REPORT

Science Academies’ Lecture Workshop in Botany at PSGR Krishnammal College for Women – Coimbatore

The Institution

Established in 1963, the college has been the realization of the dream of the founders Sri. G. R. Govindarajulu and Smt. Chandrakanthi Govindarajulu to educate and empower women. The institution has blossomed into an academy of learning, having under its fold 20 UG, 13 PG, 2 PG Diploma, 3 Certificate courses, M.Phil and Ph.D programmes in 11 disciplines with a student enrolment of more than 5500. The college is an autonomous, ISO 9001-2008 certified institution and has been reaccredited by NAAC with ‘A’ Grade. The college has achieved its highest status as College with Potential for Excellence and included under the Star College Scheme of DBT. The institution has entered into its 50th year of golden jubilee in 2012-13.

Department of Botany

The Department was established in the year 1967, with the introduction of the UG programme, upgraded to a centre for postgraduate education (M.Sc. and M.Phil.) and as a Research Centre for Ph.D. in Botany. At present the department has 12 faculty members, of whom 11 have Ph.D qualification. The faculty strive hard to with dedication, zeal and enthusiasm to achieve excellence in teaching. The department has been sanctioned with the FIST (Fund for Improvement of Science and Technology Infrastructure in University and Higher Educational Institutions) programme of the Department of Science and Technology (DST), Ministry of Science and Technology, Govt. of India.

About the Course

Plant science is one of the important branches of science which finds solutions to most pressing challenges of humanity such as food production, human health and environmental protection. There has been tremendous advancement in this field both in academics and in research. This course would provide an opportunity for the teachers to refresh and update their knowledge in the subject and share their experiences with other learned people.

Science Academies’ Refresher Course on

Plant Sciences

at

Department of Botany, PSGR Krishnammal College for Women, Coimbatore

19 November 2012 to 3 December 2012

Name and address of the organization : PSGR Krishnammal College for Women

Peelamedu, Coimbatore 641004
Title: Molecular and Developmental Biology

Convener: Dr. T. J. Pandian
   f. National Professor
   Department of Genetics,
   Centre for Excellence in Genomic Sciences
   Madurai Kamaraj University
   Madurai

Local Co–ordinator: Dr. S. Poornima
   Assistant Professor
   Department of Botany
   PSGR Krishnammal College For Women
   Coimbatore

Duration of the workshop: 14 days –(19th November to 3rd December, 2012)

Venue: Multimedia Hall, GRG School of Management Studies
   PSGR Krishnammal College for Women
   Peelamedu, Coimbatore 641004

No. of participants: 30 (5 outstation teachers + 22 local teachers and research scholars)

Name and address of the resource persons

1. Dr. T.J. Pandian
   f. National Professor
   Department of Genetics
   Centre for Excellence in Genome Science
   Madurai Kamaraj University, Madurai.

2. Dr. K. N. Ganeshiah
   Professor and Head
   Department of Forestry and Environmental Science
   University of Agricultural Sciences
   Bangalore 560 065
3. Dr. D.J. Bagyaraj  
   NASI Senior Scientist & Chairman,  
   CNBRC, Bangalore.

4. Prof. R.R. Rao,  
   CSIR Emeritus Scientist, Central Institute of Medicinal and Aromatic Plants,  
   Allalasandra, GKV PO Bangalore

5. Dr. Jebasingh  
   IPLS Programme  
   School of Biological Sciences  
   Madurai Kamaraj Univ, Madurai 625 021

6. Dr. Sri Priya  
   IPLS Programme  
   School of Biological Sciences  
   Madurai Kamaraj Univ, Madurai 625 021

7. Dr. Victor Arokiy Doss  
   Department of Biochemistry,  
   PSG College of Arts and Science, Coimbatore 641014

8. Dr. K. S. Subramanian  
   Professor and Head  
   Department of Nano Science & Technology  
   Tamil Nadu Agricultural University, Coimbatore 641003

9. Dr. D. Sudhakar  
   Professor (Biotechnology)  
   Centre for Plant Molecular Biology  
   Tamil Nadu Agricultural University, Coimbatore 641003

10. Dr. S.F. Maleeka Begum  
    Asst. Professor & Head  
    Dept of Biotechnology  
    Sri Krishna Arts and Science College, Coimbatore-641006

