BUGS 'R' ALL

Newsletter of the Invertebrate Special Interest Group, CBSG, India

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Dragon and damselflies in Lucknow University campus

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Introduction

Today, insects are the biologically dominant and successful creatures on our planet, the Earth, as its species outnumber all other animals'. Insects have largest number of species as well as individuals occupying the widest stretches of territory and the greatest variety of habitats consuming the largest amount and types of food. Also they are most capable of defending themselves against their enemies. They have taken advantage of almost every habitat and have shown such a diversity of habitat that they occupy every niche and tap every source of energy available in that community. The adults of dragon and damselflies are aerial in nature and about 4,870 species have been described in the world (Metcalf & Flint, 1962). They are beautiful flyers and have survived through permian to recent period. Their nymphs (naiads) and adults have chewing mouthparts. They constitute a natural biological control over other several insects. The nymphs are aquatic in nature and hibernation is passed in this stage (Ross, 1965). They are distributed throughout Lucknow district.

Study area

The present study on the investigations of habitats and other parameters on odonates of Lucknow have been carried out in the Botanical garden of Lucknow University. Lucknow lies on the elevation of 450m and is situated on 26°48' N; 80°54' E in Uttar Pradesh. Lucknow has three seasons climatically, summer (March to mid June) rainy, (mid June to September) and winter (October to February). Stagnant water sources with aquatic plants are there in the garden which proved to be good breeding places for odonates. The observations were made during rainy season from mid June to September 1996.

Observation

Dragonflies are relatively strong and fast fliers, whereas damselflies are delicate and weak fliers. They are mostly diurnal, but are seen active till dark. They are found near marshy places, lakes, ponds, pools and streams.

Adults are air-borne, predaceous and constantly flying in search of food comprising small insects, which they capture and devour by help of a basket type arrangement of their legs. The nymphs are aquatic predaceous with chewing type of mouthparts, living in ponds, lakes, stangnant pools and streams. They do not swim but crawl and hide in the bottom of ponds or among debris or vegetation catching other small aquatic animals, insects, crustaceans etc. Hibernation is passed in this stage. Presence of respiratory rectal chamber in nymphs of dragonflies is also unique and is not found in any other group of insects.

A peculiar and characteristic trait of odonates is the method of mating. Before the act of mating the male first bends the tip of the abdomen forward to transfer the spermatozoa in a special bladder-shaped receptacle situated in the second abdominal segment. The male and female are often seen flying *in tandem*. During mating, the male using its terminal claspers grasps the female around the neck. The female bends her abdomen forward at the second sternite of the male where actual transfer of spermatozoa is effected. Following this act of mating male and female keep *in tandem* for a short while and later separate.

The slender nymphs of damselflies possess three large leafy caudal tracheal gills for gaseous exchange. An unusual structure occurs in the nymphs of dragonflies where no external gills are found but in enlarged rectum a respiratory chamber is formed and gills provided with abundant fine tracheae which extend into the rectal pouch. Into this respiratory rectal chamber, the nymph draws water and expels it. In the meantime gaseous exchange takes place through the thin walls of the gills. In this way the nymphs of dragonflies respire through tracheal gills found inside the rectum and forcible water ejection from the anus of nymph propels the nymph forward.

After mating, oviparous female lays eggs during flight on water surface or on aquatic plants in the case of dragonflies but damselfly thrust cigar shaped eggs in the stems of aquatic plants. Metamorphosis is gradual and incomplete. The dragonfly nymphs which live in the bottom of ponds, when full-grown crawl up out on an aquatic plant extending out of water and attach to a stemstick for the final molt. The cuticle of head and thorax splits down and adult emerges out. There are 10-15 molts in a nymph to attain the adult stage. The newly emerged adult bears soft, limp wings which gradually expand as blood is pumped into them. The newly emerged adult requires 24-48 hours to become hardened and coloured.

