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**NATIONAL SYMPOSIUM  
ON  
RECENT TRENDS IN INDIAN WILDLIFE RESEARCH**

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**ABSTRACTS**



**P. G. AND RESEARCH DIVISION OF  
WILDLIFE BIOLOGY AND ZOOLOGY  
A. V. C. COLLEGE (AUTONOMOUS)  
MANNAMPANDAL, MAYILADUTHURAI-609 305.  
Tamil Nadu**

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## Diversity of Invertebrates and rodents in rice Ecosystem

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The natural pest and predator complex in rice ecosystem is unique in distribution and diversity. The rice insect pest fauna was recorded to an extent of more than 30 species. Among these pests, the rice leaf folder, stemborer and earhead bug occur in complex and other pests like gallmidge, BPH, WBPH and whorlmaggot are also recorded as major pests in this region. The population dynamics of these pests are discussed in this paper. The natural enemy complex includes green mirid bug, groundbeetle, rove beetle, various spiders namely *Pardosa pseudoannulata*, *Tetragnatha*, sp, *Oxyopes* sp., *Argiopes* sp., parasitic hymenopterans, their population fluctuation and their role in regulation of pests are discussed. The rice field rat damage was observed in different cultures, hybrids and scented varieties. Their management with pesticides were tried and the results are discussed.

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A preliminary note on the fluctuations of some Zooplankton in relation to hydrographic properties in Indian sea, Gulf of Mannar and Palk Bay.

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In the present investigation an attempt was made to relate the hydrological and meteorological features with the abundance of zooplankton. Regular fortnightly collections were made in two different stations viz., Gulf of Mannar and Palk Bay. Surficial plankton and water samples were collected at prefixed stations. In the present study hydrographical properties such as temperature (atm. and surface), hydrogen ion concentration (pH), salinity, Do, nutrients (phosphate, nitrate and silicate) of the surface water of the two stations were recorded. A total of 180 plankton samples were collected from the two stations during October 1993 to September 1994. The total net plankton volume fluctuations was observed in every month. Fluctuations were found in zooplankton number, phosphate value, nitrate value and DO content in both the stations. The silicate content was slightly higher in Palk Bay than the Gulf of Mannar. The pH values generally varied from 8.1—8.9 at both stations. Not much variation was observed between atmospheric and surface water temperature at both stations during the sampling time. The results deal with zooplankton biomass and quantitative abundance of major zooplankton

## Observations on meroplankton production in Gulf of Mannar Biosphere Reserve

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Gulf of Mannar is known for its unique marine biodiversity in the south east coast of India. The present work attempts to observe the changes in the production of meroplankton for one year. Two collection sites A and B were selected. Site A is nearer to Pamban bridge and site B is close to Mandapam Camp. Maximum number of meroplankton 142289 nos/m<sup>3</sup> and 96395 nos/m<sup>3</sup> were recorded during the month of November 93 at both sites. Whereas, minimum number (10329 nos/m<sup>3</sup> and 9417) nos/m<sup>3</sup> of plankton were recorded during March 1994. The larvae of *Peneaus semisulcatus* *P. merguensis*, *P. indicus*, *P. monodon*; zoea of Branchyura, Petrolisthes, and eremite were recorded. Physico-chemical parameters such as pH, temperature, Do, salinity, conductivity, phosphate, nitrate and silicate were estimated. Bio-diversity index and richness, were calculated.

## Studies on plankton fluctuation in a reservoir at Annamalainagar, Tamilnadu

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The present investigation deals with the qualitative and quantitative estimation of plankton. Some of the phytoplankton and zooplankton were identified in a reservoir at Annamalainagar, Tamilnadu, during April to September, 1993.

The biology, total number and productivity during the study period were studied. The phytoplankton showed fluctuation and its productivity was higher (618 org./l) during June and lowest (402 org./l) in April, 1993. The density of zooplankton population was maximum (496 org./l) during September and minimum (224 org./l) in June 1993. The significance and fluctuation in plankton productivity was discussed.

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### Coefficient of interspecific association of the aquatic fauna of the high altitude lake of the Nilgiris

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The relative density, abundance and species indices of the aquatic fauna of Ooty lake indicated that their distribution pattern was affected by several factors.

The covariation of the phytoplankton, zooplankton and microorganism community was calculated. Out of 153 pairwise combinations of Pearson's product moment correlation in phytoplankton, 34 species showed significant correlation. However Spearman's correlation analysis revealed that 41 species are significantly correlated. In the case of Zooplankton only two species are correlated. In Zooplankton 4 showed positive correlation and 2 showed negative correlation. In micro organisms, 44 combinations showed positive and 34 showed negative correlation. It was concluded that the increase of one species tend to increase the number of other species.

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## Insect diversity of Pitchavaram Mangrove forests, Tamil Nadu

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A Survey on the insect diversity of Pitchavaram Mangrove Forest, Tamil Nadu was made from December 1993 to March 1994. A total of 101 species of insects belonging to 8 orders and 42 families were collected and identified upto species level except a few. A maximum number of 28 species of beetles and 25 species of scale wings were collected. It was followed by 14 species of ants, bees and wasps, 11 species of bugs, 7 species of orthopterans, 7 species of flies, 3 species of dragonflies and only one species of antlion. Totally 52 species of insects were collected from herbs, 23 species from trees, 17 species from soil and 8 species from grasses while only one species from aquatic habitat. Fifty percent of the insects collected were found to be pests of plants or parasites on useful trees, insects and other animals while the remaining were beneficial insects.

7

## Studies on diversification of *Pheropsophus* sp.

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Among carabid beetles, the members of the sub-family Brachinnae attract the attention of entomologists as they have fascinating defensive mechanism to capture their prey and for their production from enemies. The present study on

the distribution of *Pheropsophus* sp reveals that there are four species of the genus *Pheropsophus* namely *P. hilaris*, *P. bimaculatus*, *P. lissoderus* and *P. occipitalis* which are distributed in and around the Annamalai University campus. It is known that these insects are found to be effective biological control agents for Rhinoceros beetle *Oryctes rhinoceros* a serious pest of coconut. Variation among *pheropsophus* sp, and their diversification on the basis of morphological characteristics have been discussed.

8

### Reproductive biology of the aquatic hemipteran bug *Laccotrephes griseus* (Guer) (Hemiptera:Nepidae)

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The reproductive biology of the aquatic hemipteran bug *Laccotrephes griseus* has been investigated. This insect is commonly found in permanent ponds and lakes near the edges of the water. Males are frequently seen on the back of the females and they remain together for a long time while the actual act of copulation lasts for 12 to 15 minutes. The pre-oviposition period varies from 14 to 20 days and the female insect may deposit 25 to 30 eggs in the soil of the pond. Each egg measures about 1.5 mm in length and 0.5 mm in width. The golden coloured egg turns into pink on fourth day of incubation and finally becomes red in colour at the time of hatching. The hatching period normally ranges from 6 to 12 days. The insect passes through five instar stages and after final ecdysis the adult emerges out. The life span of the insect extends over 260 to 280 days. The morphometric changes of length and width of the different stages of instars and adult bugs are also discussed.

