



NABS *News Letter*

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From the Desk of the President.....



Dear NABSians,

Greetings.

I convey my wishes for a happy New Year.

It is the time we look back our goals and achievements. I am extremely happy that NABS is steadily progressing in its activities. Looking back, we started the first Interactive Workshop with the theme "Microbial Interactions for Food Security" which was scheduled on 30 September 2008 at ICAR-IISR, Calicut, Kerala and the first national level seminar scheduled on 20 & 21 July 2013 at Bharathidasan University,

Tiruchirappalli, Tamil Nadu and so on. We have conducted the 9th NABS National Seminar very recently at Madurai Kamaraj University, Madurai, Tamil Nadu which was attended by large number of students and faculties from all over India.

Fellowships (since 2005) and Associate Fellowships (since 2009) are being conferred on eligible members. Several awards were instituted based on need at various point of time. Currently we have Prof. S. Kannaiyan Memorial Award (since 2012) and Dr. APJ Abdul Kalam Memorial NABS- Life Time Achievement Award (since 2013) which are made to members/non-members on nomination basis.

NABS-Best Woman Scientist Award (since 2010); NABS- Best Research Paper Award (since 2012) (Prof. T. S. Sadasivan Memorial NABS- Best Research Paper Award for Basic Sciences; Prof. G. Rangaswami Memorial NABS- Best Research Paper Award for Agricultural Sciences & Forestry; Dr C.M. Singh Memorial NABS-Best Research Paper Award for Veterinary & Fisheries; Dr. V. Subrahmanyam Memorial NABS-Best Research Paper Award for Food Sciences); NABS-Young Scientist Award (since 2013); NABS-Leadership Award (since 2014); NABS- Best Scientist Award (since 2014) (Dr. G. S. Venkataraman Memorial NABS-Best Scientist Award for Basic Sciences; Dr. B. P. Pal Memorial NABS -Best Scientist Award for Agricultural Sciences and Forestry; Dr. V. S. Alwar Memorial NABS-Best Scientist Award for Veterinary and Fisheries; Dr. Smt. Rajammal P. Devadas Memorial NABS-Best Scientist Award for Food Sciences) were instituted and NABS continue to recognize the NABSians based on their contributions. All these awards are based on Score Card System which is very transparent. The motivation of young biologists / researchers and teachers continue to yield dividend as evidenced by enrollment of new members.

In order to play a more vital role we need to develop policy papers on issues confronting biologists. It is time, we also make steps to start a journal of international standards. Hope, in the years to come this goal shall be achieved with the cooperation of all members. Let us all believe and wish that the New Year brings greater bondage among biologists for more active and productive role of biologists in the country.

(V. A. Parthasarathy)
President, NABS

2. Message from Vice-President...



My New Year wishes to all NABSians!

The modern agricultural practices are heavily dependent on the use of chemical pesticides, inorganic fertilizers, growth regulators, etc. Now it has been realized that these practices have deleterious effect on environment and on soil, animal and human health. Hence, the concept of sustainable agriculture emerged which not only emphasizes on the conservation of natural resources but also the quality of environment. Often there is misconception that sustainable agriculture and organic agriculture are the same. It is not true. Organic agriculture strictly avoids the use of chemical fertilizers and pesticides. In sustainable agriculture chemical fertilizers and pesticides are used in a limit that has no disruptive effect on the soil and the environment. Sustainable agriculture systems are designed to use existing natural resources for producing food which is nutritious with no harm to human health. In practice, such systems have tended to avoid as far as possible use of chemical fertilizers, pesticides, growth regulators and livestock feed additives; instead relying upon crop rotations, crop residues, organic manures and on natural biological and cultural controls for insect pests, plant diseases and weeds. We the scientists working in biology should promote sustainable agriculture for meeting the food requirements of growing population with no deleterious effect on the environment.

(D.J. Bagyaraj)
Vice-President

3. Message from the Editor...



Happy new year to one and all at NABS!

As we usher in the New Year, I would like to express my sincere thanks and best wishes to the President, Secretary, all the office bearers and to all the members for their unstinting support over the past years. At this juncture it's wise to look forward and think about what this year is bound to bring us. But first, a quick look back at what we did in the past year. The 9th National Conference on New Biological Researches: Opportunities and Challenges for Sustainable Development held from 11th to 12th August 2016 was a great success and helped us in providing valuable insights into prioritizing issues in agriculture, biology, energy, environment, health and climate change. While we are still in the process of consolidation, such interactions have helped us in stabilizing and transforming the academy into a more flamboyant one. We also roped in more members into our fold and we continued to motivate the existing members to explicitly share their views when confronted with headwinds. We did continue to lean on our collective scientific acumen no matter what the circumstances by not losing sight of our priority i.e. to be robust, strong and sustainable by keeping the nation, society and the environment at the heart all our deliberations. Though it has been quite challenging, it is important to use our resources and time wisely and move ahead with more conviction, decisiveness and swiftness in this year. The year ahead is bound to be wrought with new challenges, but by working as a team and focusing on our priorities we can realize our objectives. This will be the Academy's priority and we at NABS strongly believe that we can count on each one of you to offer your big-hearted support and cooperation.

