restored the cane yield potential of the popular variety Co 86032 of the tropical region. Cane yields of 200-250 t/ha were achieved through varietal rejuvenation programmes.

Systematic seed replacement of the ruling varieties is another critical area that needs consideration and implementation at field level to overcome the varietal degeneration. Currently, seed replacement is practised in less than 10% of the new planting, and this indicates repeated use of the same canes as seed and degeneration is sustained. This scenario is depicted in Fig. 2, where we found that most of the cane fields exhibit degeneration in sugarcane belts in Maharashtra. To meet the demand of 600 MT of canes during Vikshit Bharat (2047), adoption of the clean seed programme, it is a necessity to realize additional cane production of nearly 150 MT within the same cropped area. Cane area is likely to shrink due to urbanization, competition from other crops, poor returns, etc.; a systematic varietal rejuvenation programme is required to attain targeted cane yield and to sustain cane cultivation in the country.

Varietal degeneration is not confined to sugarcane alone; it occurs in all the vegetatively

propagated crops, more specifically in horticultural crops like potato, banana, tapioca, black pepper, cardamom, etc., and it is addressed depending on awareness and availability of management tools. In crops like potato and banana, a clean seed programme is successfully implemented, and the benefits are clearly established. In sugarcane, it is clearly proven that degeneration is manageable, and there is a need to create awareness to manage the constraint.



Fig. 2. Aerial view of YLD-affected (yellow arrows) and disease-free field (green arrow) in a commercial plantation. Diseased fields exhibit a pale-yellow canopy

R. Viswanathan

President, Indian Phytopathological Society, New Delhi & Former Director, ICAR-Indian Sugarcane Research Institute, Lucknow 226002, Uttar Pradesh, India

Email: rasaviswanathan@yahoo.co.in; Orcid id: 0000-0002-7274-8144

Editorial

Indiscriminate use of pesticides in agriculture-Can we avoid or minimize it?

In her book, 'Silent Spring' in 1962, Rachel Carson could predict the devastation of eco-systems through the haphazard use of chemicals like DDT. In 2006, her book was named as one of 25 greatest scientific books of all time by the editors of Discover Magazine. It was an eye opener and warning for the future, and it holds good even today. Herbicides followed by insecticides, and fungicides are the most used chemicals worldwide. Annual global consumption of fungicides and bactericides at present is around 1.04



million metric tonnes and a 20 billion USD industry. Luckily in India use of pesticides hovers around 60,000 tonnes and fungicides comprise a smaller part in comparison to the insecticides of the 236 million USD ventures. Most of these fungicides are used on fruits like apple, vegetables and rice etc. Unfortunately in some cases the fruits or vegetables are being consumed shortly after the sprays. Many times clean fruits or vegetables may not be free from the pesticides. Systemic fungicides like triazoles and strobilurins cause hormonal system disruption, affect thyroid function and sex hormone production. Long-term exposure may end up in oxidative stress and dysfunction of mitochondria in human cells. Carbendazim and few other compounds are known human carcinogens. In addition imazalil, chlorothalonil and carbendazim, are typical broad-spectrum fungicides, are detected at high levels in the natural environment, on heterogeneous human epithelial colorectal cells (Caco-2 cells). All three fungicides had the potential to induce different degrees of toxicity, cause apoptosis, reactive oxygen species (ROS) and even change the cell cycle in the cells. Do we really know the fungicidal residues on the freshly produced fruits and vegetables, and their possible repercussions on human health? I think this type of awareness has to come to people and the use of fungicides has to be within a safety limit. Studies to look into these issues would be useful for the consumers and can form a part of new scientific information.

Dr. G.S. Shekhawat, who happened to be the Director of Central Potato Research Institute Shimla, H.P., a very learned scientist once said that the solution of the plant health problems of a farm is on the farm itself. He meant that the bio-control agents, plant extract, crop rotation, soil amendments, sowing at right time, mixed cropping, intercropping, destruction of ancillary hosts, and use of disease free seed or planting material are the need of hour. It will not only discourage the use of chemicals but will also improve soil health and eco-system. Today we have bio-control protocols for the management of diseases and many pests. More recently, genome editing has opened another area for generating disease resistant crop types. Therefore, we should bank upon the possible non-chemical alternatives instead of pesticides. There were times when a farmer would spray an insecticide for the

control of a fungal disease or spray metalaxyl for the control of blight. Thanks to the online availability of information, literature, platforms, and assistance to identify the correct cause of plant stress and its possible control. There is a growing awareness in people about pesticide health hazards and demand for organic products is increasing. Safety limits, pesticidal residues, judicious use of chemicals will have to become a part of the studies in future. Therefore, there is a need to explore the alternate approaches, and ways to minimize the use of chemicals to leave a safe ecology to the posterity.

