



NABS *News Letter*

National Academy of Biological Sciences

Volume : 7 (1)

For private circulation only

January, 2016

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Former Chairman, NBA, GOI, Chennai

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From the Desk of the President.....



Dear NABSians,

At the outset, on behalf of every member of NABS, I would like to place on record our sorrow and grief to the flood affected brothers and sisters of Chennai, Cuddalore and other Northern districts of Tamil Nadu. I pray that they get back to their active life at the earliest. We also mourn the premature death of many citizens during the period of havoc in December 2015 at Chennai.

In spite of all these odds during the farewell time of the year 2015, let us welcome the New Year with cheers and confidence and wish we enjoy a purposeful and fruitful 2016 and the years to come.

We have reasons to be happy that NABS is growing in its strength as more and more member are becoming part of NABS family. During 2015 about 70 life membership has been enlisted. I would like to reinstate that all the life members of NABS shall make it a point to enrol his / her colleagues, at least one or two, as life members. Several awards, besides fellowship and associate fellowship have been introduced from time to time to encourage the outstanding contributions made by our members. Further, NABS News Letter is yet another instrument used to take the message of contributions made by our own members. The Secretary has already called for applications / nominations for Fellowship, Associate Fellowship, NABS-Best Woman Scientist Award, NABS-Best Scientist Award, NABS-Young Scientist Award, NABS-Leadership Award and NABS-Best Research Paper Award. The eligible members are requested to follow the guidelines stipulated by NABS as it facilitate the evaluators and will also be helpful to the applicants.

The next NABS-National Seminar for 2016 is likely to be held at Madurai Kamaraj University, Madurai, Tamil Nadu during last week of July or first week of August 2016.

Let us always aim for excellence in our activities and achievements. Wishing you all the best.

(V. A. Parthasarathy)

2. Message from Vice-President...



The vision of NABS is that biologists interact with each other for mutual benefit and to further the knowledge on areas of biological sciences. UN declared 2015 as “International Year of Soils”. UN also declared December 5th as “World Soil Day”. I am writing this message in the International Year of Soils. Fertile soil is vital for human survival. It is estimated that at least a quarter of the earth's biodiversity can be found in soil. Soil biodiversity is the study of biological systems occurring in soil. The living organisms in soil range from microorganisms, small and large invertebrates and small mammals. Macrofauna contribute to improve soil structure, aeration and water infiltration. They predate on soil organisms and help to maintain biological equilibrium in soil. Mesofauna are important plant pathogens. Microfauna are important predators of bacteria and algae, thus regulating their population in soil. Algae are photosynthetic and aquatic. Algae and lichens contribute to soil formation from rocks. Algae also contribute to soil aggregate stability and some of these fix atmospheric nitrogen. Fungi play a role in decomposition of organic matter, promotion of soil aggregation, nutrient cycling and biocontrol of plant pathogens. Some of them are edible. Some cause disease in plants and animals. Bacteria are common in soil environment and play important role in nutrient cycling, organic matter decomposition and in the production of industrially important secondary metabolites. Some of them cause disease of plant. Ecosystem services are the benefits people obtain from the ecosystem. Soil organisms are responsible for many of these services like nutrient cycling, control of pests and diseases, formation of soil, degradation of wastes and harmful chemicals, and production of goods like food, fuel, fiber etc. In recent years industrial microbiologists have started looking into the soil for organisms which are capable of producing various substances including antibiotics, vitamins, hormones and enzymes. The results obtained so far have revolutionized the industry in many countries. Hence, it is time to review the state of knowledge of soil biodiversity, its functions, its contribution to ecosystem services and its relevance for the sustainability of human society.

I wish all the members of NABS a very happy and prosperous 2016.

(D.J. Bagyaraj)

3. Message from the Editor...



Greetings from NABS!

At the outset let us pay our tributes to Chennaiites for the immense courage and resilience with which they have kept alive the human spirit in the wake of the devastating floods that have shaken the very foundation of our country and let us fervently hope and pray that Chennai returns to normalcy at the earliest.

