NATIONAL ACADEMY OF BIOLOGICAL SCIENCES
Founded 2004

NABS News Letter

National Academy of Biological Sciences

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Contents

From the Desk of President.....

Dear NABSians,

Greetings form NABS.

Hope all of you are keeping well. It has been more than a year, the pandemic has taken a heavy toll on the routines of every one's life. NABS is not an exception. The new normal has led to a string of changes. Our first international conference scheduled in Annamalai University has to be postponed and now would be held in Virtual mode.

We lost some of our members during this period. Dr. K. Balaraman, who was the founder EC member, passed away, besides, Dr. K. Natarajan, an active EC member. We also lost our senior member, Prof. M. Mahadevappa. We pay our respects to them and pray for their soul to rest in peace.

We are planning our AGM and EC meetings in virtual mode. The applications for the award of Fellowship and other NABS Awards (2019 & 2020) are at the NABS-Secretariat Chennai. Hopefully, by November, 2021 we may finalize them.

Our Editor, Dr. M. Anandaraj is unwell for the last one year and Dr. S. Nakkeeran has taken over the role. I wish him all the best. He is one of our active members to take on the mantle. I welcome new EC members, Dr. M. Prakash form Annamalai University and Dr. B. N. Hazarika from Central Agricultural University, Arunachal Pradesh.

I wish all our members a safe and healthy life and active career.

(V. A. Parthasarathy)
President, NABS

2. Message from Vice-President...

Dear Members of NABS,

Greetings.

Since the appearance of COVID19 pandemic by the end of 2019 and early 2020 several conferences and seminars were and are being cancelled because of social distancing to prevent spread of the virus. This led to an alternative for communicating new developments in science i.e., webinars composed of two words "web" and "seminar". Webinar is an event which is held on the internet and attended by an online audience. Audience can participate via smart phones, PC, tablets and laptop from anywhere in the world. They can see and hear the speaker and ask questions, thus allowing 2-way communication. The speaker has the possibility to present material through slides and talk. There are some advantages and disadvantages of webinars compared to face-face seminars. The advantages are, saves cost as no need to travel, accommodation requirement, registration fee (most of the times), etc. The disadvantages are dependency on the technology (mostly internet connection) which is not always reliable, leading to cancellation or postponement. Participants could be distracted due to their surroundings and the interaction between the speaker and participant is often reduced to a minimum. Whatever it is, webinars have helped the scientists to be in touch with each other and communicate the recent developments in their subject of interest. Let us hope that in the days to come the virus becomes virulent so that we will have face-face seminars in the near future. Wishing all the Members a good health and all the best.

(D.J. Bagyaraj)
Vice-President

3. Message from Editor...

Dear Members of NABS,

Greetings.

While wishing you all a safe stay at your home, I would like to share with you information about- "Bacterial endophytes with RNase Gene- The New generation Bioviricide for plant viral disease management"

Plant viruses infect more than 450 plant species. Among them, majority are RNA viruses, which cause a significant loss in productivity. Amidst the total crop loss, 40 % has been attributed by plant viruses. Effective management of viral diseases in crop plants are achieved through the integration of various management strategies including, avoiding the infection source, vector management, exploring host plant resistance and genetic engineering. Though, molecular tools such as RNA interference, analogues of antiviral nucleosides, genetic transformation, genome-editing with CRISPR/Cas9 system and ribozymes are effective against plant viruses, its commercial potential remains as a big puzzle to the end users. Besides, the journey from my student life and till now, we were advised and are also advising to eradicate the infected plants as a potential management strategy. But, it is the paramount responsibility of plant doctors to develop a solution to manage viral infection in crop plants for the economic empowerment of farming community.

Bouizgarne (2012), kindled the minds of researchers by throwing a light to explore endophytes rather than the generation of transgenic plants to manage viral infection in crop plants. Endophytic Bacillus spp. from tobacco plants induced SAR and thus suppressed TMV by inhibiting the synthesis of CP and enhancing the expression of genes encoding JA and SA-signaling pathways proteins, NPR1 and defense proteins PR-1a and PR-1b. B. amyloliquefaciens MBI600 strain induced immune response to TSWV and PVY through SA-induced signaling pathway in tomato. Biohardening of pepper plants with B. amyloliquefaciens 5B6 reduced the incidence of CMV in field conditions due to the induction of genes encoding PR-4, PR-5, and PR-10 proteins.

