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NESA

NATIONAL ENVIRONMENTAL SCIENCE ACADEMY

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FIRST ANNONVEMENT

Department of Biotechnology, Jamia Millia Islamia, New Delhi
in collaboration with the
National Environmental Science Academy (NESA)
is going to organize a grand event

National Conference on Biotechnology and Environment (NCOBE-2017)

as per the following details:

Date: 10-11 April 2017
Venue: **Department of Biotechnology, S. Ramanujan Block**
Jamia Millia Islamia, New Delhi-110025

The gathering would be addressed by **Prof. M. S. Swaminathan, Dr. Girish Sahni (DG CSIR) and Dr. Shahid Jameel (CEO Wellcome-DBT) at Inaugural.**
Many honorable eminent Scientists have already confirmed for their expert talks

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Report of National Conference
on

FOOD SECURITY ISSUES AND ENVIRONMENTAL CHALLENGES FOR INDIAN AGRICULTURE IN THE NEXT DECADES

19-20 November, 2016

University Auditorium, Panjab University, Chandigarh

The **29th Annual Conference** of the National Environmental Science Academy, and **National Seminar on "FOOD SECURITY ISSUES AND ENVIRONMENTAL CHALLENGES FOR INDIAN AGRICULTURE IN THE NEXT DECADES"** was held at the University Auditorium, Panjab University, Chandigarh on **November 19-20, 2016.**

The subject of sustainable environment and development has become very topical in recent years due to depletion and destruction of our resources base. Air, water, oil, food resources and minerals are the lifeline of modern age that need to be protected and conserved. The use of clean technologies, and mitigation and adaptation to environmental changes play a crucial role in coping with threats posed by climate change, global warming and anthropogenic factors.

The conference was inaugurated by Prof. Devender Singh, Registrar, Punjabi University, Patiala. He underlined the importance of food security linked with environment for Indian Agriculture. Prof. Javed Ahmad, President, NESA, welcomed the Chief Guest and participants, and apprised them of various activities undertaken by the Academy.

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Dr Laxman Prasad, Former Director, DST, Govt of India, New Delhi delivered the keynote address on "Water Availability in 2050: A Technological Challenge for Food security". He underlined the need to work together by all stake holders including scientists, policy makers, farmers, social scientists and NGOs to address the issue properly and effectively.

Prof. W. Rajendra, Former Vice Chancellor, Tirupati University talked on Genetically Engineered Baculoviruses Expressing Insect-selective Toxins for effective pest management to improve crop productivity for addressing issues on food security.

Dr. Ravinder Singh, Assistant Director, Ministry of Ayush in his invited talk highlighted the importance of Crop Diversification through Medicinal Plants Cultivation and Standardization.

Dr. N. Devakumar, Regional Coordinator, Organic Farming, University of Agricultural Sciences, Bangalore talked in length and width On Challenges and Opportunities in Organic Farming in India. He highlighted in his talk that if India could manage proper productivity of organically grown crops then it would be leader in production of safe to eat foods worldwide.

Prof. (Dr.) D. V. Rai, Vice Chancellor, Shobhit University, Gangoh, Saharanpur, UP also attended the conference as Guest of Honour.

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Dr. Dinesh Gupta of Amity University, Chandigarh discussed prospects of Digital Agriculture Marketing in Indian agriculture in much interested and convincing ways.

In all, about 25 papers were presented in two days on wide ranging topics like Food and Nutrition: New Frontiers and Opportunities; Agriculture Science in India: Technological Interventions and Innovations; Fertilizers, Pesticides and Agricultural Pollution: Challenges and Opportunities; Impacts of Global Warming and Climate Change; Sustainable Agriculture: Organic Farming; Science, Environment, Ecology and Economics. The Seminar Proceedings will be published after full papers are received from authors.

The Valedictory Session on November 20, 2016 was presided by Dr. Vinod Mittal, Managing Director of Dolphin College and Chief Patron of the Conference. The Guest of Honor Dr. Harish Srivathsa, Regional Director, Panchkula of National Center for organic farming, said that organic farming will rule the coming decades of agriculture in India and world. He stressed on the need to promote inter-disciplinary approach to agriculture, environmental issues, awareness programs independent research by young scientists.

