



ENVIRONEWS

INTERNATIONAL SOCIETY OF ENVIRONMENTAL BOTANISTS

Newsletter

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IN THIS ISSUE

Letters	02
News Flash	04
Cost Effective Method for Removal of Fluoride from Polluted Water Abida Begum (India)	05
A Report on International Workshop on Climate Change & its Impact on Flora	06
News and Views	09
Conferences	12
Books	12

ISEB AND ENVIRONEWS

International Society of Environmental Botanists was founded some 14 years back to promote and co-ordinate research, educational and mass awareness activities on environment and plant life. Its sphere of activities extends to a wide geographical areas: global, regional, national and local. At higher levels, ISEB has organized three well-attended and highly successful international conferences in collaboration with the National Botanical Research Institute, Lucknow, published two conference proceedings carrying research contributions from distinguished scientists across world. At local level, popular/scientific lectures, debates, art competitions, training programmes, film shows etc. have been organized from time to time.

Environews, which is a quarterly newsletter of ISEB, was launched with the specific purpose of educating **non-specialists** about current environmental issues and about latest researches and advancements on environment and plant sciences. It is, therefore, imperative that we publish articles and other scientific matter in a simple and easy to understand language so that **non-specialist** readers from a cross section of the society, such as, corporate people, civil servants, bankers, management gurus, lawyers, journalists, school teachers, social activists and politicians could read and understand the matter published in Environews and benefit from it. In pursuance of this objective, we accept only such contributions, which are written in simple, non-technical/semi-technical language, avoiding complex scientific data, chemical formulae, equations, charts, graphs and tables etc. It is our considered view that complex scientific data and research findings can certainly be presented in a simple narrative style for the benefit of a larger section of our society. Our contributors are advised to stick to this thumb rule.

Although ISEB, membership is steadily growing, its financial resources have not shown any significant upswing. Due to these constraints, we are unable to increase the number of pages presently, as advised by some of our well-wishers.

K.J. Ahmad
Secretary, ISEB

- Informative news, views and popular articles/write-ups on current environmental researches/issues are invited for publication in ENVIRONEWS.
- Environews is published quarterly on the first of January/April/July/October; and is supplied free to all members of ISEB.
- Environews is also supplied in exchange for scientific literature published by reputed organisations.
- All correspondence should be addressed to : **The Secretary, International Society of Environmental Botanists**, National Botanical Research Institute, Lucknow - 226 001 (India).
- **E-mail : isebnbrilko@satyam.net.in • Website : <http://isebindia.com>**



LETTERS

It was shocking to learn from the EnviroNews about the passing away of Professor N.K Mehrotra and Prof (Mrs) Archana Sharma. This indeed is a big loss to the Indian Botany.

I remember that I met Professor Mehrotra last in the Ministry of Environment & Forests, Govt of India, some eight years ago when I was presenting progress of a research project and he was one of the experts. My last meeting with Prof Archana Sharma was in 1987 in Bangalore, where I received the Prof HL Chakravarty Award of the Indian Science Congress Association (ISCA) from the late Prime Minister, Rajiv Gandhi and she, as General President of the ISCA that year, presided over the function.

I was in Poland for the last several weeks in connection with my collaborative research on Cell Growth Dynamics in the Vascular Cambium, and have just finished mathematical modeling of multidirectional growth of the fusiform cambial initials. These days I am in Istanbul (Turkey) to deliver a couple of lectures in Fatih University. Here, I could find opportunity to meet Professor Munir Ozturk, among others, and discuss about the International Conference on Plants and Environmental Pollution (ICPEP) scheduled to be held at the Erciyes University, Kayseri (Turkey) in July 2009.

Prof Muhammad Iqbal

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ISEB and *EnviroNews* have made serious and well-planned efforts to highlight the global concern for sustainable environment from their very inception and these have resulted in a distinctly visible popularity of this newsletter. The new approach, in the magazine e.g. debates on JIF (journal impact factor) and climate change, and quality of published materials in the recent past indicate a significant maturity of ISEB leadership. I wish to see, like many other ISEB members, an *EnviroNews* of at least 24 pages rather than 12 pages.

Prof. Rana P. Singh

Professor & Head, Department of Environmental
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I would like to inform you that the 2008 APGC Symposium on '**Plant Metabolism, Air Pollution and Global Change: Plant Functioning in a Changing Global Environment**' will be held in the School of Forest and Ecosystem Science, Creswick, Victoria 3363, Australia, 7-11 December 2008 (see: www.apgc.eu).

It is being jointly organized by the University of Melbourne, Australia, the University of Groningen, The Netherlands, INRA Nancy, France and the World Agroforestry Centre for Southeast Asia Region (ICRAF SEA), Bogor, Indonesia. The aim of the APGC Symposium Series is to bring together scientists of various disciplines, who are actively involved in research on responses of plant metabolism and functioning to air pollution and global change. The previous symposia in the Series were held in UK, 1982, Germany, 1987, USA, 1992, The Netherlands, 1997, Poland, 2001 and Japan, 2004.

We would be pleased if you or one of your colleagues would contribute to the programme (there are still some open slots, see the website). However, the symposium will be organized at minimal costs and we will not be able to provide financial support for traveling etc.