11. Prof. T S Lokeshwari Sivvaswamy  
    Head, Department of Biotechnology & Biomedical Sciences  
    Faculty of Biomedical Sciences, Technology and Research,  
    Sri Ramachandra University, Chennai

12. Dr. Narendar Sivvaswamy  
    Advisor  
    SynkroMax Biotech Pvt Ltd (SMBPL), Chennai
13. Dr. S. Paulsamy  
   Associate Professor  
   Department of Botany  
   Kongu Nadu Arts and Science College, Coimbatore  

14. Dr. V. Narmathabai  
   Professor  
   Department of Botany  
   Bharathiar University, Coimbatore  

15. Dr. Modhumita Dasgupta  
   Scientist E  
   Institute of Forest Genetics and Tree Breeding, Coimbatore  

16. Dr. M. Ramanathan  
   Professor and Head  
   Department of Pharmacy  
   PSG College of Pharmacy, Coimbatore  

17. Dr. N. Natarajan,  
   Professor (Seed Science & Technology)  
   Department of Nano Science & Technology  
   Tamil Nadu Agricultural University, Coimbatore  

18. Dr. K. Mani  
   Associate Professor Retd  
   Department of Botany  
   PSG College of Arts and Science, Coimbatore  

19. Dr. T. S. Suryanarayanan  
   Director  
   Vivekananda Institute of Tropical Mycology (VINSTROM)  
   Ramakrishna Mission Vidyapith, Chennai  

20. DR. S. Karuppusamy  
    Associate Professor  
    Department of Botany  
    Madura College, Madurai  

21. Dr. N. S. Vasanthi  
    Professor and Head  
    Dept. of Biotechnology  
    Sri. Bannari Amman Institute of Technology, Sathyamangalam  

22. Dr. Selvi Subramanian  
    Associate Professor  
    Department of Biotechnology  
    PSG College of Technology, Coimbatore 641 004
Science Academies’ Refresher Course on Plant Sciences – Report

Science Academies Refresher Course on Plant Sciences was organised by the Department of Botany, PSGR Krishnammal College for Women, Coimbatore from 19.11.2012 to 03.12.2012. The programme was convened by Dr. T.J. Pandian, f. National Professor, Department of Genetics, Centre for Excellence in Genomics, Madurai Kamaraj University, Madurai.

The course was inaugurated by Dr. (Mrs)N. Yesodha Devi, Principal, PSGR Krishnammal College for Women, Coimbatore who emphasized the importance of refresher courses for college teachers which help them to update their knowledge.

Date : 19 November 2012.

Technical session 1 : Dr. D.J. Bagyaraj, NASI Sr. Scientist & Chairman, Department of Agricultural Microbiology, University of Agricultural Sciences, Bengaluru.

Topic : “Role of Arbuscular Mycorrhizal fungi in sustainable Agriculture”

Association of Arbuscular mycorrhizal fungi (AMF) in agricultural crops, shrub, tropical tree species and some aquatic plant species was clearly explained with examples. The commonly occurring genera of AM fungi like Glomus, Gigaspora, Scutellospora, Acaulospora and Entrophospora and their beneficial effects such as role in the biological control of root pathogens, biological nitrogen fixation, hormone production and greater ability to withstand water stress were presented along with their molecular mechanism.

Technical session 2 : Dr. D. J. Bagyaraj, NASI Sr. Scientist & Chairman, Department of Agricultural Microbiology, University of Agricultural Sciences, Bengaluru.

Topic : “Microbial inoculants and crop productivity”

The lecture gave an emphasis on sustainable agriculture by using organic inputs including microbial inoculants which serve as bio-fertilizers supplying major plant nutrients Nitrogen (N), Phosphorus (P), Potassium (K). They also serve as bio-control agents suppressing root pathogens. Constrains in biofertilizer technology like physical, chemical and biological barriers to incorporate microbial inoculants into the field was discussed in detail.

Technical Session 3 : Dr. S. Poornima
Assistant Professor
Department of Botany
PSGR Krishnammal college for Women
Coimbatore

Practical session I : Bioinformatics

Brief introduction to bioinformatics and databases such as National Centre for Biotechnology Information (NCBI), Swissprot Protein database, Pubchem, chembank and
Protein Data Bank (PDB) was given. Hands on training were given to participants on how to retrieve the data on sequence or structure from each source.

