Use of Holography in Modern Life

AK Agrawal, G C Poddar, Sushil Koura & DP Chachiya
Central Scientific Instruments Organisation, Chandigarh 160 030

Abstract

Any scientific concept or instrument discovered or invented by the scientists may be considered as a difficult subject till it is not presented in the simpler form. Besides, it is also a hurdle in the way of development. For example, photographic technique being presented in such a way that it became a part of life of the people all over the world. In photography a 2-dimensional image is formed. How surprising it will be if the image will be 3-dimensional and it may be seen in the air far from the surface, from all the directions. It is possible today. Due to the development of 3-dimensional photographic technique, known as Holography, it became true. In this paper, basic principles of holography, method of image recording of 3-dimensional image and its uses in modern life have been discussed.

A Study on Palaeobotany of Karanpura and Bokaro Coalfields

S M Singh & H B Singh
National Botanical Research Institute, Lucknow 226001

Abstract

The morphological and systematic investigations of plant fossils of Equisetales (*Equisetalean axes*), Filicales (*Neomariopteris*), Glossopterids (*Glossopteris, Gangamopteris, Palaeovittaria*), Euryphyllum, Cordaitales (*Pantophyllum=Noeggerathiopsis, Kawitzophyllum*), detached seeds of *Cordaicarpus* and *Vertebraria axes* from different Collieries of Barakar Formation (South Karanpura and Bokaro Coalfields) and from Talchir Formation (Rikba plant bed; North Karanpura Coalfield) have been described. Plant fossils assemblage of present study shows dominance of *Glossopteris* species (among 32 species 3 are new), one new species of *Pantophyllum* and two new species of *Kawitzophyllum*.

As these two coalfields are relatively less important for their coal deposits, not enough attention has been given to palaeobotanical studies of the coal-bearing sediments in these areas. The present study has therefore been undertaken to update the data base on plant megafossils from the Permian sediments associated with coal seams in the Karanpura (North and South) and Bokaro (West) Coalfields.
Characterisation of Natural Resources of Deolikhan Water Shed

Ravinder Kaur1, J.S. Rawat2, Shiv Prasad1, Om Vir Singh1 and Geeta Rawat2
1Environment Science Division, Indian Agricultural Institute, New Delhi
2Department of Geography, Kumaon University Almora, Uttrakhand

Abstract

Presently the country is facing with the problem of population explosion. In order to meet the ever-increasing demands of increasing population, in both mountainous and plain areas, there is an urgent need to increase agricultural production as well as productivity. With the evolution of the process of planning in the fragile (mountainous) ecosystem, currently the emphasis has been on decentralized planning to smaller area units (i.e. micro – watershed, district or below). This is to facilitate developmental strategies that are sustainable, area-specific and take into account the local needs and the problems. Inter-relation and inter-dependence between various sectors make such decentralized planning of micro level a complex and information sensitive task, involving a large matrix of sectoral data on the local natural resources and requiring appropriate methodologies for data collection, analysis and processing. The present study demonstrates the collection, processing and application of this local level data on natural resource for understanding the land and water related problems of a representative (Deolikhan) micro-watershed in Almora district of Uttaranchal state. For this, land use related information comprising of present land use, land management practices, cropping pattern, irrigation practices, fertilizer applications and their use-efficiency etc along with the soil and hydrologic data were collected from the test site. The land use data was obtained by means of a primary survey of the local farmers through a questionnaire while the hydrologic data was obtained, at regular time-intervals, through in-situ gauging stations. Besides this, soil samples collected from different sampling sites within the test watershed were analyzed and digitized in Arc/Info GIS package for obtaining soil property based maps of the test area. The above effort could thus very lucidly demonstrate the use of such studies in proposing developmental plans and effective solutions to the local level problems by the agricultural specialists and decision or policy makers.

Study of Heterosis and Combining ability in Cuphea procumbens

Meenakshi Singh & Sant Prasad Singh
Department of Genetics & Plant Breeding
National Botanical Research Institute, Lucknow 226001

Abstract

Six genotypes of Cuphea Procumbens, rich in capric acid (C10:0) were hybridized in half diallel fashion to study the combining ability and heterosis for plant spread, primary branches and secondary branches/plant Gca and sca variances were significant for all the characters though high gca variance for primary branches and secondary branches/plant indicated the prevalence of additive gene action while high sca variance indicated the dominance gene action for plant spread. Parent NBC-30 was found
significantly superior combiner for all the characters. The crosses NBC-25 × NBC-30 and NBC-01 × NBC-25 showed significant specific combining ability for all the 3 characters, while hybrid NBC-25 × NBC-30 exhibited significant sca effect for plant spread and secondary branches/plant. The heterosis over better parent was noticed upto 36.8 percent for plant spread, 20.8 percent for primang branches 20.46 percent for secondary branches/plant. in general hybrids showing high heterosis had also high per-se performance.

**Genetic Study of Plant Spread in *Cuphea procumbens***

Sant Prasad Singh & Meenakshi Singh
Department of Genetics & Plant Breeding
National Botanical Research Institute, Lucknow 226001

**Abstract**

Six parents half diallel of *Cuphea procumbens* was made and 15 each F₁, sand F₂, s along with 6 parents were evaluated to study the genetics of plant spread. Non-significant2 and significant regression coefficient from zero (B-O) showed that the assumptions of diallel analysis are fulfilled and additive dominance model is an adequate description of data. The high value of over-dominance obtained by \((H/D)\frac{1}{2}\) and \((s/s/g)\frac{1}{2}\) and regression line cutting below Wr axis indicated the prevalence of over-dominance in both F₁ and F₂ generation. Parent 3 and 4 possessed maximum dominant alleles in both the generations. The pattern of parental order of dominance was almost same from Wr-Vr graph and standard deviation graph. On the basis of per-se performance and heterosis hybrids 1 × 3, 5 × 6 and 1 × 5 were best indicating that hybrids may be selected on the basis of per-se performance. The maximum heterosis of 36.8% was noticed in cross 1 × 3. Considering the gene actions involved, the recurrent selection followed by bi-parental mating may be adopted to genetic upgradation in plant spread.