Before I conclude, I convey my hearty congratulations to our stalwarts, Dr. T. Marimuthu, Secretary (NABS) who received "Prof. SS Chahal Lifetime achievement award" from Indian Society of Mycology and Plant Pathology and Dr. D. J. Bagyaraj, Vice President (NABS) for being the only one from India to contribute to the publication on "Global Soil Biodiversity Atlas". I also congratulate Dr. Prakash Kumar for becoming the Fellow of National Academy of Science, India.

I once again wish you all a healthy, peaceful and happy New Year!

(M. Anandaraj)
Editor, NABS NL

4. News and Events

Obituary



Prof. Dr. R. Rabindran left us for heavenly abode on 27-12-2016

Dr. R. Rabindran, a life member of NABS, was born on 14 January, 1956. He served in Tamil Nadu Agricultural University, Coimbatore in several capacities- as Professor of Plant Pathology, Deputy Registrar Registrar i/c and Dean i/c, Aravindar Agricultural Institute, Tiruvannamalai (on deputation). He superannuated on 31-01-2016. He made commendable contributions in the field of Plant Virology.

His sudden demise on 27-12-2016 by 07:45pm is deeply mourned by NABSians and conveys their condolences to his wife, son, daughter-in-law and other family members. May his SOUL rest in PEACE.

Home address: Mrs. R. Arunmozhi 7/13, Thondamuthur Road, Sri Lakshmi Nagar, Coimbatore- 641 046.
Mobile: + 91-97892 17705

4.1. Ninth NABS National Conference

The 9th NABS-National Conference with theme, "New Biological Researches: Opportunity and Challenges for Sustainable Development (Agriculture, Biology, Energy, Environment, Health and Climate Change) was organized from 11-12 August 2016 in collaboration with School of Energy, Environment and Natural Resources, Madurai Kamaraj University (University with Potential for Excellence), Madurai, Tamil Nadu, India.

Prof. Dr. K. Muthuchelian, Formerly Vice-Chancellor, Periyar University, Salem, Tamil Nadu & Chairperson, School of Energy, Environment and Natural Resources, Madurai Kamaraj University, Madurai was the organizing Secretary of the Conference.

Prof. Dr. T. Marimuthu, Secretary, NABS was the Coordinator.

Inaugural function

- The inaugural function of the conference was organized on 11 August 2016 at the Preview Theatre of MKU. After the invocation, Kuthuvilakku was lit by the dignitaries as a mark of auspicious beginning of the conference.
- Prof. T. Marimuthu, Secretary, NABS welcomed the gathering.
- The dignitaries were honored by the organizing Secretary, Prof. Dr. Muthuchelian.
- Dr. D. J. Bagyaraj, Vice-President, NABS briefed about NABS and its activities and requested the delegates to become a part of NABS family.



Dr. R. Appavuraj, Director, Defense Research and Development Organization, Ministry of Defense, GoI, Chandipur, Balasore, Odisha and Chief Guest inaugurated the 9th NABS-National Conference. He also declared the conferment of "Dr.APJ Abdul Kalam Memorial NABS-Life Time Achievement Award" on Prof. K. Ramasamy, Vice-Chancellor, TNAU; released the book on "Bioinformatics, Barcoding and Benefit sharing in Biodiversity" authored by Dr. K. Muthuchelian.



Dr. Kirti Singh, Chairperson, World Noni Research Foundation & President, International Society for Noni Science, Chennai declared conferment of 'Prof. S. Kannaiyan Memorial Award' on Prof. R. R. Hanchinal, Chairperson, PPV & FRA, New Delhi and released the Abstract Book of NABS-National conference.

- Dr. (Tmt.) G. Valli, Vice-Chancellor, Mother Teresa Women's University, Kodaikanal, TN received the copy of the abstract book and felicitated.



- Dr. S. Natarajan, Vice-Chancellor, The Gandhigram Rural Institute-Deemed University, Gandhigram, Dindigul, TN, declared the presentation of Recognition Award to Dr. D. J. Bagyaraj, Vice-President, NABS and offered his felicitation.