We would be pleased if the Symposium would be announced in *EnviroNews*.

Dr. Luit J. De Kok

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We are pleased to inform you that we are organizing 1st World Congress on Disaster Management (WCDM-2008), from October 21-24, 2008 at Hyderabad to evolve a plan of action to overcome the tragic consequences associated with all types of disasters. Some of the leading experts on Disaster Management from all over the world are likely to participate in the congress.

We are glad to invite you and your associates to this mega world event and to participate in the deliberations by

presenting a paper and shedding new light on this burning problem. The proceedings of the congress will be published, and to commemorate the occasion we are bringing out a souvenir also.

S. Ananda Babu
Convener, WCDM-2008
Disaster Management Infrastructure & Control Society
(DMICS)
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On behalf of the Suez Canal University (SCU), I am pleased to welcome all of you to the 3rd International Conference on '**Future Trends in Genetics and Biotechnology for Safe Environment**', which will be held from 8 to 9, July 2008 in Suez Canal University, Ismailia, Egypt in collaboration with The Egyptian Society for Environmental Sciences.

As SCU is a community oriented university, which aims to coordinate between education and the scientific research, which help in the development of the whole area. This conference will discuss some important topics in Genetics and Biotechnology and using them in saving environment.

In the past two years, this conference has been providing an opportunity for intensive discussions about the current topics in the environmental sciences, which help in the development.

Finally, I invite all members of ISEB to join us in SCU, Ismailia, Egypt and look forward to an insightful and rewarding exchange on some of the most important issues on the international agenda.

Prof. Dr. Mohamed El-Zoghby
President of Suez Canal University Ismailia, Egypt
Website: <http://www.eses-catrina.com>

We are happy to inform you that we are publishing an international journal on multidisciplinary aspects of environment for the past 14 years in the name **Nature, Environment and Pollution Technology**. The journal has evoked a very good response across the scientific fraternity all over the world. The journal is abstracted in most reputed abstracting services in the world. The journal has also got an exclusive website: www.neptjournal.com

The abstracts of the papers published in the journal are put up on the website. We hope that the journal may be extremely useful to members of ISEB in their scientific endeavors. A sample copy of the journal can be sent to you on request.

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The *Journal of Medicinal Plants Research* (JMPR) is currently accepting manuscripts for publication. JMPR publishes high-quality solicited and unsolicited articles, in English, in all areas of Medicinal Plants. All articles published in JMPR will be peer-reviewed.

Our objective is to inform authors of the decision on their manuscript within five weeks of submission. Following acceptance, a paper will normally be published in the next available issue.

The Journal of Medicinal Plants Research is fully committed to providing free access to all articles as soon as they are published. We invite members of ISEB to support this initiative by publishing their papers in this journal.

Instruction for authors and other details are available on our website www.academicjournals.org/JMPR. Prospective authors should send their manuscript(s) to JMPR@academicjournals.org

JMPR is also seeking for qualified reviewers as members of its editorial board. Please contact me if you are interested in serving as a reviewer.

Professor Hilary Edeoga,
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Last month, we started a campaign to build awareness about the global threat of deforestation. And since that day over 4,000 additional acres have been protected.

It's been an exciting campaign that has drawn interest from tens of thousands of people across the globe. To keep up the momentum and to show how committed our online community is to stopping deforestation, we are asking everyone to help us protect a forest the size of Manhattan .

The more CO2 in the atmosphere, the more the world as we know it, will change. Oceans rise, shorelines change, deserts spread, droughts increase. Not to mention the millions of people, plants and animals that are affected by each acre of forest cleared due to poor or irresponsible decision-making in the name of progress.

Vinnie Wishrad
Sr. Director, Community and Membership
Conservation
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WELCOME NEW LIFE MEMBERS

Mr. Jagdish Gandhi is an internationally acclaimed educationist and social worker. He founded City Montessori School in Lucknow (CMS) at a very young age of 23 years, in 1959 to provide 'Jai Jagat' based quality education to children. Initially there were only five students on roll. Today, CMS figures in the Guinness Book of World Records as the World's largest school with an enrolment of 32,000 students.

He firmly believes that the World Judiciary needs to be strengthened, as it is the only hope for survival of humanity and just social order on the globe. In pursuance of this objective he has been organizing World Judiciary Summits and the International Conference of Chief Justices of the World every year, for the past seven years. This Conference, finds a prominent place in the international calendar of major events.

For his long-standing contributions to education and peace, the United Nations awarded him the prestigious UNESCO Prize for Peace & Education in the year 2002.

Mr. Gandhi has been building bridges for peace across the globe for over half a century and Lucknow is his '**Karma Bhumi**'. He is a visionary, a far-sighted person and a world citizen. ISEB is privileged to welcome such a distinguished person as its new Life Member.

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Dr. Satish A. Bhalerao is the Reader and Head of the Department of Botany at Wilson College, Mumbai. He has made extensive research contributions in the field of Environmental Science.

