

access-blocking restrictions of paper distribution, there is no longer any need to be constrained by the impact-blocking financial fire-walls of Subscription/Site-License/Pay-Per-View (S/L/P) tolls for this give-away literature that its authors have always donated for free (and its referees have refereed for free), with the sole goal of maximizing their impact on research (by accessing the eyes and minds of fellow-researchers) and hence on society. Generic interoperable (OAI-compliant) software is now available for institutions to install, so their authors can self-archive their refereed papers publicly in Auto-Archives (<http://www.eprints.org>) for free. This will usher in the optimal and the inevitable: Journal publication will down-size to just implementing the service of Quality-Control and Certification (QC/C, through peer review and editing), which will be paid for up-front at the author-institution end, out of only a small portion of the annual savings from the cancellation of all S/L/P tolls at the reader-institution end. Journal publishers are best advised to prepare for and accommodate the optimal/inevitable solution for science in the new era of 'Scholarly Skywriting', rather than try to delay or block it via restrictive submissions and copyright policies that merely amplify the conflict of interest inherent in the revolutionary possibilities for scholarly and scientific communication, opened by the Post-Gutenberg Galaxy.

Aparna Basu (NISTADS, New Delhi) and Subir Sen (Calcutta University) gave talks in the area of scientometrics, an area in which Garfield has played a central role. Basu suggested the creation of bibliographic and full-text databases

of Indian science. Such databases are not only important for research evaluation, but are also a memory bank for increased cohesiveness. Sen attempted to model the citation process, indeed a difficult task. In an overarching effort Sen attempted to synthesize the ideas of Gerald Holton (themata), Richard Dawkins (memes) and Leo Egghe (IPP).

Three papers were concerned with the use of information in medicine, government and industry, respectively. V. Mohan (M. V. Diabetes Specialities Centre) spoke about the development of an electronic database on diabetic patients' history and medical records that his group had created in collaboration with a Danish group and showed how such data could be of immense use in designing large-scale programmes to deal with growing incidence of diabetes. S. Vaithianathan (Larsen & Toubro Ltd, Chennai) gave an account of how a small group of librarians could support the technical staff of a major engineering and construction company. V. S. R. Krishnaiah (National Informatics Centre, New Delhi) discussed the steps being taken in India to bring about greater transparency in governance through creation of databases based on government information such as land records.

The conference ended with a panel discussion. Harnad emphasized that Open Archives (or self-archiving) can solve at once, both the problem of inadequate access to information and poor visibility of work done in developing countries. He urged India to take up Open Archives initiatives. Gilchrist said that there is much confusion in what is meant by information. He said that with all the new arrivals – Internet, the World Wide Web, knowledge manage-

ment, etc. – one has realized the importance of the basic tools of the librarian's trade, viz. classification, cataloguing and organizing large collections. He stressed the need for information professionals to adapt themselves to the changes that are taking place. Sunder Singh listed the different initiatives DSIR and NISSAT have taken and told that NISSAT was keen to work together with scientists and information professionals.

The conference is likely to lead to self-archiving by many Indian scientists and the establishment of an Open Archives server in India.

The conference recommended that: (i) Communication between scientists, technologists and industrialists, and between science administrators, sociologists and economists be strengthened through such means as improved information and communication technologies, social networks, collaboration between academia and industry, incentives to work on applied research, and introduction of specialized gateways on the Internet; and (ii) Self-archiving (of preprints), with OAI compatibility, by both individual scientists and institutions be encouraged and facilitated.

It is clear that the government has a powerful role to play in all of these initiatives, and in devising and supporting a national information policy to advance such initiatives.

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Himalayan Biodiversity 2000: Options for development*

In order to take stock of existing knowledge and gaps on biodiversity-related issues and to maintain a continuum in

interaction among various stakeholders on the subject matter, a three-day National Workshop on 'Himalayan Biodiversity 2000: Options for Development' was organized. Information management, recognition of interface between scientific research and peoples' interest, disseminating packages, peoples' participation, policies and implementation were major issues addressed during the workshop. These issues were broadly

categorized into the following objectives: (i) to develop information management systems catering to scientific community and stakeholders; (ii) to develop state-of-the-art methods and approaches for assessment and maintenance for evolving sustainable use strategies; (iii) to develop approach of biodiversity conservation compatible with development; (iv) to involve stakeholders in better understanding of poli-

*A report on the three-day National Workshop on 'Himalayan Biodiversity 2000: Options for Development', organized by Conservation of Biological Diversity Core Group of the G. B. Pant Institute of Himalayan Environment and Development at Kosi-Katarmal, Almora during 2–4 November 2000.

cies and programmes, especially those related to IPR regimes; (v) to develop dissemination packages as awareness material for community groups and stake holders.

In all 51 experts (representatives of Community Groups, NGOs, scientists, academics, bureaucrats, forest managers and research students) belonging to 43 institutions participated and presented their findings in nine technical sessions and interacted intensively in group discussions.

