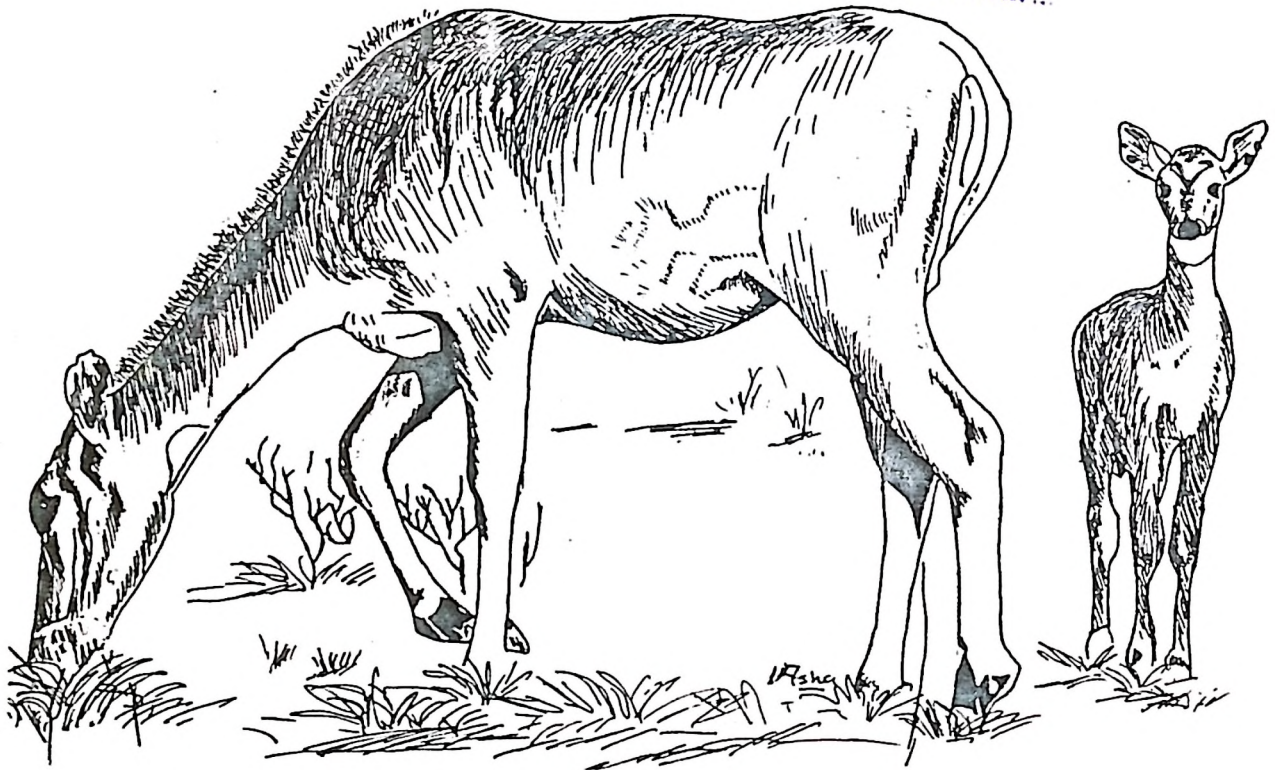


NEWSLETTER

पुस्तकालय Library
भारतीय वन्य जीव संस्थान, देहरादून
Wildlife Institute of India
वसिष्ठ
ACB 10
आवक सं.
पुस्तक सं.
पत्रक सं.
दिनांक/Signature



WILDLIFE INSTITUTE OF INDIA

Vol. 3 Nos. 1 & 2

Jan. - April 1988



CONTENTS

Editorial

<i>Development at the Institute</i>	2
<i>Research & Projects</i>	7
<i>Workshop & Seminar</i>	9
<i>Special Features</i>	10
<i>Announcements & New Faces</i>	28
<i>Films</i>	29

Editor : R. N. Acharya

Art Work : Asha Jain

Word Processor : H. C. S. Rajwar

Wildlife Institute of India

P. O. New Forest

Dehra Dun - 248006

Phones : 27021 to 27028

(Ext 334)

28760 (Director)

83334 (Wildlife Extension Faculty)

83394 (Account Sec.)

83324 (Adm. Sec.)

Telex : 585/258 FRI IN

Editorial

This issue of the WII Newsletter contains both the nos.1 and 2 and thus covers January through April, 1988. Bringing out this issue of the Newsletter has been delayed due to various reasons. However, we promise to bring out following issues in time for which your cooperation is needed. These four months have been very hectic at the Institute with the starting of the M.Sc. programme in wildlife. This apart 9th Diploma Course in Wildlife Management also came to an end in the month of April '88.



Mr. K. Berkmuller, who had been one of our editors, will be leaving India in June '88 as the first phase of the FAO/UNDP project at WII comes to an end. Mr. Berkmuller's contributions towards the Institute in terms of providing his expertise and improving the quality of the Newsletter has been commendable. We wish him all the best in his postings in Laos as well as Malaysia.

This issue includes a study on Nilgiri langur in Mundanthurai Plateau, Tamil Nadu, and articles on Elephant transfer in Karnataka and on Nilgai among others.

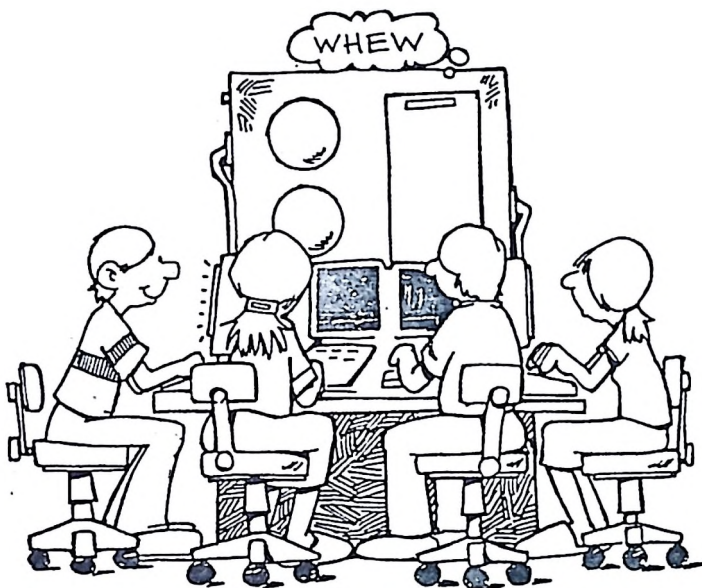
R. N. Achary

DEVELOPMENTS AT THE INSTITUTE

M.Sc. Wildlife Biology Course

For the M.Sc. Wildlife Biology Course in total 454 applications were received. Of these 300 applicants qualified, 81 were selected for the entrance test and 21 candidates turned up for the entrance test.

The written test was conducted on 6th December, 1987, personality test on 7th December and a merit list of 15 candidates was prepared. Seven following candidates were selected from the merit list.



1. Shri M.V. Katti
2. Miss Shomita Mukherjee
3. Shri Vasant Saberwal
4. Shri N.V. Ashraff
5. Miss Neema Manjrekar
6. Shri P.K. Bhagat
7. Shri Diwakar Sharma

At present we have seven students who joined the course. After a week's teaching at the Institute they were taken on an orientation tour to Delhi Zoo and Dholkhand from 17th January to 23rd January.

Unit 301 (Ecological Concepts) has already been taught and four more units (302 Physical Environment, 303 Conservation Biology, 304 Indian Flora and Vegetation Types and Unit 305 Biology of Indian mammals) are in progress.

A.J.T.Johnsingh

REPORT ON THE IX DIPLOMA COURSE IN WILDLIFE MANAGEMENT

The IX Diploma Course started on the 1st August, 1987 and is now coming to an end today after 39 weeks of activities. 24 Officer trainees from 14 different States and Union Territories namely Andhra Pradesh, Assam, Andamans and Nicobar Islands, Bihar, Himachal Pradesh, Kerala, Madhya Pradesh, Maharashtra, Mizoram, Rajasthan, Tamil Nadu, Uttar Pradesh and West Bengal joined this course.

The total training period of the course comes to about 39 weeks. Of this, 22 weeks were spent at headquarters in learning the theoretical basis of wildlife management, participating in seminars and guest lectures and writing exams, while the remaining 17 weeks were spent in field tours in the various protected areas of the country.

The first tour was the one week orientation tour at Chilla in Rajaji National Park from September 07-13, 1987 where the Officer trainees were inducted in identifying animal tracks, interpreting jungle signs, bird watching and in quantifying vegetation and animal evidences.

animal abundance in different vegetation types, assessment of impact of forestry operations on wildlife abundance and quantification of the effects of human settlements and pressures on wildlife were conducted. The Officer trainees did an indepth study of the problem of teak regeneration and also discussed the prescriptions of forest working plans.