- Dr. K. Shiva Shankar, NABS Fellow and NABS, Life Time Achievement Awardee felicitated.



- Dr. V.A. Parthasarathy, President, National Academy of Biological Sciences, Chennai felicitated and briefed about the activities of NABS and the 9th NABS-National Conference.



- Dr. S. Sudalaimuthu, Vice-Chancellor, Karpagam Academy of Higher Education- Deemed University, Coimbatore gave his special address and felicitated.



- Dr. K. Muthuchelian, Organizing Secretary, NABS-National Seminar, Madurai Kamaraj University, Madurai delivered presidential address.



- Dr. C. Gopinathan, Head, Department of Solar Energy School of Energy Sciences, Madurai Kamaraj University, Madurai proposed vote of thanks.
- The inaugural function was concluded after the National Anthem.



Valedictory function

- Dr. S. Kannan, Director, Academic Staff College, Madurai Kamaraj University, Madurai welcomed the delegates of the Conference.
- Prof. K. Muthuchelian, Organizing Secretary presented the recommendations of the conference. Dr. R. R. Hanchinal, Chairperson, PPV &FRA, GoI, New Delhi distributed the participation certificate to the delegates and felicitated.
- Dr. K. Ravichandran, Director, Research & Project Officer & Special Officer, Madurai Kamaraj University, Madurai felicitated.
- Dr. P. Vijayan, Registrar i/c, Madurai Kamaraj University, Madurai and the Chief Guest of valedictory function presented the Best oral and Poster Presentation awards and delivered the valedictory address.
- Dr. V. A. Parthasarathy, President, NABS specially honored the Organizing Secretary, Prof. K. Muthuchelian for ably organizing the Conference in a grand manner. Because of his efforts 450 registered delegates attended the conference which is hitherto an unprecedented attendance.
- Prof. T. Marimuthu, Secretary, NABS proposed vote of thanks and conference was concluded with National Anthem.



Technical Sessions

Technical sessions on Agriculture, Biology, Energy, Climate change, Health and Environment were conducted as concurrent sessions. Session on Agriculture was divided into 5 sub-sessions; session on Biology was divided into 6 sub-sessions for the sake of convenience.

Oral Presentations

New Biological Researches: Agriculture

The sub-sessions were chaired by Dr. K. Shiva Sankar, Dr. D.J. Bagyaraj, Dr. M. Subramanian, Dr. K. Natarajan, Dr. K. Samiayyan chaired the sub-sessions on Agriculture while Dr. S. Nakkeerna, Dr. M. Prakash, Dr. R. Selvarajan, Dr. B. Meena, Dr. N. Arun Kumar were the rapporteurs for the respective sub-sessions on Agriculture.

In all two lead papers and 24 oral presentations were listed.

New Biological Researches: Biology

Dr. N. Mathivanan, Dr. Jyotsana Rai, Dr. K. Manoharan, Dr. R. Balagurunathan, Dr. A. K. Nagpal, Dr. S. Murugesh chaired the sub-sessions on Biology while Dr. A. Maruthupandian, Dr. U. Ramesh, Dr. R. Ganesan, Dr. V.T. Hiremath, Dr. V. Shanmugaiah and Dr. M.N. Shivakamashawari were the rapporteurs for the respective sub-sessions on Biology.

In all two lead papers and 34 oral presentations were listed.

New Biological Researches: Energy

Dr. C. E. Sooriamoorthy chaired the session while Dr. C. Gopinathan was the rapporteur

In all one lead papers and 8 oral presentations were listed.

New Biological Researches: Climate Change

Dr. M. G. Rgunathan chaired the session while Dr. S. Selvakumar was the rapporteur.

In all one lead paper and 6 oral presentations were listed.

New Biological Researches: Health

Dr. N. Bala Nayagam chaired the session while Dr. S. B. Anand was the rapporteur.

In all one lead paper and 8 oral presentations were listed.

New Biological Researches: Environment

Dr. R. Ramanibai chaired the session while Dr. M. Anand was the rapporteur.

In all one lead paper and 9 oral presentations were listed.

Poster Presentations

Poster sessions on Agriculture, Biology, Energy, Climate Change, Health and Environment were conducted session-wise. In all 384 posters were listed, 87 in Agriculture, 182 in Biology, 14 in Energy, 59 in Environment, 36 in Health and 6 in Climate Change.