**Bio-fuel Ethanol: An Important alternative to Mineral Oil**

K.K. Tiwari
Central Fuel Research Institute
P.O.FRI, Dhanbad-828108

**Abstract**

Ethanol is considered to be an attractive for replacing gasoline as a motor fuel. It can be produced from various cellulosic wastes such as sugar cane bagasse, wood/saw dust, municipal solid wastes etc. These types of biomass are comprised primarily of cellulose, hemi-cellulose and lignin. Carbohydrates account for about 50-70% and lignin accounting for approximately another 20%. The enzymatic biomass-to-ethanol process constitutes mainly four basic steps - Pretreatment, Enzymatic hydrolysis, Fermentation and Recovery of Ethanol. The R&D pursued, current status of the technology and strategies planned in various countries for commercial exploitation of the process have been described.

India with its vast agricultural, forestry and urban wastes resources, has an excellent opportunity and potential to explore R&D in the newly emerging field of bio-ethanol technology. Commercialisation of bio-ethanol process, apart from providing an alternative to petroleum based fuel for the transportation sector, is an important strategy in addressing environmental issues.
Effect of Spacing and bulb size on Growth and Floral Yield in *Poliantha tuberosa* var. Single and its Techno-economics under Lucknow Conditions

A K Dwivedi, B K Banerji, V N. Gupta and S K Datta
Floriculture Section
National Botanical Research Institute Lucknow-226 001

Abstract
The effect of spacing used for plantation and diameter of bulb - two physical parameters on flowering behavior in *Poliantha tuberosa* Single tuberose have been studied. Bulbs of three different sizes were planted at two different spacing, of 20 and 25 cm apart. Data were recorded on various vegetative and floral characters for further assessment. Bulb size with diameter of 2.5 cm or above planted at 25 cm apart was found to be most suitable for early flowering and best quality of spike.

Study of Growth and Biomass Production of some Fuel-wood Species in Northwestern Himalaya-Palampur under Short Rotation High Density Plantation

Gopi Chand
Institute of Himalayan Bioresource Technology, Palampur (H.P.)

Abstract
The growth and biomass production of some fuel-wood species, found locally as well as exotic, were studied under short rotation high-density plantation under the agroclimatic conditions of Palampur in the northwestern Himalaya. Observations at 3 years after planting showed that the significantly highest vertical growth rate was exhibited by *Grevillea robusta* followed by *Jacaranda acutifolia* and *Eucalyptus* hybrid. Significantly highest radial growth was attained by *Bauhinia variegata* followed by *Eucalyptus* and *Grevillea*, after 36 months. The different spacings of the trees had no significant effect on vertical and radial growth. The lowest dose of NPK fertilizers, i.e. 50:25:25 kg/ha, produced the highest vertical and radial growth rate. In the interaction studies (species’ spacing), between the species *G. robusta*, *J. acutifolia*, *Eucalyptus* and *B. variegata* produced significantly highest vertical growth in comparison to *Populus deltoides*, which was considered as the check species.
Studies on Regeneration of Bougainvillea by Stem Cuttings with the aid of Auxins under Intermittent Mist

V N Gupta, B K Banerji & S K Datta
National Botanical Research Institute, Lucknow 226 001

Abstract
Semi-hardwood cuttings (15 cm length) were taken from vigorous shoots of gamma ray induced mutant of bougainvillea cv Pallavi and Mahara variegata were treated with Indole-3-butyric acid (IBA) and naphthalene acetic acid (NAA) each at 0, 1000, 2000, 3000, 4000 and 5000 ppm by quick dip (10 s) method. The cuttings were planted in 6” pots filled with coarse sand and kept under glass roofed mist chamber for rooting. IBA 4000 ppm induced maximum rooting (90.00%) and survival (78.00 to 88.90%) in both the cultivars. This concentration was also helpful in producing greater number of roots and longer root length per rooted cutting than treatments with NAA but thickness of root was not affected by IBA and NAA concentrations.

Floriculture in Barren Land - An Experiment

R Shukl, R K Pandey, Talevar Singh & S K Dutta
Floriculture Laboratory
National Botanical Research Institute, Lucknow 226001

Abstract
Due to population explosion, culturable land is decreasing fastly. Therefore, it is necessary to select such varieties of plants which can thrive on waste and user land. Due to increasing popularity of floriculture, three varieties of ornamental plants ie Gladiolus, Narcissus and Marigold have been selected to grow in garden soils and Auravan fields for comparative study. By the study of physical and chemical properties of the soil, taken from both these places, it is clear that soil from Auravan is alkaline. Marigold and Gladiolus (sp. White Prosperity) showed satisfactory results in plant growth and production. This type of study of salt tolerant species of ornamental plants will give a new direction to floriculture.
Gamma Ray Induced New Flower Colour Chimera and its Management through Tissue Culture

A K Dwivedi, B K Banerji, Debasis Chakrabarty, A K A Mandal & S K Datta
National Botanical Research Institute, Lucknow 226 001

Abstract

Mutation breeding is an established method for crop improvement and gamma radiation has been successfully used for the development of new flower colour/shape mutants in Chrysanthemum. The main bottleneck in mutation breeding of vegetatively propagated plant is the formation of chimera. The present experiment was conducted to induce flower colour mutation in Chrysanthemum cv. Lilith through gamma irradiation and to apply tissue culture technique for management of chimera.