During the field tours the emphasis was to study the range of management practices and problems in India's protected areas along with the need to integrate forestry practices to suit wildlife management and studying of human dimension aspects of wildlife management.

In order to inculcate love for outdoors, treks to Mohand Ridge were organized with the help of Dr Johnsingh and some bit of bird watching was done in the New Forest Campus.



A demonstration of the chemical immobilization technique was done in the Wildlife Institute of India Deer Park for the benefit of the Officer trainees by Dr Sale and Dr Sushant Chowdhury on 18th April, 1988.

Guest Lecture programme is another integral part of the training programme. Guest speakers with considerable experience in forestry and wildlife are invited to share their knowledge and expertise with our Officer trainees and the faculty. The following guest lectures were arranged during the training period :

On 6th October, 1987 Dr Cliff Rice of University of Texas, USA talked about the 'Behaviour and Ecology of Nilgiri Tahr'.

On 14th & 15th January, 1988 Shri N.K. Pantane, Director, Satpura National Park talked about the management practices and problems in Satpura National Park.

On 22nd & 23rd February, 1988 Dr Pratap Singh of I.C.F.R.E. gave lectures on 'Butterfly farming in India'.

On 24th February, 1988 Dr Vivek Sinha, Additional Secretary, Defence Research, Govt. of India gave an excellent slide show and discussed various intricacies of wildlife photography.

On 8th March, 1988 Dr M.L. Hunter of the University of Maine, USA gave a talk on 'Managing forests for Biological Diversity'.

On 25th April, 1988 Shri Rajan Mathur, Dy.Chief Wildlife Warden, Keoladev National Park, Bharatpur gave a lecture on 'Wetland Management'.

During the Sariska Tour, Director of Veterinary Services of the U.S. Fish & Wildlife Service gave lecture and slide show on Wildlife Health and Diseases.

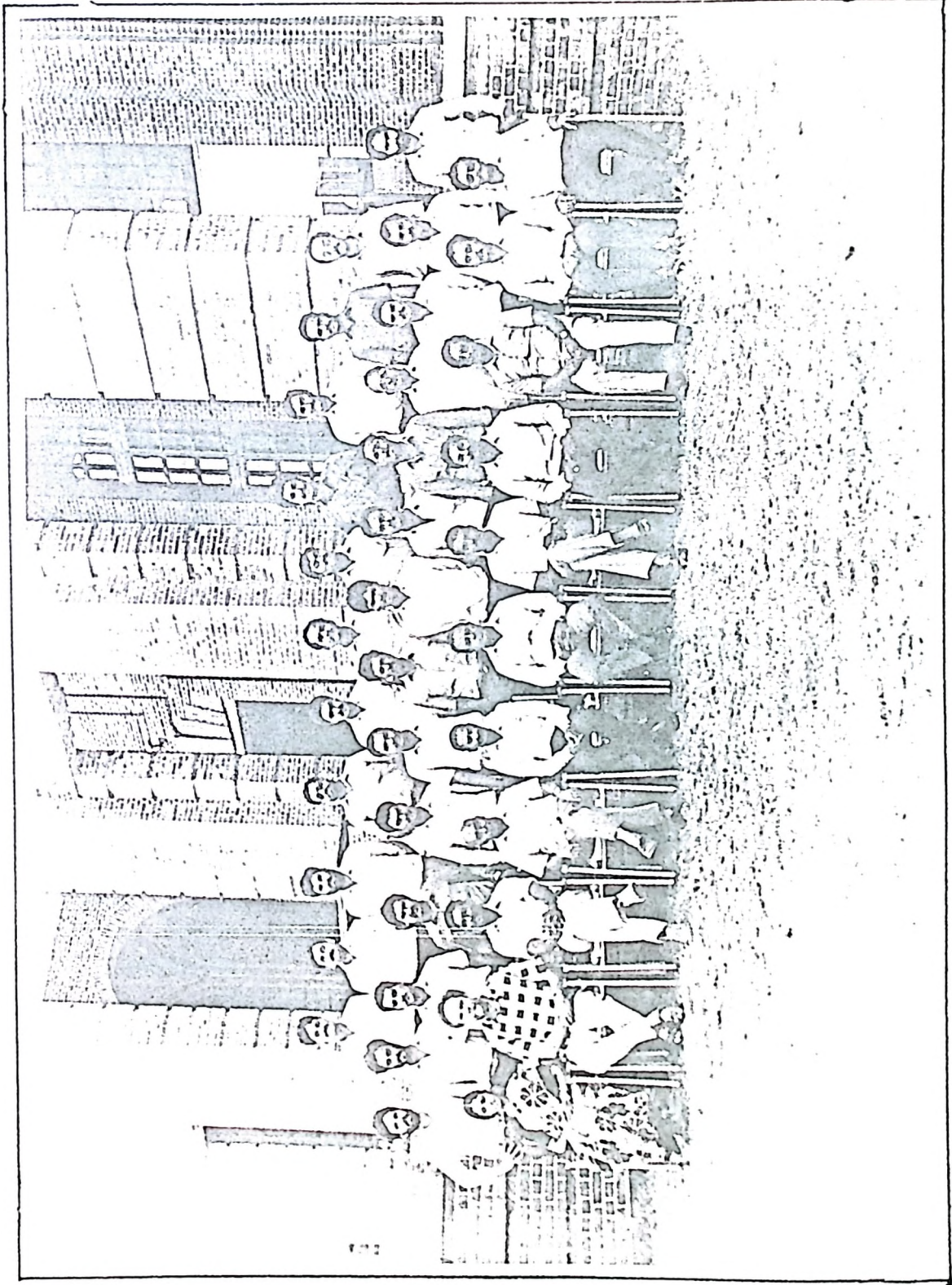
One of the new introductions in the training programme was organization of seminars by the Officer trainees themselves. The following seminars were presented :

Shri E.A.Jayson - Habitat Utilization of Large Mammals at Parambicular Wildlife Sanctuary.

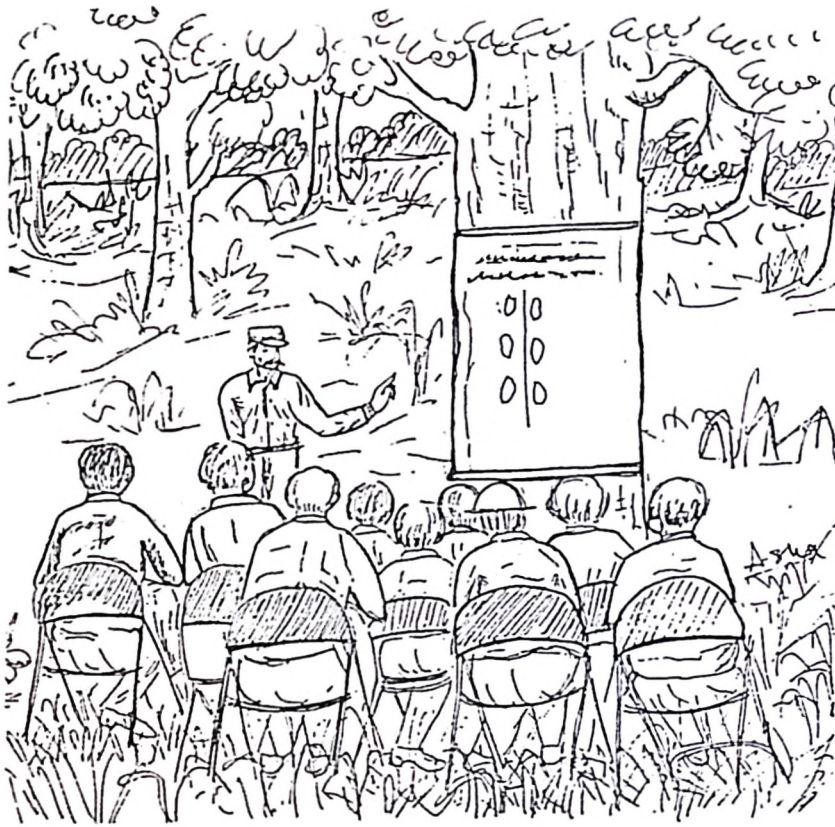
IX DIPLOMA COURSE IN WILDLIFE MANAGEMENT

WILDLIFE INSTITUTE OF INDIA, DEHRA DUN

1987-88



The Wildlife Field Techniques Tour was conducted from 28th October to 24th November, 1987. Places visited were Kedarnath Musk Deer Sanctuary, Sariska and Keoladev National Parks in Rajasthan. The Officer trainees evaluated the Musk Deer Breeding Project, discussed the problems of regeneration and trekked in high altitude during their stay in Kedarnath



Sanctuary. At Sariska, techniques for quantifying vegetation, estimating ungulate populations, quantifying biotic pressures on wildlife habitat were taught and discussed with the trainee Officers alongwith the study of recreation management of the park. In Keoladev National Park, Bharatpur, an effort was made to understand the intricacies of management of the wetland ecosystem and its conservation problems with the assistance of the local field Officers and the B.N.H.S. research team. In Delhi, the Officer trainees studied the management of the National Zoological Park and also visited the National Natural History Museum.

