ENVIRONEWS

INTERNATIONAL SOCIETY OF ENVIRONMENTAL BOTANISTS

Newsletter

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IN THIS ISSUE

Global Environment Outlook

Noting that development should not be at the expense of environment, the Global Environmental Outlook (GEO-5) has held that while there is considerable success in ozone layer replacement, little progress has been made in stemming climate change. The fifth edition of the Global Environmental Outlook (GEO-5) of United Nations Environment Programme points to significant progress only in four of the possible 90 goals and objectives set to achieve global sustainable development.

The report cautions if humanity does not urgently change its ways, several critical thresholds may be exceeded, beyond which abrupt and generally irreversible changes to the life-support functions of the planet could occur. It also pointed out that some progress has taken place in some goals, including expansion of protected areas like national parks and reduce deforestation but there is little progress in goals climate change, desertification and drought, while further deterioration was posted in other like state of coral reefs and wetlands.

The report points out that efforts to eliminate production and use of substances that deplete the ozone layer, removal of lead from fuel, increasing access to improved water supplies and boosting research to reduce pollution of marine environment are the only goals that recorded progress. The GEO-5 calls for more specific targets, with quantifiable results, across a broader range of environmental challenges. The GEO-5 reminds world leaders and nations meeting at Rio + 20 why a decisive and defining transition towards a low-carbon, resource-efficient, job-generating Green Economy is urgently needed.

In Asia Pacific, the report also calls for a greater focus on policies that target the drivers of environmental degradation - population increase, unstainable economic growth, urbanisation, consumption and resource use. The report states scientific evidence shows Earth systems are being pushed towards their biophysical limits with evidence that these limits are close and have in some cases been exceeded.

Of the nine internationally agreed atmospheric goals reviewed, the report says, significant progress has been made in eliminating substances that deplete the ozone layer and the phase-out of lead in gasoline but there has been little or no progress on serious issues such as indoor air pollution and climate change.

Indoor air pollution from particulate matter is responsible for nearly 2 million premature deaths annually, including 900,000 deaths in children under the age of five. Of these deaths, 1.3 million occur in low-income countries, especially in South Asia, South East Asia and Africa. Outdoor particulate matter may be responsible for around 3.7 million deaths annually while ground level ozone is responsible for 700,000 respiratory deaths, over 75 per cent of which occur in Asia.

Source: The Economic Times

- **Members of ISEB are requested to intimate any change in their contact address including postal, Email, Fax, Telephone to ISEB office.**
- All correspondence should be addressed to: **The Secretary, International Society of Environmental Botanists**, National Botanical Research Institute Campus, Lucknow - 226 001 (India).
- **E-mail:** isebnrilko@sify.com **Website:** http://isebindia.com

LETTERS

We are writing this letter to inform you that Amity University, UP, Noida, India is hosting the 7th International Symposium of the International Society for Development of Natural Products (ISDNP) jointly with 6th National Symposum of the National Society of Ethnopharmacology (NSE), India and the 1st International Symposium of Phytochemical Society of Asia (PSA) on 'Recent Advances in Natural Products' from November 15-17, 2012.

The 6th ISDNP Symposium organized jointly with the 7th International Symposium on Chromatography of Natural Products was held in the medieval University City of Lublin, Poland in 2010. Prof. Kaziemierz Glowniak of the Medical University of Lublin, is the current President of ISDNP. The sixth ISDNP was attended by 250 participants from 45 countries. The 7th ISDNP Symposium is planned at Amity University, Noida, UP (near Delhi) and it is jointly organized with 6th NSE and PSA. It will be thus an International event of three major organizations in the world and we request you not to miss it.

The Details of the symposium are available at our website http://www.amity.edu/acisr/symposium. About 700 participants are expected to attend this symposium of three major international organizations.

Padma Shri Dr. P. Pushpangadan
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Please find attached our recent paper. ISEB Secretariat can e-mail the electronic version of the paper on request to interested individuals: Viney P. Aneja, William H. Schlesinger, Jan Willem Erisman, Sailesh N. Beherad, Mukesh Sharma, William Battye. "Reactive nitrogen emissions from crop and livestock farming in India", *Atmospheric Environment*, vol. pp. 92-103, 2012.

I believe that the members of the International Society of Environmental Botanists may find the attached manuscript useful.

Dr. Viney P. Aneja
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We gratefully acknowledge your acceptance of our request for institution of a medal in honour of late Professor H.S. Srivastava. We are in process to transfer Rs One Lac (Rs.1,00,000/) from the account of PHSS Foundation (www.phssfoundation.org.in) to ISEB shortly for which some internal procedures are to be followed. I hope we shall be able to hand over the draft/ multi city cheque within May, 2012.

Rana Pratap Singh
Secretary, PHSS foundation for Science & Society
B.B.A University, Lucknow
www.ranapsingh.com

Kindly convey my heartfelt condolence to the family of Prof. B.K Nayar, who expired recently. I pray for the peace of the departed soul.

Padma Shri Dr. P. Pushpangadan
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Hearing the news of demise of Dr. B.K. Nayar, I became very sad. He encouraged me a lot when I joined NBRI in 1960. Though I never worked under him directly, I had to interact with him on various occasions. I was posted at Banthra a sub-station of NBRI located about 15 km away from Lucknow. I was very sad at that time as I was away from my home town Visakhapatnam and had to adjust with the local people with a different language and culture. At this juncture Dr. Nayar encouraged me in my work on tobacco and also was instrumental in the publication of my first paper from NBRI. I pray God to make his soul live in peace. This may be conveyed to his family.