**Date:** 20 November 2012.

**Technical session 4:** Dr. K.S. Subramanian  
Professor and Head  
Department of NanoScience & Technology  
Tamil Nadu Agricultural University, Coimbatore.

**Topic:** “Status of Nano Agriculture in India”

Importance of nanoscience and its need in Indian agriculture was emphasized. Methodology involved in nanoparticle synthesis and plants used were explained. Implication of nanotechnology in various applications as nano: food systems; fertilizer; herbicide; insecticide; biosensor was enumerated with separate case studies. Theoretical hypothesis on nanotechnology in the meta material development was highlighted.

**Technical session 5:** Dr. D. Sudhakar,  
Professor, Department of Biotechnology  
Tamil Nadu Agricultural University, Coimbatore.

**Topic:** “Engineering Insect resistance in plants”

Pathogenesis of lepidopteron, coleopteron and dipterons in plants especially in cotton and brinjal and the pesticides used against them was explained. Discovery of BT based pesticide – porin and its importance in agriculture were described. Expression of BT genes, codon modification to enhance the expression, searching effective mutants specific to pests Highlighted about mode of action of Cry proteins in transgenic plants and different types of it. Transplasgenomic technology was described to enhance the expression of gene in plants. Pesticides and their mode of action based on carbohydrate synthesis, protein synthesis and lipid metabolism in insects was highlighted.

**Technical session 6:** Dr. D. Sudhakar, Tamil Nadu Agricultural University, Coimbatore.

**Topic:** “Safety of GM crops”

A debate on “safe” and “not safe” on genetically modified crops and its causes in human system with special reference to Bt Brinjal was discussed. Professor Sudhakar, explained about the clinical trials carried over to prove that the GM crops are safe to use and he also provided evidence articles to understand the importance and benefits of GM crops to the farmers. Conclusion made was “No human activity can be guaranteed 100% safe. Commercial GM crops and products are at least as safe in terms of food safety as those produced by conventional methods. With the proper balance of caution and scrutiny, we can take advantage of the power of this technology without compromising the health of humans, animals, or the environment.”

**Technical session 7:** Dr. S.F. Maleeka Begum  
Assistant Professor and Head  
Department of Biotechnology  
Sri Krishna Arts and Science College, Coimbatore.

Dr. Maleeka explained the environmental problems caused by overuse of pesticides and the need of natural products as an excellent alternative to synthetic pesticides. This will reduce the negative impacts on human health and the environment. The move towards green chemistry processes and the continuing need for developing new crop protection tools with novel modes of action and commercialization of natural products as green pesticides that are eco-friendly, economic, target-specific and biodegradable was highlighted. Various types of biopesticides such as bioinsecticide, biofungicide, bioherbicide, bionematicides, for different applications like seed treatment on farm application were explained.

Date : 21 November 2012.

Technical session 8 : Dr. T.S. Lokeswari Sivasamy,
Head
Department of Biotechnology & Biomedical Sciences,
Technology and Research,
Sri Ramachandra University, Chennai.

Topic : “Silencing RNAs in Plants”

RNA Silencing was explained based on the discovery of RNAi. General features of silencing process in plants and about siRNA, miRNA and applications of this technology were described. Early demonstration of RNAi in plants with special reference to Petunia sp., and polarity establishment C.elegans was explained. Comparison between siRNA and miRNA and mechanisms and applications of RNAi was clearly explained.

Technical session 9 : Dr. T.S. Lokeswari Sivasamy,
Head, Department of Biotechnology & Biomedical Sciences,
Technology and Research,
Sri Ramachandra University, Chennai.

Topic : “Gene regulation Mechanism”

The lecture gave an overall insight on the control of gene expression and regulation by mechanisms such as alternative splicing, translational frame shifting, regulation poly A tail and RNA editing in the cell. Emphasize on epigenetics, transcriptional control, genome imprinting, post translational modifications and gene regulation in prokaryotic and as well as in eukaryotic cells were explained in detail.

Technical session 10 : Dr. Narendar Sivvasamy,
Advisor
SynkroMax Biotech Pvt. Ltd.
Chennai.

