



# Indian Phytopath News

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## From President's Desk

### Registration and use of biocontrol agents / biopesticides in India

We know that biocontrol agents / biopesticides products are highly specific and selective to target pests and safe to non-target and beneficial organisms. They are also environmentally safe and having immense role in sustainable intensification of agriculture using green and nature- friendly technologies. The market of biopesticides is increasing at global level including India. Utilization of low-cost biocontrol agents for pest management is one of the feasible options of doubling the farmers' income in the country. Though, bioagents-based management strategies are cheaper as compared to the expenditure on chemical pesticides but still their use is limited, hence it is a matter of great concern. The availability of substandard biopesticides in the market has adversely affected farmers' faith in the biocontrol technology.



Biopesticides are regulated through Insecticide Act, 1968 and Insecticide Rules, 1971 in India. The Insecticide Act, 1968 is a central law enacted "to regulate manufacture, import, sale transport, storage, distribution and use of insecticide with a view to prevent the risk to human being or animals and matters connected therewith". The major data requirements for registration are legal, scientific data on chemistry, bio-efficacy, safety, packaging, and labelling. Based on data submitted, registration is being granted as provisional under 9 (3B) for any new strain and regular or original as 9(3). No registration under section 9 (4) is to be granted against 9 (3) for microbial pest control agents. The guidelines for registration of biopesticides along with consortium of biopesticides have been revised to facilitate registration process. Presently, Comprehensive Registration of Pesticides (CROP) portal has been developed to facilitate registration.

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Over 70 strains belonging to more than eight different genera of entomopathogenic/ entomotoxic bacteria, antagonistic bacteria, entomopathogenic fungi, antagonistic fungi and nuclear polyhedrosis virus (NPV) and granulosis virus (GV) have been registered.

Quality nucleus cultures of parasitoids, predators and biopesticides are required. Large scale augmentation of biocontrol agents through mass production and release of bioagents need strong support from government funding agencies, which would specifically fund Public-Private-Partnership projects. The promising bioproducts developed by ICAR institutes and SAUs should be evaluated under AICRP on biocontrol and other crop based AICRPs at multi-locations to facilitate the registration of the promising products and to increase the label claim.

Adequate protection and publicity of already registered biopesticides developed under the NARS is required at national level. Same time a stringent monitoring system should be placed for frequent monitoring to maintain the quality of biocontrol agents/ biopesticides. Fortunately, we have national policy to promote natural farming and organic farming. The plant protection fraternity should harness the advantages of these policies for popularizing biopesticides and biocontrol agents for pest management. To achieve the projected goals, ICAR Institutes, SAUs and KVKs should come forward and work together for promotion and popularization of already existing biocontrol agents/ biopesticides technologies relevant to their region and crop among farmers.

A strong policy decision is also required to ensure that companies engaged in chemical pesticide production also have infrastructure for biopesticides production. The minimum volume of biopesticide produced should be 5-10% of the total chemical pesticides being produced. Overlapping categories under biostimulants and biopesticides need to be worked out.

**S.C. Dubey**  
President

Indian Phytopathological Society

## Research Highlights

### Lack of planting material is prima causa for abandoning Khasi mandarin (*Citrus reticulata*) cultivation in the North-East India

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North-East (NE) region of India is one of the natural homes of many citrus species including the remunerative citrus fruit crop, Khasi mandarin (*Citrus reticulata*). The tristeza caused by *Citrus tristeza virus* (CTV) transmitted primarily by the brown citrus aphid (*Toxoptera citricidus*) and the Citrus greening (CG)/Huanglongbing (HLB) caused by *Candidatus Liberibacter asiaticus* (*Ca.Las*) transmitted by citrus psyllids (*Diaphorina citri*) are responsible for decline of Khasi mandarin (*Citrus reticulata*) orchards in the NE region of India. Both the diseases are spread quickly through vegetatively propagated planting materials. As per one of the estimates, altogether 56.0% of citrus plants in NE India are found infected by CTV. Once orange cultivation was a flourishing industry in the NE region but, of late orange orchards of the region have suffered a setback due to citrus decline which has caused either abandoning of orange orchards or converting the citrus orchards into other plantations especially in to arecanut plantations and recently by rubber plantations. New orchards, within a few years of establishment, show decline syndrome mostly due to lack of disease-free planting materials. Once the planting materials are affected by CTV and HLB at early

stage, there are no methods available to manage these diseases. It is also believed that CTV predisposes citrus plants to many biotic stresses including HLB. When the tree has mixed infections of CTV and *Ca.Las*, there is quick decline. Till date, no effective management strategy to control the citrus decline is available. Eradication of infection by removing the infected trees is not practical. Moreover, there is no availability of genetic resistance in citrus plant against these diseases.