Delegates from various universities and other centres from across the country spoke and deliberated on above mentioned issues. Various sessions were chaired by Prof W. Rajendra, Former Vice Chancellor, Tirupati University, Dr. KS Dadhich, Prof. K.P. Viswanatha, Vice Chancellor, Mahatma Phule Krishi Vidyapeeth, Maharashtra, Dr. Manish Mathur, Dr. B. Vijayalaxmi, Dr. N Devakumar.

'Life time Achievement Award' was conferred to Dr. Vinod Mittal, Managing Director, Dolphin (PG) College of Science & Agriculture, Chandigarh-Sirhind State Highway 12-A, Chunni Kalan, Fatehgarh Sahib, Punjab for his outstanding contribution in the higher education.

The Academy also honoured and conferred upon many scientists with 'Fellowship', 'Best Scientist' 'Eminent Scientists', 'Scientists of the Year', 'Environmentalist of the Year' and 'Junior Scientists' Awards for their respective achievements in the academic field.

The Seminar concluded successfully with a vote of thanks proposed by the Dr. SP Jindal, Principal of the College and Patron of the seminar to all sponsoring organizations for their financial assistance. He also thanked the delegates, speakers, guests, NESA Staff, Technicians and everyone who contributed to the success of the National Seminar.

The efforts of the NESA were highly appreciated by the host, guests and delegates.

(Prof. Ajay Kumar Gupta)
Chairman cum Organising Secretary


National Conference
on
Food Security Issues & Environment
Challenges for Indian Agriculture
in the next decades
19-20 November, 2016
DOLPHIN (PG) COLLEGE OF SCIENCE & AGRICULTURE

Canada Geese

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Canada goose (*Branta canadensis* L.) is one of the iconic species representing wild America; and is a native of the continent of North America. Canada goose is also a grand symbol of the Canadian life, nature and eco-environmental values and is being currently reviewed based on popular voting organized by the famous Canadian Geographic magazine as one of the top five contending species for being considered as the National Bird of Canada. This beautiful avian species has a trans-continental distribution with several sub species reported across North America.The geese are known to lay between 2-12 eggs depending on the seasonal weather patterns, quality of food supply and the level of predation of eggs and chicks by coyotes, foxes, badgers and raptors. The Canada geese are excellent parents and devoted partners raising their chicks together; and are known to be highly territorial and aggressive in defending their nests, eggs, chicks and roosting areas. They are predominantly dependent of aquatic vegetations, crustaceans, insects and also on grains and other available plant as parts for their regular diet. They are a gregarious species and usually like aggregating together on the ground in between their long and exhausting flights in massive flocks. The species are commonly visible in most water bodies, parks and agricultural fields across North America.

The "v-shaped" flying pattern of trumpeting and migrating Canada geese flocks are seen as one of the most well known and symbolic signs of the change of season across the range of this beautiful species. Many aboriginal communities in Canada consider this as a sign of good luck and fortune and there are numerous references of this majestic species in the form of folklore, legends, songs and indigenous stories and thereby constitute an essential part of the rich Canadian heritage from a sociological and historical perspective. The majestic species is consider to be an important symbol of the majestic wildlife and grandeur wilderness of the continent of North America as well as a dynamic symbol of the socio-ecological heritage of the world's second largest country, Canada. The highly organized flight pattern of the species represents strength, unity and solidarity among the flock members. It is a legendary, socio-cultural and eco-ethnic symbol of numerous aboriginal communities from the continent of North America stretching across the frozen North to the dry Southern reaches of the continent. The large water bird with its wide wings stretched flying over the head is a poetic representative of the free spirit of eco-environmentalism and the eco-friendly people of the continent. The Canada goose has been inscribed in a special Canadian1$ coin to commemorate the spirit of winter Olympic held in Canada and have regularly found places in the postage stamps of both US and Canada.