In Technical Session I (Information Management), V. B. Mathur (WII, Dehra Dun) presented existing knowledge on database management, quoting examples on Integrated Protected Area Network (IPAN) and Forest Management Information System (FMIS). This was followed by a presentation by Vishnu Chandra (NIC, New Delhi) who said that spatially referenced database will be digitally available for wider access and usage in the near future and proposed the establishment of National Biodiversity Information Facility (NBIF). He also introduced the concept of Geographical Information Communities (GICs) that are formed by the people, organizations and agencies outside project world to share information. The last speaker of this session, Sanjay Singh Gahalout (NIC, New Delhi) stressed on effective co-ordination between the subject experts and IT specialists for enhanced quality of database development. In the Himalayan context he indicated that efforts are on to launch a database on Species Identification System and another for Biosphere Reserve Planning.

In Technical Session II (Inventories – Fauna), B. D. Joshi (Gurukul Kangri University, Haridwar) reviewed the fish fauna in Jammu and Kashmir, Himachal Pradesh (HP) and Uttaranchal followed by Farah Ishtiaq (BNHS, Mumbai) who briefed on bird species that are under global threatened category, biome-restricted assemblages and congregations. Ipe M. Ipe (St. Johns College, Agra) dwelt on entomofauna of the Himalaya from 1848 onwards with special reference to high altitudes of north-west Himalaya. He informed that the group Hymenoptera (215 species) is responsible for regulating pollination in timberline zone of north-west Himalaya.

In Technical Session III (Inventories – Area), A. K. Kaul (Jammu University, Jammu) reviewed the progress

in development of biological inventories in Jammu and Kashmir. He emphasized the need to initiate inventorization of endemics and lower plants. This was followed by a documentary (N. S. Chauhan; Y. S. Parmar, UHF, Nauni, Solan) describing floristic diversity and medicinal wealth of Himachal Pradesh. Information on biodiversity of Sikkim was presented by A. S. Chauhan (BSI, Sikkim) who provided detailed analysis of flora and fauna with a focus on importance of Rhododendrons of the state.

In Technical Session IV (Inventories – Flora), D. K. Singh (BSI, Dehra Dun) dealt with the existing information on wild plant biodiversity across the Himalaya. He felt the need for intensive inventorization of nonvascular plants, wetlands and protected areas. An illustrative presentation of the pteridophytes of the Himalaya was made by S. P. Khullar (Punjab University, Chandigarh) highlighting the points of conservation interest. M. P. Sharma (Punjab Univ., Chandigarh), while providing an overview of fungal flora, expressed concern on shortage of fungal taxonomists. On agrobiodiversity in the Himalaya, J. C. Rana (NBPGR, Shimla) mentioned that the depletion of crop species was mainly due to better access to modern means of livelihood, lack of awareness, inadequate technical understanding of the subject and out-migration in the hills. Virendra Nath (NBRI, Lucknow) who emphasized the need for constitution of a Task Force to facilitate the inventorization of bryoflora reviewed Himalayan bryodiversity. R. D. Khulbe (Kumaun University, Nainital) spoke on diversity of water molds in Kumaun Himalaya and stressed the need for conservation of the subtropical region, which supports rich diversity of water molds. D. K. Upreti (NBRI, Lucknow) who stressed the need to conserve lichen-rich habitats, reviewed lichen flora of the Himalaya.

Speaking on Central Himalayan Ecosystems (Technical Session V – Assessment and Maintenance), S. P. Singh (Kumaun Univ., Nainital) presented an overview on richness of diversity and major threats to biodiversity. He was of the opinion that social concerns must be kept in mind while developing strategies for conservation. At species level, Uma Shankar (GBPIHED, NE Unit) described various approaches in assessing biodiversity.

The review reflected that western Himalaya is better understood than the eastern region at this level. R. D. Singh (VIPKAS, Almora) briefed on the role of soil constituents in enriching biodiversity and bioproductivity. Application of Remote Sensing and Geographical Information System in biodiversity assessment was reviewed in detail by P. S. Roy (IIRS, Dehra Dun). He informed that a beginning has been made to create a spatial database based on authentic published information on IUCN Red Data Book species. R. N. Gohil (Jammu Univ., Jammu) spoke on the efficiency of cytological investigations for assessing variability among populations and was concerned that such studies have not advanced beyond knowing chromosome counts. Malathi Lakshmikumar (TERI, New Delhi) provided a detailed account of the use of molecular techniques for the genome characterization and conservation of genetic resources. She emphasized on the need to identify molecular markers for prioritization. R. D. Singh (IHBT, Palampur) who delved on the importance of the issue for import substitution and supply of raw materials presented details of *ex situ* conservation of important plants. Role of plant tissue culture in biodiversity conservation was presented by L. M. S. Palni (GBPIHED, Almora) who focused on mass multiplication, long-term storage, disease-resistant plants and cloning of novel genes.