Topic : “Bio-processing (Fermentation-upstream and downstream Processing)”

Process of fermentation, different types of fermentation and fermentors used were clearly explained. Industrial production of nattokinase from fermented soyabean using Bacillus subtilis, omega-3-fattyacids from soil microorganisms like Trichoderma sp., and Aspergillus niger,
identification, isolation and cloning of chitinase gene from salted fish and importance of pectinase enzyme in textile industry for bio scouring, fruit pulp clearing and tea industry were elaborately presented from his industrial research experience.

Technical session 11  
Dr. Narendar Sivvasamy,  
Advisor  
SynkroMax Biotech Pvt. Ltd.,  
Chennai.

Topic: “Industrial Enzymes (enzymes, applications and problems)”
Importance, sources, commercial aspects, areas of application, industrial application, manufacturing process, market status of enzymes was enumerated in industrial point of view. Enzymes used in agricultural, dairy, baking, beverage, sugar, leather, textile, paper, cosmetic, flavour, detergent, feed, pharmaceutical, mining and oil industries were explained and need of enzymes in diagnostics and bioremediation was emphasized.

Date  : 22 November 2012.

Technical session 12  
Dr. T.J. Pandian,  
National Professor, Department of Genetics  
Centre for Excellence in Genomics

Topic: “Plant-insect interaction”
Plant and insect interaction was explained with special reference to a pollinator – honeybee. Several adaptations of plants to attract pollinators and species specific plant and insect interaction were discussed by his enthusiastic speech. The relationship of aquatic autotrophs and heterotrophs was discussed. The story of paper factor and Juvenile hormone from pro-thoracic and the interdependency of preying mantis, Poecilocerus pictus and Calotrophis gigantea were explained.

Technical session 13  
Dr. T.J. Pandian  
National Professor  
Department of Genetics  
Centre for Excellence in Genomics

Madurai Kamaraj University, Madurai.

Topic: “My encounter with wasp”
Professor Pandian explained how his hobby of watching the wasp Scelipheron violaceum and its enticing breeding behaviour, a synthetic expression of its reproductive physiology has been changed to an exciting encounter to realize the mysterious expertise and incredible strategy that this little wasp has developed to achieve its goal of reproduction. From the encounters, the following inferences he made were: (i) a wasp is able to recognize its own prey from those of other wasps, (ii) with increasing energy cost of spider deposition and food provisioning, a higher percentage of wasps makes more efforts to continue and complete the spider provisioning process and seal the hole, (iii) the wasp is capable of doing addition and memorizing the same at least for a day, and (iv) with addition of alien spiders in the inner end or middle of the hole
and/or removal of the deposited spiders, the confused wasp, incapable of doing subtraction and addition together, abandons the hole.

Technical session 14  :  Dr. Madhumita Dasgupta  
Scientist-E  
Institute of forest Genetics and Tree Breeding  
Coimbatore.

Topic: “Functional Genomics”

Functional structure of a gene, importance of genomics in fighting diseases in human and protecting plant life were explained. It is necessary to study genomic construction of the microorganisms that can thrive under extreme conditions of heat, cold, pressure, and even radiation to solve a variety of environmental problems such as to develop new energy sources, to improve industrial processes, to progress bioremediation and to combat global warming by absorbing or sequestering carbon from the atmosphere.

Date  :  23 November 2012.

Technical session 15  :  Dr. M. Ramanathan  
Principal, Professor and Head  
Department of Pharmacy  
PSG College of Pharmacy  
Coimbatore.

Topic: “Basic principles of Pharmacological Screening of Drugs”

Dr. Ramanathan explained the screening techniques to understand the pharmacological activity, safety and efficacy, to test the mechanism of action of drug, to assess potency, to get toxicological profile of the New Chemical Entity (NCE), dose finalization and safety. Screening methods like bioassay, in vitro, ex vivo and in vivo were explained with apt examples.

Technical session 16  :  Dr. M. Ramanathan  
Principal, Professor and Head  
Department of Pharmacy  
PSG College of Pharmacy, Coimbatore.