At NABS, it has been a great journey so far, and the travails faced by the Academy have not prevented us from consolidating and confirming our triumphs, and this encourages us to look to the future with confidence and self-belief. I expect the advancements to continue in 2016. While doing so, it is imperative that we bring more members into our fold. This will enhance our growth potential and prowess to combat any threats that may arise in future and also reaffirm our commitment to the overall societal development through proactive and upright scientific activities. The annual seminar held by the Academy is one such effort that helps us to converge and capitalize on our robustness, thereby improving our capabilities and achievements, never losing sight of our environmental, social and scientific responsibilities.

We are also pleased to share the views of the Academy and the members through this newsletter. Besides news and highlights of the various events stages by the Academy, you will also find abstracts on recent developments in various sciences contributed by the members. It indicates their unique skill set and compulsive ways to further NABS's vision of changing the society through science and education. We strongly believe in Team Work and eagerly look forward to new partnerships and hearing more of your findings, ideas and feedback for the upcoming issues of this newsletter

Let me also take this opportunity to wish all our NABSians a very cheerful, peaceful and prosperous 2016.

(M. Anandaraj)

4. News and Events

4.1. Eighth NABS-National Seminar

A seminar with the theme, "Biological Products for Crop, Animal and Human Health-Problems and Prospects" was organized by National Academy of Biological Sciences in collaboration with University of Mysore from 21 to 22 August 2015 at University of Mysore.

4.1.1a. The Inaugural function

The inaugural function was held on 21 August 2015 at Shri Nalwadi Krishnaraja Wodeyar Auditorium (Senate Bhavan), Manasagangotri, Mysuru. Prof. K. S. Rangappa, Vice-Chancellor, University of Mysore, Mysuru presided over the inaugural function; Dr. S. Chandrasekhar, Director, CSIR-IICT, Hyderabad delivered inaugural address; Prof. Tapas K. Kundu JNCASR, Bangalore, delivered keynote address; Dr. V. A. Parthasarathy, President, NABS & Prof. S. R. Niranjana, Vice-Chancellor, Gulbarga University, Kalaburagi, Karnataka spoke on the occasion.

Padma Bushan M. Mahadevappa was conferred with 'Prof. S. Kannaiyan Memorial Award' and Prof. K. Shiva Shankar with 'NABS-Life Time Achievement Award' during the inaugural function.

4.1.1b. The Technical Sessions

Four technical sessions were planned for the seminar. Technical Session on 'Biological Products for Crop Health Management' was chaired by Dr. D. J. Bagyaraj, Vice-President, NABS; Co-chaired by Dr. M. Anandaraj, Director, IISR, Calicut, Kerala; Technical Session on 'Biological Products for Animal Health Management' was chaired by Dr. V. A. Srinivasan, Advisor, NDDDB, Hyderabad; Co-chaired by Dr. S. Basavaiah, Professor of Sericulture Sciences, University of Mysore; Technical Session on 'Biological Products for Human Health Management' was chaired by Dr. P. V. Salimath, JSS University, Mysore; Co-chaired by Prof. N. Raaman, University of Madras, Chennai and Technical Session on 'Formulations of Bio products and Registration Requirements and Quality Control of Bioproducts' was chaired by Dr. N. Mathivanan, Director, CAS Botany, University of Madras, Chennai. Co-chaired by Dr. S. Nakkeeran, Tamil Nadu Agricultural University, Coimbatore. Separate Poster Session was also organized.

4.1.1c. The Annual General Body meeting cum Award Ceremony

The annual General Body Meeting which was chaired by Dr. V. A. Parthasarthy was held on the FN of 22 August 2015 at University of Mysore. The Annual Reports of NABS were presented before the members. The selection of members for Fellowships and other NABS awards were ratified by AGM. The Secretary, NABS read the citation and the fellowship was conferred by President, NABS and awards by Dr. Kirti Singh and Dr. M. Mahadevappa.