Breeding biology of milkweed bug *Spilostethus pandurus* (Scopoli) (Hemiptera:Lygaeidae)

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The breeding biology and metamorphosis of the milkweed bug *Spilostethus pandurus* (Scopoli) have been investigated. Typical heteropteran end to end type and multiple mating lasting for two days have been observed. After 24 hours of mating the female searches for a suitable site for oviposition and starts laying eggs. The insect passes through five nymphal instar stages and finally emerges out into an adult. The newly hatched nymphs are red in colour. The colour of the instar does not change during post embryonic period. The fifth and last nymphal instar attains sexual maturity on 6th or 7th day after final moult. The morphometric changes of different instars and adult bugs are also discussed.

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Effect of male cone extract of *Cycas circinalis* (Linnaeus) on fecundity in the tobacco caterpillar *Spodoptera litura* (Fabricius)

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Investigations were carried out to study the influence of the extract of male cone of *Cycas circinalis* on the fecundity of *Spodoptera litura*. Dose dependent reduction was observed in

Breeding biology of milkweed bug *Spilostethus pandurus* (Scopoli) (Hemiptera: Lygaeidae)

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Investigations were carried out to study the influence of the extract of male cone of *Cycas circinalis* on the fecundity of *Spodoptera litura*. Dose dependent reduction was observed in

extract treated animals reared on leaves. The number of eggs laid by the control insect was  $341 \pm 16.05$  eggs/female, while the insects treated with the cone extract at concentrations of 100, 200, 300 and 400 ppm laid  $271 \pm 8.83$ ,  $175 \pm 5.19$ ,  $158 \pm 5.12$  and  $69 \pm 5.09$  eggs/female respectively showing the effect of cone extract on fecundity. In the present investigation the size of the larvae treated with the extract at concentrations of 300 and 400 ppm was found to be reduced. Moreover, the pupae were much reduced in size and shrunken causing a delay of 1 to 3 days in adult emergence. These changes were attributed to the decline in consumption, assimilation, production and metabolism of experimental animals.

II

Report on isopod parasites from the Rainbow Sardine, *Amblygaster sirm* (Pisces: Clupeidae)

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A total of 2265 specimens of Rainbow Sardine, *Amblygaster sirm* were examined for parasites. Two species of parasitic isopods such as *Cymothoa indica* and *Neroclea pigmentata* were recovered from the inner surface of opercular flap in the gill chamber. The specimens were obtained from the commercial catches caught by gill nets over two years period between September 1992 and December 1994. The fish was caught at a depth ranging between 20 and 40m. The size of the parasites, sex, seasonality and mode of attachment are also recorded and discussed in detail.

## Ecological diversity of Pseudoscorpions

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Pseudoscorpions are fascinating arachnids and tailless scorpions belonging to the order Chelonethi (Arachnida). They are slight in build, light in weight, slender in dimension and delicate in construction with a dorsoventrally flattened body. They are terrestrial, secondarily amphibious or more precisely maritime and some live in high altitude of almost 3000 metres (MSL). They lead a strictly cryptozoic life, establishing themselves in constantly dark and damp surroundings, in degrading vegetation, dung, beneath bark and stones, in coconut and palm sheaths, in soil cover, grass and ground cover of sand dunes, swamps (bogs), rotten logs of wood, lurking in nooks and crevices of underwater stones (maritime) and their out cropings, among algae, sea weeds and mass, in caves, in bee, ant and termite colonies, under elytra or the body of insects and other arthropods, in chicken houses, nest of birds and mammals, stored food grain and human inhabitations as well. They also inhabit old books and herbarium, Some species of pseudoscorpions are really choosy and restricted to certain niches, for instance the genus *Ellingsenius* is confined to bee colonies only,

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## Spiders of Shoolpaneshwar Wildlife Sanctuary

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This paper presents the checklist of spiders recorded from the Shoolpaneshwar Wildlife Sanctuary during the faunal studies conducted for a period of two years in the Narmada Valley in Gujarat. This sanctuary is part of old Rajpipla forest and situated on the left bank of Narmada. 50 species of spiders belonging to 29 genera of 16 families were collected. The spiders form an important foodlink in the undisturbed ecosystems of the sanctuary. The sanctuary area as a whole cannot be termed as an undisturbed ecosystem as there are several areas within it that are strongly disturbed or are in the process of destruction due to human interference. If the present rate of disturbances is continued, the species diversity in this sanctuary will be perished within a short period. Hence, there is a need to maintain the ecological continuity in a forest area like Shoolpaneshwar Wildlife Sanctuary as it is necessary for the conservation of a variety of spiders, insects and the entire ecosystem.

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## Benthic biomass of portonovo waters in relation to environmental parameters.

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An attempt was made to study the benthic biomass (wet and dry weight) in relation to environmental parameters such as temperature, pH, salinity and dissolved oxygen content.

These studies were carried out in three stations of Portonova waters viz , marine zone, gradient zone and Killai backwaters.

The study indicated that the benthos of Portonovo waters consisted of four major groups viz. polychaetes, crustacea, bivalves, gastropods and other miscellaneous forms such as coelenterates, amphipods, copepods and gobid fishes. 18 species of polychaetes, 6 species of bivalves, 3 species of gastropods and 2 species of crustacea were recorded.

The biomass of benthos in terms of wet weight varied from 2.54 to 13.17gm/m<sup>2</sup> while its dry weight ranged between 0.34 and 1.96 gm/m<sup>2</sup> . To know the relationship among the environmental parameters, benthos and stations appropriate statistical analyses were made.

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## Studies on selective egg masses of Prosobranchs from Gulf of Mannar and Coramandel coastal area

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Poompuhar College, Melaiyur 609107. Tamil Nadu

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The egg masses of some selective species (Prosobranchs) representing families of Neretidae, Cerithidae, Naticidae, Cypridae and Muricidae were studied. Salinity temperature and spawning behaviour were noted during spawning period.

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## Study of plankton production in relation to soil nutrients in fish ponds.

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A study of possible relationships between different levels of nutrients such as potassium, calcium, nitrogen, phosphorus available at the bottom soil and the plankton production was considered necessary to determine the fish production in a pond.

An attempt was made to study the effect of phosphorus content in a phosphorus deficient soil on plankton production both in laboratory and in field conditions. A progressive increase in plankton production for different levels of phosphorus content of the soil observed both in laboratory and in fish ponds.

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## A Study of the Zooplankton diversity of the Thirukkulam pond in relation to the nutrients (Phosphate & Nitrate) for a period of six months

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An attempt was made to study the phosphate and nitrate contents of Thirukkulam pond in Mayiladuthurai and their relationship with zooplankton diversity. The zooplankton of the pond consisted of copepods, cladocerans and rotifers respectively occupying the first, second and third positions in their abundance. An inverse relationship has been observed between the nutrient contents of the pond and zooplankton production. It is inferred that the phosphate and nitrate contents of the pond have a direct bearing on zooplankton diversity.

The importance of preservation of biodiversity of Amphibians in the Schoolpaneshwar Wildlife Sanctuary.