Andra S. Murty
(Former scientist & Head Plant Physiology Lab., NBRI)
Visakhapatnam (A.P.)
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The Message carrying the news of the demise of Dr B.K. Nayar saddened me .I know that all of us have to pass. But what remains in our memory, as long as we live ,is what each has done or did in his or her active period of life. A tree periodically or at any given time sheds its leaves without

Several polycyclic aromatic hydrocarbons (PAHs), including those which are carcinogenic, have been detected in “rougan”, a traditional Chinese barbecued pork dish.

Source: Environmental Monitoring and Assessment

any regret. As all the materials they release are needed to form new life. Humans are no exception. Yet there is one difference between men and all other forms of life. We can think about things like evolution, the meaning of life and about what could happen in the future. Moreover, we can record what we discover, which may or may not be of great significance. Even what appears at one time important or significant may or may not remain so. New things keep happening and old things either become a part of accepted knowledge or may gradually go into books or encyclopaedias. We should not certainly mourn the death of persons like Dr. Nayar but celebrate their life. I had known him well. He had made a special collection of ferns and fern allies. This was one of the best collections I had seen. Professor Mehra was highly appreciative of the N.B.R.I. collection. Professor Bir, another student of the Punjab school also has been responsible for assembling such a collection from the Himalayan region. Professor Verma imbibed the knowledge and evolutionary concepts about this group. Calicut and TBGRI (now called JNTBGRI) have also been enriching our knowledge of the Pteridophytes.BSI has played an equally significant role in maintaining herbarium collections for reference and retrieval of knowledge. At a time when there is a rapid decline in experts and collectors who could, by their accumulated acknowledge and experience spot and tell the authentic identity of a wide range of plants, the real worth of persons like Dr Nayar become clear. I join all of you in conveying my admiration of Dr Nayar and finer qualities of his personality. I request you to convey the contents of this mail to members of his family.

H.Y. Mohan Ram
INSA Honorary Scientist; formerly Professor & Head, Department of Botany, Delhi University.
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For the last six months I was busy in drinking water projects in and around 24 Parganas of West Bengal. I was elected as Secretary of Technology with Human Face, Kolkata.

Fund raising is a very crucial factor for NGOs, I am learning it now. TEAM building with multidisciplary groups is also another key area. Participatory Rural Development and Drinking Water are two main issues.

I have also discussed with them about opening a chapter of ISEB and economic botany with. All depends on how fund can be raised step by step approach. I am also trying to locate 3-4 like-minded NGOs, in Bihar and Assam to start with. In this respect I paid courtesy visits to two eminent mentors like Dr H.A.B. Parpia, Dr G. Thyagarajan in Mysore and Chennai, respectively.

Tilak basu
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WELCOME NEW LIFE MEMBERS OF ISEB

Dr. Neelima Ratti is a Women Scientist (DST) at Hislop School of Biotechnology, Hislop College, Nagpur, India.
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Literature received in Exchange by the ISEB

Envis Eco-Echoes Quarterly Publication of Indian Centre for Plastics in the Environment, Mumbai; Vol. 12 issue 1/Jan-March 2011; Vol. 12 issue 2/April-June 2011 & Vol. 12 issue 3/July-September 2011 (Editor: T.K. Bandyopadhyay)

www.icpeenvis.nic.in; www.icpenviro.org

Association Meetings International (AMI) June 2012 Published by Conference and travel Publications Ltd., West Sussex, U.K. (Managing Editor: Martin Lewis)

www.meetpie.com

Energy Next - Your Guide to Renewable Energy: Volume 2 Issue 6, April 2012, Editor-in-Chief: D Majumdar; Publication Director: R. Ram Prasad; Gateway Media Pvt. Ltd., Hyderabad, India

www.energynext.in

ENVIS-NBRI Newsletter (Plants & Pollution) NBRI-ENVIS Coordinator : Dr. Nandita Singh

NEWS FLASH

Dr. Muhammad Iqbal, Professor of Botany and former Vice-Chancellor of Jamia Hamdard, New Delhi, who is also a member of the Executive of ISEB, has been honoured with the Bharat Jyoti Award (2012) of the India International Friendship Society, for his contribution and achievements in plant science research. Shri Bhishm Narayan Singh, the former Central Minister and the former Governor of Assam and Tamil Nadu, conferred the honour upon him. Syed Sibte Razi, former Governor of Jharkhand, GV Krishnamurthy, former Election Commissioner, and Jogendar Singh, former Director of CBI, greeted the awardees on this occasion.

Dr. S.C. Sharma, former Head Botanic Garden, Floriculture and Landscaping at NBRI and Vice-President, International Society of Environmental Botanists was conferred a `citation and a memento by the Bougainvillea Society of India for his outstanding R & D work on the "Bougainvilleas". Dr. Sudhir Krishna, Secretary Urban Planning, Government of India,

New Delhi presided over the function of the Bougainvillea Festival on April 1, 2012.

Dr. S.C. Sharma, Vice President ISEB delivered a talk on "Urban Pollution and Phyto-remediation" to the Foresters in the seminar on the Eco-tourism in the Institute of Tourist Management on June 2012.

Dr. Vivek Pandey, Principal Scientist, CSIR-NBRI and a Life member of ISEB visited Finland on deputation from 09.4.2012 to 21.4.2012 under an ongoing Indo-Finnish collaborative research project. Prof. Oksanen, who is an internationally renowned environmental scientist, has visited India to attend ICPEP-2 Conference at NBRI Lucknow in February 2002.

Dr. Pandey visited Kuopio and Joensuu campuses of University of Eastern Finland (UEF). He had detailed discussions about the progress of the project with Prof Elina Oksanen, Head, Department of Biology, UEF and Co-coordinator of the project. Dr. Pandey also attended a one day symposium on "Abiotic Plant Stress Signaling" at University of Helsinki.