Details are furnished below:

- | | | |
|---|---|---|
| A. Prof. S. Kannaiyan Memorial Award | - | Padma Bushan M. Mahadevappa |
| B. NABS- Life Time Achievement Award | - | Prof. K. Shiva Shankar |
| C. Elected Fellows | - | 1. Dr. N. Anand 2. Dr. Anil Kumar
3. Dr. A. Arunachalam 4. Dr. K. Balaraman
5. Dr. T. L. Baskaran 6. D. B. M. Chetti
7. Dr. N. Mathivanan 8. Dr. A. G. Murugesan
9. Dr. Pradeep Sharma 10. Dr. R. Ramesh
11. Dr. V. Sundararasu 12. Dr. S. Umesha
13. Dr. Veer Singh 14. Dr. S. Vincent |
| D. Elected Associate Fellow | - | Dr. Vijai Kumar Gupta |
| E. NABS-Best Woman Scientist Award | - | Dr. V. R. Prabavathy |
| F. NABS- Best Scientist Award | - | 1. Dr. B.P. Pal Memorial NABS-Best Scientist Award
- Dr. Chenna Reddy Aswath
2. Dr. G.S. Venkataraman Memorial NABS -
Best Scientist Award- Dr. N. Thajuddin |
| G. NABS- Leadership Award | - | Dr. R. Prakashkumar |
| H. NABS-Young Scientist Award | - | Dr. Vijai Kumar Gupta |

I. NABS Best Research Paper Awards

1. Prof. G. Rangaswami Memorial
NABS-Best Research Paper Award - Dr. Kalyana Babu
2. Prof. T. S. Sadasivan Memorial
NABS Best Research Paper Award - Dr. H. P. Priyanka
3. Dr. C. M. Singh Memorial
NABS-Best Research Paper Award - Dr. B. Mohana Subrmanian

4.1.1d. Valedictory function

The Valedictory function was presided over by Dr. V. A. Parthasarathy, President, NABS.

Dr. T. L. Baskaran, Treasurer, NABS welcomed the gathering; Dr. S. Umesh, Organizing Secretary, NABS-National Seminar presented the summary proceedings of the two day seminar; Dr. M. Subramanian, Fellow of NABS and Formerly Director of Research (TNAU) felicitated Dr. S. R. Niranjana, Fellow of NABS and Coordinator-NABS-National Seminar on his assumption as Vice-Chancellor, Gulbarga University, Karnataka; Dr. K. Ramasamy, Vice-Chancellor, Tamil Nadu Agricultural University, Coimbatore presented the "Best Presentation Awards" and delivered valedictory address as Chief Guest. Prof. C. Basavaraju, Registrar, University of Mysore delivered a special address as Guest of Honor. Dr. T. Marimuthu, Secretary, NABS proposed vote of thanks.

4.2. Executive Council Meeting of NABS

The sixteenth EC meeting was held on 20 August 2015 at the Guest of House of University of Mysore. Dr. V. A. Parthasarathy presided over the meeting. Dr. D. J. Bagyaraj, Vice-President, Dr. T. Marimuthu, Secretary, Dr. T. L. Baskaran, Treasurer and Dr. M. Anandaraj, Editor, NABS NL were present besides other EC members. Dr. K. Muthuchelian, Fellow of NABS and Formerly Vice-Chancellor, Periyar University, Salem was present as a special invitee. The agenda proposed by the Secretary was discussed and decision taken. It was decided to organize the 9th NABS-National Seminar at MK University, Madurai, Tamil Nadu.

5. Awards, Recognitions, Honors received by members of NABS

5.1. Awards and Recognitions

Congratulations to all the NABSians who received awards and recognition from various institutions and organizations in the country and outside during 2014.