Fishing out the antimicrobial peptides and nucleases present in the microbiome dwelling in rhizosphere, endosphere and phyllosphere can be well explored not only as a biopesticide to manage bacterial and fungal pathogens, but could be also harnessed to trigger the resistance response in host plants against plant viruses. Hence, nucleases of bacterial origin can serve as a potential source to inhibit plant viruses. Bacteria on binding with virus particle, could lyze it by producing extracellular proteases, and nucleases. Recently, 20 RNases of extracellular nature were discovered from Bacillus spp. Extracellular RNases including barnases, binases, and baliphases were reported to be produced by Bacillus amyloliquefaciens, B. pumilus, and B. licheniformis. B. subtilis secrete RNase encoded by the bsn gene, B. pumilus produced RNase binase II encoded by the birB gene responsible for antiviral action. RNA viruses were cleaved by bacterial RNase leading to the disruption in the synthesis of viral coat protein (Fedorovo et al., 2011). RNase from B. cereus ZH14 lyzed TMV, RNase from B. pumilus inhibited the development of potato virus S (PVS) and potato virus M (PVM) and red clover mottle virus (RCMV) in peas. Soybean plants expressing the RNase gene of Schizosaccharomyces pombe PAC1 possessed resistance to a wide range of viruses (Yang et al., 2019). Barnase gene from B. amyloliquefaciens imparted resistant to TLCV infection (Pakniat-Jahromy et al., 2011). Thus, the selection of endophytic microorganisms, which can produce RNases directly in plant tissues is a promising strategy for the development of virus control mechanisms in plants, which can perform as a new generation bio-viricide. Editor, NABS NL

(S. Nakkeeran)
Editor, NABS NL

4. News and Events

4.1. News

4.1.1. Obituary

Dr. M. Mahadevappa, born on 4th August 1937 is an elected Fellow of NABS (2007). He is well known as Rice Mahadevappa as he has dedicated himself in developing rice varieties in the country. Basically he is a Geneticist and a Rice breeder. He served for the cause of the farmers and occupied several coveted positions like- Director, JSS Rural Development Foundation, Mysore; Chairman, Agricultural Scientists Recruitment Board, New Delhi (2001-2002); Vice-Chancellor, University of Agricultural Sciences (UAS), Dharwad (1994-2000); Director of Instruction (1993-1994). He is one of the recipients of Prof. S. Kannaiyan Memorial Award (2015) from National Academy of Biological Sciences.

We deeply mourn the demise of Prof. M. Mahadevappa who passed away on 5th March 2021. The members of Executive Council and all the members of NABS covey their condolences to the grieved family members of Prof. M. Mahadevappa.

May his soul rest in Peace.

Address: 'Samarasa' 1576, 1st Cross, Chandra Layout, Bangalore – 560 040, Karnataka; [Phone-R: 080-23216040; M: 094483 60991; mahadevrice@yahoo.com]

4.1.2. Obituary

Dr. K. Balaraman born on 10 December 1946 is the founder Executive Council member of NABS and an elected Fellow of NABS (2014). He is the first member to enroll as a life member of NABS in 2004. A reno wned microbiologist in the country, who shifted his interest from agricultural microbiology to medical microbiology, moved from Tamil Nadu Agricultural University, Coimbatore to Vector Control Research Centre (under ICMR), Puducherry and superannuated as Deputy Director (Sr. Grade) from VCRC. He dedicated himself to find means and ways to eradicate the mosquito vector and developed many bio-products to manage the mosquito vector.

On 15th August, 2021, ICMR-Vector Control Research Centre (Department of Health Research), Ministry of Health and Family Welfare, Government of India, Medical Complex, Indira Nagar, Puducheery awarded Dr. K. Balaraman posthumously "Certificate of Honor" for his innovation and commercialization of VCRC Bti B-17 recognized as Indian Standard (ISBTI2021 VCRC B-17) by Central Insecticide Board & Registration Committee (CIB & RC).

We deeply mourn the demise of Dr. K. Balaraman who passed away on 22 May 2021. The members of Executive Council and all the members of NABS covey their condolences to the grieved family members of Dr. K. Balaraman.

May his soul rest in Peace.

Address: 10, II Cross, Tagore Nagar, Puducherry-605 008

4.1.3. First NABS-International Conference

- The First NABS-International conference with the theme, "Life Sciences: Contemporary Approaches in Biological Sciences for Food, Health, Nutrition Security and Conservation of Biodiversity" (12th NABS-Conference) is scheduled to be organized in collaboration with Faculty of Agriculture, Annamalai University, Annamalainagar, Chidambaram from 26 to 28 August, 2021 on virtual mode.

4.1.4. EC & AGM online meeting

- The 20th Executive Council Meeting and 16th Annual General Body Meeting were held on 20 February 2021 via zoom platform. Members attended the meeting.

