

capacity of a member of the BSG. During the BSG meetings, he as the co-chair of the South Asian Brown Bear Expert Team presented an update regarding the constitution and work carried out so far. **Contact: ssk@wii.gov.in**

Attended International Workshop on 'Environmental Toxicology and Waste Management with Special Reference to Hospitals of Northern India', New Delhi, December 2-4, 2006. Dr. Pranab Pal attended this international workshop held at the Convention Centre of Jamia Hamdard University, New Delhi. It was organised by National Environmental Science Academy (NESA), New Delhi in collaboration with the Department of Medical Elementology and Toxicology of Jamia Hamdard. It was sponsored by Indian Council of Medical Research (ICMR) and Council of Scientific and Industrial Research (CSIR), New Delhi and Jamia Hamdard, New Delhi. Dr. Pal presented a paper in the workshop. About forty five participants attended the workshop. **Contact: ppal@wii.gov.in.**

Regional Workshop on "Policy Priorities for Sustainable Rangeland Management in Hindukush Himalaya", Kathmandu, Nepal, December 4-7, 2006. Dr. S. Sathyakumar participated in the regional workshop which was organized by the International Centre for Integrated Mountain Development (ICIMOD), Nepal, in association with UNDP Regional Centre in Bangkok and World Initiatives for Sustainable Pastoralism (Nairobi). It was aimed at providing rangeland policy makers from Afghanistan, Bhutan, China, India, Nepal and Pakistan with an opportunity to better understand and exchange information on rangeland policy that would help provoke thought for future actions. The objectives of this workshop were: (i) identification of policy priorities for sustainable rangeland management in the Himalaya, and (ii) to develop country-wise plans for addressing rangeland policy priorities in their own context.

Dr. Sathyakumar made a presentation entitled "Alpine Rangelands and Wildlife Conservation: Development of a policy framework for sustainable livestock grazing in the Himalaya" in the Rangeland Ecology session. A group

work on Rangeland Policy Priorities and Follow-Up Actions was conducted on 06.12.06 in which Dr. Sathyakumar along with a few colleagues representing India developed a Policy Priority and Action Plan for India. It was presented as a country report during the last day of the Regional workshop. He participated in all the deliberations of the workshop and interacted with policy makers and biologists from other south Asian nations regarding the development of a Rangeland Policy Priority and Action Plan. **Contact: ssk@wii.gov.in**

WII in the Field

Diversity of Predaceous Cicindelidae (Tiger beetles) in Relation to Bioindication and Ecological Importance - Observations from Shivaliks, Himachal Pradesh

- Vinay K. Bhargav,
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Tiger beetles are predatory ground beetles belonging to the family Cicindelidae (Sub Order: Adephaga) of the largest known order of insects the Coleoptera. Large, prominent compound eyes and eleven-segmented, filiform antennae characterize adult tiger beetles. Tiger beetles feed on small insects and other arthropods. The adults are active, mobile predators that search and hunt for prey in open areas. The larvae, however, are peculiar among beetles and, unlike the adults, are waiting (ambush) predators. A tiger beetle larva constructs a burrow and waits at the burrow's entrance, blocking the opening with its large, sclerotized head. When a suitable prey item passes close enough, the larva jumps out and grabs the prey with its long, sickle-shaped mandibles. Hooks on the dorsal surface of the fifth abdominal segment can dig into the side of the burrow, thus preventing the larva from being pulled out by large or particularly active prey. Larvae retreat down their burrows rapidly when disturbed, and can be quite a challenge to collect. Depending on the species, the spring/fall life cycle generally takes 2 to 4 years to complete. In summer species, adults emerge from pupae in the early summer and are active during the summer months. They mate and lay eggs during this time. Larvae hatch in the fall,

develop burrows, and hibernate for the winter. The summer life cycle generally takes 1 or 2 years to complete.

Tiger beetle species differ greatly in habitat preference. Some prefer soils with high clay content while others prefer sandy soils. Some like moist environments while others like it dry, found along roads and open paths in moist deciduous woodlands where sunlight can penetrate. Temperature is very important to tiger beetles; they are most active (unlike Carabids) on warm, sunny days. A few species of adult tiger beetles are attracted to lights. Entomologists feel that it is only the more "advanced" species that fly to lights. The beetles actually come to the light to feed on other insects attracted to the lights. It is interesting to note how the beetles' behavior differs between daylight hours and night time. Thus, employing a light trap helps to capture many species that cannot be approached during the daylight hours. Tiger beetles have definite habitat preferences. Many species inhabit sandy areas such as riverine areas, sand dunes, sand pits, and sand "blowouts" (often far away from water), even some are arboreal.