Dr. Swaranjit Singh Cameotra, Senior Principal Scientist CSIR-IMTECH and Ms. Noorpreet Inder Kaur Dhanjal (Project Assistant) have been given the first prize for their paper" Soil Microbes Population use for Sweeping the Residual Pesticides Load from the Soil and Aqueous Environment" in the International Conference in the Panjab University Sector 14,Chandigarh. Prof Cameotra is a life Member of ISEB.

Obituary

Prof B.K. Nayar, an internationally renowned Pteridologist and former Head of Botany Department Calicut University died on 12th May2012 after a protracted illness. Prior to joining Calicut University he had been working in the National Botanical Research Institute Lucknow as a Senior Scientist. In NBRI, he established a school of Pteridology which won international fame and recognition.

Dr. P.N. Misra, well known agronomist and a former scientist at NBRI, expired on 6 July 2012 at Lucknow after a prolonged illness. He was 75. As head of Banthra Research Station of NBRI, for over two decades, Dr. Misra had done pioneering work on reclamation of alkaline soil and authored several books and research papers on the subject.

Microbes for Soil Sustainability and Crop Productivity

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Feeding our ever-expanding population is one of the greatest challenges facing mankind. Increasing population of the world is raising alarm that the requirement of food will be 28.8 million ton, while their availability will be only 21.6 million ton by 2020. Soil being a critical component on earth not only for sufficient food production but also for maintaining the sustainable global environmental conditions, attract many researchers to evaluate its role in various direct and indirect physico-chemical and biological processes. The soil quality has been defined by many researchers as 'the capacity of a specific kind of soil to function, within natural or managed ecosystem boundaries, to sustain biological productivity, promote environmental quality, and maintain plant and animal health. Soil erosion, atmospheric pollution, extensive soil cultivation and grazing, salinization and desertification decrease the productive agricultural land.

A unique balance of chemical, physical and biological components contribute towards maintaining soil quality. Agri-ecosystem functioning is governed largely by soil microbial dynamics. Sustainable productive agriculture depends on a healthy community of soil microbes that decompose organic matter and contribute to the biological recycling of chemical nutrients that affect soil fertility. Thus interactions between the diversity of primary producers (plants) and decomposers (microbes) are the two key functional groups that form the basis of all ecosystems and have major consequences on the functioning of agricultural ecosystems.

Soil microorganisms are highly diverse and abundant organisms on earth; one gram of soil may contain billions of microbes with thousand of different species. Several biotic or abiotic factors lead to the alteration of microbial community structure and composition which may directly or indirectly influence the soil ecosystem, nutrient cycle activity and crop production. In addition, anthropogenic intervention for the management and treatment of soil involving pesticide, chitin, compost, manure or genetically modified microorganisms and plants also influence microbial diversity. The excessive use of chemical fertilizers and pesticides to attain the green revolution has made the food and environment contaminated with chemicals and thereby putting ill effects on our health. Though the use of chemical fertilizers (nitrogen, phosphorus and potassium: NPK) enhance crop yield, but brings alteration in soil properties, functional diversity in microbial population and their enzymatic activities. Further, there is more demand for agrochemicals with degrading soil quality, and the enhanced cost is prohibitive and even unaffordable by small and marginal farmers. Contrary to this, several researchers have demonstrated that organic farming (compost and green manure) leads to improved soil quality with higher microbiological activity involving crop rotations, reduced application of synthetic nutrients and no pesticides. Along with the cost of chemical fertilizers now people are getting aware about the negative effects of chemical fertilizers on the soil health and crop productivity. In addition, we can now see a renewed recognition of the ill effects of agrochemicals and the central role of soil resources for assuring food security and the increased awareness that soil microorganisms play a fundamental role in sustainable agriculture that has triggered numerous studies and projects taking initiatives of organic farming. Several studies have been made to evaluate the application of fresh and composted organic wastes modifying the structure, size and activity of soil microbial community.

Although long-term impact of chemical fertilizers on soil microbial biomass and diversity is not well documented, however, it has been shown that chemical fertilizers could increase the soil microbial biomass, carbon and nitrogen, and exerts no significant change in the microbial characteristics of the soil. Changes in microbial parameter are correlated with the soil organic carbon content and not to the application of P and N. Evidences linking direct impact of chemical fertilizers on microbial diversity function and phylogeny are not so evident. Crop productivity greatly depends upon the amount of available nutrients in the soil, which is governed by transformations of soil microbial biomass. Thus the growth and activity of microorganisms are functions of soil properties, such as nutrition, texture, pH, temperature, moisture content, as they are sensitive indicators of changes in soil properties. Supporting the choice of organic farming, with credible science can be vital for improving the overall productivity, food security, food sovereignty and environmental impact on agriculture in the country. For conversion of a conventional field to organic, first step is to build up the lost fertility of the soil. This can be achieved by complete restriction on the use of synthetic agrochemicals and increased use of organic and biological inputs. For nutrient management and soil fertility, built up crop residue, animal dung, forest leaf litter, bone meal, blood meal, slaughter house waste and green manures are important organic sources. All such organic material needs to be composted properly for appropriate impact. Nutrient value of the raw material and composting methodology determines the quality of produce. Biological resources such as

biofertilizers, biopesticides and other microbiological inputs to improve the soil fertility and reducing the use of chemical fertilizers and pesticides have also attracted lot of attention. Plant growth-promoting rhizobacteria (PGPR) are the rhizosphere bacteria that can enhance plant growth by a wide variety of mechanisms. Recent progress in our understanding on the diversity of PGPR in the rhizosphere along with their colonization ability and mechanism of action should facilitate their application as a reliable component in the management of sustainable agricultural system. In accordance with their mode of action, PGPRs can be classified as biofertilizers, phytostimulators and biopesticides with certain bacteria having overlapping applications. However, screening strategies for selecting the best rhizobacterial strain for rhizosphere competence and studies on the ecology of introduced PGPR with the resident PGPR and other microbial species in the plant rhizosphere will require more comprehensive knowledge, although the involvement of ACC deaminase gene, siderophore, phosphate, phytohormones like IAA, cytokinin, gibberellins etc., noduation, disease suppression and their coordinated expression seemed to be responsible in enhancing the plant growth, yield and nutrient uptake of various crop plants in different agro ecosystems. Short-term interventions to provide food, water and basic needs such as seeds and fertilizer to kick-start agriculture in response to food crisis and extreme weather is not the solution. Longer-term and large-scale measures are needed in order to build greater resilience to soil degradation, drought and climate change and reduce human vulnerability to disasters.