The Officer trainees went on their first management tour from 14th December to 10th January, 1988. The objective of the tour was to understand the management practices and problems in selected protected areas of the country. Field exercises were conducted to understand to census methodology being practiced in Corbett and Palamau National Parks. Rhino reintroduction programme and man-eating problem was discussed at Dudhwa. Problem of Animal Damage control and role of electric fencing was especially discussed in Dalma Wildlife Sanctuary. Weed eradication, fire and water management in these protected areas was also covered on this tour. Recreation management in these parks with special emphasis on the shifting of Dhikala Tourist Complex at Corbett was discussed by the trainee Officers.

The Management Tour II was conducted from 27th January to 23rd February. Places visited were Srisailem Tiger Reserve in Andhra Pradesh, Annamalai Sanctuary in Tamil Nadu, Parambicular and Periyar protected areas in Kerala. Conservation management of Lion Tail Macaques and Nilgiri Tahr was discussed in Annamalai Sanctuary. At Parambicular, Officer trainees discussed the impact of teak plantations in wildlife areas, grassland management, census methods and the new management plan being written of the Parambicular Wildlife Sanctuary. At Periyar, the management of Shola forests, commercial exploitation of eucalyptus plantations and problems of protection were discussed. A census exercise for estimation of ungulate abundance in moist deciduous and semi-evergreen forests was also conducted.

One of the major component of the Diploma Course is the Management Plan Tour which calls for the application of the entire knowledge assimilated by the trainee Officers during the training. This tour of 4-weeks duration was conducted at the Satpura National Park, Madhya Pradesh. The trainee officers were required to undertake detailed field investigations and prepare a comprehensive management plan. Several field exercises such as estimating

Shri J.P.Mishra - Birds & Animals of Andaman & Nicobar Islands.

Shri Tejendra Sharma - Management of Keoladeo National Park.

Shri G.S. Negi - Remote Sensing Techniques land use and habitat mapping.

Shri Harsh Mitter - Forest Management in Garhwal Himalayas.

Some bit of interesting detail by a trainee for this report

During the course of 9 months training the trainees travelled 21264 kms; of which 11008 kms was by road, 9851 kms by rail and another 405 kms on-foot. In spite of so much travelling there was no sign of travel fatigue amongst the trainees.

V. B. Mathur

WILDLIFE INSTITUTE OF INDIA IN SCIENCE EXHIBITION

Institute participated in Science Exhibition by displaying pannels, photographs and other extension materials at St. Joseph's Academy Ground from November 8-9, 1987. The exhibition of the Institute was visited by about 40,000 visitors mostly the college students. The exhibition was liked most and viewers appreciated the knowledge content displayed through the extension material.

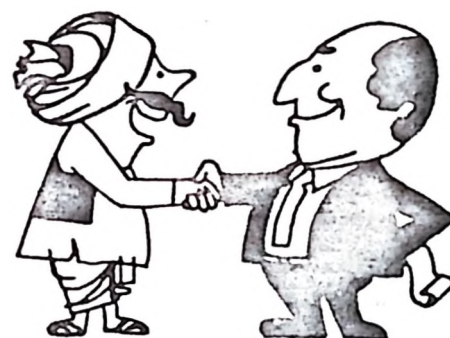
VISITS

The students of B.Sc.(Forestry), Institute of Forestry, Tribhuvan University, Nepal had visited Wildlife Institute of India during March, 1988. The following were organized for them :

- Academic discussions and lectures by the faculty members;
- Census/Animal abundance field exercise arranged at Phanduwala Camp; and
- Film show - Animal Capture and Rhino Re-introduction.

OVERSEAS TRAINING

Dr G.S. Rawat, Scientist-B, Wildlife Biology Faculty has gone to Colorado State University, USA for training in the field of Modern Wildlife Habitat Evaluation Techniques. The training is for six months starting from 1st January, 1988.



Dr P.K. Mathur, Scientist-B, Wildlife Management Faculty has visited the University of New South Wales, University of New England and Division of Tropical Crops and Pastures, CSIRO, Brisbane in Australia for one and half months during March-April, 1988. The training was on grassland management for wildlife including management of multiple-use grasslands.

TELE-FILM FOR UGC EDUCATIONAL PROGRAMME

A 19-minutes educational film "Crocodiles - The living Dinosaurs" was made by the Audio-Visual Research Centre of Osmania University in collaboration with Crocodile Research Centre of Wildlife Institute of India. The overall storyline, location, filming facilities as well as subject expertise was provided by Shri B.C. Choudhury.

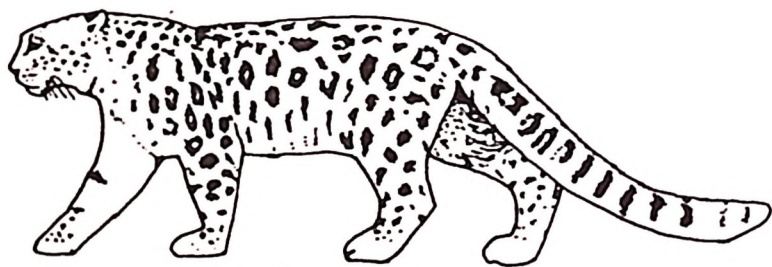
RESEARCH AND PROJECTS

SNOW LEOPARD STUDY IN LADAKH

After waiting for long time Shri R.S. Chundawat, Research Scholar finally got his orders to move to Marka Valley in Ladakh area for his research project on Ecology of Snow Leopard. The Chief Wildlife Warden, Jammu & Kashmir and his staff provided excellent support to Shri Chundawat and we hear from him that he is quite comfortable there inspite of the fact that he is working in a hostile weather where the temperature is below -20 C.

The Chief Wildlife Warden of Jammu & Kashmir has expressed his desire to co-ordinate with Wildlife Institute of India in respect of :

- a/ survey for Snow Leopard in Kishtwar region;
- b/ census of Hangul in Dachigam National Park; and
- c/ research project on Wetland Game Reserve of Jammu & Kashmir.



He has also invited Wildlife Institute of India to organize management plan exercise for the Diploma Course. Dr M.Y. Kadri, Head of the Department, Centre for Research & Development of Srinagar University has also expressed that he would like to co-ordinate with Wildlife Institute of India in conducting field research on wildlife which will help the management for better conservation of wildlife.

During my brief visit to Jammu & Kashmir in the first week of December, 1987, I visited Wooller Lake, Hygam Game Reserve and Hokersar Game Reserve which are excellent wetland areas where lot of migratory birds come during winter and traditionally the Directorate of Wildlife Protection of Jammu & Kashmir permit hunting of these migratory birds. From the local enquiry it was gathered that the number of birds visiting these reserves are gradually declining. But so far no management practice has been adopted to improve the habitat and everything has been left to nature. May be the Directorate of Wildlife Protection of Jammu & Kashmir with the help of cord of Srinagar University will take up suitable project(s) which will help the Directorate for better management of these excellent wetland areas.

During this period also noticed that the fur trade in Jammu & Kashmir is gradually declining. Only very established Furriers displayed fur articles for the tourists and small shops have practically closed down. It is noteworthy that export of fur articles is officially banned from April, 1985 and it was gathered that the furriers are lobbying hard to re-open the issue.

S.K. Mukherjee

PRESSURE AND DEPENDENCY BY LOCAL PEOPLE ON THE RESOURCES OF RAJAJI NATIONAL PARK

The Research Advisory Committee of the Wildlife Institute of India approved the project in July, 1986. The project had the objective of assessing the dependency of nearby communities on park resources and to determine the overall distribution of grazing and firewood collecting pressure on the park. This objective, by and large, have been met with the exception of the Chilla area of the park.

The second phase was expected to yield an action plan for park/community cooperation based on local needs and opportunities. The project never entered phase two because of early termination.

To evaluate the 3 factors "dependency", "pressure" and "opportunity" indicators were needed for which information was collected.

For 8 of the 33 villages visited, forest outside the park was nearer and more easily accessible but none preferred those forests to the park. This was explained either by the poor quality of forests or the presence of plantation. It was found that villages to the south generally scored higher in regard to poverty than to the north.