Name of Member	Name of Award /Recognition received
Dr. D. J. Bagyaraj	<ul style="list-style-type: none">■ Nominated as a Working Committee Member of Global Soil Partnership to contribute towards Sustainable Soil Management using microorganisms The Secretariat for the "International Year of Soils" based in FAO, Rome, initiated the programme on "Global Soil Partnership (GSP)" to facilitate and implant work on healthy productive soils.■ Invited by European Commission (EC), which decided to bring out a "Global Atlas of Soil Biodiversity", to contribute on "Mycorrhizal Fungi" along with 3 more scientists one each from USA, Brazil and China.
Dr. R. A. Balikai	<ul style="list-style-type: none">■ Appointed as Dean (Agri.), College of Agriculture, Hanumanamatti, Karnataka; joined duty on 20-08-2015.
Dr. Jitendra Kumar	<ul style="list-style-type: none">■ Conferred with NAAS Fellowship 2015 by NAARS, New Delhi■ Presented with Shree P. P. Singhal Memorial Award-2015 by PI Industries Ltd., for outstanding contribution to research, teaching and extension in plant protection for the year 2014-15.■ Received Bioved Agri-Innovagtion Award-2015 by Bioved Research Institute of Agriculture & Technology, Allahabad for outstanding contribution in the field of Agri-innovative Technologies of ICAR-DMAPR.■ Visiting Professor Anand Agricultural University, Anand, Gujarat.

Dr. B. Meena

- Conferred with Best Poster Award for the research paper entitled “Biological management of root rot disease in *Coleus forskohlii*” during the valedictory function of National Seminar on “Biological Products for Crop, Animal and Human Health Problems and Prospects”. Organized by NABS & Dept. Of Studies in Biotechnology, University of Mysore during 21-22 August, 2015.

Dr. Minakshi

- Conferred with Fellow National Academy of Veterinary Sciences (F-NAVS) (2015).
- Best paper award for the paper "Sequence and Phylogenetic Analysis of Bovine Rotavirus Isolates (G6 Genotypes) from India"- The Executive Board of International Journal “Advances in Animal and Veterinary Sciences” adjudged this paper for the award.
- Nominated as an Expert member for the Research Advisory Committee (RAC) of ICAR - National Institute of Veterinary Epidemiology and Disease Informatics (NIVEDI) (2015).
- Recipient of Certificate of Appreciation- INSPIRE-2015 by DST, GOI, New Delhi. Nominated President, Association of Microbiologists of India (2014-15) Hisar Chapter.

Dr. V. A. Parthasarathy

- Invited by ICAR Complex for NEH Region, to deliver an invited talk on the “Horticultural development in Northeast” in the workshop on “Developing road map for North Eastern Agroclimatic region” on 29th September, 2015.
- Invited to deliver a special lecture on “Potential and Policy options for Horticultural Development in North East” in SYSMSAC at TNAU on 16 December 2015.
- Delivered two lectures as Adjunct faculty of Horticulture at TNAU on “Spicing flowers” and “Research and how to do it” on 6 November 2015.
- Presented with Best Extension Worker Award (TNAU) (2015) during 45th Foundation day celebration of TNAU for his outstanding contribution in extension work performed from TNAU-Krishi Vigyan Kendra for the past five years.

Dr. V. Sendhilvel

- Conferred with Fellow of NAAS, New Delhi.
- Joined as Managing Director, National Horticulture Board, Ministry of Agriculture and Farmers' Welfare, GOI, New Delhi.

Singh, A. K.

- Nominated as an Eminent Scientist by Hon'ble President, ICAR, Govt. Of India, New Delhi.
- Conferred with Fellows of National Academy of Biological Sciences (2014) during the AGM, National Academy of Biological Sciences held on 22 August 2015 at University of Mysore.