Change in land use / agro-ecosystems can change the microbial community structure of the soil and vice-versa. Consequently, the impact of different crop species that are cultivated in various combinations is likely to be an important factor in determining the structure of microbial community that can beneficially function in nutrient cycling, the production of plant growth hormones and suppression of root disease. Improvement in agricultural sustainability requires optimal use and management of soil fertility and soil physical properties.

There is a lot to discover and understand the complex yet beneficial aspect of plant and microbial interaction in light of the present challenge like drought, soil fertility loss, climate change and soil contamination. In order to secure the food security through sustainable agricultural practices role of soil microbes is certainly a high priority component for productivity of agro-ecosystem.

Carefully controlled field trials of crop plants inoculated along with rhizobacteria are necessary for maximum commercial exploitation of PGPR strains. An increased knowledge of microbe based symbioses in plants could provide potential ways of developing sustainable agriculture in order to ensure human and animal food production with minimal risk to the environmental health. These measures need to be promoted for popularization among farmers on large scale in order to achieve sustainable agriculture and food security.

Sacred Groves: A Religious Platform for Biodiversity Conservation

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One of the critical issues on the national and global agenda is the need to preserve biodiversity for future generations while trying to understand and document the indigenous knowledge of resource management practices. Religion, being a powerful instrument for convincing people, has always been used for meeting the desired objectives of the society. The various religious philosophies have contributed significantly in the conservation of forests, biodiversity and landscapes by promulgating customary norms, practices and beliefs. Some prominent live examples of traditional and cultural forms of biodiversity conservation still exist and are in practice, which include sacred groves, sacred species and sacred landscapes. Sacred groves are the religious practice of conserving biodiversity with strong beliefs, customs and taboos and are treasure house of rare and endemic species. Everything within these groves is under the protection of the reigning deity of the grove and the removal of any material, even dead wood or twig is a taboo (Gadgil & Vartak, 1976). Such groves still exist in many parts of the world and represent relict vegetation of the locality, preserved in its original form with minimal disturbance. Preservation of these groves, though on the pretext of religious beliefs, is of importance for conserving germ plasm that is otherwise under threat from human interference (Khiewtan & Ramakrishnan, 1989).

The concept of sacred groves is still relevant and exists today, especially in many parts of Mexico, Ghana, Nigeria, Syria, Turkey and Japan (Gadgil & Vartak 1976). In India, they occur in Western Ghats, Madhya Pradesh, Maharashtra, Meghalaya, Karnataka, etc., and found in variety of habitats from scrub forests of Thar Desert (maintained by Bishnois), to rain forests of Kerala in Western Ghats, Himachal Pradesh in the North and Kerala in the south are specifically known for their large number of sacred groves. India has the highest concentration of sacred

groves in the world. Estimates suggest that there might be between 1,00,000 and 1,50,000 sacred groves around the country (Malhotra *et al.,* 2007) and named differently in different parts of India such as *Law lyngdhoh* in Meghalaya, *Kovil kadu* in Kanyakumari, *Dev bhumi* in Uttarakhand, *Kavu* in Kerala, *Sarna* and *Deorai* in Madhya Pradesh, *Oran* in Rajasthan, *Jaherthan* and *Garamthan* in West Bengal, *Deovan* in Himachal, *Ummanglai* in Manipur, etc. The existence of such undisturbed pockets is mostly due to certain taboos, strong beliefs, supplemented by mystic folklores.

Services of sacred groves

Biodiversity in sacred groves: The sacred grove is kept in a comparatively undisturbed condition, due to faith and regard of local people and the belief that the sylvan deities would be offended, if trees are cut, flowers and fruits are plucked. The vegetation composing the sacred groves is very different from that of the surrounding areas of the region. Many of the sacred groves are studied in different parts of India, with a general focus on diversity of plant species. Hariyal Devi and Tarkeshwar sacred landscape are one of the examples of rich heritage of plant diversity situated in Garhwal Himalayas. About 372 species are found in Tarkeshwar sacred landscape and more than 100 species are found in Hariyali sacred landscape. Kabi sacred grove in North Sikkim has 241 species of plants in a 3 km^2 area. Jamir and Pandey (2003) studied plant species diversity of three sacred groves in Meghalaya and found 395 species, 14 % of which were endemic. 83 species are reported in Nakuleshwar sacred grove from Kumaon Himalaya (Singh *et al.,* 2011). Tiwari et al. (1998), studied 79 sacred groves in Meghalaya, ranging from 0.01 to 900 hectares in size and found that the species diversity was much higher than in disturbed forests. In addition, the species *Myristica magnifica* and *Pinanga dicksoni* are now mainly confined to a *Myristica* swamp in a sacred grove of Uttara Kannada in northern Karnataka.