The area affected by village cattle grazing and firewood collecting as given by local forest guards quantifies extent, but not intensity of pressure. All areas affected by grazing are also affected by firewood collecting but ranges firewood collectors penetrate further into the park. The maximum depth of affected area ranged from 0-5 km from the park boundary.

The indicator of pressure from within refers to Taungya cultivators and Gujars. The density figures ranged from 0-58 people per km square.



Besides the above many other factors were also analyzed e.g. population outside the park, landless and scheduled castes and tribes, water sources, crop predation, village commons, development projects and park notification.

Analyzing the above certain management opinions were recommended.

Bitapi Das

WORKSHOP & SEMINAR

SPECIAL SESSION ON WILDLIFE CONSERVATION IN THE TROPICS

IX INTERNATIONAL SYMPOSIUM ON TROPICAL ECOLOGY

BANARAS HINDU UNIVERSITY, VARANASI

DECEMBER 12, 1987

The IX Symposium of the International Society for Tropical Ecology was marked by the inclusion of a Special Session on "Wildlife Conservation in the Tropics", for the first time. The Special Session which was organized and conducted by Shri H.S. Panwar, Director, Wildlife Institute of India, Dehradun received 34 papers out of which 12, representing the subject area diversity were read out. These papers contributed by Wildlife Ecologists, Park Managers and Conservation Educationists covered a wide range of subjects. Special mention should be made of the paper on the need of improving a national network of wildlife protected areas so as to ensure the protection of wildlife genetic diversity by establishing a link between protected sites and representation of biological communities on biogeographic considerations. This accorded with the shifting emphasis in conservation from species to ecosystems. Grassland ecosystems in the tarai and the arid regions were specially emphasized for evolving management strategies which lead to safeguarding plant and animal communities. The need for further research on management techniques which would provide welfare both for the smaller and the larger species such as from Bengal florican and Pygmy hog to Swamp deer and Rhinoceros, was highlighted. Pleas were made for conservation of mangrove environments as a means of stabilizing the coast lines, preserving the plant and animal species and augmenting the productivity of fish and forest resources for the people of the region.

Strong case was made out for regarding wildlife conservation in protected areas as an essential aspect of overall land use. It was argued that while the preservation of areas of natural wilderness was essential and could not be compromised, simultaneous efforts should be made to bring up the productivity of multiple use areas around such wildlife reserves so that the needs of the people are supplied by the latter and the pressures on the wilderness are minimized.

The Little Rann of Kutch harbouring wild-ass, flamingo and migratory wader birds was shown as a particularly threatened ecosystem requiring most urgent attention.

Four posters papers were also presented at the Session and these covered Wildlife Institute of India research studies on Elephant in North-West Himalayas and Grizzled Giant Squirrel in the dry deciduous forests of Tamil Nadu. The poster presentation on developing computerized wildlife national database attracted the maximum interest. This was backed by live computer demonstration of the way in which wildlife information system set-up at the Institute was working.

S.K. Mukherjee

SPECIAL FEATURES

NILGIRI LANGUR ON MUNDANTHURAI PLATEAU, TAMIL NADU.

S.F. WESLY SUNDERRAJ

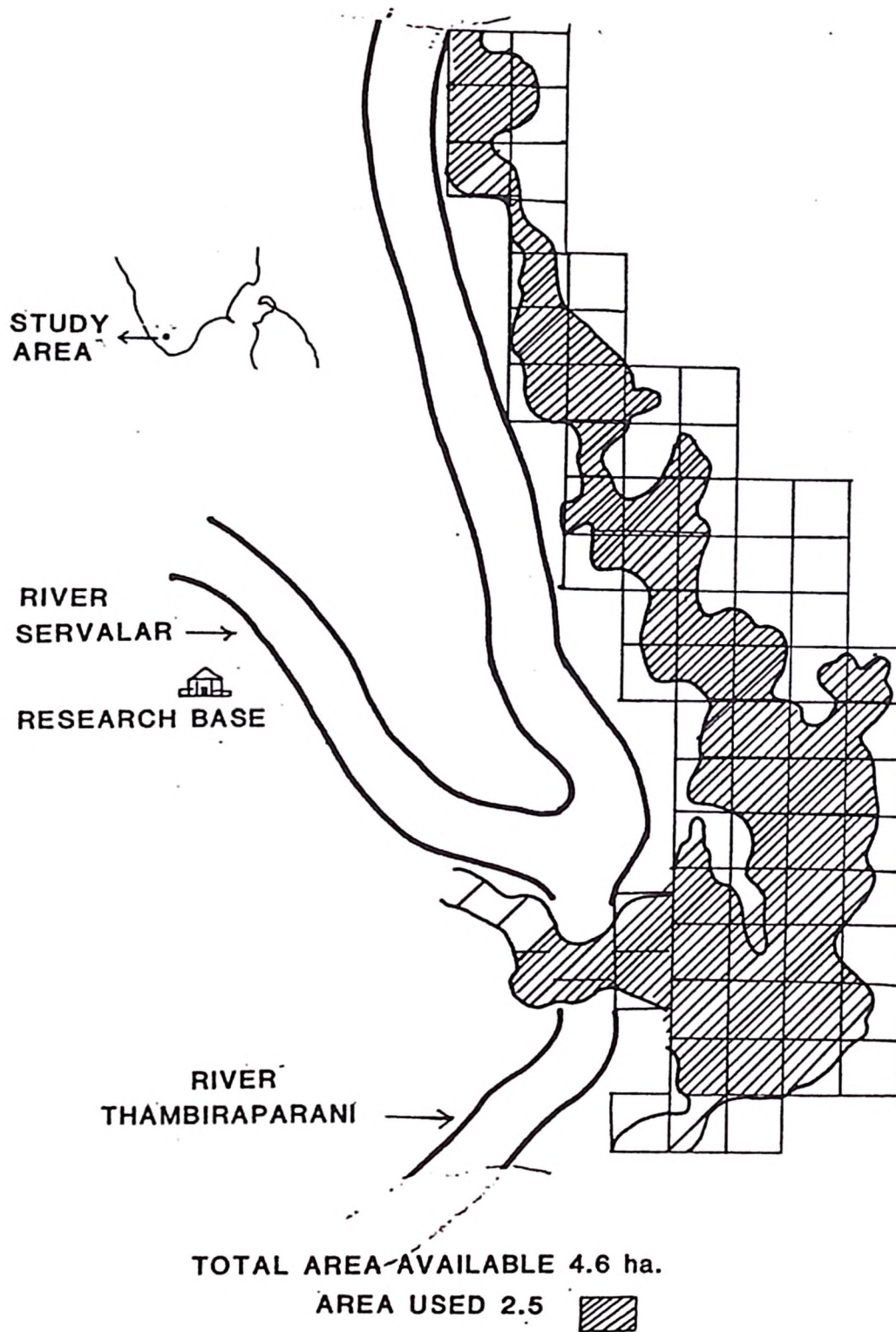
A.J.T. JOHNSINGH

The Nilgiri langur *Presbytis johnii*, a threatened primate, is endemic to Western Ghats of Tamil Nadu, Kerala and Karnataka. Nilgiri langur is largely a primate of evergreen forest found 600 m above mean sea level. However, in Tirunelveli hills it is found even in foot hills, where the gallery forests with several evergreen species have continuity with forests of the upper slopes. A typical example of this type of habitat is found in Mundanthurai Plateau (180 msl) where the riverine forests along the rivers Tambiraparani and Servalar once had a continuity with the forests in the higher altitudes.

Earlier studies on Nilgiri langur (Poirier 1970, Horwich 1972, Oates *et al* 1980) were conducted in the upper reaches (>900m) of Western Ghats. The present study on Mundanthurai Plateau since February 1984 is the first long term study on Nilgiri langur in foot hill forests where the habitat is subjected to serious wood cutting and langurs to occasional poaching. Nilgiri langur flesh is alleged to have medicinal properties.

Paper presented at the IX th Tropical Ecology Symposium, Varanasi.

**HOME RANGE OF MUNDANTHURAI TROOP, DIVIDED
INTO 25m QUADRATS, FEB 84 TO JAN 85.**



OBJECTIVES

The study has six objectives but data pertinent to only first and third objectives are presented here.