During the last five years about 70 Khasi mandarin tree samples, from different citrus growing areas of Assam, Meghalaya, Nagaland, Manipur and Arunachal Pradesh in NE India were indexed for prevalence of virus and virus-like diseases. Tristeza virus was detected by DAC-ELISA using CTV specific antisera and PCR targeting the 5'ORF1a gene fragments (404nt) of CTV genome. The HLB was detected by PCR targeting partial 16srRNA (452nt) of *Ca.Las*. Out of these citrus samples, 46 (65.7% incidence) were infected by CTV, and 32 samples (45.7% incidence) were infected by *Ca.Las*. About 42.8% samples were infected by both the pathogens, CTV and *Ca. Las*. The sequence analysis of 20 CTV isolates showed that the isolates shared 91-100% nt identities amongst them; of these 13 isolates, in phylogenetic analysis, had common grouping with the decline inducing/severe CTV isolates Kpg3/VT, and seven isolates fell into three different CTV groups. Sequence of 17 HLB isolates were analysed and they shared 99-100% nt identities amongst them; in phylogenetic analysis they fell into one clade along with *Ca. Las* of India. Samples from Khasi mandarin mother stocks collected from three citrus farms of Assam, viz., HRS, AAU, Kahikuchi, CEC farm, Kamrup Rural and University Research farm, AAU, Jorhat were tested and most of the mother stocks were found to be infected by CTV and *Ca.Las*.

It is concluded that CTV and *Ca. Las* are the major causes of Khasi mandarin decline in NE India and pose extreme threats to the citrus industry in the region. Furthermore, lack of identified disease-free healthy mother stocks in the region remains the issue of major concern. Supply of certified planting materials from any government and or private sectors remains unavailable. Therefore, growers use only the seedling plants from different nurseries which have no facilities of certification. Therefore, to develop sustainable diseases management strategies for controlling decline and rejuvenation of Khasi mandarin industry,

replacement of old orchards or development of new orchards through supply of disease-free planting materials is foremost needed. In this respect, production of disease-free and resistant planting materials based on bud-wood grafting and maintenance of disease-free quality-mother stocks are essential.



Fig. 1. Different types of symptoms in decline affected citrus plantations in the NE India

### Development of a selective medium for isolation of *Phytophthora* spp. causing gummosis diseases in citrus

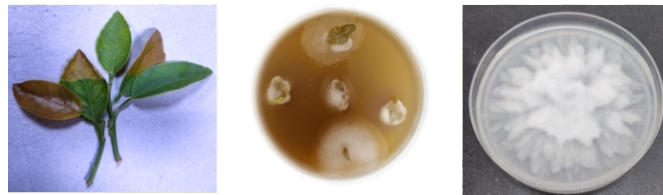
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Citrus is one of the most widespread fruit crops grown all over the world due to its great economic and health value. Among several diseases, *Phytophthora* disease has been identified as one of the major causes of decline in citrus. It causes the most serious and economically important soil borne diseases to citrus crops. In this study we tried to use carbendazim in place of PCNB to isolate *Phytophthora* from soil and planting materials of citrus. The rhizospheric soil and infected plant (bark & root) from gummosis disease caused by *Phytophthora* sp. in citrus were collected from different states of North Eastern Region viz. Assam, Meghalaya and Arunachal Pradesh, of India in 2021 and 2022. We used lemon young leaves in baiting method for the isolation of *Phytophthora* spp. from soil and plant samples (Fig. 1 & 2). We used corn meal agar supplemented with Pimaricin-Ampicillin-Rifamycin-Carbendazim (CMA-PARC) in lieu of corn meal agar supplemented with Pimaricin-Ampicillin-Rifamycin-Pentachloronitrobenzen-Hymexazol (CMA-PARPH) and carbendazim fungicide @ 300ppm was used as

substitute of Pentachloronitrobenzen (PCNB) in the selective medium. Total eighteen isolates belonging to different *Phytophthora* spp. were isolated from different soil and root samples of citrus plant (Fig. 2). The cultures were then sub cultured until pure cultures were obtained (Fig. 3). Purified colonies from CMA-PARC were then transferred and routinely maintained on to Carrot Agar. All cultures were preserved in sterilized water for long-term preservation.