Photo credit: S. K. Basu

Agrotechniques for *Andrographis paniculata* (Burm. f.) - King of Bitters

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Ayurvedic name	Kalmegh, Bhunimba
Unani name	Kalmegh, Chirayita Desi
Hindi name	Kalmegh
English name	Creat
Trade name	Kalmegh
Parts used	Dried Leaves and Tender Shoots

Morphological Characteristics

It is an erect, annual herb and 30-90 cm tall with upper part of stem quadrangular while the lower part nearly rounded stem. Leaves are opposite sessile or subsessile, linear-lanceolate or lanceolate, 3-8 cm long, acute, glabrous or minutely puberulous beneath and base cuneate, margin slighty undulate.

Distribution

The species is a native of tropical South-East Asia and occurs throughout hotter parts of India.

Climate and Soil

The plant comes up well in tropical and subtropical regions all over India. It is a hardy species, therefore, can be grown in medium fertile sandy loam to clay-loam soils, possibly with irrigation. It can withstand partial shade of trees, say few hours, but it is cultivated in open fields.

Propagation Material

It can be easily raised through seed and vegetative methods. But in commercial cultivation, propagation through seed is easy and economical.

Agro-technique

This crop is grown during cooler climate and it remains for 120 days in field; usually, ratoon crop is also taken all over north India. Cooler climate helps plants in synthesizing more bitter ingredients.

Nursery Technique

- **Raising of Nursery:** Seeds are soaked in water for 24 hours and sown in the nursery beds in early September. About 650-750 gm seeds are required for raising nursery for one hectare of land. Nursery is prepared with soil, sand and organic matter in 1:1:1 ratio and sown in early September at 5 cm spacing in rows and it takes 8-10 days for germination to commence. Six weeks old seedlings are planted in field at 30X15 cm or 15X15 cm spacing. Direct sown crop is broadcasted thinly and has a seed rate of 1.5 kg/ha. It matures early, but nursery raising is preferred. For nursery beds, FYM @ 20 kg per square meter as basal dose is mixed in the soil.

Planting in the Field

- **Land Preparation and Fertilizer Application:** The land should be prepared well by repeated ploughing to make soil pulverized. For main field, FYM @ 20 t/ha is given as basal application. It is given NPK (75:75:50 kg/ha) in two split doses i.e. first at planting stage and second 40 days after plantation. Use of 5 kg *Azospirillium* + 5 kg Phosphobacteria per hectare has also given good results.
- **Transplanting and Optimum Spacing:** 10-25 cm long seedlings raised in the nursery beds during September are transplanted in the main field (after 6 weeks of sowing) at a distance of 30X15 cm between plant to plant and row to row.
- **Irrigation:** 4-6 light irrigations are required till harvesting the crop.
- **Weeding:** Since it is an herbaceous plant, the field should be free from weeds. Two to three weedings are essential during the crop season viz. at 20 days and 60 days after transplantation.
- **Disease and Pest Control:** It is a hardy plant and not attacked by any pest and disease.

Harvest Management

- **Crop Maturity and Harvesting:** The crop matures after 120 days of sowing. It is harvested when most plants are in bloom. It is at this stage, the plants should be uprooted. However, a small lot of healthy plants should be left in the field for seed production. When the fruits become mature, these should be picked up and dried in the sun and seeds are collected. The seeds should be kept in open sun for complete drying. After this, these are stored in air-tight containers for next sowing.
- **Post-harvest Management:** After uprooting the plant, first it should be dried in the sun for two days and afterwards in the shade. This properly dried material should be packed in laminated gunny bags, lest it absorbs moisture. The harvested dry material should be stored in dark, airy and moisture-free places.
- Viability of Seed: One year of storage from the time of harvest.
- Chemical Constituents: The leaves contain three bitter principles; deoxyandrographolide, andrographolide and neoandrographolide. These are also present in whole plant. The leaves should yield 2.5% chemical constituents on analysis.
- **Yield and Cost of Cultivation:** The yield (whole plant) is 2.5 t/ha. It has sizeable demand and yields a reasonable profit to the growers. It is commercially cultivated in several States of India. Rs. 25000/- is the cost of cultivation for one hactare.