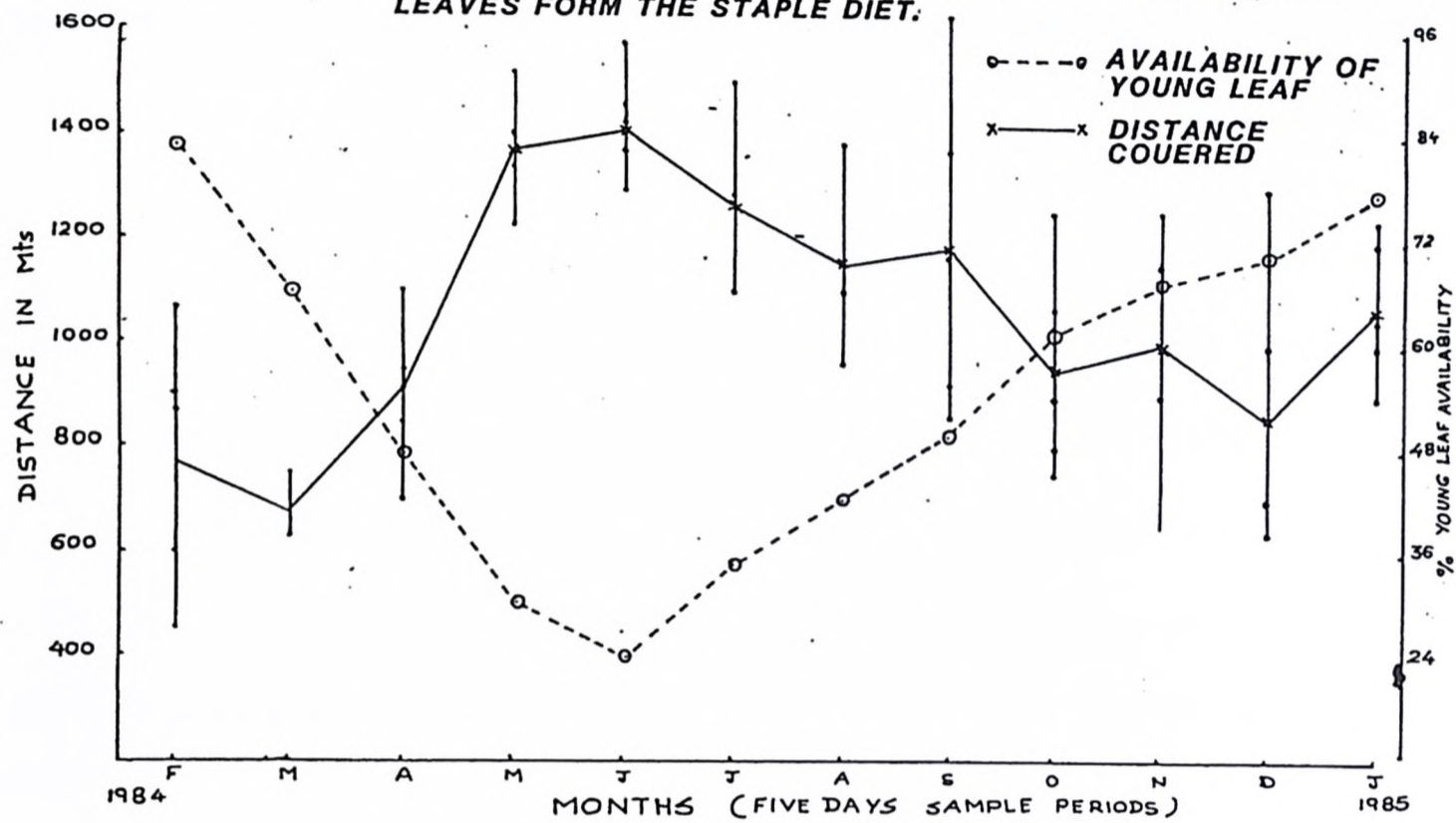
1. To estimate Nilgiri langur population on the plateau,
2. To quantify vegetation and phenology of food plants,
3. To collect information on feeding and ranging patterns of two troops.
Information on Mundanthurai troop for one year is presented here,
4. To assess the range quality of selected troops,
5. To estimate the rate of habitat destruction in riverine habitat a prime langur area and
6. Formulate recommendations for the long term conservation of Nilgiri langur on the Plateau.

METHODS

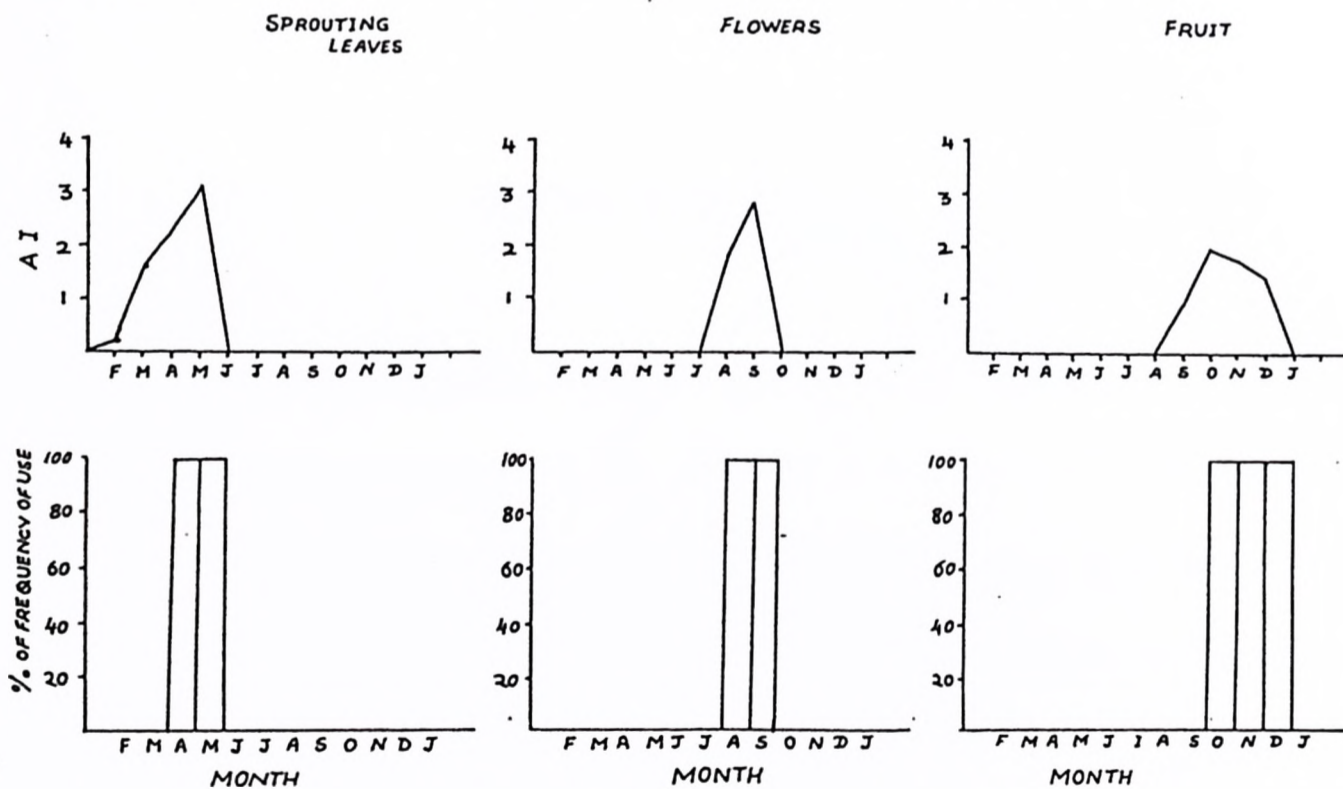
Population was estimated by total count method. The range of both the troops was quadrat mapped. Each quadrat is 25 sq.m. In the quadrats all the tree and climbers were enumerated. Data on phenology of food trees were collected.

Information on feeding and ranging was collected using the scan sampling method (Altman 1979).

THERE IS A GOOD CORRELATION BETWEEN THE AVAILABILITY OF YOUNG LEAVES AND MEAN DISTANCE COVERED. MORE YOUNG LEAVES LESS DISTANCE. YOUNG LEAVES FORM THE STAPLE DIET.



AVAILABILITY INDEX AND % FREQUENCY USE OF *STREBULUS ASPER*. PLANT PARTS OF THIS TREE WERE USED IN PROPORTION TO THEIR AVAILABILITY.