S.C. Bhardwaj

Chief Editor, IPS Newsletter

Research Highlights

Genome Insights into Indian Strain of Tomato Big Bud-Associated '*Candidatus* Phytoplasma australasiaticum

N. Li¹, S. Gupta², S.K. Kollipara³, T. Hung¹, G.P. Rao^{2*} and Chi Kuo¹

¹Department Plant Pathology and Microbiology, National Taiwan University, Taipei, Taiwan

²Division Plant Pathology, ICAR-Indian Agricultural Research Institute, New Delhi, India

³Horticultural Research Station, Dr YSR Horticultural University, Venkataramannagudem, Andhra Pradesh, India

*Corresponding author: gprao_gor@rediffmail.com

Tomato Big Bud (TBB), associated with the 16SrII phytoplasma group, has recently emerged as a major threat in Andhra Pradesh, India, with record 32–100 per cent disease incidence in the tomato hybrid Saaho (TO 3250). In absence of resistant cultivars, to understand the genome of pathogen a metagenome-assembled genome of phytoplasma strain TBB-AP was generated from infected tomato plants. Illumina sequencing produced a 558.8 kb draft genome comprising 33 contigs, 471 protein-coding genes, one rRNA operon, and 17 tRNAs 9 (Fig. 1). Phylogenetic analyses classified TBB-AP within the 16SrII-D subgroup and showed 99.6% ANI with '*Candidatus* Phytoplasma australasiaticum'. A potential mobile unit (PMU), consisting of *tra5*, *dnak*, *dnaG*, *dnaB*, *dnaE*, *dnaD*, *tmk*, was also observed (Fig. 2). The genome harboured potential mobile units and effector homologs (SAP54, SAP09, SAP05, SAP11), providing critical insights into pathogen virulence, diagnostics,

future strategies in rice research and development, thereby strengthening collaborative efforts within the rice research ecosystem. At the conclusion of the meeting, during the plenary session, prestigious awards for Best AICRPR Centre across different disciplines were presented based on outstanding performance during 2025-26. This year, the Best AICRPR Centre-Funded (Plant Pathology) Award 2025 was conferred to the Main Rice Research Station, Anand Agricultural University, Nawagam (Gujarat).

The award was presented to Dr. Rakesh Kumar Gangwar, Research Scientist (Plant Pathology), MRRS, AAU, Nawagam, Gujarat by Dr. S.K. Pradhan, ADG (FFC), ICAR, New Delhi, and Dr. A.K. Singh, Former Director, ICAR-IARI, New Delhi. The ceremony was also graced by the presence of Dr. R.M. Sundaram (Director, ICAR-IIRR, Hyderabad), Dr. G.A.K. Kumar (Director, ICAR-CRRI, Cuttack), Dr. M. Srinivas Prasad (PI, Plant Pathology, ICAR-IIRR, Hyderabad), and Dr. S.V. Sai Prasad (PI, Plant Breeding, ICAR-IIRR, Hyderabad), who were present on the dais.

Participation in International/National Events

Dr. Ritu Mawar, Principal Scientist, ICAR-Central Arid Zone Research Institute (ICAR-CAZRI), Jodhpur, Rajasthan, represented India at the International Workshop on "Pest and Disease Management Strategies for Sustainable Agriculture" held at Taichung, Taiwan, during May 5–7, 2026.

The workshop was organized by the Food and Fertilizer Technology Center (FFTC) for the Asia and Pacific Region, in collaboration with the Agricultural Chemicals Research Institute, Ministry of Agriculture, Taiwan; Agricultural Technology Research Institute; and World Vegetable Center. The event focused on biological control, Integrated Pest Management, and innovative technologies for sustainable crop protection.

Dr. Mawar participated as an expert panel member and keynote speaker, presenting India's progress in

biopesticide development, registration, commercialization, and adoption. She highlighted microbial biocontrol agents, including *Trichoderma* and *Pseudomonas*, regulatory frameworks, quality assurance, commercialization pathways, and opportunities for strengthening regional cooperation for wider adoption of eco-friendly crop protection technologies.

Dr. D.L. Yadav participated in a five-day training programme on "Capacity Building on Artificial Intelligence Applications in Agricultural Education, Research and Extension", jointly organized by the Directorate of Human Resource Development, Agriculture University, Kota, and the Extension Education Institute, Anand, held at Agriculture University, Kota, Rajasthan, during 15-19 June 2026.