Topic: “Screening for Anti-inflammatory Drugs”

Types of inflammation such as acute and chronic, pathogenesis, components of inflammatory responses, mechanism of inflammation and the drugs used in the treatment and their side effects were discussed in detail. A case study on in vivo screening for the aqueous extract of Tribulus terrestris and assessment by formalin test and carrageenan induced paw edema test was clearly explained. The study concluded that alkaloids are responsible for the anti-inflammatory action of T. terrestris.
Technical session 17 : Dr. N. Natarajan
Professor
Department of NanoScience and Technology
TamilNadu Agricultural University, Coimbatore

Topic: “Application of nanotechnology in seed science”

The lecture highlighted the effects of nanotechnology in seed science such as: seed protection by nano-coating using elemental forms of Zn, Mn, Pa, Pt, Au, Ag to control seed borne pathogens, carbon nanotubes increases the tomato seed germination, nanopolymer coating enhances water resistance, nanosensors for quick detection of seed quality and seed storage. Importance of studying morphology of seeds under scanning electron microscope and SEM images of different seeds and some organisms were presented.

Date : 24 November 2012.

Technical session 18 : Dr. K.N .Ganeshiah
Head
Department of Environmental Science
University of Agricultural Sciences, Bangaluru.

Topic: “Joy of doing Science”

Professor explained how doing science can be joyful by just improving or practicing the capacities such as thinking or meditating on the particular aspect, curiosity, serendipitous and the most importantly observation. He quoted some examples on how all the above characteristics lead to some important discoveries. One such example he presented was, rolled leaves of Aspelia sp., eaten by infected chimpanzee to combat against viral fever and the interesting factor was the same plant used by the local tribes for the same purpose. Another case study on pregnancy test by seed germination using cattle urine based on Egyptian encrypts.

Technical session 19 : Dr. K. N. Ganeshiah
Head
Department of Environmental Science
University of Agricultural sciences, Bengaluru.

Topic: “In Search of Sanjeevani”

The lecture was on how the plant Selaginella bryoptris was found to be sanjeevani by several hypothetical predictions based on the mythology – Ramayana, in which the lord hanuman took sanjeevani from mountain. The hypotheses made were: the habitat of the plant should be on mountain; that should have life reviving property from severe coma, the dry plant should have the ability to regenerate when exposed to water and so on. All these hypotheses were matched the characteristics of Selaginella bryoptris and it was concluded that this could be the sanjeevani which was mentioned in Ramayana.
Technical session 20  : Dr. K.N. Ganeshiah  
Head  
Department of Environmental Science  
University of Agricultural sciences, Bengaluru.

Topic  : “Evolution of mutualism in plants”
Mutualism between plants and insects was clearly explained by simple relationship between benefit and cost. According to Darwinian’s survival of the fittest concept each organism put some cost for the other organism only to acquire benefit for its own. This was neatly explained by his interesting case study on “Fig and Wasp mutualism”, starting from invasion of female wasp entering into the fruit, how it lays eggs proportionately into the style, germination percentage of seeds and wasp eggs, female wasps carrying pollens and male wasps assisting female to depart to another fruit to pollinate.

Technical Session 21 : Dr. S. Poornima  
Assistant Professor  
Department of Botany  
PSGR Krishnammal college for Women  
Coimbatore

Practical Session II : Bioinformatics

The participants were given training to do ligand construction using ACD lab’s Chemsketch. The 2D structure of the ligand was drawn, cleaned, optimized and converted to 3D structure and saved and molecular docking of the ligand with the target protein using Argus Lab. The free energy of the interaction was recorded.

Date  : 25 November 2012.
Field visit  : Nilgiri Biosphere Nature Park, Thuvaipathy

Participants along with the coordinator and supporting staff visited Nilgiri Biosphere Nature Park which is 35 Km away from Coimbatore. It is a man made forest area with rare, endangered forest tree species. Participants went for trekking.

Date  : 26 November 2012.

Technical session 22 : Dr. D. Victor Arokya Doss  
Associate Professor  
Department of Biochemistry  
PSG College of Arts and Science, Coimbatore.

Topic  : “Cloning of Biopesticide gene”
Dr Victor explained how he characterized a noval vegetative insecticidal protein (Vip3V) from the genomic library of Bacillus thuringiensis var. kurstaki by subcloning vip3V gene into pET-22b(+) vector. The protein over expressed in Escherichia coli to an extent of about 30% of the total protein. The purified protein showed broad-spectrum activity against some of the
lepidopteran larvae and ineffective against the larvae of silkworm (*Bombyx mori*) and mosquito (*Culex quinquefasciatus*).