Insectivorous adults feed on mosquitoes, honey bees, several types of flies, beetles, termites, moths, wasps and other insects injurious to human beings. Nymphs of dragonflies feed on catching the aquatic insects by trapping them with the help of extensible, spined and prehensile mask like labium. A damselfly nymph has grasping teeth on the labium to catch the food and it frequents stems of aquatic vegetation.

Discussion

Odonates constitute one of the fastest flying insect groups. The swiftest of them attain a speed of nearly 60 miles per hour as a expert flyer (Metcalf & Flint, 1962). Dragonflies are also the most powerful determining factor of the purity of aquatic sources (Tillyard, 1917). Predatism being the original and primitive mode of feeding in insects (Roy & Brown, 1970), nymphs of a dragonfly secure the prey by lying in bait as they have raptoral (labium) jaws (Pettit, 1962). Roy & Brown (1970) have reported that odonates are of economic importance as they consume mosquitoes, which are public enemy number one, besides houseflies and *Glossina*. A hungry dragonfly nymph can consume more than 60 mosquito larvae (Metcalf & Flint, 1970). Due to their voracious mosquito feeding habits and serving as an indicator for purity of fresh water sources, odonates are of tremendous significance to man. The high-level of preying quality by dragonflies is greatly attributable to the powerful vision foturtial provided by two compound eyes which in dragonflies are practically inseparable, though distantly located in damselflies.

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New Projects

"Biodiversity of Spiders in the Western Ghats of Tamil Nadu" - A New Scheme sanctioned by the Ministry of Environment and Forests, New Delhi

Ganesh Kumar, M.

Spiders are one of the group that afford natural control of pests. There are over 30,000 species of spiders forming one of the ubiquitous groups of predaceous organisms. Though they feed almost exclusively on insects, scant attention has been paid in this country for their possible use in insect pest suppression. Without predators, a pest population explosion can be expected. Unfortunateiy, the natural balance between insect pests and spiders is often disrupted by an indiscriminate use of chemical insecticides.

The Ministry of Environment and Forests, New Delhi has sanctioned a scheme on "Biodiversity of Spiders in the Western Ghats of Tamil Nadu" at a total cost of Rs. 8.76 lakhs for a period of three years from April 1998. The scheme will take up studies on the biodiversity of spiders in agricultural and horticultural ecosystems in the Western Ghats of Tamil Nadu with a view of augment the collection of spiders and to reclassify the species known in that area. Effective spider predators of important pests would be identified and mass multiplication techniques attempted. The initiation of the project would also help in cataloguing spiders, their natural enemies and identifying factors that regulate their population in Western Ghats of Tamil Nadu. This would be useful for taking quick decisions for the better management of pests wih the bicontrol agents/ non chemical methods. Attempts will be made to mass multiply specific spiders for use in biological control of pests. The scheme will operate at Department of Environmental Sciences, Tamil Nadu Agricultural University, Coimbatore.

Conservation of Invertebrates through captive breeding - a study with reference to butterflies

George Mathew

KFRI, Peechi 680 653, Trichur, Kerala

Objectives of this project is to i) to standardise a methodology for mass rearing butterflies in field cages, ii) to setup a butterfly house and garden to facilitate education of the public on the importance of nature conservation and iii) to develop a centre to assist in the conservation of endangered invertebrates through mass rearing and reintroduction as appropriate. Funding agency: DOEN, New Delhi; Duration: Three Years from January , 1998.

Insect fauna of the Shola forests of Munnar and Wayanad

George Mathew

Objectives: i) to document the insect fauna (of major groups) in the grassland -Shola forests of Munnar and Wayanad and ii) to study their diverstity and distribution. Funding agency: Kerala Forest Department. Duration: Two Years from February 1998.

Other Project Titles

Monitoring the Status of moth component (Lepidoptera) in the biodiversity of North - Western Himalayan Ecosystem.

H.S.Rose and V.K.Singhal

Foraging ecology in relation to pollination - A study in bioenergetic DST Project Govt. of India New Delhi.

D.P. Abrol

Behaviour Ecology of some Indian Ants - (Indo French Centre for the promotion of advanced research).