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The Shoolpaneshwar Wildlife Sanctuary is part of old Rajpipla forest and situated on the left bank of Narmada river. The rich fauna and flora of the sanctuary can be ascribed to the Satpura hypothesis and the microzoogeographical peculiarity of the area as well. Amphibians are the most striking group of animals recorded during the faunal studies in the area. The amphibian fauna of the sanctuary is a mixture of forms adapted for both arid and semi-arid as well as moist and wetland habitats. The presence of seven Western Ghat species that have limited distribution all over India enhances the importance of this sanctuary as an ecosystem worth preserving. The biodiversity of amphibians in this area is an ecological feature that has to be preserved and if possible, enhanced at any cost. The rich biodiversity of amphibians can also be attributed to the presence of several microlimatic niches in the region well-protected from the biotic interference. Nevertheless, towards the periphery of the sanctuary, the forest is more or less degraded with patches of open areas and grasslands. The human encroachment and subsequent degradation as well as commercial exploitation are increasing at an alarming rate. The study emphasizes the perturbations in the ecosystems and also the management strategies and action plans for the protection and the preservation of the biodiversity of the sanctuary.

2

## Morphometry of major visceral organs of a female common krait (*Bungarus caeruleus*)

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A study on the morphometry of major visceral organs of a female common krait was undertaken. Total length, body length, tail length, number of ventral scales and length of oesophagus and stomach (thick walled narrow tube without dilation) were 130.5, 115.15, 15 cms, 207 and 71 and 19 cms respectively. The length of intestine (43 cms), terminal part-straight tube (13 cms), cystic and pancreatic ducts (2.5 cms) the right (29 cms) and left lobes (23 cms), liver, heart (2.5 cms) trachea (29 cms) only right lung (17 cms), right (6.2 cms) and left kidneys (6 cms) was recorded. There were 10 and 11 lobes in the left and right kidneys respectively. The right ovary (2.9 × 0.6 cms) was longer than the left ovary (2.5 × 0.7 cms). The details of this study have been discussed.

3

## Recent trends in Indian wildlife research with special reference to Orissa.

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More emphasis on conservation and research on wildlife was given after establishment of wildlife conservation division in December, 1966. To begin with, conservation oriented research work was taken up on captive animals at Nandan-

kanan Biological Park. After creation of a separate wildlife wing in the State Forest Department during the year 1976, priority was given for research on wildlife both in captivity as well as under free living conditions. Behavioural studies on the pet tigress khairi, at the Similipal Tiger Reserve by Late Padmasri S. R. Choudry was a mile stone in Tiger Research. Since, 1975, Crocodile Conservation and Management Project was established with an objective to rear and rehabilitate the endangered crocodilians. Research and Conservation centres were established for gharial (*Gavialis gangeticus*) at Satkosia Gorge Sanctuary, for saltwater crocodile (*Crocodylus porosus*) at Dangmal in Bhitarkanika wildlife sanctuary and for mugger crocodile (*Crocodylus palustris*) at Simlipal Tiger reserve and all the three crocodilian species was established at Nandankanan Biological park. 681 captive reared gharials, 1384 saltwater crocodiles and 457 mugger crocodiles rehabilitated in their natural habitats. A research project on endangered sea turtles has been taken up. Various scientific research in collaboration with Universities is undertaken in collaboration with the forest department.

4

### Assemblages of reptiles in and around Madras

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Reptilian assemblage in the plains of Chengalpattu MGR and Madras districts, Tamilnadu was carried out from January 1990 to December 1995. A one time survey of reptiles in 10 forested and 10 non - forested areas was carried out with the help of trained Irulas (hunter-gatherers). Reptilian fauna representing 3 orders, 17 families, 35 genera and 49 species were recorded. One species of freshwater turtle, 10 species of lizards and 15 species of snakes were found to be distributed in the study area. Factors influencing the local assemblage of reptiles and their conservation strategy were discussed.

5

Some observations on vertebrate fauna of Machia safari desert park, Jodhpur.

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A study on the vertebrate fauna of Machia safari desert park, Jodhpur included *Calotes versicolor*, *Agma agilis*, *Varanus bengalensis* and *V. griseus*, common snakes, *Coluber ventrimaculatum*, *C. arenarius*, *Lytorhynchus paradoxus*, *Bungarus caeruleus* and *Naja naja*. 81 species of birds and mammals such as the catch rock rat, spiny mouse, northern palm squirrel, hedgehog, porcupine, hares, ruddy mongoose, desert fox, jackal and blue bull were recorded.

6

Biodiversity of Chilika wetland in Orissa.

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2. & 3. Chilika lake Wetland Bird Research Project Camp Parikudgada, Orissa.

Chilika abounds with a variety of aquatic flora and fauna and also serves as one of the most important wintering grounds for about 6 lakh resident and 150 species of migratory birds. It provides breeding and nursery grounds for 160 species of freshwater, estuarine and marine fishes, prawns and crabs. Indian largest lizard varanus, rare limbless lizards, a number of estuarine / marine snakes and Irrawady dolphins were also recorded. An emphasis has been given to protect and preserve the biodiversity of this unique wetlands.

1  
 Artificial perches use by common barn owl  
 (*Tyto alba*) in rice fields.

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The common barn owl, *Tyto alba* has been recognised as a potential predator of rodent pests, Worldwide. It is a raptor or birds of prey, nocturnal in habit, forage chiefly on rodent pests, which inhabited the agricultural fields of our area. To hunt the rodent pests this species requires a perching place to sit and observe the prey. Thirty four "T" shaped perching poles were made with three different heights viz., 5ft, 7ft and 9ft and implanted in (0.75 ha each) Kuruvai (June-August'94) and Thaladi (October'94 - January'95) rice fields. They were implanted 10m off from the bunds and the distance between two poles was of 10 - 15m. The perching poles used by barn owl was studied by an indirect method i.e., by observing the milky white droppings of barn owls, on the poles. The perching poles use by barn owl was observed once in a week and simultaneously, the population of rodent pests and magnitude of their depredation were estimated. These informations from the data were analysed for four developmental stages of rice crop. The barn owl more frequently used the 9ft poles than the poles of 5 and 7ft. The population of rodent pests, and their damage to tillers was minimum in the field with 9ft poles. It is suggested that the perching pole of 9ft height could be used for the management of rodent pests in the rice fields.

2

Utilization of man-made nest boxes by common barn owl, *Tyto alba*

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The common barn owl (*Tyto alba*) an ubiquitous and a potential predator of rodent pests, often takes its shelter for nesting / roosting in temple towers, unused rooms, unused barns and gaps present behind the statues around the Sanctum Sanctorium of the temples. The common barn owl population is declining day by day because of the less availability of such sites elsewhere. A nest box (36" × 18" × 21") for barn owl was designed for the conservation and propagation strategy. Forty nest boxes were installed in the months of July '93, October '93 and December '93. Of the 40 nest boxes installed 65% were close to human habitations, 22.5% near to agriculture fields and 12.5% in groves. The nest boxes were utilized by the barn owls to the tune of 40.93% for nesting / roosting between September '93 and January '95. The results indicate that the installation of man made nest boxes in areas where nest sites are scarce is a feasible strategy for the conservation and propagation of barn owl.