Annual General Body Meeting (AGM)

The AGM was conducted on 12 August 2016 by 09:00am under the chairmanship of Dr. V.A. Parthasarathy, President of NABS. Dr. D. J. Bagyaraj, Vice-President, Dr. T. Marimuthu, Secretary, Dr. M. Subramanian, EC member, Dr. Kirti Singh, President, ISNS & Prof. SK Memorial Awardee, Prof. R. R. Hanchinal, Prof. SK Memorial Awardee, Dr. K. Shiva Shankar, NABS Life Time Achievement Awardee were present.

The Annual Report of NABS and audited statement for 2015-16 were presented by the Secretary. The AGM approved the audited statement, annual report and award of Fellowship and awards to be presented. The details of awards and fellowship are detailed below in section 5.1.B.

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

5.1. Awards, Recognitions and Honors

Congratulations to all the NABSians who received awards and recognition from various institution and organizations in the country and outside during 2015-16.

Name of Member	Name of Award /Recognition received
5.1. A. Awards and recognitions received from other organizations	
Arup K. Mukherjee	<ul style="list-style-type: none">Received Distinguished Achievement Award -2015 from Association for the Advancement of Biodiversity Science, 2015Elected as Fellow of Society of Association for the Advancement of Biodiversity Science (2015).Elected as Fellow of Scientific Society of Advanced Research and Social Change (2015)
Balikai, R. A.	<ul style="list-style-type: none">Received 'Reviewer Excellence Award' in recognition of significant contribution to the Journals published from Agricultural Research Communication Centre, Karnal (Haryana) (Indian Journal of Agricultural Research & Legume Research-An International Journal).
Brahma Singh	<ul style="list-style-type: none">Conferred with Life Time Achievement Award during the Alumni Almamater meet of GP Pant University of Agriculture and Technology, Pantnagar held from 11-12 November 2016 at the same University.
Marimuthu, T.	<ul style="list-style-type: none">Conferred with 'Prof. SS Chahal Life Time Achievement Award' instituted by Indian Society of Mycology and Plant Pathology during inaugural function of 38th Annual conference and National Symposium on "Challenges towards Plants Health under Changing Climate Scenario for Sustainable Agriculture" held at Bidhan Chandra Krishi Viswavidyalaya, Mohanpur, Nadia, WB on 24 November 2016.

Murty, USN

Prakashkumar, V.

Pramod W. Ramteke

Renu Agrawal

Sreenivas, A. G.

Vasantharaj David, B.

Rtn. M. Mohan

- Conferred with “Life Time Achievement Award in Agricultural Sciences” by PEARL- A Foundation for Educational Excellence, Madurai on 10 December 2016 during the inaugural function of “SMART SUMMIT2016” (Science, Medicine, Agriculture, Research and Technology) held at Madurai.
- Appointed as Director, National Institute of Pharmaceutical Education and Research (NIPER), (Department of Pharmaceuticals, Ministry of Chemicals and Fertilizers Govt of India) by the President of India and the Visitor of NIPER.
- Conferred with Fellow of National Academy of Sciences, India, Allahabad
- Awarded “Excellence in Science Award” (consist of Scroll and cash prize) by Society for Conservation of Nature (SCON)
- Elected as Fellow of The Biotech Research Society of India (2016)
- Conferred with REX Karmaveer Global Fellow & UNV Karamveer Chakra: National Medallion for proactive Volunteer Action (Instituted with UN and REX) by iCONGO International Federation of NGOs for her contributions made in socio economic causes of rural people (November 2016)
- Received Dr. B. Vasantharaj David Award (2016) at the XV AZRA International Conference on Recent Advances in Life Sciences held at Ethiraj Women's College, Chennai on 11-13th Feb 2016
- SVWS, Lucknow conferred Life Time Achievement Award in Agriculture and Allied Sciences on 10th December 2016.
- Has been unanimously elected as the State President for the Tamil Nadu Agro Inputs Traders Association, in the Annual General body Meeting held at Thanjavur on 25th August 2016 who is a Corporate Member of NABS & Chairman of M/s SKYWIN GROUP, (Mohan Agro Centre, Sun Mac Agro Chemicals, Skywin Agro Tech, Skywin Bio Tech, and Prasmo Agri), Kumbakonam

5.1. B. Awards, Fellowship and recognitions received from National Academy of Biological Sciences during 9th NABS-National Conference and Annual General Body meeting held at Madurai Kamaraj University from 11 to 12 August 2016



Prof. Dr. R. R. Hanchinal, Chairperson, Protection of Plant Varieties and Farmers' Rights Authority, Ministry of Agriculture & Farmers' Rights, GoI, New Delhi

Conferred with “Prof. S. Kannaiyan Memorial Award” (2016)



Prof. Dr. K. Ramasamy, Vice Chancellor, Tamil Nadu Agriculture University, Coimbatore, Tamil Nadu