D. S. Bhakuni (CDRI, Lucknow) in Technical Session VI (Biodiversity Use Strategies) highlighted the importance of promoting biological screening of Himalayan medicinal plants. He informed that of all the medicinal plants screened so far, 90 plant species showed anti-cancer activity, 86 antiviral, 40 each anti-inflammatory and antifertility and 219 diuretic. A. Banerji (RRL, Thiruvananthapuram) spoke on emerging trends in natural product research and K. S. Khetwal (Kumaun Univ., Nainital) focused on anti-cancer properties of genus *Bupleurum* and anti-inflammatory and anti-diuretic xanthenes of genus *Swertia*. Progress of work in ethnobotany was reviewed by P. B. Singh (RRIAS, Tarikhet, Ranikhet) which was followed by a presentation on enumeration, bioproductivity, ecophysiology and utility index of multipurpose tree species of the Himalaya by A. R. Nautiyal (HAPPRC, H. N. B. Garhwal University, Srinagar).

MEETING REPORTS

On Biodiversity, Economics and Protected Areas (Technical Session VII), H. C. Pokhriyal (H. N. B. Garhwal University, Srinagar) highlighted the need to include income generation activity in biodiversity-related studies and proposed a development model for Uttarakhand. Sanjeeva Pandey (Forest Department, HP Government) talked about Women Saving and Credit Groups initiative for conservation and management of biodiversity in protected areas. Sameer Sinha (Forest Department, Uttar Pradesh Government) related biodiversity conservation with ecodevelopment in Uttar Pradesh and focused on the role of women in this activity. S. S. Samant (GBPIHED, Almora) spoke on the role of Lead/Coordinating Institutions in conservation and management of biodiversity of the biosphere reserves.

On Peoples' Participation (Technical Session VIII), Ashish Kothari (Kalpvriksh, Pune) dwelt, at length, on some success stories from Himalaya where conservation and natural resource management have yielded rich dividends. Sejal Worah (WWF-Asia/Pacific, Mussoorie) focused on strengthening linkages between conservation and livelihood and opined that attempts be made to enhance benefits from biodiversity. Shyamala Krishna (CEE, Delhi) while speaking on conservation through education, came up strongly with the need to promote involvement of school

and college students in conservation programmes. Ashwini Chhatre (Navrachna, Palampur) dealt with community-led initiatives in the protection and management of forests in HP. Training and awareness modules for biodiversity conservation were presented by Abdes Ghangwar (CEE, North East Regional Cell, Guwahati) and finally Indira Khurana (CSE, New Delhi) spoke on the role of campaign strategies to bring out appropriate changes in biodiversity conservation programmes. She opined that political, financial, technical, social, cultural and knowledge, capitals are prerequisites in mass movement programmes, including biodiversity conservation.

Convention and IPRs (Technical Session IX) was dealt with in detail by A. K. Ahuja (Government of Rajasthan) who highlighted major objectives of the Convention and stressed that dissemination of information was important and could be achieved through collation and compilation of existing work in standard formats. Finally, Ashish Kothari (Kalpvriksh, Pune) spoke on National Biodiversity Strategy and Action Plan (NBSAP) process. He opined that this process would identify issues and problems related to Himalayan biodiversity as well. He also felt that the country needed effective documentation to prevent patents, protection of documents

through copyrights and registration of innovative patent systems.

The group discussions, which followed technical sessions, identified key issues under various themes to be taken up on priority. These were further discussed in a final round of group discussions to facilitate the identification of Action Points. Action Points thus finalized will become the basis for the preparation of an Approach Paper on Himalayan Biodiversity.

Among others, K. C. Malhotra, Lalit Pande, S. P. Kulrestha, S. Bhattacharya, E. Sharma, Bansuri Taneja, David Hopkins, James Khargonkar, Shalini Shrivastava, Smita Chaudhary and Lalit Tewari actively participated in Technical Sessions and Group Discussions in various capacities.

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SCIENTIFIC CORRESPONDENCE

High regenerative nature of *Paspalum scrobiculatum* L., an important millet crop

Coarse cereals (millets) have the potential to provide food and nutrition as well as ensure sustainability of poor farmers in fragile ecosystems. *Paspalum scrobiculatum* L. (Kodo millet) is an important millet crop cultivated almost throughout India. It forms an important component of dry land, tribal and hilly agriculture. It is recommended for diabetic persons as a substitute for rice and has medicinal and insecticidal properties, which are uncommon and relatively unknown to modern societies¹. Therefore genetic improvement of this

crop will have a great effect on the socio-economic status of the people in the rural areas, where it is widely cultivated. The application of the biotechnological approaches to the Gramineae relies on the availability of reproducible and reliable regeneration procedure. Mostly plants have been regenerated through somatic embryogenesis from several explants of many graminious species². Morphogenetic responses gradually decline with increase in the age of the culture and number of subcultures³. Establishment, selection and

preferential culture methodology of embryogenic callus have been recognized as critical factors in long-term morphogenetic potential in cultures. Most of the transformation procedures published recently, have relied on inducing long-term morphogenetic potential after repeated subculture, and it is critical for successful transformation. The higher transformation rates are likely due to the induction of long-term morphogenetic callus⁴. There are a few reports of somatic embryogenesis of the genus *Paspalum*, that include