Technical session 23 : Dr. D. Victor Arokya Doss  
Associate Professor  
Department of Biochemistry  
PSG College of Arts and Science, Coimbatore.

Topic: “Antidepressant activity of plants”  
Lecture was on advantages of using plants for the treatment of mental depression instead of synthetic drugs which have adverse effects. Medicinal plants and medicines derived from plants with antidepressant property were enumerated. Mechanism of drugs like serotonin, uptake of the drugs by neurotransmitters was explained to the participants with the help of video clippings.

Technical session 24 : Dr. K. Mani  
Associate Professor (Retd)  
Department of Botany  
PSG College of Arts and Science, Coimbatore.

Topic: “Drug discovery - my personal experience”

The lecture was a new insight into the drug discovery by drugs to gene approach rather than usual gene to drugs approach. The bottom up approach of discovering new potent drugs starting from creating a chemical space; predicting biological activity; constructing pharmacodynamics and pharmacokinetics and finally verifying by *in vitro* as well as by *in vivo* studies were presented with case studies on marine algae, wood rot fungi and some medicinal plant resources.

Technical session 25 : Dr. K. Mani  
Associate Professor (Retd)  
Department of Botany  
PSG College of Arts and Science, Coimbatore.

Topic: “Chemical genomics”  
A case study on chitin synthase inhibitors from *Musa* sp., predicted by computational biology inhibited the growth of fungal pathogens under *in vitro* experiment was clearly narrated with the aid of recorded video of hyphal tip bursting. Another case study on medicinal plant that was traditionally used in siddha treatment for its antipyretic property was confirmed by computational drug discovery method by screening its phytochemicals for their target specific activity and confirmed to have the same therapeutic property and comparatively potent than allopathic antipyretic drugs in the market.
Technical session 26: Dr. T.S. Suryanarayanan
Director
Vivekananda Institute of Tropical Mycology
Ramakrishna Mission Vidyapith, Chennai.

Topic: “Ethics in Research”
Lecture was on ethics in research. They are: Science is a serious matter. Like any other human enterprise, it evolves truth. A scientist should be sincere since scientific endeavor is possible only with tax-payers money. A scientist is answerable to the Society. Types of misconduct in scientific research such as honest errors; negligence and deliberate fraud were explained. How to publish research articles, who should be in the authorship list and how to find out peer reviewed journals were clearly described.

Technical session 27: Dr. T.S. Suryanarayanan
Director
Vivekananda Institute of Tropical Mycology
Ramakrishna Mission Vidyapith, Chennai.

Topic: “Amazon- A naturalist pilgrimage”
The river Amazon is one of the longest rivers in the world. Dr. Suryanarayan explained the floral and faunai diversity of the place. The Brazil nut flowers depend on orchid bees (Euglossa spp.) to pollinate which in turn depend on the orchid (Coryanthes vasquezii) for their reproduction. This orchid is an epiphyte on other trees and the seeds of these trees can only be dispersed by Agouti (wild Squirrels). The importance of this complex structure which cannot be constructed by human was emphasized to conserve the natural ecosystem.

Field Visit: Botanical survey of India, Coimbatore
Participants visited the Botanical Survey of India, Southern Regional Circle. Dr. Singh gave a vivid account on the history of Botanical Survey of India. The method plant collection, process involved in herbarium preparation and preservation was explained in detail. Participants visited herbarium where rare and old herbarium sheets prepared by J.D. Hooker were shown. A powerpoint on Expedition to Antarctica at Dhakshin Gangotri was presented by Dr. Palanisamy, Scientist C.

Date : 28 November 2012.

Technical Session 28
Practical Session III: Dr. R. Sripriya
Asst. Professor
School of Biological Sciences
Madurai Kamaraj University, Madurai

Topic: Isolation of Plant genomic DNA
Extraction of total DNA from plant tissues by CTAB method (Rogers, S.O. and A.J. Bendich, 1994) was demonstrated.
Technical Session 29

Practical Session IV : Dr. T. Jebasingh
Asst. Professor
School of Biological Sciences, MKU.