Conferred with “Dr. APJ Abdul Kalam Memorial NABS-Life Time Achievement Award” (2015)



Dr. D. J. Bagyaraj, Vice President, NABS & Chairman Centre for Natural Biological Resources and Community Development [CNBRCD], Bangalore

Conferred with “NABS-Recognition Award”



Dr. Gurudutta Gangenahalli, Divisional Head of SCR and Associate Director, Institute of Nuclear Medicine & Allied Sciences (INMA), DRDO, Ministry of Defence, Delhi

Conferred with “Fellow of National Academy of Biological Sciences” (in absentia)



Dr. Jitendra Kumar, Director, ICAR-Directorate of Medicinal and Aromatic Plants Research, Anand, Gujarat

Conferred with “Fellow of National Academy of Biological Sciences”



Dr. Parvatam Giridhar, Principal Scientist, Plant Cell Biotechnology Department, CSIR-CFTRI, Mysore, Karnataka

Conferred with “Fellow of National Academy of Biological Sciences”



Dr. M. Prakash, Professor, Department of Genetics and Plant Breeding, Faculty of Agriculture, Annamalai University, Annamalainagar, Tamil Nadu

Conferred with “Fellow of National Academy of Biological Sciences”



Dr. Pramod W. Ramteke, Dean, Post Graduate Studies, Sam Higginbottom Institute of Agriculture Technology and Science (SHIATS), Allahabad

Conferred with “Fellow of National Academy of Biological Sciences”



Dr. Sangeeta Srivastava, Principal Scientist, Division of Crop Improvement, ICAR-Indian Institute of Sugarcane Research, Lucknow, UP.

Conferred with “Fellow of National Academy of Biological Sciences”



Dr. R. Selvarajan, Principal Scientist, ICAR-National Research Centre of Banana, Tiruchirappalli, Tamil Nadu

Conferred with “Fellow of National Academy of Biological Sciences”



Dr. Sangeeta Srivastava, Principal Scientist, Division of Crop Improvement, ICAR-Indian Institute of Sugarcane Research, Lucknow, UP.

Conferred with “NABS-Best Woman Scientist”



Dr. Parvatam Giridhar, Principal Scientist, Plant Cell Biotechnology Department, CSIR-CFTRI, Mysore, Karnataka

Conferred with “Dr. (Smt.) Rajammal P Devadas Memorial NABS-Best Scientist Award” (Under Food Science)



Dr. Pious Thomas, Principal Scientist, Division of Biotechnology, ICAR-Indian Institute of Horticultural Research, Bangalore

Conferred with “Dr. B.P. Pal Memorial NABS-Best Scientist Award” (Under Agricultural Science & Forestry)



Dr. Amit Kumar Mishra, Assistant Professor, Indian Institute of Technology (IIT), Jodhpur, Rajasthan

Conferred with “NABS-Young Scientist Award” (in absentia)



Dr. Y. Rajashekar, Scientist-C, Institute of Bioresources and Sustainable Development, Department of Biotechnology, GoI, Imphal, Manipur

Conferred with “Prof. T. S. Sadasivan Memorial NABS-Best Research Paper Award” (Under Basic Sciences- in absentia)



Dr. Reshmi Upreti, Senior Research Fellow, Division of Biotechnology, ICAR-Indian Institute of Horticultural Research, Bangalore

Conferred with “Prof. G. Rangaswami Memorial NABS-Best Research Paper Award” (Under Agricultural Sciences & Forestry- in absentia)

Best Oral Presentation Awards



Plant microbiomes and molecules
- *A. Kumar*
(Under New Biological Researches: Agriculture)



Quality assessment of herbal laxatives containing Senna (*Cassia angustifolia*)
- *Satyanshu Kumar, Raghuraj Singh, Tusbar Dhanani, Ritesh Chauhan and Rajiv Sharma*
(Under New Biological Researches: Biology)



Synthesis and characterization of TiO₂-NiO and TiO₂-WO nanocomposites for DSSCs
- *C. Gopinathan and P. Pandi*
(Under New Biological Researches: Energy)



Role of village council in protecting Indian genetic resources
- *K. Sowmia, R. Kannan and K. Muthuchelian*
(Under New Biological Researches: Environment)



Fish epidermal mucus and muscle extractions as antibacterial drugs
- *Jinsu Varghese, P. Liju Varghese and Rosemary Titto*
(Under New Biological Researches: Health)



Patterns of ecosystem level carbon pools along an elevational gradient in temperate forests of Western Himalaya, India
- *Javid Ahmad Dar, S. M. Sundrapandian and M. L. Khan*
(Under New Biological Researches: Climate Change)