5

Growth changes in the body weight, bill length and talon length of nestling barn owl (*Tyto alba*)

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The growth rate of barn owls (*Tyto alba*) a predatory bird of various rodent pests of agricultural importance has been

investigated. The owlets were altricial and nidicolous at the time of hatching. Average body weight, bill length and middle talon length of six just hatched chicks were  $15.8 \pm 2.73$  g,  $6.3 \pm 1.63$  mm and  $2.3 \pm 0.82$  mm, respectively. The growth rate, was low (3.11 g / day) (mean body weight) during the first week and it was rapid between second and third week with a maximum mean growth rate of 14.04 g / day. The average weight of the subadults was 525.63 g (n=16) at the time of fledging which was 25% greater than that of adult owl weight. In total 64% of the bill grew prior to fledging, in which 20% growth attained within two weeks of time. The remaining 36% of bill growth occurred after fledging. Maximum middle talon growth was between fourth and fifth week, with an average increase of 0.85 mm / day. The owlets grew rapidly and attained the fledging stage at the age of seven weeks. The growing owlets' body weight positively and significantly correlated with the bill length ( $r = 0.8497$ ;  $p < 0.001$ ;  $df = 144$ ) and middle talon length ( $r = 0.9285$ ;  $p < 0.001$ ;  $df = 144$ ). The weight of the owls significantly declined ( $t = 6.79$ ;  $p < 0.01$ ;  $df = 26$ ) while the bill length ( $t = 6.83$ ;  $p < 0.01$ ;  $df = 26$ ) and middle talon length ( $t = 2.64$ ;  $p < 0.05$ ;  $df = 26$ ) were significantly increased after fledging.

4

The effect of oil exploration operations on avian nesting at Narimanam, Tamilnadu.

S. MUTHUKUMAR and J. ALPHONSE JAYABALAN

Department of Zoology, A.V.C. College,  
Mannampandal 609305 Tamilnadu

To evaluate the potential effect of oil exploration activities on nesting birds at the oil and Natural Gas Commission oil fields in and around Narimanam, Tamilnadu a study was carried out from December 1993 to March 1994. At Narimanam oil well area black kite (*Milvus migrans*) 7.10%, crow (*Corvus*

*splendens* 14.29%). sparrow (*Passer montanus* 7.10%). weaver bird (*Ploceus philippinus*, 64.29% babbler (*Turdoides malcolmi*) 3.51%) and spotted dove (*Streptopelia chinensis* 3.58%) utilized coconut trees (*Cocos nucifera*), palm trees (*Borassia flabellifer*) and accacia tree (*Accacia arabica*) for nesting. At the control study plot the nesting bird species diversity was lesser. Black kite (17.39%) brahmny kite (17.39%) sparrow (30.43%) and crow (34.78%) were nesting either in the palm trees or in the coconut trees. Spacing of nest at Narimanam study area was negatively oriented to the position of the ONGC oil wells. Most of the nests (58.16%) were located beyond 5000 mts from the oil wells and only few (7.14%) nests were within 4000 mts. Twenty eight bird nests were locatoh at Narimanam oil well area while 23 bird nests were recorded at the control site. This study showed that the range of human activities on nesting birds was within the tolerance level of the bird species.

5

Roosting habits of the small green Bee - eater, *Merops orientalis* in Mayiladuthurai, Tamilnadu

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Department of Zoology, A.V.C. College, Mannampandal 609305

The roosting habits of the small green Bee-eater, *Merops orientalis* in Mayiladuthurai area during the period of 1993 to April 1993. was studied. Communal roosts in five trees nameiy *Odina wodier*, *Jatropha glandulifera*, *Azadirachta indica*, *Ipomea carnea* and *Cassia tora* were located in the pre-breeding season. The communal roosts of Bee-eater were small in size, ranging from 6 to 10 individuals. Usually they started to roost 10-15 minutes before sunset and departed from the roost 5-15 minutes before sunrise one by one or in pairs. The height of roosting trees ranged from 1.5 to 4 meters. The birds were found to forage at a distance of 200-800 meters from the roosting sites.

6

Diurnal time budget of white peafowl (*Pavo cristatus*)  
in captivity.

P.S. VENKATESAN<sub>1</sub>, D. SHANTHI<sub>2</sub>, C.J. MATHEW<sub>3</sub> and  
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4. Arignar Anna zoological Park, Vandalur, Madras.

Time activity budget of white peafowl was studied by using scan sampling method at Arignar Anna Zoological Park, Vandalur. The activities of peafowl were mainly influenced by the day light. The main activities were locomotion, resting and auto preening. Individual activities differed among male, female and chicks.

7

A study on the feeding habits of avifauna of  
certain lakes of Thanjavur District.

G. SWAMIDOSS DANIEL,

Dept. of Zoology,

A. Veeriyar Vandayar Memorial Sri Pushpam College.

(Autonomous), Poondi 613 503, Thanjavur Dt. Tamil Nadu,

Studies on food and feeding habits of selected migratory birds such as sandpipers, stilts, snipes, moorhen, jacana, ibises, cormorants, darter, spoonbills, ducks and teals, herons, egrets and storks revealed that they occupy certain specific trophic niches in their environment. A decline in their natural feed affect their population.

8

## Water birds around Madurai.

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M.S. VENUGOPAL

Department of Agricultural Entomology,  
Agricultural College and Research Institute,  
Madurai - 625104, Tamilnadu.

A survey of water birds in Viragnur dam ponds and tanks around Madurai was undertaken. Water birds belonged to twelve families were recorded. Feeding habits and abundance of birds in different habitats were observed.

Relationship between the presence of bird species and tree cover in water bodies was discussed.

9

## Feeding behaviours of wadding birds in Keoladeo National Park, Bharatpur, Rajasthan.

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1. P.G. Department of zoology, Khadir Mohideen College, Adirampattinam 614701, Tamilnadu.
2. Salim Ali Center for Ornithology and Natural History, Kalampalayam, Coimbatore, Tamilnadu.
3. Department of Biosciences, Saurashtra University, Rajkot 360005.

The feeding behaviour of wadding birds was studied by using direct visual observation at Keoladeo National Park, Bharatpur from January 1987 to December 1990. The entire aquatic area (8.5 sq.km) was surveyed at regular intervals from sunrise to sunset. Habitats were classified according to the occurrence of dominant plant species in the feeding area. The

feeding methods of birds were categorised on the basis of their body position on the water surface. The habitat, water depth and feeding method adopted by each bird were recorded. The feeding behaviour of wading birds was grouped into 13 categories. "Stand and wait", "Walk slowly", "Walk quickly" and "Running" were the major feeding methods employed by the herons and egrets. Storks and white ibis fed mainly by "robbing". Highest frequencies of the "Head swaying method" was exhibited by spoonbills. The large egret, little egret and painted stork used eight feeding methods. Feeding behaviour of the wading birds was related to the depth and the availability of macrophytes.

10

A study of winter waterfowl at Udayamarthandapuram Birds Sanctuary and Muthupet lagoon,  
Tamilnadu

C. SIVASUBRAMANIYAN<sup>1</sup> and P. KUMARASAMY<sup>2</sup>

B. RAM MANOHAR,<sup>3</sup>

1. Khadir Mohideen college, Adirampattinam, Tamilnadu
2. Dept. of Zoology, Govt. Boys Higher Secondary School, Pattukkottai - Tamilnadu.

Udhayamarthandapuram Birds Sanctuary and Muthupet lagoon are the two important refuges for the aquatic migratory birds in Nagai-Quaid-e-Millath-district, Tamilnadu. During 1993-94 Bird census twenty eight species at Udhayamarthandapuram and forty three species at Muthupet lagoon were recorded and their total population was calculated. The reasons for the abundance of individual species were also discussed.