Therapeutic Uses

The whole herb is bitter in taste and is source of several diterpenoids of which a bitter water soluble lactone "andrographolide" is important. The plant is bitter, acrid, cooling, laxative, antipyretic, antiperiodic, anti-inflammatory, expectorant, sudorific, anthelmintic, digestive and stomachic. It is useful in burning sensation, chronic fever, malaria and intermittent fever, inflammation, cough, bronchitis, skin diseases, intestinal worm, dyspepsia, flatulence, colic, diarrhoea, dysentery, haemorrhoids and vitiated condition of *pitta*. The plant is often used as a substitute for Chirayita (*Swertia chirayita*).

Geoinformatics in Monitoring Biodiversity

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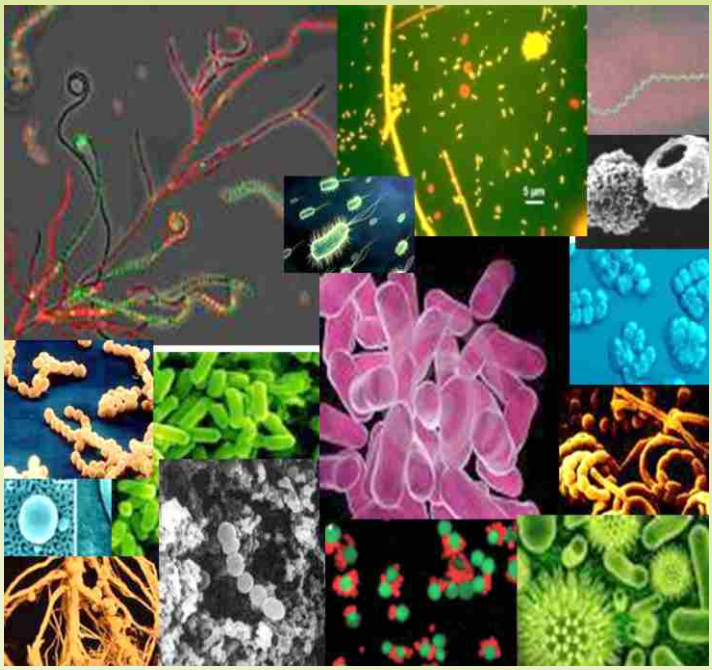
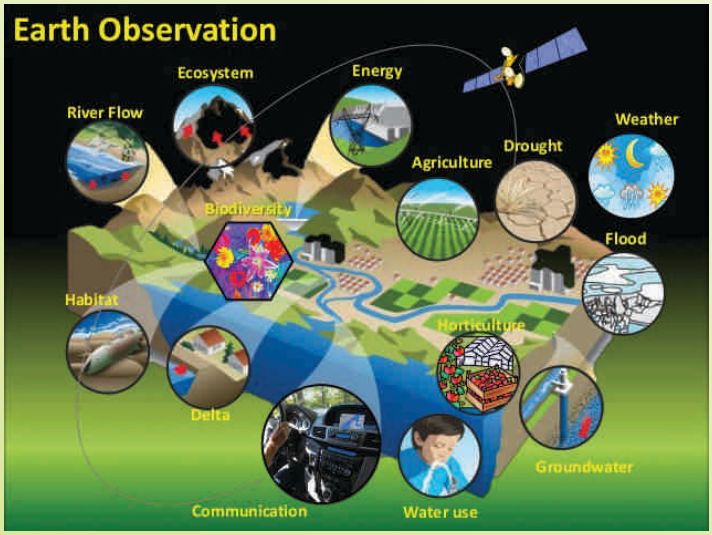