Best Poster Presentation Awards



Assessment of factors influencing the agrobacterium mediated plant genetic transformation of peanut (*Arachis hypogaea* L.) Cultivars
- *Kartibik Sivabalan*
(Under New Biological Researches: Agriculture)



Purification, characterization and kinetic study of cellulose from *Aspergillus niger* Kp164968
- *Priyanka Pachauri*
(Under New Biological Researches: Biology)



Comparative study of pretreatment methods for agro-waste of pearl millet (*Pennisetum glaucum*) stalk for bioethanol production
- *Smitha Banu*
(Under New Biological Researches: Energy)



Genotoxicity study using micronuclei assay in *Channa punctata* of Vaigai River, Madurai Tamil Nadu
- *K. Ragavan*
(Under New Biological Researches: Environment)



Anticancer property of an yellow pigment produced by *Exiguobacterium alkaliphilum*: An in vitro study
- *P. G. Bharath*
(Under New Biological Researches: Health)



Estimation of land surface temperature using remote sensing: A case study in Southern Districts of Tamil Nadu
- *Shabira Begum*
(Under New Biological Researches: Climate Change)

Note: Full address of members is available in website of NABS [www.nabsindia.org]

Group Photo



5.2. Activities of members

5.2.1. Dr. T. Marimuthu, Secretary, NABS delivered a lecture on “Noni-Morinda citrifolia L. and health Security” to the participants of Refresher Course organized by Human Resource Development Centre in Life Sciences at Bharathidasan University, Tiruchirappalli on 12-11-2016.

5.2.2. Organizing Eleventh Noni Search 2016 and participation of NABSians

- Eleventh National symposium on “Noni and Medicinal Plants for Health and Livelihood Security” was organized from 3-4 December 2016 at ICAR- Indian Institute of Sugarcane Research, Lucknow and the following members of NABS actively participated.
- Dr. K. V. Peter, Fellow & Secretary, International Society for Noni Science (ISNS) & Dr. T. Marimuthu, Secretary, NABS & Treasurer, International Society for Noni Science (ISNS) were the coordinators and organized the Eleventh Noni Search 2016.
- Prof. P. I. Peter, Corporate Fellow & Chairman, Noni Biotech welcomed the delegates & guests.
- Dr. Kirti Singh, Fellow, delivered introductory address during inaugural function of NS-2016 and also presided the Valedictory function of NS-2016.
- Prof. R. R. Hanchinal, Fellow and Chairperson, PPV & FRA, was the Guest of Honor during the inaugural function and also chaired the technical session on Biodiversity and Crop Improvement.
- Dr. D. R. Singh, Fellow & Director, NRC for Orchids, Sikkim, Co-chaired the technical session on Biodiversity and Crop Improvement.
- Dr. S. ThyagaRajan, EC member & Professor and Head, Department of Biotechnology Co-chaired the technical session on Clinical and Pharmacological Studies and also made a lead presentation.
- Dr. P. Selvam, Fellow, was the convener of the technical session on Clinical and Pharmacological Studies and also made oral presentations
- Dr. P. Rethinam, Member, and Editor, WNRF chaired the technical session on Good Crop Production Practices and also made a lead presentation in the technical session. He also presented the proceedings and recommendations of the two day National Symposium-Noni Search 2016.
- Dr. S. Sithanatham, Member & Director, Sun Agro Biotech Research Centre, Chennai delivered a special lecture on “Medicinal Plants as targets and tools in organic insect pest management”.
- Dr. N. Mathivanan, Fellow and Director, CAS in Botany, University of Madras, Chennai made a lead presentation in the Technical session on Good Crop Protection Practices.

5.2.3. Books published by NABSians

- Renu Agrawal. 2017. Probiotics and their role in improving Human health, New India Publishing Agency, New Delhi, p. 180.

6. Research notes and short communications from members

6.1. A seed coating PGP technology for seed spices

PGPR technology is a novel process of coating efficient strains of PGPR on seeds. The components consist of live PGPR, inert material and a binding agent. The process is done at a particular temperature which is congenial for the organisms to survive and the coated seeds can be stored at the room temperature. Seed spices such as coriander (*Coriandrum sativum* L.), cumin (*Cuminum cyminum* L.), fennel (*Foeniculum vulgare* M.) and fenugreek (*Trigonella foenum-graecum* L.) cultivated predominantly in states of Rajasthan and Gujarat have major constraints like low germination, slow initial growth and high susceptibility to diseases and frost. The seed coating technology developed by Dr M Anandaraj and Dr YK Bini, ICAR-Indian Institute of Spices Research, Kozhikode, Kerala employs PGPR, a root colonizing bacteria with the capacity to enhance plant growth by increasing seed emergence and crop yield. It was observed that seeds coated with PGPR [FK14- *Pseudomonas putida* (FN257488) from fenugreek rhizosphere and FL18- *Microbacterium paraoxydans* (FN257489), a root endophyte from fennel] exhibited longer shelf life and germination and remained intact even after 1 year of storage (Fig.1). The technology has wide applicability and can be extended to vegetable seeds imparting the appropriate crop specific bioagent.