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11

## Foraging behaviour of Shorebirds (Aves: Charadriiformes) from the Vedaranyam swamp

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The Vedaranyam swamp (10°18'N; 79°5'E) is located on the bay of Bengal seaboard of Nagai Quaid-e-Milleth district of Tamil Nadu. This swamp extends over an area of 2400 hectares. Large scale extraction of 'Table Salt' and Industrial Grade Salt from this swamp is being done for many years. A study on the foraging behaviour of three most common and abundant species of shorebirds (Charadriiformes) of the swamp such as little stint (*Calidris minuta*), curlew sandpiper (*Calidris testacea*) and marsh sandpiper (*Tringa stagnatilis*) was carried out during November 1986 to March 1987, by adopting focal animal sampling method. The peck rate was determined by body size, length and shape of the beak, feeding behaviour, nature of the feeding ground and food preferences shown by the particular species. Among the three species the peck rate was highest in *C. minuta* and the lowest in *I. stagnatilis*. The peck rate increased with decrease in body size and beak size. The mode of feeding viz visual and tactile feeding had influence on the peck rate. The peck rate of *C. minuta* and *C. testacea* was independent of the density of prey species. But in the case of *I. stagnatilis*, the peck rate was dependent of prey density. Even during the lowest level of prey density optimum level of peck rate was observed.

12

## Diversity and conservation of the Avifauna of Kanniyakumari District

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Kanyakumari District with a wide range of natural habitats include dense tropical wet evergreen forests, rapid mountain streams, ponds, estuaries and some arid regions. Moreover, man made habitats such as reservoirs, plantation and agricultural crops are not uncommon. These habitats support a wide diversity of birds. Two hundred species of birds were recorded over these areas. Avifaunal diversity of this district, their threats and a few suggestions for conservation have been discussed.

13

## Orchard Birds: A Review

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Bird damages in orchards of grapes, mango, guava, papaya, peach plum, pear, apples, palms, cherries, citrus, ber and berries varied depending on the varieties of the fruits and localities. Bird preference within varieties and species varies greatly with stages of fruit development, maturity arrangement of bearing on plant, coloration of fruits with in varieties of fruit and the training system followed. In grapes maximum damage (54.60%) occurred in grapevines trained with Head System and least damage (25-35%) in those trained with Bower System, reported from PAU, Ludhiana, India. Birds preferred Beauty seedless variety of grapes having purple

berries. Reports on bird damage from India promulgated damages being done by roseringed parakeet *Psittacula krameri* common myna (*Acridothera tristis*), house crow (*Corvus splendens*) jungle crow (*Corvus macrorhynchus*) on wide varieties of fruits and common myna, jungle crow (*C. macrorhynchus*) and house crow (*C. splendens*) are the major pests of oil palm in south India damaging 76% of the ripe bunches and 5.6% of the unripe bunches along with crow pheasant (*Centropus sinensis*), parrot (*Loriculus* sp.) and pariah kite (*Milvus migrans*) feeding on oil palm fruits.

All these studies from various parts of the world recommended that a study of the different types of birds and their behaviour is a prerequisite for effective control of bird damage to fruits.

14

### Bird community of Eucalyptus plantations in Punjab

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Department of Forestry & Natural Resources,  
Punjab Agricultural University, Ludhiana - 141 004.

Three eucalypt block plantations (each having an area of 12 acres) in Ludhiana district of Punjab from October 1992 to September 1993 were selected to study the bird community. A general survey was also conducted on eucalypt rows, strips and scattered trees to find out all bird species visiting eucalypt plantations for purposes like roosting, nesting and perching.

Out of sixty six bird species, 52 were found in eucalypt blocks, and 39 species on rows and strips. Fifteen bird species utilized eucalyptus for nesting, 28 species for roosting. Shannon-Weiner species diversity (H) and equitability (J) in eucalypt block plantations were 1.21 and 0.77 respectively. Bird density was found to be 21.04 birds/ha.

Eucalypt plantations also provided shelter for great horned owl, redheaded merlin and shikra.

15

### Echinostome in Indian cormorant (*Phalacrocorax nige* (Vieillot))

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1. Department of Preventive Medicine,
2. Department of Wildlife Science. Madras Veterinary College, Madras - 600007.

An young great Indian cormorant (*Phalacrocorax niger*), aged 6 months was fell down at Kellys, Madras. It was suffering from acute enteritis, died after two days of observation. On post-mortem examination, it was found to suffer from Echinostomiasis (fluke infection in birds) and Capillariasis (round worm infection in birds). Details of the lesions were discussed.

16

### A modern walk through Aviary for Terrestrial Birds at Arignar Anna Zoological Park, Vandalur.

M. JAGANNADHA RAO & P. ASAITHAMBI

Arignar Anna Zoological Park, Vandalur, Madras-48.

Having realised that scientifically managed zoos are inevitable to conserve the rapidly depleting wildlife resources, it is very essential to meet the physical and physiological needs of the animals in captivity by providing adequate living space for free movement and exercise with provisions for protection from extremes of weather conditions simulating nature. For birds in the zoological parks walk through aviaries have become popular to meet the twin objectives of utmost freedom to the birds as well as natural feeling to the visitors.

One such large walk through aviary for terrestrial birds has been built on modern scientific lines in an area of 15000 sq mt. at Arignar Anna Zoological park Vandalur and was fully commenced for scientific studies since 1992. The

objectives of the aviary are 1) The birds should have an area large enough for free flight 2) The aviary must blend into the surrounding area 3) visitors should be able to enter the enclosure without disturbing the birds but should also have a clear view of the birds but should also have a clear view of the birds. 4) Enrichment of the enclosure with trees, shrubs and water facilities to simulate the natural conditions for perching, feeding and resting.

The recent study indicated that 16 species have acclimatized to the co-existence in aviary as can be observed from their perching and nesting behaviours. Eight species have successfully constructed nests and laid eggs also. All the details regarding design installation, nesting and breeding are discussed in the main paper.

17

## Population count and time activity pattern of some birds of economic importance in Mannampandal.

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The population count and time activity pattern of the common myna, (*Acridotheres tristis*), the black drongo (*Dicrurus adsimilis*) the spotted dove (*Streptopelia chinensis*), and the large pied wagtail (*Motacilla madraspatensis*), were studied at four different sites of Mannampandal area from January to March 1992. Monthly mean counts of the above birds were 370, 92, 61 and 32 at the four sites. Site IV indicated relatively greater population than other sites. Variations in population density among the birds have been discussed. The per cent time spent by the above birds except the drongo on feeding and flying was relatively higher during 6-9 hours and 15-18 hours than other time blocks.

## A Technique for estimating barn owl prey biomass

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Mannampandal 609 305, Tamilnadu

Studies on raptor diet provides valuable information on prey distribution, abundance, behaviour and vulnerability. The percentage occurrence of each prey category in the total sample can be calculated by pellet analysis method. However, this method cannot give the information on the biomass of prey consumed by barn owls. Hence a technique has been described by which prey mandibles are used to estimate the consumed prey biomass of barn owls. This technique is also used to estimate the rate of barn owl food consumption.