Topic : RNA Extraction
Extraction and isolation of total RNA from rice leaf samples was demonstrated.

Date : 29 November 2012.

Technical session 30 : Dr. V. Narmathabai
Professor
Department of Botany
Bharathiar University, Coimbatore.

Topic : Orchids - genetic resources, utilization and conservation
Various stages in orchid seed germination and regeneration of orchids by embryo culture, meristem tip culture, pseudo bulb culture and leaf culture using tissue culture techniques was enumerated. Effect of artificial seed in orchid propagation and its advantages over somatic embryos was discussed. A case study on influence of mycorrhizal fungus in orchid seedling development was presented. Several orchid species namely: Cattleya sp., Vanda, Pelanthera, Habenaria, Dendrobium sp., Masdevallia sp., Paphiopedilum esquirolei, Polyradicion gracilis, Rhynchostylis gigantean, Dracula anthracina etc., with their special characteristics were clearly explained. Conservation strategies and centres in international and national forums were presented.

Technical Session 31 : Dr. S. Poornima
Assistant Professor
Department of Botany
PSGR Krishnammal college for Women
Coimbatore

Practical Session III : Bioinformatics
The participants were taught to do sequence alignment using the software BLAST (Basic Local Alignment Search Tool) for comparing two sequences; Clustal X for comparing sequences of more than two belonging to different organisms. Primary and secondary structure of protein sequences were predicted using Expasy online tools. Hands on training was given on molecular visualization tool namely Rasmol to view the protein molecule in different display modes.

Date : 30 November 2012.

Technical session 32 : Dr. R.R. Rao
INSA Honorary Scientist
Central Institute of Medicinal and Aromatic Plants
Bengluru.
Topic: “Floristic Diversity in India: Inventorization, conservation and bioprospection”
Variety and variability of living organisms based on species diversity, genetic diversity and ecological diversity was enumerated. New taxa reported by his research team was presented. Mega biodiversity zones in India, richness of East, Northeast and West Himalaya, Western Ghats, Deccan region, dessert, coastal regions, Andaman and Nicobar islands and the endemic plants to those areas were discussed in detail. Need of biodiversity prospection, threats to biodiversity and conservation on Indian vegetation were highlighted.

Technical Session 33 : Dr. R.R.Rao
INSA Honorary Scientist
Central Institute of Medicinal and Aromatic Plants
Bengluru.

Topic : Problems in Taxonomy teaching and research in Indian Universities- a plea for urgent resurrection
Objectives of plant systematic, history of taxonomy, relevance of taxonomy in different areas of applications, prominent activities of a taxonomists, current status of taxonomy, current problems on taxonomy, morphological classification vs molecular systematic were discussed. Need of promoting the taxonomy discipline and measures for improving the status were explained. The take home lesson for traditional taxonomists was “he should be aware of the modern trends and techniques in taxonomy though he may practice herbarium taxonomy”.

Technical session 34 : Dr. S. Paulsamy
Associate Professor
Department of Botany
Kongu Nadu Arts and Science College, Coimbatore.

Topic : Biodiversity- an overview
The lecture was on the importance of diversity, different types of biodiversity, status at global level, depletion of bioresources, extinction of biodiversity, mega biodiversity countries in the world and India as a mega biodiversity nation, threats to biodiversity with examples of endangered plants. He explained a case study on biodiversity status of angiosperms in the sholas of Nilgris, diversity of plants and about the endangered animals in the Western Ghats.

Date : 1 December 2012.
Technical session 35 : Dr. S. Karuppusamy
Associate Professor
Department of Botany
Madura College, Madurai.

Topic: Molecular taxonomy and floristics
Lecture was on molecular plant taxonomy that motivated systematists to begin using molecular differences to compare species, populations and how molecular taxonomy allows the examination of species which have changed over evolutionary time, as well as of the relationships between species that have no common physical characteristics. Molecular changes used to explore phylogenetics. The session was concluded that the genes are thought to evolve and mutate at a constant, predictable rate, giving rise to this evolutionary clock hypothesis.
Technical session 36 : Dr. S. Karuppusamy  
Associate Professor  
Department of Botany  
Madura College, Madurai.