Rare and endemic plant species from sacred groves: A number of studies have emphasized that many sacred groves are repositories of rare species. Haridasan and Rao (1985) have reported at least 50 endangered and rare species in sacred groves of Meghalaya. *Kunsteria keralensis*, a climbling legume, reported from a sacred grove in southern Kerala, is confined to that sacred grove (Mohanan and Nair, 1981). *Belpharistermma membranifolia*, *Buchanania lanceolata* and *Syzygium travuncorium* are rare species found only in some sacred groves of Kerala. Mohanan also discovered a rare species of cinnamon, *Cinnamomum quilonensis*, in some of the *Kavus* of Alapuzha district in Kerala (Unikrishnan, 1995).The Kallabbekan sacred grove in Kumta taluk, Karnataka, over 50 *ha.* in extent, despite being in the midst of arecanut-spice gardens of a populated village, is rich in endemics like wild nutmegs (*Myristica malabarica*), *Cinnamomum malabathrum* *Garcinia gummi-gutta* and wild pepper. *Petiveria alliacea*, an endangered medicinal plant has been reported from sacred grove of Kanyakumari (Sukumaran & Raj, 2008). In Kodagu district of Western Ghats, sacred groves were found to protect some threatened tree species such as *Actinodaphne lawsonii, Hopea ponga, Madhuca neriifolia* and *Syzygium zeylanicum*, which are not found elsewhere.

Micro-climatic habitats: Several taxa exhibit remarkable microhabitat-specific nature which can be attributed to the local environmental conditions and sacred groves provide excellent micro-climatic conditions for the luxuriant growth of those plant species which are not present in the surrounding areas at the same altitude. Changes in the microhabitat often induce noticeable damping effect on the dominance of one taxon in that area which sometimes account for its disappearance on one hand and simultaneous emergence of another species, since many species are highly sensitive even to the smallest changes in the environmental conditions. For example in Haat Kali sacred grove, *Hedera nepalensis* and *Smilax aspera* are found frequently on trees of *Cedrus deodara* and provide shelter to other life-forms. *Microstylis acuminate*, an orchid grows gregariously in moist and humus rich soil of the grove.

Conservation of water resources: Larger sacred groves also have their own micro-climate which increases nutrient recycling, recharge of aquifers and act as a primary source of perennial streams. For example, in Nakuleshwar sacred grove of Pithoragarh district, Uttarakhand, the dense forest forms plenty of catchment for perennial water stream and provide essential requirement of water to the villagers and other people of the area.

Providing livelihood: Most of the sacred groves besides maintaining biodiversity provide a livelihood to the community they belong to. The local communities and the care takers of the groves have developed a rotation system of getting forest products by which all the families receive benefits during different time. Tree cutting is prohibited and only felled trees are taken away by the natives. Chamunda Devi and Haat Kali sacred groves in Kumaon Himalaya are one of the examples of sustaining communities around the sacred groves.

Sacred plant species

From pre-historic times, plants and animals are the part of our life. Some plant species are grown in sacred places because people thought that ancestors and deities reside in these plant species and protect their life. Plants are oldest creation of God on earth and the conscious about them is as the human civilization. Plant worshiping is one of the earliest religious trends since the time ancient. Numerous references are available in literature where plants are treated as to the abode of the gods. In the scriptures, these plants are mention of the *Kalpa vrisksha* and *Chaitya vrisksha*, indicating that worshiping of the trees is an Indian tradition. These plants are often grown along and within the temples and can be considered as "sacred plants". Various religious

ceremonies are based on these trees or plants. In India, there are many festivals, which are based on flora. Holy Basil (*Ocimum species*), Asoka (*Saraca asoca*), Banyan tree (*Ficus bengalensis*), Peepal (*Ficus religiosa*), Kela (*Musa paradisica*), Neem (*Azadiaracta indica*), Aam (*Mangifera indica*) and Beal (*Aegle marmelos*) etc., are sacred plant species in India. Many of them like the sacred basil and neem are multi-purpose medicinal plants. These culturally valued species are often ecologically important keystone species, which by their key role in ecosystem functioning contribute to support much biodiversity associated with it. Several studies were carried out in Almora district (Uttarakhand) on the religious or sacred plants (Sharma and Joshi, 2010). For example, *Cedrus deodara* is frequently seen in Jageshwar and Dhaula Devi sacred groves and is protected through religious beliefs, *Quercus leucotricophora* in Jhakarsham sacred grove, *Pinus roxburghii* in Gairar sacred grove, similarly, in Pithoragarh district, *Rhododendron arboreum* in Malay Nath and Narayan Swami Ashram sacred grove, *Osmanthus frangrance* in Thal Kedhar sacred grove, *Cedrus deodara* in Haat Kali and Chamunda (Hanera) Gangolihat, etc. Many ethnic, religious and cultural traditions are associated with plant species (folk music, dance, literature and poetry). In spite of this, these plant species play a significant role in our daily life. These species are used as a good fodder, fuel wood and timber, apart from the fact that they play a key role in nutrient cycling and conservation, as well as in ensuring water balance within the soil.

Threats to sacred groves

There are several key threats that have led to the degradation of groves in India, these are:

Developmental projects: Some of the sacred groves that fell under government-vested lands, were destroyed when townships grew. Rails, roads and highways have also taken their toll of many sacred groves. Others disappeared under mining and industrial operations. Still others were flooded by big dam projects. Such developmental projects have contributed greatly to the diminishing of the flora and fauna of these sacred groves.

Collection of biomass and medicinal plants: Collection of biomass like fodder, fuel and other edible plants are frequently done by local communities for their survival and daily needs and grazing of animals is major concern to the biodiversity of sacred groves. Ruthless destruction and overexploitation of medicinal plants which are abundantly found in the sacred groves is another factor for degradation of biodiversity within the grove.

Shift in belief system: Shift of beliefs systems have also led to a weakening of the conservation of sacred groves. In some cases, Hinduism has subsumed the sacred groves that were established for older folk deities. Moreover, in many countries local traditions are being challenged by westernized culture, which results in the loss of sacred groves and their cultural importance for future generations of local people. Diminishing traditional beliefs due to modernisation is another factor which effects their conservation.