Mean burrow occupancy of field rodent pests.  
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 R. KANAKASABAI

Division of wildlife Biology, A.V.C. College, Mannampandal  
 609 305, Tamilnadu.

The population of rodents was estimated in the crop fields by Live Burrow Count, Lincoln index and Removal methods. Burrows of rodent pests viz., *Bandicota bengalensis*, *Millardia melada* and *Mus booduga* were excavated in the crop fields and fallow lands to determine the mean burrow occupants from February '93 to January '95. The Population of rodent pests was observed more than one per burrow during January, February and August. Maximum number of rodents/burrow was  $4.53 \pm 4.53$ ,  $3.21 \pm 2.45$  and  $4.92 \pm 3.66$  for *B. bengalensis*, *M. melada* and *M. booduga* respectively. The mean burrow occupants of the predominant rodent pest was statistically not significant between the years for *B. bengalensis*.

2

Studies on the ecology of the fruit bat *Pteropus giganteus* in Kamarajar District, Tamilnadu.

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3. Forest Utilization Office, Madras.

The distribution, foraging strategies and roosting behaviour of *Pteropus giganteus* were studied, in the Kamarajar District from December 1993 to March 1994. Five permanent roosting colonies were identified by survey. The population in each colony was estimated by direct roost counts. The smallest colony had 225 individuals of both sexes and all age groups, and the largest colony had 400 individuals. The different tree

species used for day roosting included *Tamarindus indica*, *Ficus bengalensis*, *Ficus religiosa* and *Terminalia arjuna* (Neermarudhu). There was no preference over the tree species for selection of day roost. The distance of the food source from the roost was also not a criterion. But wide spreading trees with greater canopy width were generally preferred. Bats of the same colony moved in different direction for feeding in order to avoid competition among themselves and to explore new feeding areas. The food sources were situated from 4 to 45 km from the roost sites. The time of departure from the roost and the time of arrival to the roost differed among the members of the same colony. The duration of the foraging activity also showed some variation even among the members of the same colony. Faecal analysis revealed the presence of *Ficus*, Guava, Kovai, Sappota, Tamarind, Nuna, (*Morinda*) seeds indicating that they formed the major source of food for all colonies. The fruit bats were found to play an important role in the dispersal and natural regeneration of *Ficus* and *Morinda* sp.

3

Impending danger to the Lion tailed monkey (*Macaca silenus*) at Srivilliputtur, grizzled giant squirrel sanctuary, Tamilnadu.

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3. Forest Utilization office, Madras.

The endangered lion tailed macaque of India (LTM) is fighting its last battle in some small patches in the western ghats. It is distributed in small pockets of the shola forest of Karnataka, Tamilnadu, and Kerala in elevations ranging from 500-1600 mts. The PHVA symposium concluded that about 4000 animals are living in the wild. A survey of macaque at the Grizzled Giant Squirrel Sanctuary, Srivilliputtur revealed

that there were 75 animals of 5 troops. There are many private estates in the western ghats and in this area these animals are scared away by the estate owners by firing crackers and shooting to guard their cash crops. The clearing of forest paves way to the fragmentation of the existing population and is the impending danger to these animals. No concrete steps so far have been taken to protect this species.

4

Estimation of population growth of Hanuman langur (*Presbytis entellus*) groups in Jaipur, Rajasthan.

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1. Government Boys Higher Secondary school, Pattukottai.
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The Hanuman langur lives in a wide variety of habitats. They have already joined list of threatened species published by CITES. The population and ecology of Hanuman langur were studied from 1985 to 1988 at Jaipur. The per capita rate of increase in group size was estimated in four different habitats in 20 langur groups. The per capita rate of increase in group size was highest in forest habitat. But the average per capita rate of increase in population was 0.99 and the value of lambda is less than 1. It indicates that there was overall decrease in the population over a period of one year.

5

A study on diurnal activity pattern of sambar deer (*Cervus Unicolor*)

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Observations were made on sambar (*Cervus unicolor*) in Aringnar Anna Zoological Park at Vandalur. The behavioural

Studies revealed that the deers were most active during 11.00 to 12.00h and at 15.00 to 16.00h which coincides with the feeding time. Resting time was pronounced in the morning and afternoon. Statistical analysis showed no significant differences in activities such as standing, walking and sleeping.

6

### Histological characteristics of the preorbital gland in black buck (*Antilope erevicapra*),

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In antelopes chemical communication is established by the presence of certain dermal glands. Preorbital gland in black-buck (*Antilope cervicapra*) of antelope family was studied. It was located in the bony fossa anterior to the lower margin of the orbit. There are variations in the size and colour between the territorial male and the rest of the adult males. In territorial black buck the gland was darker and larger than the other bucks.

On microscopical examination, the characteristic and distinguishing features of the territorial buck were 1. epidermis was thick 2. hair follicle components namely hair follicle, sebaceous glands and arrectores pilorum were thick 3. Apocrine sweat glands were more in number with wider lumen distributed throughout the dermis. The alveolar type of glands were thrown into numerous folds, 4. The fat cells were incorporated in the epithelium of sweat gland and also as isolated mass. 5. Cytoplasmic blebs were observed in the cuboidal cells lining the sweat glands, and 6. the most distinguishing feature was the presence of melanin pigment as

coarse granules in all the cells of epidermis except those of stratum corneum. Melanoblasts were also found in the superficial layer of dermis.

7

Activity patterns and feeding habits of gaur (*Bos gaurus*) in Berijam reserve forest, Palni hills, Tamilnadu.

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Daily activity pattern studies revealed that the gaur was most active between 0600 h and 0900 h and 1600 h to 1900 h. The different activities such as feeding, moving, resting, vocalization, drinking, fighting and comfort behaviour were observed. The result shows that the gaur spent most of the time on feeding. Gaur feeds selectively in grass dominated areas. The observation shows that the gaur are primarily grass eaters though they also feed on browse species. The diet of the gaur consists of the grass species such as *Themeda cymbarica*, *T. tremula*, *Eragrostis tenuifolia*, *Setaria* sp. *Heteropogon matrinii*, *Imperata cylindrica* and *Ishaemum* sp. The gaur actively feeds from 0600-h to 0900 h in the mornings and 1600 h to 1900 h in the evenings.

8

A preliminary survey on crop damage by major wild animals in the forests of Kerala

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A survey was conducted to determine the crop damage by wild animals in Kerala. The data were collected from the office record of the Divisional Forest Offices and by visiting

the field. Major crops destroyed by wild animals in Kerala are paddy (*Oryza sativa*), coconut palm (*Cocos nucifera*), plantains (*Musa sp.*), arecanut (*Areca catechu*), coffee (*coffee arabica*), tea (*Thea sinensis*), rubber (*Hovea braziliensis*), cashew (*Anacardium occidentale*), oil palm (*Elaeis guineensis*), pepper (*Piper nigrum*), sugarcane (*Saccharum officinarum*) and tapioca (*Manihot utilissium*). Maximum crop damage was recorded from the wynaad wildlife sanctuary. Elephant (*Elephas maximus*), wild boar (*Sus scrofa*), porcupine (*Hystrix indica*), gaur (*Bos gaurus*), sambar (*Cervus unicolor*), bonnet macaque (*Macaca radiata*), and common langur (*presbytis entellus*) are the main animals involved in crop damage. Out of the total compensation claimed only 8.2% was disbursed by the forest department. It is found that high voltage electric fencing using energizer is very effective for stopping elephants from entering agricultural fields. The traditional methods practiced by tribals were also effective to certain extent.