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Dr. Bhanesh H. Joshi has made significant research contributions in the area of Microbiology. Currently he is associated with C.G. Bhakta Institute of Biotechnology, Surat, Gujarat as a Senior Lecturer.

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Prof. A.P. Dikshit is the Founder Trustee and Chairman of Sustainable Development Foundation, Mumbai. He has made outstanding research contributions in the fields of agricultural botany, agricultural economics and sustainable development.

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Dr. Mohd. Kashif Kidwai is a Lecturer in Chaudhary Devi Lal University, Sirsa, Haryana. After his post graduation, he had joined National Botanical Research Institute, Lucknow where he carried out his Ph.D. research work.

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NEWS FLASH

The journal "**Physiology and Molecular Biology of Plants**" which is in 14th year of its publication with volume 14 from January 2008 has entered into a collaboration with

'Springer' which will be co-publisher and sole distributor of this journal for the next three years. Editor-in-chief, Prof. R.P. Singh, one of the associate editors Dr. R.D. Tripathi, and several

other members of ISEB are associated with this journal as members of Editorial Board.

www.editorialmanager.com/pmbp;
www.springer.com/journal/12298

Cost effective method for Removal of Fluoride from Polluted water

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Water pollution is a serious problem as almost 70% of India's surface water resources and a growing number of its groundwater reserves have been contaminated by biological, organic and inorganic pollutants. Pollution of surface and groundwater resources occurs through point and diffuse sources. Examples of point source pollution are effluents from industries and from sewage-treatment plants. Typical examples of diffuse pollution sources are agricultural runoffs due to application of inorganic fertilizers and pesticides and natural contamination of groundwater by fluoride, arsenic and dissolved salts due to geo-chemical activities. In pursuit of measures to achieve sustainability in water management, the Centre for Sustainable Technologies (CST) at the Indian Institute of Science (IISc), Bangalore has begun to address treatment of fluoride-contaminated groundwater for potable requirements. The fluorosis problem is severe in India as almost 80% of the rural population depends on untreated groundwater for potable water supplies

Sources of pollution

Pollution of surface and groundwater resources occurs through point and diffuse sources. Examples of point source pollution are effluents from industries, sewage-treatment plants and untreated domestic sewage. The main sources of diffuse pollution may be anthropogenic activities, such as agricultural applications of fertilizers and pesticides or of geo-chemical origin, such as natural contamination of groundwater sources by fluoride, arsenic and dissolved salts. Pollution from point sources can be controlled by disposal in engineered facilities, treatment and recycling of waste

materials. Minimizing application of fertilizers and pesticides is a way to control pollution from agricultural activities. Natural contamination of groundwater sources by fluoride, arsenic and dissolved salts is dealt with by suitable treatment of extracted groundwater.

Industrial pollution

In case of industrial units, effluent in most of the cases is discharged into pits, open ground, or open unlined drains near the factories, thus allowing it to move to low lying depressions resulting in groundwater pollution. The industries, which are burgeoning at a fast rate, produce about 55,000 million m³ of wastewater per day, out of which 68.5 million m³ is discharged into river and streams. Thus the magnitude of damage caused to our water resources can be estimated from the fact that about 70% of rivers and streams in India contain polluted water. The incidence of surface and groundwater pollution is highest in urban areas where large volumes of waste are concentrated and discharged into relatively small areas. The groundwater contamination is detected only some time after the subsurface contamination begins. Although the industrial sector accounts for only 3% of the annual water withdrawals in India, its contribution to water pollution, particularly in urban areas, is considerable.

Pollution from domestic activities

Inadequate treatment of human and animal wastes contributes to the high incidence of water-related diseases in the country. To date, only 14% of rural and 70% of urban inhabitants have access to adequate sanitation

facilities. Fluorine, a fairly common element of the earth's crust, is present in the form of fluorides in a number of minerals and in many rocks. Excess fluoride in drinking water causes harmful effects such as dental fluorosis and skeletal fluorosis. The permissible limit of fluoride level is generally 1ppm. The high fluoride levels in drinking water and its impact on human health in many parts of India have increased the importance of defluoridation studies. The fluoride-bearing minerals or fluoride-rich minerals in the rocks and soils are the cause of high fluoride content in the groundwater, which is the main source of drinking-water in India.

A study was conducted to find a suitable low-cost environmentally friendly method for the removal of fluoride in the groundwater that is used by common man. A few natural materials such as pea-nut shell carbon, *Bombax malabaricum* carbon, untreated charcoal, fly-ash from bagasse and MgO₂ maintained at PH 8.5 were used. The capacity of fluoride removal by the individual materials was studied and accordingly five columns were set up and studied for their defluoridation capacities.

Methodology

- ▶ The fly-ash from bagasse has oxides of Si, Al, Fe, Ti, Ca, MgSO₃ and alkalies along with mixed oxides.
- ▶ The pea nut shell and dried fruits of *Bombax malabaricum* were carbonized in the electrical conventional heating reactor by two stages carbonization process in the range of 250-600 °C and 600-700 °C respectively. The materials were placed in closed

stainless steel vessel by maintaining inert conditions and pyrolysis was carried out at 40 °C for 30 minutes followed by next stage to develop the pore size structure.