Dr. Veer Singh

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

5.2. Activities of members

- **Dr. D. J. Bagyaraj**, Vice-President, NABS & NASI Senior Scientist and Chairman, CNBRCD, Bangalore was invited to attend the International Workshop on “Innovation of Environmental Stress Management for Spice crops” and delivered the lead lecture on “Arbuscular Mycorrhizal Fungi and their Role in the Biological Control of Soil-borne Plant Pathogens” at Indonesian Spice and Medicinal Crops Research Institute, Bogor, Indonesia on August 25-27, 2015.
- **Dr. Renu Agarwal**, the Fellow of NABS & NABS-Best Woman Scientist Awardee has organized a training programme to 'Empower Woman Farmers with CSIR-CFTRI technologies' in collaboration with Dakshin Bharath Mahila Krishi Jagariti Karyashala and Indian Sugarcane Farmers' Association (Woman Wing) on 10-08-2015 at Mysore.
- **Dr. M. Subramanian**, the Fellow of NABS & EC member has delivered a lecture on “Salt tolerant landraces of rice” on 6 January 2016 for the ICAR sponsored short course on Phenotyping techniques for precisely mapping salt tolerance QTL in crop plants at PAJANCOA & RI., Karaikal, Puducherry; distributed certificates to the participants; delivered valedictory address..

6. Research notes and short communications from members

6.1. Research notes

6.1.1. TNAU- UV-Light trap for grain storage godowns

The UV light trap mainly consists of an ultra-violet source (4 W germicidal lamp). The lamp produces ultra-violet rays of peak emission around 250 nano meter. The light is fitted at the centre of a funnel of 310 mm diameter at the top and 35 mm diameter at the bottom. The bottom end of the funnel is attached with a transparent plastic container for collecting the trapped insects. To hang the unit at desired points, three hooks have been provided at the periphery of the funnel. The unit is also provided with a tripod stand.

The UV light trap can be placed in food grain storage godowns at 1.5 m above ground level, preferably in places around warehouse corners, as it has been observed that the insect tends to move towards these places during the evening hours. The trap can be operated during the night hours (preferably 19:00hrs to 24:00hrs). The light trap attracts stored product insects of paddy like lesser grain borer, *Rhyzopertha dominica*, red flour beetle, *Tribolium castaneum* and saw toothed beetle, *Oryzaephilus surinamensis* in large numbers. Psocids which are of great nuisance in godowns are also attracted in large numbers. Normally 2 numbers of UV light trap per 60 x 20 m (L x B) godown with 5 m height is suggested.

The trap is ideal for use in godowns meant for long term storage of grains, whenever infested stocks arrive in godowns and during post fumigation periods to trap the resistant strains and left over insects to prevent build up of the pest populations. In godowns of frequent transactions the trap can be used for monitoring.



Efficiency

It has been found that two traps kept at the corners of the warehouse (60m x 20m x 5m) can catch around 200 insects/day even from a godown where normal sampling did not show any insect presence, thus indicating its effectiveness as a monitoring and mass trapping device. It has been recorded around 3000 *Rhyzopertha dominica* on a single day from single trap kept in a paddy godown. The trap is also useful for monitoring and mass trapping of cigarette beetle, *Lasioderma serricorne* which attack all major Spices.

Technology Users

- M/s Madaus Pharmaceuticals PVT. Ltd. Goa, India
- M/s Saraf Trading Corporation PVT. LTD, Cochin, India
- M/s SKM Siddha and Ayurvedic, Tamil Nadu, India.
- M/s Cadburys India Ltd., Dharapuram, Tamil Nadu, India.
- M/s Jayanthi India Spices Ltd, Coimbatore, India.
- Food Corporation of India.
- M/s Ulavan Producers Company, Erode uses TNAU Stack Probe Trap for turmeric storage.
- Recently, the Tamil Nadu Govt. announced the adoption of TNAU- UV- Light traps of 162 numbers to be installed in 54 godowns of Tamil Nadu State Warehousing Corporation.