9

Conservation perspectives for the threatened wildlife habitats and selected endangered mammals of the Nilgiri Biosphere Reserve.

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Significance of reserve forests, which form 59% of the Nilgiri Biosphere Reserve, in terms of endangered species and threatened habitats (5540 sq km) has been focussed. These reserve forests harbour various endangered species such as elephant (*Elephas maximus*), hyaena (*Hyaena hyaena*), sloth bear (*Melursus ursinus*), fourhorned antelope (*Tetracerus*

quadricornis), blackbuck (*Antelope cervicapra*), Nilgiri marten (*Martes gwalkinsi*) and Nilgiri langur (*Presbytis johnii*). Abundance of these species in the reserve forest was greater than in some protected areas in the Nilgiri Biosphere reserve. Many endangered species heavily depend on endangered habitats such as gallery forests, valleys, and tropical thorn forests which are located in reserve forests. These forests are being subjected to heavy anthropogenic pressures. The ways and means to protect the endangered species and habitats through species specific and habitat specific conservation programmes have been addressed. This approach would go a long way in benefitting not only specific endangered species and habitats but also in conserving the rich biodiversity of the Nilgiri Biosphere Reserve.

1  
Biological diversity - A short study from  
Grizzled Giant Squirrel Sanctuary, Srivilliputhur.

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The Grizzled Giant Squirrel Sanctuary is situated in the Kamarajar District forest division, Tamil Nadu with an area of 480 sqkm. To date the diverse forest ecosystem is on the threatened condition and it needs In-situ and Ex-situ conservation from its extinction. The diverse habitats in this sanctuary are ideal for many wild animals. The study area is classified into (i) Shola forest (ii) Mixed forest (iii) Riverine forest (iv) Scrubland (v) Grassland and (vi) Dry deciduous forest. A survey of the forest types revealed that *Zizyphus* sp., *Aibizzia* sp., *Bauhinia* sp., *Holoptelia* sp., *Acacia* sp., and *Tamarindus* sp., are utilized by the animals. The dominant tree species like *Terminalia* sp., *Gyrocarpus* sp., *Pterocarpus* sp form the major part of the sanctuary. The animal droppings were generally analysed to know the percentage of seed distribution since they are a boon to sudden activity or afforestation. The conservation measures are discussed against depleting plant and animal resources.

2

Comprehensive approach for the rehabilitation and regeneration of forests, community lands and private lands

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Andhra Pradesh is the fifth largest state in geographical area and the third largest in forest area in the country. The notified forest area is 63,814 Sq. km. which forms 22 per cent of the land. The per capita forest area is 0.10 hectares.

Like most other states, forests in Andhra Pradesh are in various stages of degradation, primarily because of intense "biotic pressure" which includes the effects of human population - in the form of cutting for cultivation, harvesting wood for sale, indiscriminate grazing and burning of forest floor - adversely affecting the productivity of forests in quality and content.

As per the Forest Survey of India, 25 per cent of notified area is without forest cover and less than half of the area has crown density of 40 per cent or more. Nearly 28,000 Sq. km is categorised as degraded forest, requiring rehabilitation and regeneration.

3

### Plants in modern medicine

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The medicinal and pharmaceutical resources of India is very high since the ancient years. Medicinal plants were known to the early civilizations. Most diseases caused by infectious organisms can be controlled by drugs. The history of the drug plants is as early as 5000 to 4000 BC. Drug yielding plants can be used as raw materials for pharmaceutical, perfumery, cosmetics and flavour industries. Some of these plants produce valuable drugs which have high export potential. Plants form a dominant part of ayurvedic pharmacopoeia. Emetine, papaverine, quinidine, berberine, khellin, morphine,

atropine, cocaine, noscapine reserpine, serpentinine and vincamine are some of the important plant drugs. More than 200 plants are exploited from wild sources for production of formulation of traditional systems of medicine. Plants not only give food and shelter and also takes care about our health.

4

### Ethnobotanical studies on kurumbas of Kotagiri (Nilgiris) and pharmacognosy of *Moringa concanensis*

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The role of Ethnobotany in the study and conservation of forest Ecosystems in Kotagiri regions of Nilgiris district by the tribals of kurumbas is highlighted. There are about seven subtribes distributed dwelling in Nilgiris district of Tamilnadu. The traditional culture and social restrains developed by kurumbas on resource utilization can greatly help the conservation of Bio-diversity.

The paper enumerates sixty species (54-genera, 45 families) which are used in their customs, food, medicines etc., with notes on their local name, uses, method of collection, drug preparation, dosage and mode of administration etc apart from their role in forest conservation. Among these *Moringa concanensis* is used for birth control by the tribe. Pharmacognosical informations are scanty and hence it is studied with the following parameters: macro and micro morphology of bark, organoleptic, fluorescence and phyto-chemical evaluation of stem, bark were determined.

### Bird attracting trees for reforestation of dry evergreen forest

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Birds play a vital role in seed dispersal of plants, because of their fruit-eating habits and the long distances they travel. They aid in the natural regeneration of several wild plants by dispersing their seeds away from the parent plant as well as by placing them in suitable sites for germination.

A study on plant-bird interactions was carried out in Point Calimere Wildlife and Birds Sanctuary, South India. The vegetation of the forest in this Sanctuary is tropical dry evergreen type. Out of 317 flowering plants in Point Calimere 91 species have fleshy fruits. Twenty fruit-eating birds, of which 14 are legitimate seed dispersers are recorded from this locality. Those plants whose fruits were eaten by birds are considered as bird attracting plants. The list of these plants was prepared by making extended observations on fruit bearing trees.

At Point Calimere, 27 wild trees belonged to 17 families are recorded as bird attracting species. Moraceae and Rubiaceae are the dominant families having five and three bird attracting species respectively. However, only 10 tree species were found to attract more than six species of legitimate seed dispersers. Maximum number of bird species were attracted to *Salvadora persica* (15) followed by *Manilkara hexandra* (12) and *Ficus tsjakela* (11). In addition to these ten species, other trees such as *Walsura trifolia*, *Lanea coromandelica*, *Azadirachta indica* and *Cretaea adansosii* which fruit during dry season and whose fruits from food for birds during lean period are also

considered important from the birds point of view. Therefore, for reforestation of dry evergreen forests, the above-mentioned bird attracting indigenous trees should be selected.

6

## Perspectives of mycological research in the forest ecosystem

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Forest biomes vary in their structure and composition. They are governed mainly by the complex climatic and edaphic conditions of the habitat. The litter constitutes one of the important components in the detrital system of any ecosystem since it plays very important role in the biogeochemical cycling of matter. The rate of leaf fall, accumulation of litter and decomposition and the associated microbes, particularly mycoflora vary depending on the nature of the biomes and the prevailing environmental conditions. The fungi, characterized by the excretion of extracellular enzymes, play a crucial role in the disintegration of the complex organic matter and in releasing the various organic and inorganic fractions and energy from the decomposing litter.