Raghavendra Gadagkar

Survey of Entomolfauna of Pench National Park Nagpur and Tadoba National Park Chandrapa, Maharashtra.

Kamble Rajendra Haribhau

Biosystematic Studies on Predatory Coccinellid Fauna of the Indian Subcontinent, with the objective of preparing an easy-to-use Identification guide for field workers.

J. Poorani

1. Taxonomy of Parastenocarididae (Copepoda: Harpacticoida) of River Krishna near Vijayawada. 2. Interstitial fauna of River Krishna. 3. Taxonomy of crustacean parasites on freshwater fish.

Y. Ranga Reddy

1. Biodiversity of Freshwater Rotifera and Cladolera in India. 2. Biodiversity of Zooplankton in N.E. India and Bhutan. 3. Biodiversity and Ecology of Plankton and Limnology of flood, plain lakes and reservoirs. 4. Limnology of sub-tropical Rice-field ecosystems.

B.K. Sharma

1. Faunistic survey of invertebrates of Bihar. 2. Collection and preservation of all the land and aquatic invertebrates of Bihar for taxonomical study.

Y.P. Sinha

Fifth South Asian Symposium of Odonatoloty

Dates: 20-21st December, 1998
Organisors: Societas Internationalis Odonatologica Regional office in South Asia and SSESAs Science College.
Place: Nagpur.
Focus: Aspects of Odonata morphology, anatomy, physiology, biochemistry, and ecology with special reference to biodiversity, biomonitoring and vector control.
Contact person: Dr. R.J. Andrew, Organising Secretary, V South Asian Symposium of Odonatology, SSESAs Science College, Congress Nagar, Nagpur - 440012, Maharashtra

Release of Indian Invertebrate Researchers' Directory 1997- 98.

Zoo Outreach Organisation/ CBSG, India, Invertebrate Special Interest Group has brought out a directory of Invertebrate Conservation Specialist and Network Members for the year 1997-98. Number of pages vii + 52. This directory includes:

* List of Invertebrate research members in India-including on-going projects, geographic area covered, publication details, communication information
* List of name of systematics
* List of universities, colleges and institutes
* List of places of important Invertebrate collections in India

Order from ZOO, PB. 1683, Peelamedu, Coimbatore 641 004, T.N., India for Rs. 100/- each (including postal charges) pay by D.D., M.O. or cheque (+ Rs. 20 outstation cheque charges).

Comments, Compliments..... About Directory

.....It is no doubt a flying start for networking the Indian Invertebrate specialists. and you deserve to be congratulated on compiling the Directory..... I suggest... specialist be identified based on their *CV*. Why not start a literature data base ?....
Dr. Y. Ranga Reddy, Nagarjuna Univ.

It is indeed a wonderful, informative and labourious task.....
Dr. B.E. Yadav, ZSI, Pune -44.

I am indeed delighted to own a copy of the highly informative Directory...
Dr. S.J.Satyamurti, Chennai -42.

... it's a great pleasure and of much use to have a Directory of members of invertebrate conservation Network members- India. Certainly there is a considerable scope to improve the directory and enlarge to include SAARC regions also...
Dr. A.K.Chakravarthy, Bangalore

.....It has been well designed, well compiled and well printed and the use of it will very well be shared by like minded.....Any help from my side ....can be utilsed and shared ...
Mr. K. Jayaram, Coimbatore -18.

The directory is very useful and informative. ...indicate whether the individual scients who could provide identification services for the groups of their expertise. Initiate action to have a co-ordinated centre for insect identification using the expertise available in various institutions.
Dr. George Mathew, KFRI, Peechi.

Congratulation ..... I hope the next issue on similar subject wil be a "complete" one, since this certainly deserves a quick revision.
Dr. B.K. Tyagi, Jodhpur - 5.