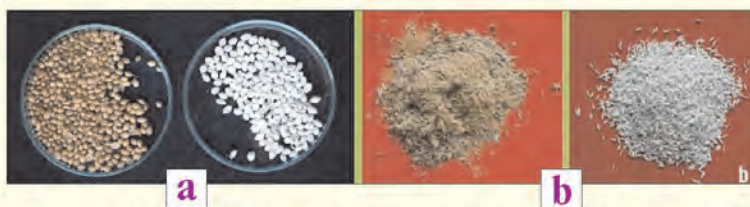


Fig. 1. a. Uncoated and coated seeds of coriander b) uncoated and coated seeds of cumin after one year. Note the storage pest infestation in uncoated cumin.

Site-specific nutrient management plans and micronutrient formulations for targeted yield in major spices

Majority of soils in the spice growing areas are encountering fertility issues due to acidity, nutrient imbalances and deficiencies of secondary and micronutrients that becomes yield limiting. Besides crop specific, soil pH based micronutrient mixtures for foliar application in black pepper, cardamom, ginger, and turmeric crops which guarantees 10 to 25% increase in yield and quality have also been developed by soil Scientists Dr R Dinesh, Dr V Srinivasan and Technical Officer Dr S Hamza, ICAR-Indian Institute of Spices Research, Kozhikode, Kerala. An innate advantage of these mixtures is that they can also be used in organic agriculture and therefore are benign and environment friendly. The technology comes at very low cost and hence is very farmer friendly. The micronutrient technologies have been licensed to entrepreneurs for large scale production and commercialization (Fig. 2).



Fig. 2: Designer micro-nutrient formulations for spices

- Dr. M. Anandaraj, Formerly Director, ICAR-IISR, Calicut, Kerala, E-mail: arajiisr@gmail.com

6.2. Arachis gene pools and genetic improvement in groundnut

Groundnut (*Arachis hypogaea* L.) is an important oilseed and food crop in the world. The crop is predominantly grown in low input production systems in developing countries in Asia and Africa. There are several production constraints, both biotic and abiotic, to groundnut. Some of these are global in nature and the others are either regional or local.

Four *Arachis* gene pools contain 80 species, distributed among nine sections native to five countries of South America. Section *Arachis* contains tetraploid cultivated groundnut, divided into two subspecies and six botanical varieties and a number of cross-compatible diploid species with rich genetic diversity. International efforts have made significant progress in collection and conservation of these genetic resources, facilitating genetic improvement.

Groundnut is an autogamous crop. The pedigree and bulk selection methods are more commonly used by the groundnut breeders. Conventional breeding, including cytogenetic manipulations introgressing genes from cross-compatible wild diploid species has been effective in some areas, while in others it has been tardy due to lack of proper and effective phenotyping tools and limited understanding of the genomics, genetics/inheritance and underlying mechanisms influencing targeted traits. A greater diversification of parental resources (both cultivated and wild *Arachis* species) in breeding programs is required to develop new cultivars with diversified genetic backgrounds, which will enable them to perform better under the changing climatic/adverse conditions. Molecular breeding is in infancy. Infrequent and low polymorphisms have restricted the progress in the development and application of genetic maps, except in cases where polymorphic chromosomal regions have been

introgressed from diploid wild *Arachis* species into *A. hypogaea*. Both conventional and nonconventional crop improvement efforts in groundnut need to concentrate on bridging the yield gap between the potential yield and the realized yield by alleviating major production constraints particularly in rain fed environment.

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6.3. Marigold in the management of root knot nematode, *Meloidogyne incognita*

Marigold has an excellent potential in the management of nematodes because of the production of biethienyl compounds which are having antagonistic properties against plant parasitic nematodes. In the present study, five varieties of *Tagetes viz.*, *Tagetes patula*, *T. erecta*, *T. erecta* cv. Yellow, *T. erecta* cv. Orange and *T. minuta* were tested against the root knot nematode, *Meloidogyne incognita* in vitro. The extracts from the leaf, root, stem and flower of the above varieties were taken for the study. Inhibition in the nematode egg hatching and enhanced juvenile mortality were recorded in all the extracts tested over control. Among them, significant reduction in the nematode egg hatching was observed with the flower extract (10 %) of *T. erecta* (90.8 %) followed by its root (87.0 %), leaf (86.9 %) and stem extract (85.6 %). Similarly, for the mortality studies, flower extract (10 %) of *T. erecta* recorded the highest mortality (78.13 %) at 120h after inoculation of nematodes followed by the leaf and root extract of *T. erecta*, which recorded the mortality of 77.29 and 75.50 per cent respectively.