5. Research Highlights

5.1. Bacillus amyloliquefaciens triggers the expression of defence genes leading to the suppression of Botrytis cinerea causing Lilium leaf blight under protected conditions

Lilium leaf blight induced by Botrytis cinerea is a major threat in the cultivation of Lilium in the Nilgiris District of Tamil Nadu, India under protected conditions. The present study aims to understand the bipartite and tripartite interactions between B. cinerea, Lilium and B. amyloliquefaciens to develop a cost-effective antagonist to manage Botrytis leaf blight. The in vitro antagonism revealed that the mycelial growth of B. cinerea was suppressed to 46% by B. amyloliquefaciens (VB7). Foliar application of B. amyloliquefaciens colonized the phylloplane within 48 h and prevented the germination of B. cinerea conidia. The formation of biofilm on the leaf surface, colonized the conidia of B. cinerea (SEL). The colonized conidia were parasitized by the bacterial cells and resulted in the shrinkage of B. cinerea (SEL) conidia.The bipartite interaction between B. amyloliquefaciens (VB7) and mycelial biomass of B. cinerea as sole carbon source produced volatile and nonvolatile antifungal compounds. Tripartite interactions between Lilium leaf, B. amyloliquefaciens (VB7) and conidia of B. cinerea produced five different non-volatile antifungal and antibacterial compounds. Expression of defence genes through qRT-PCR analysis induced PAL, PR 10 and ascorbate peroxidase (APX) transcripts in plants treated with B. amyloliquefaciens (VB7), challenged against B. cinerea (SEL). Dipping of bulbs and soil drenching combined with foliar spray of B. amyloliquefaciens (VB7) 1% (10 ml/L at 10^8 CFU/ml) had the minimum leaf blight incidence of 11.71 PDI, with the stem yield of 38 stems/m^2 as against 27 stems/m^2 in the untreated control. Thus delivering of B. amyloliquefaciens (VB7) 1% (10 ml/L at 10^8 CFU/ml) through dipping of bulbs, soil drenching combined with foliar application suppressed Botrytis leaf blight and increased the stem yield of Lilium under protected conditions.

S. Nakkeeran , R. Priyanka., P. Renukadevi and S.Vinodkumar

S.Nakkeeran, Professor (Plant Pathology), Department of Plant Biotechnology, Tamil Nadu Agricultural University, Coimbatore -641 003
R. Priyanka – Ph.D., Scholar, Department of Plant Pathology, Tamil Nadu Agricultural University, Coimbatore -641 003
P. Renukadevi, Associate Professor (Plant Pathology), Department of Medicinal Plants, Tamil Nadu Agricultural University, Coimbatore -641 003

6. Awards, Recognitions, Honors received by members of NABS / Activities of the members

Parthasarathy, V.A.
- Conferred with Fellow of 'Society for Promotion of Horticulture'

Dileep Kumar, B.S.
- Promoted as Chief Scientist from 4th September 2017 onwards at CSIR-National Institute for Interdisciplinary Scientific and Technology (NIIST), Thiruvananthapuram, Kerala

Vasantharaj David, B.
- Admitted as Honorary Fellow of 'Society for Biocontrol Advancement' during the 6th National Conference on 'Biocontrol: Innovative approaches for Green India' held at Bangaluru from 3-5 March 2021.

Mandal, K. G.
- Joined as Director of ICAR-Mahatma Gandhi Integrated Farming Research Institute (MGIFRI), Motihari, Bihar [a new Institute under NRM division of the ICAR].

7. Activities of Members of NABS

7.1. Dr. D.J. Bagyaraj

As Convener/ Resource Person of the National Academies (INSA, NASI, IASc) Lecture Workshop/ Refresher Course delivered virtual lectures as given below:

- "Recent trends in microbiology and biotechnology" and "Microorganisms for human welfare" at St. Joseph's College, Bangalore on January 12-13, 2021.
- Microbially mediated mobilization of soil P for sustainable agriculture" and "Interaction between AM fungi and other soil organisms" at Hindustan College of Arts and Science, Coimbatore on February 05-06, 2021.
- "Mycorrhizal fungi and their role in agriculture" and "Ecology of AM fungi" at Sacred Heart College, Tirupattur on February 16-17, 2021.
- "Mycorrhizal fungi for sustainable agriculture" and "Soil Biodiversity" at Srimad Andavan Arts and Science College, Tiruchirapalli on February 14-15, 2021.
- "Microorganisms and human welfare" and "AM fungi for sustainable agriculture, horticulture and forestry" at Telangana University, Nizamabad on March 22, 2021.
- "Mycorrhizal fungi for sustainable agriculture" and "Ecology of AM fungi w.r.t agriculture and environment" at Bharathiar University, Coimbatore on April 08-09, 2021.
- Delivered a virtual lead lecture on "Can agricultural practices affect AM fungal population and diversity" during the annual meeting of Mycological Society of India organized by Punjabi University, Patiala on February 22-24, 2021.
- Delivered a virtual lead lecture on "Microbial inoculants and crop productivity" during the webinar on "Dynamics of microorganisms and plants" organized by BHU, Varanasi on February 22-23, 2021.
- Chaired the session (virtual) on "Crop production" during the 51st Annual Group Monitoring meeting of AICRP on Soybean at Indore on March 12, 2021.