Topic: “Research opportunities in plant science  
  The lecture gave the overall view on the different areas of research in plant science  
  namely: morphotaxonomy, chemotaxonomy, medicinal plant systematic, diversity informatics,  
  cosmeceuticals, agricultural biotechnology, genomics, metabolomics, RNAi,  
  phytonanotechnology, garden funding, bio energy, bioremediation. Some rapid assay to study the  
  effect of pharmacological property of plant extracts were explained clearly. He gave details  
  about the funding agencies such as Ministry of Science and Technology, Ministry of  
  Environment and Forest and Ministry of Agriculture.

Technical session 37 : Dr. N.S. Vasanthi  
Professor and Head  
Department of Biotechnology Sri Bannari amman Institute of Technology  
Sathyamangalam.

Topic: Plants as source of nanoparticles – some vision to reality  
Dr. Vasanthi explained about the biosynthesis of nanoparticles using plant extracts as the  
  favourite method of green, eco-friendly production of nanoparticles by bottom up approach.. The  
  need for biosynthesis of nanoparticles using microbial enzymes or the plant phytochemicals with  
  anti oxidant or reducing properties that are usually responsible for reduction of metal compounds  
  into their respective nanoparticles was discussed. The three main steps in the preparation of  
  nanoparticles were enumerated from a green chemistry perspective in detail.

Technical session 38 : Dr. N.S. Vasanthi  
Professor and Head  
Department of Biotechnology  
Sri Bannari Amman Institute of Technology  
Sathyamangalam.

Topic: Biotechnology- a boon for diabetes Treatment: from vision to reality  
Diabetes is an important public health problem. Major contribution of biotechnology for the  
  treatment of diabetes includes - recombinant Insulin - produced from bacteria by rDNA  
  technology were discussed. New biotechnological approaches such as Islet transplantation, Beta  
  cell Transplantation/ regeneration therapy, Stem Cell Therapy, Artificial Pancreas, Incretin  
  therapy and Gene Therapy were also discussed. Special emphasize on stem cell treatment for  
  Diabetes that can replenish sufficient β cells and protect the remaining cells which would result  
  in 62.9% patients decreased insulin injections & hypoglycemic medications by more than 50%  
  and 3.7% of Type 1 & 11.1% of Type 2 patients could completely stop using insulin were  
  highlighted. The session was concluded that the development of new techniques, hopefully  
  future treatment of diabetes will be a more efficient and satisfying experience for patients.
Date: 3 December 2012.

Technical session 39: Dr. Selvi Subramanian
Associate Professor
Department of Biotechnology
PSG College of Technology, Coimbatore.

Topic: Role of miRNA plant gene regulation

Biogenesis of miRNA, function, miRNA mediated plant gene regulation and regulating factors were explained by Dr. Selvi. Studies on indentifying miRNA targets in plant mitochondria using computational approach was explained in detail and concluded that the specific genes predicted present in nucleus and mitochondrial compartments enhance the possibility of regulating the mitochondrial genes by manipulating the appropriate miRNA genes in the nuclear compartment and which can be validated by transgenic plant production.

Technical session 40: Dr. Selvi Subramanian
Associate Professor
Department of Biotechnology
PSG College of Technology, Coimbatore.

Topic: “Transgenic approaches to modify oils and fats in plants”

Lecture focused on improvement in oilseeds by by increasing oil content, homogeneity of composition and novel fatty acids like omega-3-fatty acids and omega-6-fatty acids. A case study on modification of sesame oil to be the source of omega-3-fatty acid as the seed has high oil yielding property and several medicinal values. The modification was done by a fungal bifunctional fatty acid disaturated which introduces two double bonds at particular position of carbon and convert monounsaturated oleic acid to poly unsaturated linoleic acid in sesame seed oil.

In the Concluding Session Prof. S. Balasubramanian, Director, GRG School of Management Studies delivered the valedictory address and distributed the certificates. Participants Dr. Melwyn d Cunha and Dr. K. Sasikala gave the feedback. They suggested that more practical sessions can be included. The programme came to an end after fourteen days. Each participant selected books of their own interest for worth Rs. 1250/- each.

Inaugural address by Dr. N. Yesodha Devi, Principal
Participants

Group photo

Practical session on molecular biology
Practical session on Bioinformatics