Encroachment, Pilgrimage and Tourism: Encroachment in various sacred groves for agricultural practices such as coffee production in Kodagu sacred grove of Karnataka and heavy influx of tourism and pilgrimage play significant role in destruction of biodiversity. The biodiversity of Patal Bhuvneshwar and Haat Kali sacred grove are now degraded due to high tourism.

Conservation measures: Sacred groves are managed by local communities since ancient time and protection through religious norms and taboo is excellent approach to protect these patches of virgin forests, however, in the absence of effective conservation management these sacred groves are facing challenges to hold the original plant diversity they have. Sacred groves serve as repositories of genetic diversity and are provided with comprehensive and rich ecological niche. Creating awareness among the inhabitants about the importance of invaluable genetic diversity and sustainable use of resources can lead to a secure future of these conserved patches. Government and international conservation agencies should support traditional institutions of sacred grove management, whether at family, community or even regional level. For effective conservation, it is important to respect community values behind such impressive conservation.

An estimated 610 billion tonnes of CO_2 is sequestered by tropical rainforests, worth $ 18 trillion. Norway would pay up to US$ 250 million to Guyana, if it kept deforestation in check.

Environmental Conservation , Editorial Dec. 2011

"Scientific conferences are not actually about the science; they are about the people who do science. You can learn about the science of botany from published papers and books, but you can only learn about the people who do the science of botany by attending botany conferences"

Dr. Joseph Armstrong
Member, Botanical Society of America.

Tidal Energy

According to estimates, world's 15% of the power needs could be met through tidal energy sources. Tidal power, also called tidal energy is a form of power generated in oceans and seas by converting the energy of tides into electricity. Although not yet widely used, tidal power has potential for future electricity generation with tides being more predictable than wind energy and solar power. Tidal current power uses turbines to harness the energy contained in the flow of ocean tides. It is unique as the power output like tidal movements is highly predictable and sustainable with zero visual impact and the turbines are completely submerged. It causes very little environmental impact to marine flora and fauna

According to a recent study, the Gulf of Kutch (Gujarat, India) has 1200 MW of tidal energy potential. The gulf of Khambhat is also blessed with immense tidal waves capable of generating power.

Source: 'Tidal Energy in Gujarat'
Energy next, Hyderabad
www.energynext.in

Drug-resistant bacteria found in 4-Million year old cave

Lechuguilla is one of the deepest and most extensive cave systems in New Mexico's Carlsbad. Caverns National Park in U.S.A with at least 210kilometers of mapped passages, it is the planet's seventh longest known cave.

Deep in the bowels of the cave microbiologists have discovered nearly a 100 types of bacteria that can fight off modern antibiotic drugs. The bacteria coat the walls of the cave system on rock, faces some 487 meters below earth's surface. A thick dome of rock has isolated the cave between four and seven million years ago. Any water that trickles through, takes roughly 10,000 years to reach the cave's depths which means the subterranean life has existed entirely in the absence of modern medicine. While not infectious to humans, the cave bacteria can resist multiple classes of antibiotics, including new synthetic drugs. The discovery serves as an intriguing lead in the quest to understand how drug resistant diseases emerge. When a new antibiotic is brought into the hospital, resistance inevitably appears shortly thereafter, within months or years. It is still a big question, where is this coming from.

In 1984 cavers began digging through rubble in an old mining pit and found an entrance to the cave. The cavers broke through in 1986 to unveil one of the last environment's on earth untouched by human activity. Scientists scraped off and bagged samples of biofilms-thick mats of bacteria-growing on the cave walls and delivered to the laboratory where scientists spent three years probing the samples for any sign of antibiotic resistance

Source: National Geographic News

World living way beyond its resources

Biodiversity has decreased by an average of 28 percent globally since 1970 and the world would have to be 50 percent bigger to have enough land and forests to provide for current levels of consumption and carbon emissions according to conservation group WWF, Geneva.

WWF recently released "Living Planet Report 2012", a biennial audit of the world's environment and biodiversity - the number of plant and animal species' observes that unless the world addresses the problem, by 2030 even two planet Earths would not be enough to sustain human activity.

Yet governments are not on track to reach an agreement at sustainable development summit being held in Rio de Janeiro

Reuters

Plastic-eating fungi to save environment

A team at Yale University, U.S.A. have found a "plastic-eating " fungi in the Amazon rainforest, which they claim could save the world from one of its biggest man-made environmental catastrophe, as it can break down common plastic polyurethane. One of the most widely used plastics, the global consumption of polyurethane raw materials in 2007 was above 12 million tonnes, with an average annual growth rate in its use of about 5%. As part of Yale's Rainforest Expedition and Laboratory educational programme, the researchers scoured the Ecuadorian rainforest for plants and cultured the micro-organisms within their tissue,

Source: Daily Mail London

Building windows can produce solar energy

Leading engineers and entrepreneurs are intensively exploring the idea of turning windows into solar-power producers. Solar windows, a subset of the growing field known as building-integrated photovoltaics, are based on the concept that a window does not need to be 100 per cent transparent, and a solar panel does not need to be 100 per cent opaque. Several ways currently exist to turn a window into a power-generating device, from thin-film silicon, to dye-sensitized solar cells, to tiny organic cells.

Some experts think that this field is poised to take off; a number of companies are promising commercial-scale production of various solar windows in the next two years. Still the cost and technical hurdles facing this technology could get in the way of sky-scrapers built to serve as emission-free power plants.

Several techniques have emerged for solar windows; one company in Columbia, Maryland has developed a method for spraying tiny organic cells

onto windows in see-through coating that lets in 40 to 80 per cent of sunlight, absorbing the rest.

The rate at which a solar panel turns the Sun's energy into electricity is a concern for all types of solar power, but especially for windows. The challenge is that if it absorbs the light and use it to make electricity then we don't get light and don't have a window anymore.