- ▶ Powdered untreated charcoal and MgO₂ were used.

All the materials used for defluoridation were treated with 0.5 M HNO₃ for the removal of unwanted materials. The acid washed product was thoroughly washed with hot distilled water to remove acidity and chlorides. The products were finally dried. All chemicals were of analytical reagent grade, and distilled water was used throughout. The standard solutions were prepared 1mg/L, 5 mg/L 10mg/L 15mg/L and 20 mg/L using DDW (the pH maintained was 8.5 HCO₃⁻ 2.1 mg/L, Ca 1.2 mg/L, SO₄ 0.43 mg/L). Sorption experiments were conducted at 23°C in a column packed with 450 g of each material (*Bombax malabaricum* carbon, untreated charcoal, fly-ash from bagasse and MgO₂) The concentrations of fluoride in water fed on the columns were 1, 5, 10, and 20 mg/l. 250 ml of a fluoride solution was first poured into the column to moisten the natural material. Then a 250-mL portion of the solution was placed in the top reservoir and the draining rate was adjusted to ca 2.0 ml/hr. Each experiment with solution of a given concentration was run with a fresh

portion of each natural material. The stopper was adjusted at a standard rate of 1.5 ml /min. The samples were collected at intervals of 20, 40, 60, 80, 120 and 140 minutes. The fluoride level in the effluent was monitored potentiometrically by using a fluoride ion-selective electrode. Further 5 locations of ground water were analyzed. From each location 3 samples were taken and tested for fluoride concentration before and after treatment. The results showed that all the samples were found to be within desirable limit of fluoride concentration of Indian standards but for untreated charcoal where the fluoride concentration was above permissible limit.

The results showed that the sorption of fluoride increases with increasing concentration of incoming solution. Pure water leaches fluoride for all the five materials may be due to formation of fluoride complexes. When a solution with low fluoride concentration (1 mg/l) is passed through the column, the fluoride level in the effluent was nil in the case of peanut shell carbon, fly-ash and MgO₂ at 80 minutes. However, after 120 minutes the effluent becomes completely free of fluoride in all the columns.

It is remarkable that the retention capacity of the natural materials increases with increasing fluoride concentration in incoming solution. .

For the 5, 10 and 20 mg/l F⁻ concentrations the respective drops in F⁻ concentration are 27, 58 and 76.5 per cent. Complete retention of the fluoride by fly ash occurs after 100 minutes for the lower F⁻ concentrations (1, 5, and 10 mg/l) and after 120 minutes for the higher F⁻ concentrations. The rate of adsorption is controlled by the rate of diffusion of fluoride in the inter-capillary pores of the particles. In the case of charcoal treatment the retention of fluoride did not change significantly with time, although there was some defluoridation at the initial stage. Strong sorptive capacity of residual carbon in the natural materials used, may be due to the fact that residual carbon samples showed signs of significant oxidation that has led to highly porous and fragmented particle structures. Hence all the materials used in the experiment are good sorbent except untreated charcoal. Further, ground water from five locations were analyzed. From each location 3 samples were taken and tested for fluoride concentration before and after treatment. The results revealed that after the treatment the samples were found to be within desirable limit of fluoride concentration of Indian standards except in the case of untreated charcoal the fluoride concentration was above permissible limit. It is a preliminary experiment and it needs further research.

A Report on International Workshop on “Climate Change and its Impact on Flora in the South Asia Region”

(Organized during March 9-12, 2008 at the National Botanical Research Institute, Luckinow, India

Worldwide, temperatures have risen by 0.6°C over the past 40 years and are predicted to rise by 2-6°C over the next century. Precipitation patterns have also changed, some places are receiving more rain than they did in the past, some places less. Evidence of climate change is evident through the shrinking glaciers, lengthening of

mid-to-high-latitude growing seasons, pole-ward and altitudinal shifts of plants, decline of some plant populations, earlier flowering of trees etc. Natural systems are vulnerable to climate change and some will be irreversibly damaged due to the limited adaptive capacity, the examples are mangroves, boreal and

tropical forests, prairie wetlands, native grasslands and biodiversity. Besides many human systems are also sensitive like the water resources, agriculture (esp. food security), forestry, coastal zones and marine systems.

Plant responses to climate change depend upon species and cultivars, soil properties, pests and pathogens, the direct effect of pollutants - CO₂, O₃, methane etc. on plants, interactions between pollutants, air temperature, water stress, mineral nutrition, air quality and adaptive responses.

Lanka during March 9-12, 2008 at NBRI. NBRI, a constituent laboratory of the Council of Scientific & Industrial Research (CSIR, Government of India), is a leading R&D Institute in the field of plant sciences. SACEP is an intergovernmental organization, established in 1982 by the Governments of various countries

workshop. He emphasized the requirement of accurate assessment of impacts of projected climate change on natural ecosystem, through scientific modeling and field studies. He further added that the workshop was to provide an ideal platform to initiate interdisciplinary work among experts in South Asia to pool their



South Asian countries including India show a wide range of variation in climate, altitude and physiography. There is considerable divergence of opinion about the magnitude of climate change predicted for this region and its effect on plants. Both climate models and observational studies give conflicting and hazy pictures of the effect of climate change on vegetation. The assessment of impacts of projected climate changes on natural ecosystems is not based on accurate scientific modeling or field studies at regional level.