RESULTS

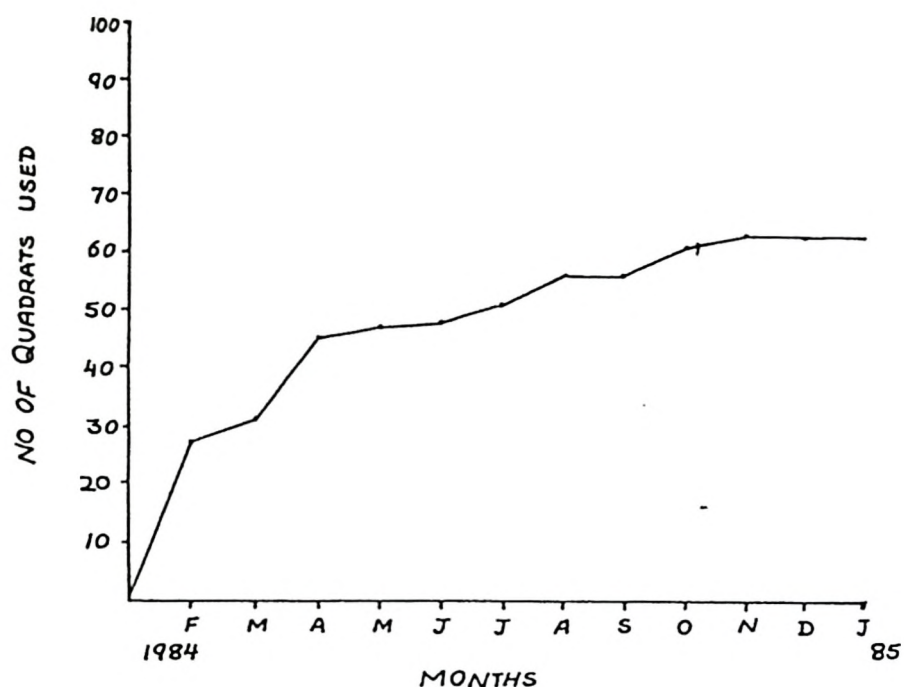
Results on feeding and ranging by Mundanthurai troop are presented in the figures and tables displayed here.

Age / sex differences in feeding , Mundanthurai Troop , Feb 84 to Jan 85

	Adult ♂	Adult ♀	Sub adult
Frequency of feeding	42.03	47.86	44.23
Percentage frequency of feeding on :-			
Young leaves	40.06	35.84	40.35
Mature leaves	5.14	4.74	4.26
Flowers	9.20	9.65	9.62
Fruits	27.51	28.86	26.40
Seeds	10.29	13.35	11.68
Petioles	4.05	3.88	3.83
Bark	0.62	0.60	0.62
Pith	1.95	2.10	2.13
Deadwood	0.23	0.13	0.16
Termite mound	0.70	0.52	0.60
Termite	0.23	0.34	0.35

NOTE : Lack of significant differences in selection of different plant parts .

CUMULATIVE NUMBER OF 25 M² QUADRATS USED BY MUNDANTHURAI TROOP FROM FEB '84 TO JAN '85. IT TOOK ALMOST 10 MONTHS FOR THE TROOP TO FULLY MAKE USE OF ITS HOME RANGE.



POPULATION AND SEX RATIO OF NILGIRI LANGUR ON MUNDANTHURAI PLATEAU, TAMILNADU

Year	Age / Sex					Total
	Adult ♂	Adult ♀	Sub adult	Juvenile	Infant	
1985	19	43	57	27	23	169
1986	22	51	40	43	19	175
1987	23	60	41	31	33	188
Average	21	51	46	33	25	177

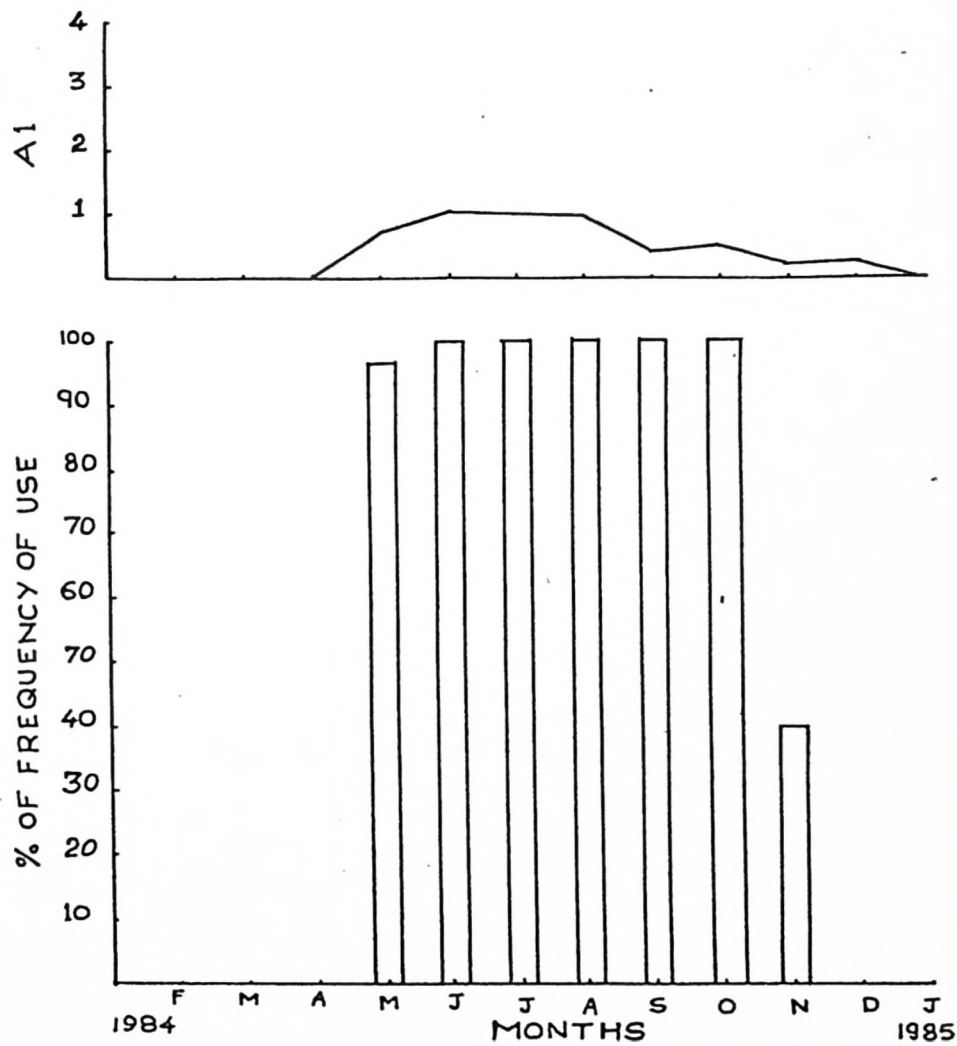
**Adult ♀
100**

**Adult ♀
100**

**Adult ♂
41**

**Infant
49**

AVAILABILITY AND UTILIZATION OF ALPHONSEA SCLEROCARPA



**ON THE CONTRARY ALPHONSEA SCLEROCARPA
FRUIT WAS HEAVILY USED INSPITE OF ITS LOW
AVAILABILITY.**

**Age / sex differences in behavioural activity ,
Mundanthurai Troop , Feb 84 to Jan 85**

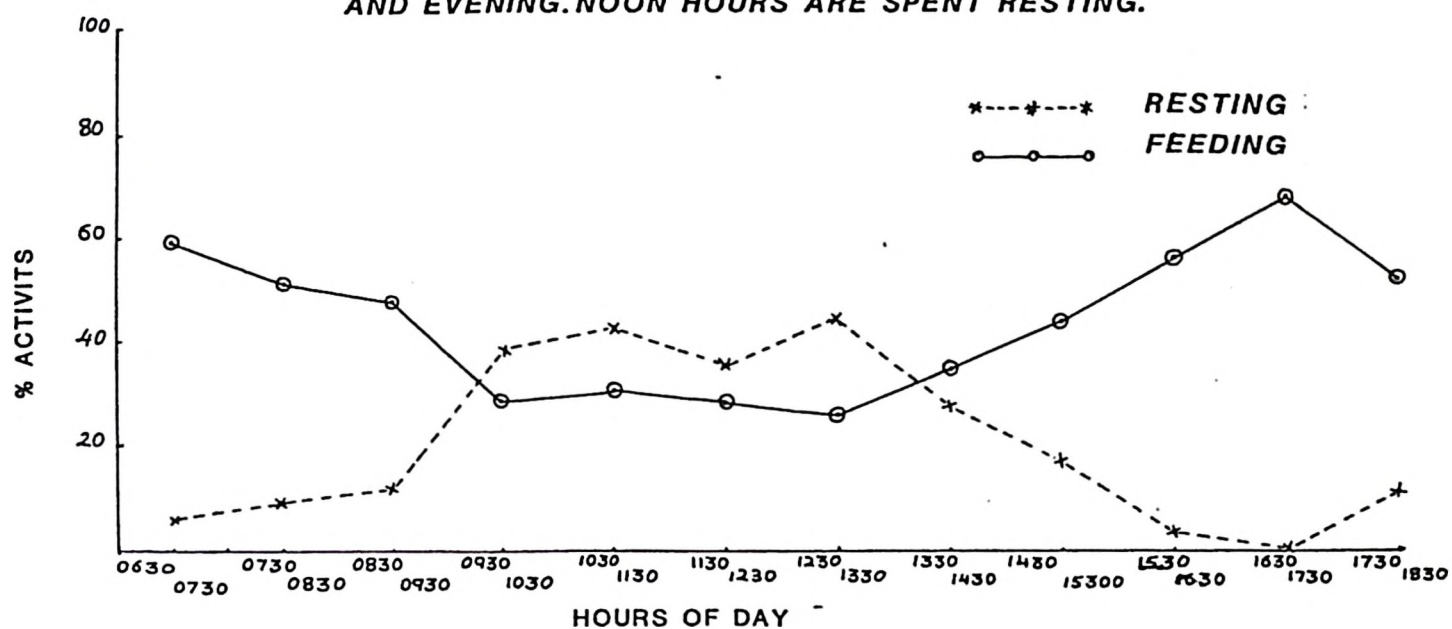
Activities	Percentage of activities		
	Adult ♂	Adult ♀	Subadult
Feeding	42.03	45.17	44.23
Watching	25.00	13.62	12.86
Grooming	4.80	6.03	21.43
Sleeping	18.58	19.55	7.54
Moving	3.51	3.63	2.63
Basking	4.53	2.76	2.88
Playing		4.57	7.77
Fighting		0.11	0.27
Nursing		4.14	
Alarm call	1.35	0.17	
Drinking	0.20	0.25	0.19