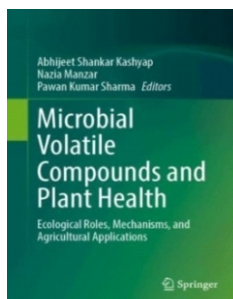
Dr. Kalyan K. Mondal, Joint Director (Research), ICAR-National Institute of Biotic Stress Management (ICAR-NIBSM), Raipur, Chhattisgarh, has been conferred the Prof. S. Kannaiyan Memorial NABS Lifetime Achievement Award-2025 in recognition of his pioneering contributions to plant health management, particularly for advancing the molecular understanding of bacterial pathogenesis. He has also been elected as Vice President of the Society for Advancement of Research on Pomegranate (SARP), India.

Prof. Zaki Anwar Siddiqui, Department of Botany, Aligarh Muslim University, Aligarh, has been elected as a Fellow of the National Academy of Agricultural Sciences (NAAS), New Delhi. The Fellowship Certificate was conferred upon him by Dr. M. L. Jat, President of NAAS, Director General of the Indian Council of Agricultural Research (ICAR), and Secretary, Department of Agricultural Research and Education (DARE), Government of India, during the 33rd Annual General Meeting and Foundation Day programme of the Academy on 5 June, 2026 held in New Delhi.



Book Published

Microbial Volatile Compounds and Plant Health: Ecological Roles, Mechanisms, and Agricultural Applications is an edited volume by Abhijeet Shankar Kashyap, Nazia Manzar, and Pawan Kumar Sharma, published by Springer Nature. It explores the ecological significance, underlying mechanisms, and agricultural applications of microbial volatile compounds, highlighting their emerging roles in plant health, plant-microbe interactions, disease management, and sustainable agriculture.



Obituary

Prof. B.L. Puttoo, a stalwart and pioneer of Plant Pathology in Jammu & Kashmir, passed away on 19th April 2026 in Hyderabad. His invaluable contributions to the field and his lasting legacy will always be remembered. He was not only an eminent academician but also a mentor and guide to countless students and colleagues, who benefitted immensely from his wisdom and dedication. His passion for teaching and research helped shape the discipline in the region and inspired generations to follow in his footsteps. His passing is an irreparable loss to the academic fraternity and all those who had the privilege of knowing him.



Dr. S.C. Chatterjee, Former Secretary, Indian Phytopathological Society, New Delhi, and Former Principal Scientist, Division of Plant Pathology, ICAR-IARI, New Delhi, left for his heavenly abode on June 22, 2026. Dr. Chatterjee made remarkable contributions to the field of Plant Pathology through his distinguished scientific career and his dedicated service to the Indian Phytopathological Society. As Secretary of IPS, he rendered invaluable services and played a significant role in strengthening the Society's academic and scientific activities.



Editorial Board - Newsletter



Dr. S.C. Bhardwaj
Chief Editor
scbfdl09@gmail.com



Dr. Mallikarjun Kenganal
Senior Editor
mallikarjun_nss@rediffmail.com



Dr. Malkhan Singh Gurjar
Senior Editor
malkhan_iari@yahoo.com



Dr. Deebea Kamil
Managing Editor
malkhan_iari@yahoo.com

Editors



Dr. Kuldeep Singh Jadon
kuldeep.icar@gmail.com



Dr. Laxman Singh Rajput
laxman0742@gmail.com



Dr. V. Shanmugam
shanpatho@yahoo.com



Dr. Ganesan Prakash
prakashg.ganesan@gmail.com



Dr. Ayon Roy
ayonroy.plantpathology@gmail.com



Dr. Surajit Khalko
surajitkhalko@ubkv.ac.in



Dr. Rajarshi Kumar Gaur
gaurrajarshi@hotmail.com



Dr. Smriti Mall
smriti.mall@rediffmail.com



Dr. Sanjeev Sharma
sanjeevsharma.cpri@gmail.com



Dr. Santosh Watpade
santoshpathology@gmail.com



Dr. Palash Deb Nath
pnath1@rediffmail.com



Dr. Anurag Kashyap
anurag.kashyap@aaau.ac.in



Dr. Gururaj Sunkad
sunkadgururaj@gmail.com



Dr. Mohan V. Totawar
mohantotawar@gmail.com



Dr. Shrikant B. Bramhankar
bramhash@gmail.com

Published by
Indian Phytopathological Society

New Delhi, India

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