1996 IUCN Red list of Threatened Invertebrates of India

Class: Crustacea Order: Calanoida
Family: Diaptomidae
Allodiaptomus satanas VU
Arctodiaptomus euacanthus VU
Arctodiaptomus michaeli VU
Eodiaptomus shihi VU
Heliodiaptomus kolleruensis VU
Heliodiaptomus pulcher VU
Neodiaptomus intermedius VU
Neodiaptomus physalipus VU

Class: Insecta Order: Anoplura
Family: Haematopinidae
Haematopinus oliveri CR

Class: Insecta Order: Hymenoptera
Family: Formicidae
Monomorium effractor VU
Myrmica ereptrix VU
Pheidole lanuginosa VU
Pheidole parasitica VU
Rhoptromyrmex mayri VU

Class: Insecta Order: Lepidoptera
Family: Nymphalidae
Euploea scherzeri VU
Family: Papilionidae
Graphium epaminondas VU

Class: Insecta Order: Odonata
Family: Aeshnidae
Acanthaeshna victoria VU
Cephalaeschna acutifrons VU
Family: Gomphidae
Burmagomphus sivalikensis CR

Class: Gastropoda
Order: Basommatophora
Family: Pomatiopsidae
Tricula montana EN

Useful Web Sites to Check related to conservation

The Conservation BreedingSpecialist Group (SSC/CBSG) web **http:// www.cbsg.org**
Re-introduction News letter **http:// www.africaonline.co.ke/Africa Online/ rsg.html/**
Re-introduction guidelnes **http:// www.rbgkew.org.uk/conservation/RSG guidelines.html**
Discovery Channel **http:// www.discovery.com**
Environmental News Network **http:// enn.com**
Guide to Volunteering in Nature Conservation **http://www.greenvol.com**
For beekeeping development worldwide **http//www.planbee.org.uk**
Zoological Journal of the Linnean Society **http://www.hbuk.co.uk/ap.journals/ zj.htm**
Animal welfare information center **http:// www.nal.usda.gov/awic**
Selected list of websites of interest to Zoo and Aquarium staff **http:// www.selu.com/ ~bio/zoo**
The cephalopod page **http://is.dal.ca/ ~ceph/wood.html**
Institute for scientific information **http:// www.isinet.com**
Zoo outreach organisation **http:// www.geocities.com/rainforest/vines/ 6883**
CBSG, India, CAMP PHVA Results **http:// members.xoom.com/ZOO India/**
Biosci/Bionet Newsgroups **http:// www.wcmc.org.uk**
IUCN - Species Survival Commission **http://iucn.org/themes/**
IUCN - The World Conservation Union **http://iucn.org**
CBSG **http://www.cbsg.org**
The Biodiversity Forum **http:// www.worldcorp.com/biodiversity**
Binet (Biodiversity Action Network) **http:// www.access.digex.net/~bionet**
Indira Gandhi Conservation Monitoring Center, India **http://www.wcmc.org.uk/ igcmc/**
Mangroves and Coral Reefes Management and Mpdeling **http:// ibm590.aims.gov.au/**
Ministry of Environment & Forests, Government of India **http://www.nic.in/ envfor/welcome.html**
Western Ghats Biodiversity Network, India **http://ces.iisc.ernet.in/hpg/cesmg/pew/ wgbn.html**
Wildlife Institute of India **http:teal.ttc.nbs.gov/~rthapa/index.html**
World Conservation Monitoring Centre **http://www.wcmc.org.uk/**

ZOOS' PRINT Publications

Rao, K.R. 1998. On the ecology of leafhoppers (Homoptera:Cicadellidae) of Kanyakumari District and their status, *ZP* 13(2): 22-23.
Kumar, S.P 1998. Observations on the Reduviid population of Western Ghats *ZP* 13(2): 24-26.
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Palot, J. Md 1998. A Report on the Butterfiles of Calicut University Campus, *ZP* 13(11): 32-33.
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Radhakrishnan, C., V.J. Zacharias and Aneesha Thomas, 1998. Occurrence of the Malabar banded Swallowtail, *Papilio liomedon* (Moore) (Lepidoptera: Papilionidae) in Wynad, Kerala, *ZP* 13(11): 34.
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Karthikeyan, M. 1998. Diversity and Habitat Utilization of Butterflies in Different Forest Types of Hosur Division, Dharmapuri District, Tamil Nadu, *ZP* 13(11): 38.
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List of new members of the Inveretbrate Network