Plant parts of the different varieties were prepared as extract with water of dry powder and their efficacy was tested under pot culture in tomato against root knot nematode. It was found that 10 per cent concentration (10 ml) of flower extract of *T. erecta* inhibited the nematode juvenile population to the extent of 93.64 per cent and recorded the highest plant growth parameters followed by leaf extract (87.65 %) and root extract (80.15 %) of the same plant at the same concentration. In the dry form of the *Tagetes* products tested, dry flower powder of *T. erecta* recorded the highest plant growth parameters and inhibited the nematode population to the extent of 88.41 per cent when applied at 10g. It was followed by the dry leaf powder (83.62%) and dry root powder of *T. erecta* (82.42 %).

The nutrient contents *viz.*, nitrogen, phosphorus and potassium present in the different parts of *Tagetes* spp. were analyzed and found that flower portion of *T. erecta* contained highest level of phosphorus (0.992 %) and potassium (1.0%) and root portion of *T. minuta* with the highest level of nitrogen (1.792%). These nutrients might be playing indirect role in imparting resistant properties to the plants against the nematodes.

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6.4. Organic strategy for eco friendly management of leaf blight disease of amaranthus

Rice based cropping system, especially rice-rice vegetables is the most predominant cropping system of Kerala. Among the summer vegetables, amaranthus is the most widely cultivated one. It is also one of the most popular leafy vegetables of Kerala. It is a nutritious vegetable which is a rich and cheap source of many vitamins and minerals. Leaf blight disease amaranthus caused by *Rhizoctonia solani* drastically reduced the yield, besides affecting the quality of the produce. The present work is a pioneer attempt in exploring the antifungal potential of naturally available organic preparations for the management of leaf blight disease. Among the various organic preparations and non hazardous compounds, root dipping and foliar applications at weekly intervals of three preparations *viz.*, turmeric and baking soda mixture in diluted cow's urine, jeevamrutham as well as diluted cow's urine were effective in reducing the leaf spot disease intensity by 93, 65 and 64 per cent respectively with the highest yield, maximum root length and maximum number of leaves compared to the control and were on par with the chemical check (Mancozeb) in reducing the disease, which signifies the possibility of using them as substitutes/alternatives to pesticides which may open up new avenues for an effective, eco friendly disease management strategy with least residues.

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6.5. In vitro antibacterial activity of ZnO and Nd doped ZnO nanoparticles against ESBL producing *Escherichia coli* and *Klebsiella pneumonia*

The study was aimed to address the major clinical unmet issues concerning ESBL mediated resistance among gram negative bacterial pathogens for which new antibiotic therapeutics are utmost concern. In this study, the pure ZnO and Neodymium (Nd)

doped ZnO nanoparticles (NPs) were synthesized adopting co-precipitation method. The structural determination and characterization of nanoparticles were carried out using X-ray diffraction studies, FESEM, UV- Spectrophotometer, FTIR and photoluminescence measurements, respectively. The antibacterial activity of synthesized nanoparticles against ESBL-producing *E. coli* and *K. pneumoniae* was determined using well diffusion assay wherein Nd doped ZnO (MIC 800 µg/mL) showed significant inhibition against exponentially cells of *E. coli* and *K. pneumoniae* than the pure ZnO nanoparticles (MIC 1000 µg/mL). The Nd doped ZnO NPs appears to damage the bacterial membrane, with subsequent cell lysis, as revealed in CLSM and SEM analysis. Over all, we strongly recommend that non-toxic Nd doped ZnO NPs could be a swift alternative to broad spectrum antibiotics for the treatment of bacteraemia caused by ESBL-producing bacteria.

Haja Hameed, A.S., Karthikeyan, C., ParveezAbamed, A., Thajuddin, N., Naiyf S. Alharbi., Sulaiman Ali Alharbi and Ravi, G., Babarathidasan University, Tiruchirappalli, Tamil Nadu [Extract from Scientific Reports. DOI:10.1038/strep24312 (Nature Group) (IF:5.578)].

7. 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]

Sl. No.	Name of contributor	Amount (Rs.)
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An appeal to members of NABS

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