- Chaired the webinar on "Microbial biodiversity and its utilization in agriculture" organized by ICAR-NBAIM at Mau on "International Day of Biodiversity" , May 22, 2021.
- Attended the virtual Editorial Board meeting of the journal "Proceedings of the National Academy of Sciences India, Section B - Biological Sciences" on June 28, 2021.

7.2. Dr. V.A. Parthasarathy

- Delivered a guest lecture on Horticulture and historical perspective and was the Chief Guest of AGM of the Society for Promotion of Horticulture.

7.3. Dr. M. Prakash, Annamalai University

- As Organizing Secretary of First NABS-International Conference, making all arrangements to conduct the Conference through virtual mode at Faculty of Agriculture, Annamalai University, Tamil Nadu.

7.4. Dr. R. Gomathi, Organizing Secretary & Dr. M. Prakash, Coordinator

- Organized an International Plant Physiology Virtual Symposium 2021 [IPPVS-2021], from 11 to 12 March 2021 which was organized by ICAR-Sugarcane Breeding Institute (SBI), Coimbatore and Indian Society for Plant Physiology (ISPP), New Delhi, NAAS-Coimbatore Chapter & Society for Sugarcane Research and Development (SSRD)

  [Organizing Secretary: Dr. R. Gomathi, PS, ICAR-SBI, ISPP Secretary (S) Coordinator: Dr. M. Prakash, AU, TN]

7.5. Dr. Renu Agrawal

- Delivered lecture on Utilization of agriwastes to high valued products for farmers and entrepreneurs organized by Agriculture Information [18-01-2021]
- Had discussion with engineering students of Vidya Vikas college on How Probiotics can improve Health [22-01-2021].
- Served as an expert committee member for screening AWSAR , research stories around the nation [17-02-2021].
- Invited as Chief Guest on Women's day organized by Shri Sai trust, Mysuru [08-03-2021]
- Helped in selection of project proposals of Young Scientists and Technologists, DST, GOI [7.5.2021]
- Served as an expert panel member on the role of probiotics in conference on Food and Nutrition organized by SYNNEX [20, 21-05-2021].
- Delivered a lecture on 'Probiotics and enhancing human health' organized by JSS academy of Higher education and Research, Mysuru [10-07-2021].
- Delivered a lecture on 'Opportunities in Food and Health Sector', organized by Sairam College of Engineering, Bangaluru [29-07-2021].

8. Publications

a. Books

Vasantharaj David, B., Alexander Jesudasan, R.W. and Sundararaj, R. 2021 Handbook of Whiteflies (Aleyrodidae: Hemiptera: Insecta). p.505.

Anand Prakash, Vasantharaj David, B., Jagadiswari Rao., Shrivastava, S. K., Berliner, J. and Totan Ada. 2021. Synthetic Pesticides. Applied Zoologists Research Association (AZRA) Bhubaneswar, Odisha, India [ISBN 81-90 0947-2-1].

Benckiser, Gero (Ed.) 2021. Soil and Recycling management in the Anthropocene era. Springer Publications.

b. Book-Chapters

Chaithanya, G., Bagyaraj, D. J and Mohan Raju, B. 2020. Symbiosis with fungal endophytes conferring stress tolerance to legumes. In: Microbial Mitigation of Stress Responses of Food Legumes (Eds. Amaresan, N., Senthil Kumar, M., Krishna Kumar and Sankaranarayanan, A.), CRC Press, Taylor and Francis Group. Pp: 69-83 (Closed Access).

Sharma, M. P., Grover, M., Chourasiya, D., Bharti, A., Agnihotri, R., Maheshwari, H. S., Pareek, A., Buyer, J. S., Sharma S. K., Schutz, L., Natarajan, M., Singla-Pareek, S. L., Grossman, J. M. & Bagyaraj D. J. 2020. Deciphering the role of trehalose in tripartite symbiosis among rhizobia, arbuscular mycorrhizal fungi and legumes for enhancing abiotic stress tolerance in crop plants. Frontiers in Microbiology, 11: 2219. https://doi.org/10.3389/fmicb.2020.509919 (Open Access).