Taking this in view, the "International Workshop on Climate Change & its Impact on Flora in the South Asia Region" was organized jointly by National Botanical Research Institute (NBRI), Lucknow, India and South Asia Co-operative Environment Programme (SACEP), Colombo, Sri

of South Asia to promote a and support protection, management and enhancement of environment in the region. About 139 scientists, experts and researchers from various parts of India and South-Asian countries viz., Bangladesh, Bhutan, Maldives, Pakistan, Sri Lanka, Nepal and Afghanistan participated in the workshop.

The workshop was aimed to provide an international forum for serious scientific discussion and deliberation to develop projections on climate change and its impact on the flora in various countries of South Asia.

The workshop was inaugurated on 9th March 2008 by Dr. Rakesh Tuli, Director NBRI and patron of the workshop, who while welcoming the delegates/participants from different countries, introduced the theme of the

resources, knowledge and information related to climate change, and develop appropriate strategic action to assess the impact of climate change on flora and vegetation of South Asian region. Dr. Arvind Anil Boaz, Director General, SACEP in his inaugural address enlightened on the issues of vulnerability and adaptation in the context of bio-diversity, agriculture and forestry brought by climate change, regardless of efforts to reduce emissions of green house gases. He hoped that the workshop would develop strategies for regional research and development of South Asian information network for enhancing the preparedness for global climate change and encouraging the mutual cooperation in the South Asian countries.

Prof. N.H. Ravindranath, of Indian Institute of Science, Bangalore, gave an overview of the Climate Change, the highlights of the Fourth Assessment Report of IPCC (IPCC, 2007). He said "The South Asia region inhabited by about five million people will be most affected by adverse climate change". Elaborating further Prof. Ravindranath said that there had been a consistent rise in the green house gas emission especially between 1970 and 2006. As a result of this, North West India, Pakistan, Nepal would see more warming conditions, which would be detrimental for the vegetation of the region. In his key note address he said that the climate change would also adversely affect the bio-diversity. Prof. C.K. Varshney, former Dean, School Of Environmental Sciences, JNU, New Delhi, gave a comprehensive account of the impact of climate change on the plant response at species level, community level, agriculture and food security and ecosystem services. According to him, ozone (tropospheric) is also an important secondary pollutant due to the GHGs and should not be ignored, as this is a strong phytotoxic agent.

The workshop was divided in seven sessions starting from the climate change scenario in different countries where all participating countries expert gave their country presentation.

Dr. J.S. Pandey, Scientist National Environmental Engineering Research Institute (NEERI) gave the overview of the Global Climate Change and its Environmental Impacts. He stressed that the impacts can be due to temperature gradients; soil, land and forest degradation; perturbations in water supply and demand; aberrations in flooding patterns, desertification; rising sea-levels, etc. He categorized some issues and research areas, which require closer look and analysis e.g., population dynamics, land-use changes, transboundary air

pollution, environmental management and international interactions. Country presentations were made by Mr. Saeed Abraham Sherzai from Afganistan, Mr. Lohzang Dorji from Bhutan, Mr. Ibrahim Naeem from Republic of Maldives, Prof. Sant Bahadur Gurung from Nepal, Dr. Raja Khalid Hussain from Pakistan and Mr. M.A.A.M. Jayarathna from Sri Lanka. All the speakers emphasized the extent of greenhouse gas emission and the effect on agriculture, forest and marine flora in their countries.

The second session concentrated on the effect of climate change on the biodiversity. The deliberations focused on the impacts from climate change and disruption of ecosystems such as Himalayan region, marine biota, desert conifer family and evergreen forest of Western Ghats leading to tremendous loss of biodiversity. Dr. Baban Ingole, Scientist from National Institute of Oceanography, Goa expressed his views on the impact of increased anthropogenic activities on Marine Biota through case studies on the marine flora and fauna. Prof.J.P.N. Rai, G.B. Pant University of Agriculture and Technology, gave his views on the changes that will occur in Agrobiodiversity due to Climate Change. Dr. Rashmi Srivastava and Ms. Anumeha Shukla from Birbal Sahni Institute of Palaeobotany, Lucknow, showed the changes in the carbonized woods collected from the desert and river basin regions due to prevailing environmental conditions.

A session focused on Forestry sector with special reference to carbon sequestration. Prof. S.P Singh, Vice Chancellor, H.N.B. University, Uttarakhand enlightened about the vulnerability of high Himalayas and the remedial steps to manage alpine forests and meadows in a sustainable way to reduce the effect of global warming. He pointed out methods to give economic incentives to

community's efforts to protect ecosystem health. Mr. Sandeep Tripathi, Secretary of the Indian Council of Forestry Research and Education, Dehradun, expressed his views on the role of forests in Climate Change especially in GHG reduction and thus mitigation. He further stressed on devising appropriate mitigation and adaptation strategies under Land Use, Land Use Change and Forestry (LULUCF) sector. He expressed his concern for the CDM (Clean Development Mechanism) Projects in forestry sector, which can provide relatively low cost opportunities to combat climate change. Dr. Uma Melkania of Department of Environment Sciences, G.B. Pant University of Agriculture & Technology, Pantnagar expressed her view on the Carbon sequestration potential in Forest Ecosystem through the studies undertaken in the Tarai region of Uttarakhand.