Note : Adult male spent more time watching .

Alarmcall is given largely by male .

Play behaviour was not seen in male.

ACTIVITY PATTERNS OF MUNDANTHURAI TROOP, FEBRUARY '84 TO JANUARY '85. NILGIRI LANGURS HAVE A FEEDING PEAK IN THE MORNING AND EVENING. NOON HOURS ARE SPENT RESTING.



CONSERVATION PROBLEM

The major problem faced by Nilgiri langur on the Mundanthurai Plateau is wood cutting. Although the plateau is part of Mundanthurai Wildlife Sanctuary pressure from 50,000 people living in a town just on the boundary is very high.



REFERENCES

- Altman, J. 1974. Observational study of behaviour: sampling methods. *Behaviour*, 49:227-265.
- Horwich, R.M. 1972. Home range and food habits of Nilgiri langur (Presbytis johnii), *J.Bombay nat.Hist.Soc.* 69:256-267.
- Oates, J.F., Waterman, P.G. and Choe, G.M. 1980. Food selection by the South Indian leaf monkey (Presbytis johnii) in relation to leaf chemistry. *Oecologia*, 45:46-56.
- Poirier, F.E. 1970. The Nilgiri langur (Presbytis johnii) of South India. In *Primate behaviour*, Rosenblum, L.A. ed, pp 251-383 Academic Press, New York.

NILGAI : BULL OR ANTELOPE?

Venerated over the years because of the Hindu belief that it is related to the cow, the nilgai or blue bull has escaped the fate of many other antelopes and deer in India. The nilgai, however, is no relative of the cow but belongs to the antelope family and is the largest antelope found in the subcontinent.

Like other antelopes, the nilgai browses extensively, preferring grasslands, scrub and cultivated fields. Essentially an animal of the drier North West and the plateau regions, the nilgai extended its range with the clearing of forests for agriculture and grazing.

The flowers of the Mahua tree, berries and fruits from other trees, leaves, tender shoots and grass, constitute a major part of the nilgai's diet. Its fondness for sugarcane often gets it into trouble with farmers.

The fact that water may not be easily available in and around the areas it inhabits, does not bother it much. Even in summer, the nilgai satiates its thirst once in a couple of days. During droughts, it gets the little water it needs from the morning dew, fibrous thorny plants and tree bark.

Another reason for the name 'nilgai' is the slate-grey coat of the male nilgai which gives off blue reflections in the sun. Distinguishable from its female by eight-and-a-half inch long horns, and a

tuft of black hair on its throat, the male nilgai weighs about 200 kg when fully grown. Of a slightly smaller build, the female nilgai's pale brown coat is very like that of the male.

Nilgais form small groups. Herds, normally ten or twelve individuals strong are largely made up by cows and immature calves. Mature and aged bulls prefer their own company. The only time a bull joins the herd is during the rutting season when rival bulls challenge one another for possession of cows. It is very rare that in such fights either contestant suffers any serious injury.

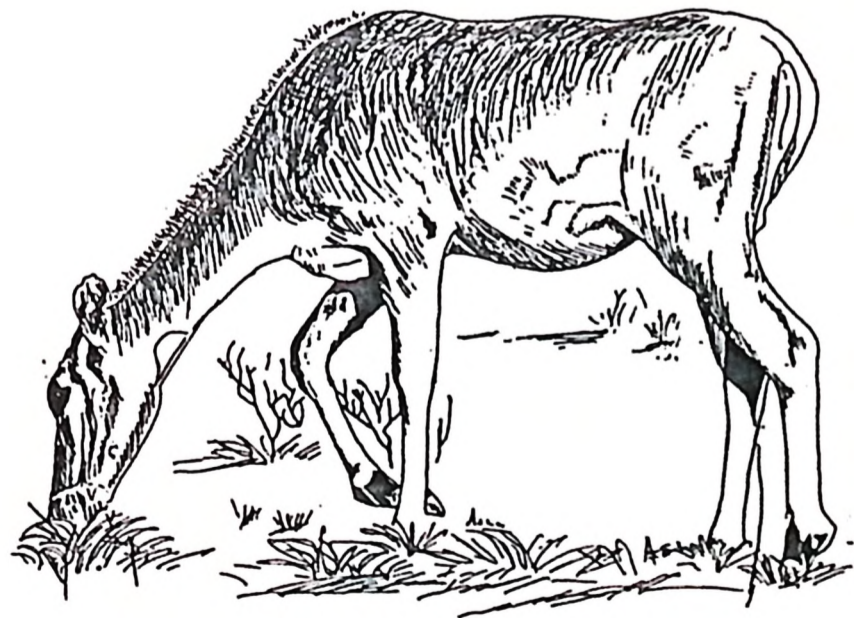
Territories are indicated by defecating at particular spots. This practise also helps in preventing individuals of a herd from getting isolated.

Apart from man, lions, tigers and leopards are the main predators of adult nilgais. Jackals and hyenas may kill unattended young or sickly fawns. Feral dogs are a growing threat to newly dropped fawns.

The nilgai's only means of escape is its speed. Its long legs can carry it over the roughest terrain with great speed and agility.

The sentiment attached to the nilgai is now on the wane and nilgais are no longer as plentiful as before.

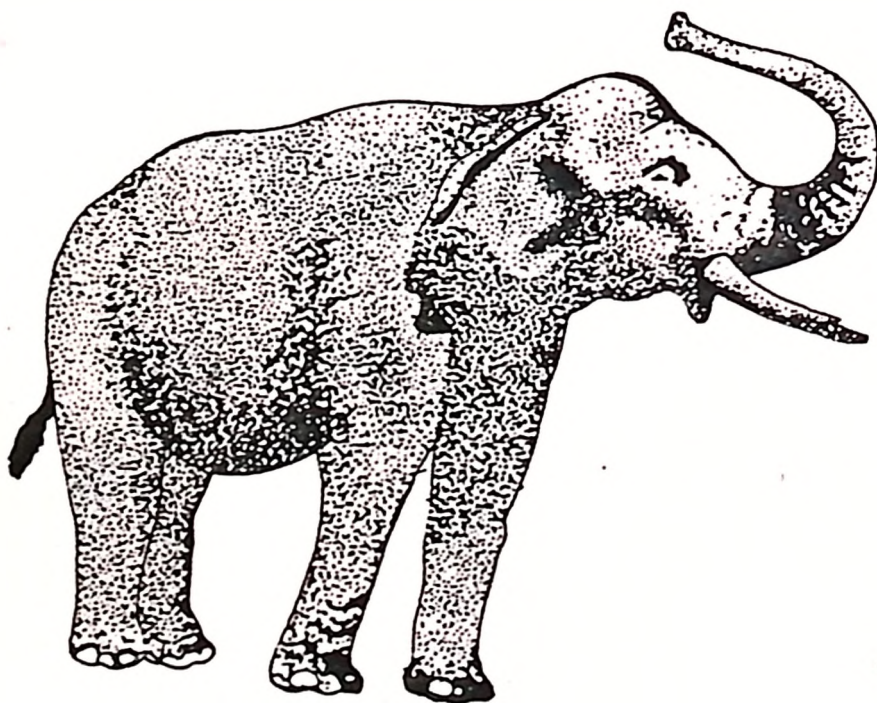
Durga Patankar
(CEE-NFS)



AN ELEPHANT TRANSFER

The Karnataka Forest Department took up the most ambitious wildlife translocation programme when it transported wild elephants from Katteपुरa in North Coorg to the Nagarhole Wildlife Park, more than 100 km away. The move was necessitated by the Harangi dam which had cut off the elephants from the Nagarhole National Park. The animals were first tracked down, reports Vivek Ganapathy, CEE-NFS correspondent, in a eye witness account of the Katteपुरa operation.