C. Journals

Raghu, H.B., Anuroopa, N., Ashwin R., Ravi, J.E. and Bagyaraj, D.J. 2021. Selected microbial consortia promotes Dalbergia sissoo growth in the large-scale nursery and wastelands in a semi-arid region in India. Journal of Forest Research, DOI: 10.1080/13416979.2021.1955439 (Closed Access).

Nakkeeran, S., Prajapathi,V.S., Vandhana,M. and Renukadevi, P. 2021. Draft genome sequence of Bacillus amyloliquefaciens Strain CB, a biological control agent and plant growth-promoting bacterium isolated from cotton (Gossypium L.) rhizosphere in Coimbatore, Tamil Nadu, India.2021. Frontiers in Genetics, DOI: 10.3389/fgene.2021.704165 (Open Access).

Nakkeeran, S., Rajamanickam,S., Saravanan,R., Vanthana,M. and Soorianathasundaram, K. 2021. Bacterial endophytome-mediated resistance in banana for the management of Fusarium wilt. 3 Biotech (2021) 11:267. https://doi.org/10.1007/s13205-021-02833-5

Nithya, P.R., Manimegalai,S., Nakkeeran, S. and Mohankumar,S. 2021. Comparative study of the ditrophic interaction between Beauveria bassiana and Plutella xylostella. 3 Biotech (2021) 11:223. https://doi.org/10.1007/s13205-021-02760-5.

Sreenayana, B., Vinodkumar,S., Nakkeeran, S., Muthulakshmi,P. and Poornima, K. 2021. Multitudinous potential of Trichoderma species in imparting resistance against F. oxysporum f. sp. cucumerinum and Meloidogyne incognita disease complex. Journal of Plant Growth Regulation. https://doi.org/10.1007/s00344-021-10372-9.

9. An appeal to contribute for Corpus Fund

Corpus Fund for Prof. S. Kannaiyan Memorial Award is being mobilized. NABS thankfully acknowledge the contributions made by members to Prof. S. Kannaiyan Memorial Corpus Fund [vide list below- continuation]

S.No.	Name of contributor	Amount (Rs.)	S.No.	Name of contributor	Amount (Rs.)
73	Nil			Nil	

We earnestly appeal to all the rest of the Life members, NABS Fellows / Associate Fellows, Corporate Life Members, Corporate Fellows, Awardees of NABS and well- wishers to contribute to this noble cause. The Fund shall be transferred on line to the Savings Account of National Academy of Biological Sciences.
[Vide details for online transfer in item 10.1. of NL]

10. An appeal to contribute for Printing of NABS-Book

The members of NABS were requested to contribute to defray the expenses incurred on printing the book. Many members have responded. The contribution by members is listed. The contribution shall be transferred on line to the Savings Account of National Academy of Biological Sciences.
[vide list below-] [Vide details for online transfer in item 10.1. of NL].

We thankfully acknowledge the receipt of contribution by the following members during this period.

S.No.	Name of contributor	Amount (Rs.)	S.No.	Name of contributor	Amount (Rs.)
1	Nil		2	Nil	

11. Enroll yourself as a member and be a part of NABS

Types of Membership available (one time payment)

A. Life Member	:	₹ 5,000/- or US$ 200/-
b. Provisional Life Membership	:	₹ 5,000/- or US$ 200/-
c. Corporate Life Member	:	₹ 10,000/- or US$ 400/-
D. Corporate Fellow	:	₹ 1,00,000/- or US$ 4000/-

- Duly filled membership form shall be sent as Secretary NABS in WORD format by E-mail to secretarynabs@gmail.com
- The prescribed membership fee shall be transferred on line

Account details of National Academy of Biological Sciences

Name of the account holder	:	National Academy of Biological Sciences
Account number	:	10496978637
Type of account	:	Savings Account
Name of Bank	:	State Bank of India, Valmikinagar Branch, Thiruvanmiyur, Chennai - 600 041
Branch code / IFSC code	:	Branch code: 11721 - IFSC code: SBIN0011721

Down load your application from www.nabsindia.org

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On behalf of National Academy of Biological Sciences

An appeal to members of NABS
Kindly inform change of address including phone numbers and
E-mail to the Secretary, NABS by E-mail (secretarynabs@gmail.com)

Printed and circulated to members as E-copy on 30 September 2021