While traditional solar panels are now producing power with 15 to 20% efficiency, efficiency levels for solar windows of roughly 5 per cent are unlikely to be economical. If a solar window can only achieve one-third the efficiency of a solar panel, then it will take three times as long to pay back the investment.

But some experts think it is just a matter of time before efficiencies rise high enough – to make solar windows a sound investment.

Source: Dave Levitan
Yale Environment

Diamond mining affects environment

Today, diamonds are the most valuable stones in the world not only because of their beauty, but also because of their utility. Diamonds are not only specially cut for use in jewellery, but they are also used for special cutting tools like saw blades and drills because the stones are extremely hard and durable.

Diamond mining means destruction. Whether diamond mines are responsibly managed or not, environmental destruction is inevitable and like most types of mines the area surrounding the mine is adversely affected. Most diamond mines are open pit mines requiring the digging of thousands of square meters of land. Some diamond operations are conducted on the beach or off shore, in which case retaining walls are built to protect the mine from waves and tidal fluctuations. In these cases, large quantities of sand and rock (and sometimes coral reefs) are removed from the mine and placed elsewhere.

The results of such mining techniques can be catastrophic if left unmanaged. In many African countries that are rich in diamond reserves, yet poor in the enforcement of mining laws, the open pit mines are left once all the diamonds are extracted and the excavated dirt is left to run off onto farmland and into rivers.

In some countries where the diamond industry is regulated more closely there exist reclamation programmes that aim to restore land that have been strip mined. Often, these operations promise to fill in the excavated areas and re-plant the land with native foliage. However, these operations are not always successful because it takes decades for an ecosystem to become established and often the animals that play a necessary role in the process have been pushed far away from the location in question. It remains challenging to find diamonds that are mined in an environmentally sustainable method.

Source: Mitchell Gavillion
Los Angeles, California, U.S.A.

Arctic warms as tundra shrubs turn into trees

Tundra is a cold, treeless region in the Arctic, where tree growth is stunted by harsh weather. But shrubs and willow in part of the area have been growing upward to the height of trees in the recent decades due to warming climate.

Roughly 30 years ago, trees were nearly unknown in the region, but about 10 per cent to 15 per cent of the land in the southern part of the north-western Eurasian tundra, which stretches between Finland and western Siberia, is now covered by new tree-size shrubs, which stand higher than 6.6 feet. The growth of these shrubs is really linked to temperatures, according to researchers of Oxford University's Biodiversity Institute.

The change first came to the attention of scientists, when nomadic reindeer herdsmen, said they were losing sight of their reindeer in the new trees.

To better understand the climate dynamics associated with the increase in growth in the north-western Eurasian tundra, researchers studied information from the herdsmen's observations, temperature data, growth rings in the wood of shrubs and satellite data, including observations of how much green covers the landscape during the growing season.

Source: The Hindu

Permafrost

Permafrost that extends over almost fifth of the planet's land area is a vast time capsule, a plate where ancient life is preserved it is a natural cryopreservation of plant tissue over many thousands of years which plays a role as a depository for an ancient gene pool, i.e, pre-existing life, which has long since vanished from the Earth's surface, a potential source of ancient germplasm and a laboratory for the study of the rates of microevolution. Recent findings are a landmark us research of ancient biology material and the race to potentially revive other species, including some that are extinct.

The life kept buried in layers of snow could be revived or resurrected by comparing the ancient counterpart with modern day, both at the morphological and molecular level it is possible to study the contours of evolution.

Source: Dr. T.V. Venkateshwaran in Dream 2047 (Vigyan Prasar)

Climate Change, Biggest Threat to Food Security

Climate change is the greatest threat to food security according to a report "Food Security and Poverty in Asia and the Pacific: Key Challenges and Policy Issues," released by Asian Development Bank (ADB) recently. ADB tagged climate change as a key player in determining food security levels, and interventions needed to stem the impacts of global warming go beyond national borders and surpass the authority of any single government.

Problems caused by climate change be are much more difficult to resolve in the short term and will require long-term and internationally coordinated solutions.

In Sri Lanka nearly 20 per cent of the harvest was wiped out when devastating floods between January and February 2011 were followed by a harsh drought in some flood-hit areas. United Nations' updates on the impact of floods detailed instances of older children dropping out of school in order to help their families who, as a result of a ruined harvest, had lost their only source of income. Severe water scarcity is also a very real possibility in the future as rising temperatures will exacerbate decreasing rainfall. As ground water supplies dry up, the threat of rising salinity emerges as yet another obstacle to food production and security

ADB report predicted large crop losses in Asia due to changing climate patterns in the next 100 years primarily due to its proximity to the equator. Yield losses are expected to be even larger in tropical regions such as South and South east Asia, and will continue to drop further toward 2100. In Southeast Asia the rice yield is projected to fall by about 50% in 2100 relative to 1990 yields.

A. Wartha Perera (Sri Lanka)
in Care2 News

Rising Carbon Dioxide in Atmosphere Also Speeds Carbon Loss from Forest Soils

Elevated levels of atmospheric carbon dioxide accelerate carbon cycling and soil carbon loss in forests, according to recent researches by scientists of Indiana University U.S.A.

The new evidence supports an emerging view that although forests remove a substantial amount of carbon dioxide from the atmosphere, much of the carbon is being stored in living woody biomass rather than as dead organic matter in soils.

After nearly two decades of research on forest ecosystem responses to global change, some of the uncertainty has been lifted about how forests are storing carbon in the wake of rising carbon dioxide levels.

It's been suggested that as trees take up more carbon dioxide from the atmosphere, a greater amount of carbon will go to roots and fungi to acquire nutrients, but the researches show that little of this carbon accumulates in soil because the decomposition of root and fungal detritus is also increased.