## Awards/Honours

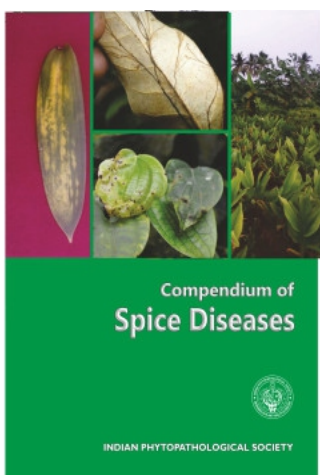
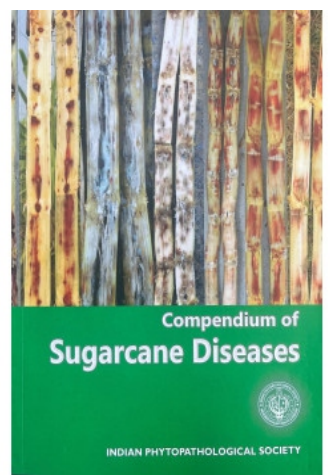
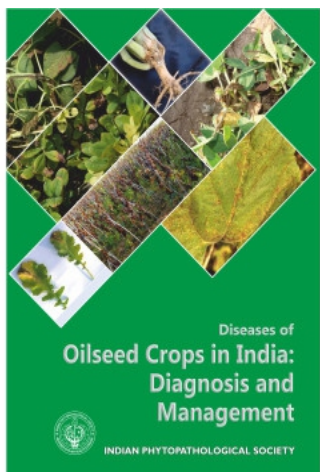
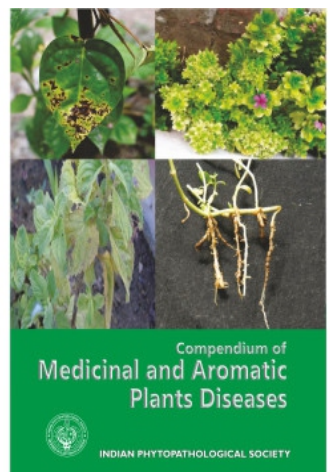
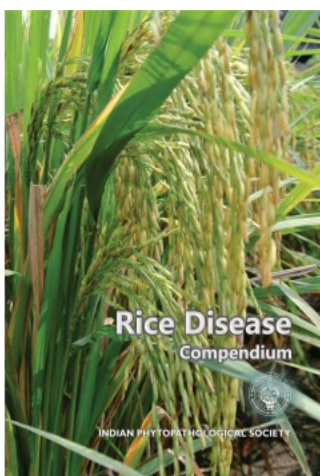
- **Dr. Sanjay Sawant**, Hon. Vice-Chancellor, DBSKKV, Dapoli has conferred Life Time Achievement Award to for his outstanding contribution in the field of agricultural research and development by Maharashtra Society of Extension Education, Akola. This award was given during the inauguration function of the MSEE National Seminar 2023 held at DBSKKV, Dapoli during May 7-8, 2023.
- **Dr. M.P. Thakur**, former Dean, College of Agriculture, Indira Gandhi Krishi Vishwavidyalaya, Bemetara, Chhattisgarh has been awarded with Life Time Achievement Award for the year 2021 during ISMPP 42<sup>nd</sup> Annual Conference and National Symposium (Golden Jubilee Celebration of ISMPP, 1970-2021) at Anand Agricultural University, Anand, Gujarat, India on "Plant Health Management: A Way Forward for Food Safety, Security and Sustainability" from 10-12, May 2023.
- **Dr. P.K. Chakrabarty**, Former Member (Plant Sciences), ASRB, DARE, Krishi Anusandhan Bhawan, New Delhi has been awarded with Life Time Achievement Award for the year 2022 during ISMPP 42<sup>nd</sup> Annual Conference and National Symposium (Golden Jubilee Celebration of ISMPP, 1970-2021) at Anand Agricultural University, Anand, Gujarat, India on "Plant Health Management: A Way Forward for Food Safety, Security and Sustainability" from 10-12, May 2023.



## Obituary

- **Dr. Saroj Singh**, Ex-Director, ICAR-NCIPM and great oilseed pathologist has left this world for heavenly abode on April 23, 2023.

## IPS Publications



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