The loss of biodiversity is now becoming a global concern as it is greatly threatening ecological balance. Global changes threaten natural ecosystems that are collapsing and even completely disappearing. Their conservation is a priority to halt the biodiversity loss, and is currently assured by conventions and programmes that aim at maintaining and restoring natural habitats. In 1972, the Stockholm conference on the Human Environment highlighted the increasing concerns of human interference on the environment and finding ways to effectively preserve the existing biodiversity. The 'International Union for Conservation of Nature (1996) also stressed to maintain maximum plant and animal diversity through genetic traits, ecological functions and bio-geo-chemical cycles, as well as uphold aesthetic values. They further emphasized that most of areas are not complete ecological units or functional ecosystems in themselves. That's why they have experienced a range of managemental problems. The main problem is the gradual decline in plant and animal diversity. A new effort called 'ecosystem effort' is conceptualized to promote biological diversity and to prevent the loss of wildlife species and their habitats due to human interventions. Different management methods have to be used to keep them in a favourable state of conservation, like the control of the natural succession and of the physical structure of the vegetation. Management of biodiversity has stressed the necessity of having updated geo-spatial information for decision-making, and implementation of plans. Efficient management of biodiversity resources needs accurate and up-to-date information, especially time series data for decision making. The dearth of adequate and appropriate information is one of the key hindrances to biodiversity monitoring and management in many places of the world. The biodiversity data required to meet the conservation strategy must be consolidated in the form of spatial databases to allow interoperability and interconnection between networks. Developing technologies with more predictive capabilities could help the society to address some of the concerns affecting nature and biodiversity. The actual need of Geoinformatics lies here to address these vital issues. The term 'Geoinformatics' has been defined by several groups of workers in different ways around the world. In general, it is a tool as well as science of collecting, processing, analyzing, retrieving, transmitting, accessing, synthesizing, interpreting, distributing and disseminating of geo-information which encompasses remote sensing (RS), geographic information systems (GIS), and the global positioning system (GPS). Remote sensing, GIS and GPS are the most effective means for management and monitoring of our natural resources. Remote sensing plays definite role in biodiversity management because of its unique advantages of repetitive coverage, synoptic view, consistency, updated and near real time spatial information. Respective coverage from different satellites gives superb spatial database for future planning of biodiversity resources. Resource information system is the primary need for management of biodiversity and its valuable implementation is required. But, the trends show that we are following sectoral planning for



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management of most of natural resources including biodiversity and wildlife. The sectoral planning ignores the spatial realities mainly due to the unavailability of the reliable, up-to-date information. As a result, success is not coming up to the desired extent, mostly over, under or improper utilization at national, regional and local levels. In monitoring the biodiversity, maps of stock and working plan play a very crucial role, and these maps are updated at each revision of the arrangement. Geoinformatics has much scope in fulfilling these objectives, which take a lot of time while revising the management plan. Satellite remote sensing provides information with respect to vegetation type, forest cover, and their changes at different scales throughout the world. Some significant applications of Geoinformatics for biodiversity monitoring are updating and upgrading of stock maps and working plan; zonation of fire prone areas; planning response routes; habitat analysis; development plans for wasteland; management of protected area; analyzing suitable sites for afforestation (e.g. fuel & fodder plantations); areas and participatory forest; grazing land management; and Soil and water conservation.

The prospects for the use of geoinformatics in biodiversity mapping, management and monitoring are massive. However, their significance, mainly in developing countries, is still inadequate due to the shortage of proper scale of data, software, hardware, and expertise. A biodiversity monitoring system can be developed which integrates (a) a complete database of Biodiversity information of a particular area, (b) the methodology that permits assessing the key characteristics and the conservation status; (c) a web based geoportal to ensure interoperability and expanding the access to biodiversity spatial data, maps, metadata, web services and applications. Different kinds of data sources required for biodiversity monitoring system include, catalogues of organisms names, floras and faunas, habitats and plants species associations, land cover, soil, geology, topographic and administrative data, satellite or aerial imageries. A multidisciplinary team of GIS professionals, environment specialists, biology experts, real property accountants, environment authorities and community planners are needed. To simplify the field surveys a biodiversity mobile GIS application can be developed to update biodiversity geodatabase with real-time, more accurate spatial data speeding up analysis, display, and decision making. Usually, multi-criteria spatial analysis and modeling is done for regional vegetation analysis to define plant species distribution patterns in relation to biotic and abiotic site factors. The most complex part is to map the distribution of habitats. It can be done through GIS and image analysis of satellite or aerial data. There are two user defined functionalities: front end (the public side of the solution, available to any user interested in biodiversity) and back-end (the Species Research Institutes, biologists and any other specialists involved in the maintenance of this monitoring system). To access biodiversity spatial data, metadata, web services and applications a biodiversity web site can be developed for the interested users. Future research needs more realistic and dynamic management options for biodiversity in space and time. Since the ecosystems to be managed can be significantly affected by stochastic events and the responses of biodiversity are non-linear in form. So, management must be dynamic and desire to supply forecasts of

To,

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