In the session on climate change and agricultural sector, renowned scientist Dr D.C. Uprety, from Indian Agricultural Research Institute, New Delhi delivered lecture on "Rise in atmospheric CO₂ and its impact on crop productivity". He gave a good account of the innovative approaches, for conducting long-term experiments to study the response of crop plants to the elevated CO₂, He further informed about the results of the experiments conducted with Free Air CO₂ enrichment (FACE) technology and open Top Chambers (OTCs) on Brassica, rice and wheat. Advisor in the Ministry of Science Technology and Earth Science. Dr. Akhilesh Gupta, through his lecture, informed about the prevailing weather condition especially high temperature on the decrease in agriculture yield. An example of this can be seen in the fact that preliminary evidences indicate that decrease in rice yields, in Indo-Gangetic plains is associated with a slight rise in minimum temperature.

Dr. Prabhat K. Gupta from National Physical Laboratory (NPL), New Delhi gave a good account of climate change, GHG Emission and Agriculture: Indian and South Asian efforts for Quality Data to meet Future Challenges. Dr. P. Krishnan presented the results on simulation standards of rice yield and methods of adaptation under Climate Change Scenario using the models of ORYZA1 and INFOCROP- rice experimenting in eastern India. The results suggest that the limitation on rice yield imposed by high CO₂ and temperature can be mitigated, at least in part, by altering the sowing time and selection of genotypes that possess a higher tolerance of spikelet fertility at high temperature. Dr. Chhemendra Sharma from National Physical Laboratory, New Delhi, gave an overview of the impact of climate change on Agriculture sector and requirement to develop/ enhance appropriate adaptation technologies and measures.

The other highlights of the Workshop were deliberations by experts on environmental issues related to climate change like effect on Sunderbans' mangrove by Prof. Joyshree Roy, Jadhavpur University, Kolkata. According to the reports, tidal flats, agriculture land, mangrove forest, declined over time, while abandoned aquaculture ponds, degraded mangrove, salt marshes have increased. Over a period of one

decade mangrove area has declined in Sunderbans from 420 hectares (1987) to 212 hectares (1997). The importance of mangroves should be promoted through economic valuation of mangroves, leading to increased levels of reforestation and conservation. In his observation on sea level rise along the Coast of the North Indian ocean, Dr. A.S. Unnikrishan, Scientist at National Institute of Oceanography, Goa observed that the sea level rise trends obtained in all the stations (except Diamond Harbour) along the north Indian ocean coasts are found to be consistent with global estimates, with an average of about 1.30 mm/year.

The presentation of Prof. M.N.V. Prasad of University of Hyderabad, dealt with the impact of Climate change phenomena on soil and plants with specific examples of ionic stress, metallomics, brackish or estuarine and wetland ecosystems and biogeochemistry of trace elements under climate change stress phenomena.

Prof. A.S. Raghubanshi, Botany Department, BHU, Varanasi gave a good account of the approaches to assess ecosystem response to climate change through Equilibrium models and Dynamic Global Vegetation Models, He expressed concern about the reliable data and suggested to take direct field measurement data which can be model calibrated by

non-linear inversion method.

Other important matters discussed during the workshop were coasts of north Indian Ocean, carbon sequestration and carbon trading opportunities and Free Air CO₂ Enrichment Technology (FACE) to assess the effect of CO₂ and temperature rise on crop plants.

The outcome of the Workshop was a **“Lucknow Statement on the effect of global climate changes on South Asian Flora and Regional action plan”**. The statement highlights the development of strategic plan for promoting education, research and extension, for knowledge based assessment, monitoring, preparedness and mitigation of climate change effects on flora in South Asian Countries.

A project proposal “Impact of Climate Change on Flora: A South Asian Initiative” for a coordinated action programme was developed, with the objectives to enhance capacity building, floral vulnerability assessment and adaptation/mitigation strategies. The project has been forwarded to SACEP Sri Lanka for seeking funds from International Organizations. The workshop concluded with thanks to the participants and especially experts from India and South Asian Countries by the **organizing secretaries Drs. R.D. Tripathi and Nandita Singh of NBRI.**



2007 SECOND WARMEST YEAR ON RECORD

The global average temperature in 2007 was 14.73 degrees Celsius the second warmest year on record, only 0.03 degree Celsius behind the 2005

NEWS AND VIEWS

maximum. Looking at the northern hemisphere alone, 2007 was the hottest year in the northern half of the globe since the record began in 1880. The year 2007 fits into a pattern of steadily increasing global temperature, with the eight warmest years on

record, all occurring, in the last decade. According to the NASA database global average temperature rose from 14.02 degrees Celsius in the 1970s to an average of 14.64 degree Celsius in the first eight years of the twenty-first century.