Carbon stored in soils, as opposed to in the wood of trees, is desirable from a management perspective in that soils are more stable over time, so carbon can be locked away for hundreds to thousands of years and not contribute to atmospheric carbon dioxide increases.

The research was conducted at the Duke Forest Free Air Carbon Dioxide Enrichment site in North Carolina. At this site, mature loblolly pine trees were exposed to increased levels of carbon dioxide for 14 years, making it one of the longest-running carbon dioxide enrichment experiments in the world. Researchers were able to calculate the age of the carbon cycling through the soil by growing roots and fungi into mesh bags that contained uniquely labeled soils. The soils were then analyzed for their organic composition. The researchers also report that nitrogen cycled faster in this forest as the demand for nutrients by trees and microbes became greater under elevated CO_2.

The growth of trees is limited by the availability of nitrogen at this site, so it makes sense that trees are using the 'extra' carbon taken up under elevated CO_2 to prime microbes to release nitrogen bound up in organic matter. What is surprising is that the trees seem to be getting much of their nitrogen by decomposing root and fungal detritus that is less than a year old.

Science Daily

World's oldest clove tree

Indonesia's "Spice Islands" produced more nutmeg, mace, pepper and cloves than anywhere else in the world and on the island of Ternate, one particular tree has an extraordinary history. For millennia, Ternate and the neighbouring island of Tidore were the world's only source of those fragrant, twig-like herbs that love to hide at the back of our kitchen cupboards. Cloves from Ternate were traded by Arab seafarers along the maritime Silk Route as far afield as the Middle East, Europe and China. A Han dynasty ruler from the 3rd Century BC insisted that anyone addressing him chew cloves to sweeten their breath. Their origin was a fiercely-guarded secret until the Portuguese and Spanish burst into the Java Sea in the 16the Century.

The oldest clove tree was once 40 metres tall and four metres round.Today, all that remains is a massive stump and some bare branches. A few years ago, villagers hungry for firewood even attacked it with machetes. A brick wall now surrounds it.

Cloves are the dried flower buds of a tree belonging to the Myrtaceae family. The trees can grow up to 12m height. Cloves are used in cooking, either whole or in a ground form. They are also used in some cigarettes, incense and perfume.

Source: Simon Warrall
BBC World Service

Wetlands are responsible for 15% to 40% of current global Methane emissions, which is a potent green house gas with 25times the global warming potential of carbon dioxide. Changes in wetland Methane emissions can have important implications for the global climate.

CONFERENCES

2nd International Conference on Environmental Pollution and Remediation (ICEPR 2012)
August 28 - 30, 2012; Montreal, QC, Canada
Contact Name: Dr. Leila Bidmeshki
Website: http://icepr2012.international-aset.com/
E-mail: icepr2012@international-aset.com

7th International Symposium of International Society for Development of Natural Products (ISDNP)
November 15-17, 2012; Amity University, NOIDA, U.P. India
Contact: Organizing Secretary,
7th ISDNP Symposium, India,
Amity Institute for Herbal and Biotech Products Development, 3- Ravi Nagar, Peroorkada P.O., Thiruvananthapuram - 695 005, Kerala, India
E-mail: isdnp.7@gmail.com.
Website: http://www.amity.edu/acisr/symposium

Third International Conference of Urban Biodiversity and Design 2012
8-12 October 2012; Mumbai, India
Contact: Haripriya Gundimeda
Chair of the Organizing Committee, URBIO 2012
E-mail: urbio2012@hss.iitb.ac.in
http://www.hss.iitb.ac.in/urbio2012

International Conference on Anthropogenic Impacts on Environment and Bioremediation (ICAIEB-2012)
26 – 28 November 2012; S.V. University, Tirupati, India
Website: www.neaindia.org

XXXV All India Conference of Indian Botanical Society
Plants and Microbes: For the Betterment of Mankind in Changing Climate
December 8-10, 2012; The Maharaja Sayajirao University of Baroda, Vadodara
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BOOKS

A Handbook of Medicinal Plants: A Complete Source Book
N. D. Prajapati, S. S. Purohit, Arun K. Sharma & Tarun Kumar
Riddhi International 2007
ISBN: 9788177541342
Price: $ 86.00

Crop adaptation to Climate Change
(Eds.) Shyam. S. Yadav, Robert Redden, Jerry L. Hatfield, Hermann Lotze-Campen
Herley Blackwell 2011
iSBN-13978-0-8138

Weeds: in defense of nature's most unloved plants
By Richard Mabey
Harper Collins 2011
ISBN: 978-0-06-206545-2
Price: $ 25.99

Plant Genome Diversity
Plant Genomes, their Residents, and their Evolutionary Dynamics
(Eds.) Wendel, J.F.; Greilhuber, J.; Dolezel, J.; Leitch, I.J.
Springer 2012
ISBN 978-3-7091-1129-1
Price: €139,95

Atlas of Stem Anatomy in Herbs Shrubs and Trees
By Fritz Hans Schweingruber, Annett Börner, Ernst-Detlef Schulze
Springer 2012
ISBN-13: 978-3642116377
Price: $106.45

Science Communication in the World
(Eds.) Schiele, Bernard; Claessens, Michel; Shi, Shunke
Springer 2012
ISBN 978-94-007-4278-9
Price: € 129,95

Plant Physics
Karl J. Niklas, Hanns-Christof Spatz
Amazon.com 2012
Price: $44.51

Sustainable Urban Environments
An Ecosystem Approach
(Eds.) van Bueren, E.; van Bohemen, H.; Itard, L.; Visscher, H.
Springer 2012
ISBN 978-94-007-4158-4
Price: € 149,95

Waste Management and the Environment VI
(Eds) V. Popov, H. Itoh, and C.A. Brebbia
Wit Press 2012
ISBN:978-1-84564-606-6
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