The traps were developed by

Dr. S. Mohan,

*Member of NABS & Dean, School of Post Graduate Studies
Tamil Nadu Agricultural University, Coimbatore - 641 003*

6.1.2. Transcriptome sequencing of young and mature leaf tissue of Senna, *Cassia angustifolia*

Senna (*Cassia angustifolia* Vahl.) is a world's natural laxative medicinal plant. Laxative properties are due to sennosides (anthraquinone glycosides) natural products. However, little genetic information is available for this species, especially concerning the biosynthetic pathways of sennosides. We present here the transcriptome sequencing of young and mature leaf tissue of *Cassia angustifolia* using Illumina MiSeq platform that resulted in a total of 6.34 Gb of raw nucleotide sequence. The sequence assembly resulted in 42230 and 37174 transcripts with an average length of 1119 bp and 1467 bp for young and mature leaf, respectively. The transcripts were annotated using NCBI BLAST with 'green plant database (txid 33090)', Swiss Prot, Kyoto Encyclopedia of Genes & Genomes (KEGG), Cluster of Orthologous Gene (COG) and Gene Ontology (GO). Out of the total transcripts, 40138 (95.0%) and 36349 (97.7%) from young and mature leaf, respectively,

were annotated by BLASTX against green plant database of NCBI. We used InterProScan to see protein similarity at domain level, a total of 34031 (young leaf) and 32077 (mature leaf) transcripts were annotated against the Pfam domains. All transcripts from young and mature leaf were assigned to 191 KEGG pathways. There were 166 and 159 CDS, respectively, from young and mature leaf involved in metabolism of terpenoids and polyketides. Many CDS encoding enzymes leading to biosynthesis of sennosides were identified. A total of 10,763 CDS differentially expressing in both young and mature leaf libraries of which 2,343 (21.7%) CDS were up-regulated in young compared to mature leaf. Several differentially expressed genes found functionally associated with sennoside biosynthesis. CDS encoding for many CYPs and TF families were identified having probable roles in metabolism of primary as well as secondary metabolites. We developed SSR markers for molecular breeding of senna. We have identified a set of putative genes involved in various secondary metabolite pathways, especially those related to the synthesis of sennosides which will serve as an important platform for public information about gene expression, genomics, and functional genomics in Senna.

*Dr. Jitendra Kumar,
Member of NABS & Director,
ICAR-Directorate of Medicinal and Aromatic Plants Research,
Anand, Gujarat, E-mail: jitendrakumar7@yahoo.com*

6.2. Other activities & Achievements of Members

6.2.1. Dr. R. Prakashkumar, Fellow of NABS & NABS-Leadership Awardee & Director, Malabar Botanical Garden & Institute for Plant Sciences (MBGIPS), Kozhikode - 673 014, Kerala

The Malabar Botanical Garden & Institute for Plant Sciences (MBGIPS), is a R&D institution under the Kerala State Council for Science Technology and Environment (KSCSTE), Govt of Kerala. This institution is dedicated to the conservation and research on the aquatic plant diversity, endangered plants of the erstwhile Malabar region, as well as disseminating knowledge on various facets of plant science. Major attractions of MBGIPS are Aquagene (Aquatic plant conservatory) & Sarovar (waterlilies), Apushpi (lower group plants), Systematic Garden (based on taxonomic classification), RET house, Herbal garden, Hortus Malabaricus Valley, Gymnosperm Sections etc. Various developmental, research and extension programmes are being carried out in this institution and serves as the dual cause for ecological conservation as well as education and research.

The Government of Kerala has very recently upgraded the Garden into a constituent R&D research institution of KSCSTE. The Hon'ble Chief Minister Sri. Oommen Chandy announced the upgradation of the institution into Malabar Botanical Garden & Institute for Plant Sciences on the 1st October 2015, launched the Rural Empowerment through Technology Intervention scheme and unveiled the Malabar Aquatic Biopark project in the institute premises. The Hon'ble Minister for Agriculture Shri K.P. Mohanan presided over the function. The Hon'ble Member of Parliament Shri. M.K. Raghavan inaugurated the Ecosystem Service Facilities.