Although 2007 did not post a new record high, the year stands out as being extremely warm despite several factors that usually cool the planet. This strongly suggests that the warming effect of increased greenhouse gas concentrations is now dwarfing other influences on the Earth's climate.

In 2007, the IPCC reported that unabated greenhouse gas emissions would result in a warming of 1.1 to 6.4 degrees Celsius in the twenty-first century. To put this in perspective, temperatures over the last 100 years rose by a comparably small 0.74 degrees Celsius, and yet this appears to have already contributed to trends of more heat waves, longer and more intense droughts, higher sea level, more frequent heavy rain events, and stronger hurricanes. Future warming on the scale projected by the IPCC will bring with it a multitude of outcomes that can only be described as disastrous.

Our future now depends on what we do to limit warming by moving away from fossil fuels and towards renewable energy and energy-efficient technologies.

Source: <http://www.enn.com>

DRINKING FLUORIDATED WATER IS HAZARDOUS

Water companies in U.K. carry out fluoridation as a means of preventing tooth decay. Artificial fluoridation involves increasing the fluoride level in water supplies to one part per million. However, fluoride's toxicity lies somewhere between that of lead and arsenic, and, like lead and arsenic, it is a cumulative poison. Only half of the fluoride we ingest is excreted. Our bodies retain the other half. It is stored, mainly in bone but also in some soft tissues such as the pineal gland. Naturally occurring

fluoride is bound to calcium and is less bioavailable than the fluoride added by water companies to treat water supply by fluorosilicic acid. In U.K. the fluorosilicic acid originates from phosphate fertilizer operations.

Worldwide, some 350 million people receive artificially fluoridated water, representing just 6% of the global population. Of this global total, 171 million Americans receive fluorosilicic acid on tap. WHO figures show that dental health has improved as much in countries without fluoridation as in those with fluoridation. With overwhelming evidence against artificial fluoridation and more to support it, is difficult to understand why people are forced to drink fluorosilicic acid-dosed water.

Source: **John Graham**
www.npwa.org.uk

WATER-REPELLANT LICHENS ARE TOLERANT TO SO₂ POLLUTION

Lichens are very susceptible to sulphur dioxide (SO₂) damage and many lichen species disappeared from areas polluted by smoke and acid rain. However, according to a study carried out by Hanek et al. at Göttingen, Germany and reported in *Annals of Botany* (Vol. 101, No. 4; March 2008), a number of lichen species are actually tolerant of SO₂ and have been seen to increase in frequency in polluted areas. According to these studies, the basis of this tolerance lies in the hydrophobicity of the thallus surface. They observed that very tolerant species *Lecanora conzeoides* has a very hydrophobic surface.

The researchers carried out a simple experiment in which both susceptible and tolerant lichens were air-dried and then water droplets (500 μm in diameter), the size of an average rain drop, were placed on the thallus

surface and the droplets contact angles were measured (high contact angles 90° and above indicate hydrophobicity). On the other hand, contact angles less than 50 could not be measured because water spread over the thallus surface more readily on very hydrophilic thalli.

When contact angles were compared with known SO₂ tolerance a very clear correlation emerged. All but one of the super-hydrophobic species (contact angles ≥ 120) were highly tolerant while with one exception, the very hydrophobic species all exhibited low tolerance.

It seems, therefore, that it is the inability of SO₂ to enter the thallus in solutions that confers tolerance on the hydrophobic species.

Thus tolerance of SO₂ and of heavy metals is a beneficial side effect of the adaptation to wet places that adds further selective advantage in polluted areas.

SOOT SPEEDS UP GLOBAL WARMING

A recent review published in *Nature Geoscience* says that soot is the second biggest contributor to global warming after carbon dioxide. Soot has 60% of the effect of CO₂ on global warming, and China and India contribute 25-35% of the total soot emissions.

Soot, also called black carbon, is primarily produced from the burning of biomass such as fuel wood, cow dung, agricultural waste and coal, and from diesel exhaust; it is reason behind many health complications. About 80% of rural households in India use fuel wood for cooking.

Source: Condensed from *Down to Earth*, New Delhi; article by Mario D'Souza

POOR AIR AFFECTS THE BRAIN

Kids who live in neighbourhoods with heavy traffic pollution have lower IQs and score worse on other tests of intelligence and memory than children who breathe cleaner air, a new study shows. The effect of pollution on intelligence was similar to that seen in children whose mothers smoked 10 cigarettes a day while pregnant, or in kids who have been exposed to lead. The study used black carbon as a marker for traffic-related particles.

Source: Planet Ark; Reuters

MOSSSES MONITOR HEAVY METAL CONCENTRATIONS

Heavy metals in the atmosphere may travel over large distances before being re-deposited on land. Mosses provide an effective way for monitoring how deposition changes with time. A bio-monitoring network coordinated by the United Nations Economic Commission for Europe (UNECE) provides data on concentrations of 10 heavy metals in mosses from about 7000 sites across Europe.

An analysis of trends between 1990 and 2000 revealed that while arsenic, cadmium, copper, lead, vanadium and zinc concentrations in mosses decreased significantly between 1990 and 2000, the decreases for chromium, iron, mercury and nickel were not significant.