Some species of fungi for example *Acaulospora* spp. *Boletus* sp. *Cortinarius* sp, *Gigaspora* spp, *Glomus* spp, *Gomphidius* sp, *Hebeloma* sp, *Laccaria*, *Lactarius* sp, *Pisolithus* sp, *Rhizopogon* sp, *Russula* sp, *Scleroderma* sp, *Suillus* sp, *Tricholoma* sp; etc., have symbiotic association with root systems of forest plants. They are broadly categorized into ecto and endo mycorrhizae. They play a beneficial role in the productivity through enhancing the uptake of nutrients.

Moreover, forests are the potential habitats for the germplasm collection of edible mushrooms and biocontrol agents which could serve as an alternative source of food and chemical control of diseases respectively.

7

Leaf surface mycoflora of teak plantation of Saliyamangalam (Thanjavur Dt.) Social Forestry

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The leaf surface Mycoflora of green, senescent and brown fallen leaves of teak (*tectona grandis*) was studied by plating of leaf surface washings and washed leaf bits. The observations were made over a period of 9 months at an interval of three months. Thirty eight species of fungi were isolated during the period of three samplings. Among thirty eight species isolated 3 belonged to phycomycetes, one belonged to ascomycetes and the remaining 34 belonged to fungi imperfecti.

The population of the fungi was comparatively more on the surface of senescent leaves than the green and brown fallen leaves. The species of *Aspergillus* was more in the first sampling (November) than the other samplings. *Humicola* sp, *Melanospora* sp, *Nigrospora* sp and *Pestalotia* sp were observed.

8

Studies on the dynamics of leaf - litter fall in the dry-ever green forest at Point-calimere

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Leaf litter is an important constituent in any ecosystem since it is the source of material for the biogeochemical cycling.

of litter. The dynamics of the leaf litter fall of *Manilkara hexandra*, a dominant tree species of coastal tropical dry evergreen forest at Pointcalimere, was studied. Leaf fall was maximum during the post-monsoon period followed by summer months. The annual turn over of the litter was 10.28 kg/sq mt. Monthly variation in the leaf fall and the accumulation of litter have also been discussed.

9

Studies on the energy content of the decomposing leaf litter in the mangrove ecosystem

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The mangrove ecosystem at Pichavaram is dominated by *Avicennia* spp. and *Rhizophora* spp. The leaf litter decomposition of the plants in the mangrove habitat was studied by adopting nylon mesh bag technique. The changes in the energy content and the absolute energy of the decomposing leaf litter was studied by using Oxygen Bomb Calorimeter. The energy content was ranged between 2875 and 4161, and 3182 and 4688 g cal<sup>s</sup> g<sup>-1</sup> dry weight of the litter; the absolute energy content declined from 77.2 to 25.2 and 117.2 to 26.6 k.cals; and the energy release from the litter during the period of one year was 67.2 and 77.3% in the decomposing leaf litter of *A. marina* and *R. apiculata* respectively.

10

Studies on the interfungal interactions

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Interfungal interactions of soil fungi namely *Cunninghamella elegans*, *Gliocladium virens*, *Trichoderma koningi*, *T. harzianum* and *Trichoderma* sp. with *Thanetophorus cucumeris* were

studied *invitro* in dual culture experiments. *G. virens*, *Trichoderma* sp. *T. harzianum* and *T. kontngi* grew over *T. cucumeris*. Mycoparasitic interactions viz. coiling, penetration, ramification, hyphal bursting and lysis were observed. It has been assigned to necrotrophic mycoparasitism. Screening of fungi in the forest ecosystem for such antagonistic interactions could provide wild strains as tools for biological control.

## Studies on the mycorrhizal association in Angiosperm plants

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Mycorrhiza is a type of beneficial association (Symbiotic) of fungi with the root system of plants which enhances the productivity of plants. It is broadly categorized into ecto and endomycorrhiza. Roots of thirty plant species belonged to different taxonomic groups and habits were screened for the endomycorrhizal association - vesicular and arbuscular mycorrhiza (VAM). Hyphal association, vesicles and arbuscules were developed endogenously and intracellularly in the cortical cells of the roots. Almost all the plants screened for VAM had one form or other of VAM. The species of VAM fungi include *Gigaspora* spp, and *Glomus* spp. Distribution and occurrence of VAM have been discussed.

12

Ethnobotanical studies in Melagiri hills, Hosur forest division, Dharmapuri district, Tamilnadu.

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Medicinal plants of Melagiri hills were surveyed at three different sites. Forty three herbal remedies belonging to different taxonomic groups and habits were recorded. 20 species at Melur site, 19 species at Gullaty site and 22 species at Thelupetta site were observed.

These sites were dominated by *Zizyphus jujuba*, *Phyllanthus emblica*, *Wrightia tinctoria* and *Aegle marmelos* respectively. The uses of different parts of these plants as herbal remedies for various diseases have been discussed,

1

Wildlife management in Madhav national park,  
Shivpuri, Madhya Pradesh

RAJIV SAXENA<sup>1</sup>, PRADEEP SHRIVASTAVA<sup>2</sup> and R. MATHUR<sup>3</sup>

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Madhav National Park [77° 15'-77° 42' E & 24° 50'-25° 55' N] is situated in Shivpuri district of Madhya Pradesh. The forests of the park are northern dry deciduous mixed type. An area of 165 sq. km. forest is rapidly shrinking and thinning out because of the lack of proper management. Major problems of the park studied during last 7 years include [1] management of waterbodies and provision of water, [2] management of wetlands for water birds, [3] protection of the boundaries of the national park, [4] management of the food availability [5] the peoples participation in conservation, [6] forest fire, and [7] ecotourism and its effects. While formulating the management plan for the conservation of the forest and the wildlife of this national park, the inter-specific relationship of fauna was taken into consideration. While suggesting the measures to improve the ecological condition for one species, it was primarily noted that the measure should not be detrimental to requirements of other species. The paper discusses these problems and suggests the measures for more effective management of Madhav national park.

2

A study of visitors attitude towards wild  
animals and zoos

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A study on visitor's attitude towards Wild animals was carried out at Arignar Anna Zoological Park, Madras. A

standard Questionnaire containing visitors social status, their nature and attitude towards wild animals, age and educational status was prepared. A total of 1200 visitors attitude towards wild animals was recorded and discussed.

3

### Forest grazing and disease spread to the wildlife

MATHEW C. JOHN

Madras Veterinary College, Madras - 600007.

Foot and Mouth, Rinderpest and other diseases are interesting models for the study of the inter-relationship between disease in wild animals and domestic stock. The virus types, subtypes, variability of virulence in different species leads to a complex epizootological developments.

4

### Management of reptiles in captivity and their use in the educational programme at the Arignar Anna zoological park, Madras.

N. BASKAR and M. JAGANATHA RAO

Arignar Anna Zoological Park, Vandalur, Madras

The reptiles are playing a major role in the Indian economy and the snakes may be regarded as the best friends of farmers. In the Madras zoological park 21 species of reptiles are kept scientifically in simulated conditons. Generally there is a misbelief among the public that snakes are enemies to the mankind. In order to clear off their dcubts and to create awareness about the snakes value to them, the Madras zoological park is running breeding and educational programme to the visiting public. The programme includes snake shows, touch table and film shows.

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