As MBGIPS is a centre of research on aquatic biodiversity of the country and for the conservation of endangered plants, a project has been undertaken by this institution in stages to develop it into the Lead Garden in Aquatic Biodiversity of the country and thereby establishing the Malabar Aquatic Bio-park. Various new sections are to be developed along with the existing infrastructural facilities. The vast wetland of MBGIPS is to be utilized for developing model ecosystems, mangrove vegetations, eco-education centres, plant breeding sections, conservatory for rare and endemic plants, etc. The Bio-park will be in the MBGIPS premises, Kozhikode which will evolve into a centre, spreading awareness among the visitors including students and researchers on the underutilized and valuable aquatic resources of the Country.

6.2.2. Books published by members of NABS

6.2.2.1. Anurudh Kumar Singh, Former Head, Germplasm Conservation Division, NBPGR, New Delhi

A book on "*Agricultural Biodiversity Heritage Sites and Systems in India*" Published by Asian Agri-History Foundation, Secunderabad, Telengana, India.

6.2.2.2. Dr. M. Muthuchelian, Fellow of NABS & Former Vice-Chancellor, Periyar University, Salem

A book on "*Bionanosciences*" edited by Prof. Dr. K. Muthuchelian, NABS Fellow & Formerly Vice Chancellor, Periyar University, Salem, Professor, Head and Chairperson, School of Energy, Environment and Natural Resources, Madurai Kamaraj University, Madurai 625 021, Tamil Nadu, published by Educationist Press, a division of Write & Print Publications, New Delhi-110 015 was released during inaugural function of NABS-National Seminar on 'Biological Products for Crop, Animal and Human Health-Problems and Prospects held at University of Mysore on 21 August 2015.

6.2.2.3 V. A. Parthasarathy, President, NABS

A monograph jointly edited by N. K. Krishna Kumar, Jaigopal and V. A. Parthasarathy on "Onion" was published by ICAR.

6.2.2.4. Dr. S. M. Paul Khurana, Fellow of NABS

A book on "*Biotechnology-Progress and Prospects*" edited by Dr. S. M. Paul Khurana (NABS Fellow) and Mchiavelli Singh and published by Studium Press, LLC, Houston was released at the inaugural session of National Innovation Conclave-2015 held at Amity University, Gurgaon.

6.2.2.4. Dr. Usha Kumari, NABS member- Usha Kumari and R. Gowthami, Department of Plant Breeding & Genetics, Agricultural College and Research Institute (TNAU), Madurai-625 104

Text Book on "Plant Genetic Resources Conservation" by NABS members- Usha Kumari and R. Gowthami, Publishers: Kalyani Publishers, 2015 was released during inaugural function of NABS-National Seminar on 'Biological Products for Crop, Animal and Human Health-Problems and Prospects held at University of Mysore on 21 August 2015.

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.)
62.	Dr. P. Vivekanandan	5,000

- We earnestly appeal to all the rest of the Life members, NABS Fellows / Associate Fellows, Corporate Life Members, Corporate Fellows and well wishers to contribute to this noble cause. The amount may be paid as Cash or through a Demand Draft / Multicity Cheque drawn in favour of National Academy of Biological Sciences payable at Chennai.
- The fund may also be electronically transferred to the Savings Bank account of the Academy held at State Bank of India; Branch: Valmiki Nagar, Chennai-600 041 / Branch code: 11721 / IFS code: SBIN0011721.
- SB Account No. of the Academy: 10496978637

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

Types of Membership available (one time payment)

A. Life Member	: ₹2,500/- or US\$ 100/-
b. Corporate Life Member	: ₹10,000/- or US\$ 400/-
c. Corporate Fellow	: ₹1,00,000/- or US\$ 4000/-

- Details of Payment : The prescribed membership fee may be paid either as Indian rupee or US \$ or Demand Draft / Multicity Cheque drawn in favor of "National Academy of Biological Sciences" payable at Chennai.
- The fee may also be electronically transferred to the SB account of the academy held at State Bank of India, Valmikinagar branch, Thiruvanniyur, Chennai- 600 041, Tamil Nadu.
- Account No.: 10496978637 / IFS code: SBIN0011721
- Down load your application from www.nabsindia.org

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