The chronological trends for decrease in the concentration of heavy metals between 1995 and 2000 were: cadmium (-42%), lead (-57%) and

mercury (-8%). These trends were similar to those reported by EMEP.

Source: Acid News

IRRIGATION BY TOXIC WASTEWATER

In a rapidly urbanizing world, when there is increasing concern about fresh water shortage, the practice of using wastewater for irrigation of food crops in peri-urban areas is encouraged. One potential risk of wastewater use is the contamination of food as a result of industrial pollution. It can have serious implications for health and livelihoods of those who consume produce that was irrigated with wastewater.

According to a study carried out jointly by universities of Sussex, Banaras Hindu University (BHU), Delhi University and an NGO Toxics Link on vegetables grown in semi-urban areas, which use industrial wastewater for irrigation, had high levels of heavy metals, such as lead which is neurotoxic and cadmium which can cause cancer. Potentially the most toxic heavy metals are cadmium and lead, which are widely associated with many small-scale industries like metal works, paper manufacturing and chemical and paint works. Vegetables, such as, spinach, radish, brinjal, cauliflower, tomato and cabbage were tested by the team.

Source: ENVIS Newsletter (IITR Lucknow)

FOUL AIR

Researchers from University of Virginia, U.S.A. have reported that air

pollution may reduce the fragrance of the flowers. This is crucial because both colour and fragrance attract insects towards flowers, thus helping pollination.

Their studies show that increasing levels of nitrogen oxides in the air react with and degrade hydrocarbons responsible for fragrance in flowers. Hydrocarbons react easily with nitrogen oxides (NO and NO₂) in the air to form ozone (O₃).

This restricts the fragrance from traveling long distances (about 200 meters) thus making it difficult for insects to find flowers. Simulation studies showed that at pre-industrial levels of air pollution, the fragrance of a flower could travel several kilometers. The hydrocarbons break down even before they can be carried away by the wind, according to a research paper published in the *Atmospheric Environment*. The researchers used mathematical models to understand how common fragrance hydrocarbons linalool, myrcene and ocimene disperse in air.

In highly polluted conditions 75% of the fragrance gets killed within 200-300 metres of the source plant. This could mean that insects will take longer to find isolated flower patches and so their efficiency as pollinators could be reduced.

Source: Condensed from Sumana Narayanan's article in Down to Earth, New Delhi.



CONFERENCES

The 3rd international conference on Future Trends in Genetics and Biotechnology for safe Environment

July 8-9, 2008; Ismailia, Egypt
Contact: Prof. Abdel-Raouf A. Moustafa
Conference General Secretary
Professor of Plant Ecology, Head of Botany Department,
Faculty of Science, Suez Canal University, Ismailia,
Egypt
Website: <http://www.eses-catrina.com>

4th International Conference on Biomass for Energy

22-24 September 2008; Kiev, Ukraine
Information: www.biomass.kiev.ua/conf2008

First WCDM 2008

World Congress on Disaster Management

21-24 October 2008; Hyderabad, A.P., India
Contact: S. Ananda Babu, Convener, First WCDM -
2008 Secretariat
Flat No. 402, Patel's Avenue, Road No. 11,
Banjara Hills, Hyderabad - 500 034, Andhra Pradesh,
India
E-mail: anandababu@dmics.in
Web: www.dmics.in

16th International Conference Of Environmental Bioindicators (16th ICEBI)

12-14 November 2008; Orlando, Florida, U.S.A.
International Society of Environmental Bioindicators
Zillioux@bioindicators.org
Web: <http://bioindicators.org/Default.aspx?tabid=75>

3rd International Conference on Water Resources and Arid Environments and the 1st Arab Water Forum

16-19 November 2008; Riyadh, Saudi Arabia
Contact: The Chairman of the Scientific Committee of
the 3rd International Conference on Water
Resources and the Arid Environment (2008) & 1st Arab
Water Forum - Prince Sultan Research Centre for
Environment, Water and Desert, King Saud University,
P.O. Box 2054, Riyadh, Saudi Arabia
E-mail: icwrae08@psipw.org; info@ramtan-expo.com

The 2008 APGC Symposium on 'Plant Metabolism, Air Pollution and Global Change: Plant Functioning in a Changing Global Environment'

7 - 11 December 2008; University of Melbourne,
Australia
Website: www.apgc.eu

EUROGARD V

Fifth European Botanic Gardens Congress Botanic Gardens in the Age of Climate Change

8-12 June, 2009; Helsinki, Finland
Contact: EurogardV@luomus.fi
Website: www.Luomus.FI/EurogardV

The 5th World Environmental Education Congress

10 - 14 May 2009; Montreal, Canada
Contact: 5weec2009@jpdll.com

9th International Plant Molecular Biology Congress

25-30 October 2009; St. Louis, MO USA
Contact: ipmb2009@missouri.edu
URL: www.ipmb2009.org

BOOKS



Handbook of Plant Science

(2 Volumes)
Edited by Roberts, K.
John Wiley & Sons 2007
Price: £ 250.00

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Proceedings of the NATO Advanced Advanced
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23-26 May 2007
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