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Announcements

"The South Indian Butterflies"
The Nilgiris Wildlife and Environment Association - Ooty, an N.G.O., has just published a non profit - non commercial publication title "The South Indian Butterflies". The book is printed on imported art paper with 151 super colour photographs and contains 275 pages. The text is written by an acclaimed environment entomologist. Only limited copies have been printed. The proceed goes for conservation work.

Listed price Rs. 395/-. Discount price upto 10 copies each Rs. 350/-. Special discount price for above 10 copies (each) Rs. 325/- Postage free. For orders sent only Demand Draft payable at Udhagamandalam (Niligiris) favouring: The Nilgiri Wildlife and Environment Association.

The Honorary Secretary
The Nilgiris Wildlife and Environment Association, C/o, Forest Department North Division, Mount Stewart Hill, Udhagamandalam 643 001, Nilgiris, T. N.

Bees for Development
is an organisation serves as a unique, international resource for beekeeping development world-wide. Its various activities: publish the awardwinning magazine, *Beekeeping and Development* - promote sustainable, simple beekeeping - organise training - Give epert advice - support beekeepers in developing countries - assist projects.
For more information contact:
Bees for Development, Troy, Monmouth, NP5 4AB, U K. Fax +44(0)16007 16167 Ph:+44(0)16007 13648; E-mail busy@olanbee.org.uk

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Insect Biodiversity in disturbed and undisturbed forests in the Kerala part of Western Ghats
Edited by George Mathew, P. Rugmini, and V.V. Sudheendra kumar.
KFRI Research Report no:135, KFRI Peechi - 680 653. 133pp. Not priced.

This research report is based on the study conducted at four locations viz., Silent valley, Nelliyampathy, Sholayar, and Parambikulam in the Kerala part of Western ghats. A total of 1250 species of insect belonging to 15 orders were collected. Lepidoptera and Coleoptera were the most dominent groups. Information on the insect fauna of major insect groups, plants are reported. The distribution pattern and the impact of disturbances due to various biotic and abiotic factors on insect diversity are reported.

Helping Hands

Dr. S.K.Gupta (Department of Zoology) Guru Nanak Dev University, Amristar - 143 005) Appreciate receiving dipterous insects (Flies) particularly Tabanids (Horse Flies), from wild and forested areas/zoos/, Tephritids(Fruit Flies) Bombylids (Bee Flies) Syrphids (Hover flies), Pipunculids (Big headed flies), Asilids (Robber flies) and Culicids afrom different parts to assess and study the diversity in these insects and willing to collaborate in the biodiversity studies in these groups.

Prof. B.K. Sharma is the author of Fauna of India volume on Indian Cladocera. ..... Invite interaction with the workers in the field of zooplankton and offering a national identification advisory service for zoo plankton. Keen to maintain and expand national reference collections for zooplankton in his laboratory and also willing to extend this service to other workers in the Indian subcontinent.

National Symposium on Biological Control of Insects in Agriculture, Forestry, Medicine and Veterinary Science, January 21 - 22, 1999.
For more details contact:
Dr. K. Murugan, Organising Secretary
BCI '99 Symposium, Dept. of Zoology
Bharathiar University
Coimbatore 641 046, TN, India.
e-mail:
murugan@as250.bharathi.ernet.in

BUGS 'Я' ALL

Newsletter of the Invertebrate Special Interest Group of Conservation Breeding Specialist Group, India. ISIG Coordinated by B.A. Daniel, Entomology Consultant, Zoo Outreach Organisation.

Editors: B.A. Daniel and Sanjay Molur; Advisor: Sally Walker. Any querries must be addressed to the Editor. The Newsletter will appear half-yearly.

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