Several species of tiger beetles may inhabit the same area. According to Gause's law of competitive displacement, species with identical ecological niches cannot coexist in the same habitat for a long period of time (DeBach 1966). However, within a given area many species of tiger beetles do



Tiger beetle Larvae



Calomera chloris

often coexist. However, they are spared from direct competition in two ways. First, species occupy different microhabitats (e.g., soils with different moisture levels, textures, salinity, and vegetation/plant cover). Secondly, many species have different times of emergence and peak populations. The combination of these two types of segregation provides for nearly complete separation among most species, and considerably reduces the competition. Selection of the breeding, or larval, habitat is critical and is made by the adult female during oviposition. Because the larvae are relatively immobile and the habitat requirements are more circumscribed than that of adults the availability of larval habitat is often the limiting factor that controls their population. When an area of larval habitat becomes endangered or disappears, so does the species it supports. Studies have also shown the predatory potential of tiger beetles on the pests of agricultural crops like paddy indicating potential role as biocontrol agents.

There are over 2600 species of tiger beetles worldwide, 220 in India (with 114 or 51.8% endemics). In the protected areas of Shivalik Landscape, about 20 species of tiger beetles were recorded from five different protected areas of Himachal Pradesh with a mean altitude of 350 m to 1200 m above msl viz., Pong Wetland Sanctuary, Naina Devi Wildlife Sanctuary, Nahan Reserve Forest, Renuka Wetland Sanctuary and Simbalbara Wildlife Sanctuary. The

various species include *Calochroa bicolor*, *Calochroa flavomaculata*, *Calomera angulata*, *Calomera plumigera*, *Calomera chloris*, *Cosmodela intermedia*, *Cylindera spinolae*, *Cylindra bigemina*, *Cylindra grammophora*, *Cylindra subtilesignata*, *Cylindra venosa*, *Heptodonta pulchella*, *Ifasina viduata*, *Jansenia chloropleura*, *Jansenia crassipalpis*, *Lophyra striolata*, *Myriochila melancholica*, *Myriochila undulate*, *Neocollyris saphyrina*, *Neocollyris bonellii*. These species showed a high degree of habitat specialisation and were found in one or few microhabitats owing to their climate and trophic characteristics. These in turn form the prime character for a bioindicator taxon and for which tiger beetles are well known. Therefore, monitoring these species in future will necessarily give precise idea about changes in microclimatic conditions, if the anthropogenic disturbance increases. Tiger beetles also provide a background for identifying centers of species richness and abundance within the protected areas as their spatial abundance correlates with other vertebrate taxon such as birds and invertebrate taxon such as butterflies. Tiger beetles are thus excellent candidates for bioindicators in long-term monitoring of forest ecosystems, ecosystem health and its application measurement in a variety of landscapes.

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Acquisition of e-Resources: A Consortium-based approach for MoEF Libraries

- M.S. Rana

Introduction: In the era of digital libraries, web-based electronic databases have become important resources for education and research. Such databases provide functionality and ease of use as compared to print products. There has been a gradual trend towards an increase in use of electronic resources in general and electronic journals in particular. So, libraries are retaining limited print-based resources, and are shifting to electronic media so that they can adapt to in the new digital information environment. E-journals are becoming increasingly in demand as these offer a variety of benefits to libraries and end users such as - allows remote access; can be used simultaneously by more than one user;

accessible at a 24x7x365 formula; and save physical storage space.

Electronic Journals: E-journals have opened up many exciting opportunities and potential in education and research. As defined by David Pulinge and Brain Shakel, 'e-Journals are those whose text material are directly entered by file transfer from, a computer or by other transfer mechanism in a machine readable form, whose editorial processes are facilitated by computer and whose articles are available in electronic form to the reader'. In other words, e-journals are produced and stored its contents in electronic form, and published and distributed nationally and internationally through Internet. The evolutionary process of e-journals has three distinct phases: an introductory phase when electronic journals were first introduced (1990-1993); an evolving phase during which the majority of scientific journals are available in electronic format (from the late 1990's to the present); and an advance phase where searching capabilities and advanced features are integrated in a complete system. Presently, the scientific e-journals are in transition to the third phase. The studies on the usage of e-journals have shown that there has been gradual reduction in the use of printed journals as most of the users prefer to use the electronic format more. The other reason for increase in the acceptance and frequency of use of e-journals is because the traditional print of scientific journals is not easily available.

Bundling of e-journals and Role of Consortia: Libraries are facing the challenges of shrinking budgets, literature explosion, varied demands of user, increasing cost of maintenance of collection, storage space and trained manpower, and the challenges posed by the advances in the field of information technology. Moreover, according to (Association of Research Libraries) ARL surveys, the bundling of scholarly journals and the marketing practices of the largest commercial publishers are a source of concern within the library community for a variety of reasons. One of the main concerns is as library budgets are locked into large bundles, cancellation pressure of unbundled titles increases and funds to acquire new journals outside of bundles are squeezed