The huge animal stood silhouetted against the sun rising over the Harangi Reservoir. It raised its trunk and trumpeted in the direction of the camp; as if it was issuing a challenge: catch me if you can. It was uncanny, as though the elephant knew why they were here. Much as the men wanted to get into action, they could not as the veterinary doctors were yet to arrive. For three hours they watched the 45-year-old tusker make mock charges at the camp. And then, with a final contemptuous trumpet, it turned and went away into the forest.



Half an hour later, the doctors arrived. Soon six trained elephants mounted by the doctors and forest officials moved into the forest. It was a three-hour chase and finally Kerala Agricultural University elephant immobilisation expert, Dr. Jacob Cheeran, managed to get a shot at the tusker. Ten minutes later the elephant had collapsed. Mahouts and forest tribals, experts in the once famous Khedda operations, moved into action. The fallen tusker was quickly roped and tied to the trained elephants, two in the rear and two in front. Huge quantities of water was constantly poured over the elephant to prevent its body temperature from rising too high, a side effect of Etrophine, the tranquilizer used.

When it showed signs of recovering, the trained elephants helped herd it gently back to the camp.

Dangerous Task

The actual transportation of the tusker turned out to be the most dangerous. A cage-like structure had been made on the truck in which the elephant was to be transported. Here was the accompany veterinarian's nightmare. The elephant had to be tranquilized just right - heavy enough to ensure that it did not try to tear loose from its mooring; light enough to ensure that it could stand on its feet.

Loading, accomplished by pushing the elephant onto the truck backwards, was comparatively easy, but things became dangerous as soon as the truck started moving. Suddenly revived by the moving truck, the tusker managed to put his leg over the side and then collapsed causing the truck to lean at a crazy 45 degrees. Trained elephants came to the rescue and pushed back it into position.

Although the transporting began at night, roads were lined with thousands of persons waiting to catch a glimpse of the tusker who had reportedly killed at least six persons in the last six years.

Enroute at Kushalnagar town, the elephant disturbed by the lights managed to break part of its cage. But the situation was saved by Bandipur National Park veterinarian, Dr. Syed Quadri who jumped onto the moving truck to inject it with a sedative. At Nagarhole, the tusker was pulled out of the truck and set free.

Stage one of Operation Katteपुरa had ended successfully.

Gift to the people

Why was such a dangerous operation undertaken? To find answer one must go back about six years when the Herangi dam was built at Kushalnagar in Kodagu District. The dam was former Karnataka Chief Minister Gundu Rao's gift to his constituency. The benefits accrued from the project still remain doubtful, but the dam site ate up thousands of acres of forest in the Nagarhole Range. As water filled the reservoir, it also cut off about five thousand acres of forest from the range trapping within it, some 14 elephants.

Unable to find enough forest area, the animals began to wander into adjoining villages where the damage they wrecked left about Rs.3 lakhs worth crop destroyed each year and more than 15 people dead.

Inspired by a documentary film showing the translocation of elephants in Sri Lanka with the help of Nanibian experts, Karnataka Chief Wildlife Warden Mr. M.K. Appayya felt the method was a possible solution to the growing problem. The department however, decided to undertake the operation alone.

Due to delays in importing the drugs needed, Operation Katteपुरa could start only in March 16, this year. Twenty five days later when it ended, seven elephants had been captured. Two were transported to Nagarhole, while the rest are still in the Department's elephant camps where the possibility of training them for Departmental use is being looked into.

Nearly 200 persons took part in the operation which cost about Rs.1 lakh.

When first announced last year, the programme faced some opposition. Dissent continues today with concern being voiced on the effect on the translocated elephants which are to undergo the trauma of being taken away from their native range. And as if to prove them right, one elephant died while under sedation. Opposers of the programme claim it was a case of oversedation. Denying this, Mr. M.K. Appayya said that the animal, which was old, suffered from a cardiac arrest.

Leading normal lives

Staunchly defending Operation Katteपुरa, he points out that the elephants released at Nagarhole had already adapted to their new surroundings and had been observed by Department trackers as beginning to lead normal lives. "In the given situation what else could we have done", he asks. The local people of Katteपुरa are, however, in favour of it. Kempamma, 45, mother of seven children, was widowed last year when an elephant trampled her husband. Speaking of the futility of trying to raise a ragi crop on her half-acre holding, she said, "Every time the crop is ready for harvesting, the elephants come and eat it up. How do I feed my children?" Doesn't she get compensation from the Forest Department? Yes, she had got Rs.5000 when her husband died, but that was barely enough to cover the funeral expenses. After that she got nothing.

Another supporter ironically is Chempa, whom Forest Department officials allege was once a sandalwood smuggler. In fact Chempa was once shot at by a forest guard and bears a scar on his back to prove it. Two years ago, when asleep under a bamboo clump, an elephant attacked him and smashed his legs. Today, Chempa cannot walk and must depend on his wife to support him. "The forest Department is doing God's work", Chempa simply says.

A viable population

Only seven elephants have been removed from Katteपुरa and the Department feels that this will be enough, since the forest is big enough to support the remaining herd. But elephant translocations in Karnataka are far from over. According to CWW Appayya there are several other pockets in Kodagu district where elephants have been trapped by different Hydel projects: nine elephants in Kargodu forest, five in Belur forest, 13 in Hudgur forest and nine in Chathalli forest. In all these places the elephant population must either be reduced or removed completely. The most difficult operation however, may be in the Dandali forests where the Kaiga Nuclear Plant Project and the Karwar Naval Base threatens to isolate 20 elephants.

Now at the Department has got the feel of it, translocations could be applied to other animals too. The feasibility of translocating panthers in Chikmagalur District, where human pressure on their habitats is causing them to stray into villages, is being considered.

Translocations may be solution to problems like those being faced in Karnataka's forests today. But with the discovery of every new solution, the causes for it - illegal forest encroachment, diminishing wildlife habitat, growing human populations - do not seem to diminish or disappear. And the problems remain, growing larger and more desperate. The time might arrive that despite our perfection in the technology of wildlife translocation but we might not have a place to take them to.

(CEE-NFS)

CHAMPION DESERT RUNNER

If the camel is the ship of the desert, the wild ass is the desert's champion runner. Even a jeep at fifty kilometres an hour will take a long time to beat a wild ass running full pelt on the soft desert sand.

Primarily a denizen of the desert, the Asiatic Wild Ass inhabits the sandy areas of Baluchistan and the Little Rann of Kachchh in Gujarat. Most of their numbers is concentrated in the Little Rann of Kachchh. The Tibetan Wild Ass is regarded by some as a distinct species while others consider it to be a race of the Asiatic Wild Ass.

The wild ass is also known by the name 'ghorkhar'. It belongs to the same group of animals as the horse. These

have only one enlarged toe-hoof, on their legs. This hoof, a semi-circular, firm bit of bone, two to three centimetres long at the end of each foot, is an adaptation for speed.

Difficult to Domesticate

Efforts at domesticating the wild ass have so far ended in failure, probably because the animal is so accustomed to range free in the limitless open spaces of the deserts that confinement is difficult for it to get used to. Perhaps also because it is specialised to subsist on the sparse, thorny desert vegetation and cannot survive on the fodder that can be made available to it under domestication. Whatever may be the reason, the wild ass shuns human company and keeps itself as far away from settlements as possible.

The wild ass is usually a light or ashy grey in colour. The chest is white or yellow brown. There is a dark brown band running from the base of its neck to the root of its tail. The tail is not very long and is tipped with a tuft of brown hair. A full grown wild ass may stand 120 cm high and weigh some 300 kg.

At home in the desert

The wild ass usually lives in small herds. Each herd may contain 20-30 animals. The desert vegetation on which it subsists also provides some amount of its water requirement. In the drier parts of the year when the main food plants perish, the wild ass moves over to greener areas.

It spends most of its time moving about the expansive desert terrain. The scorching rays of the desert sun and the burning sand seem to have no effect on it.

The breeding season is between August and October with a gestation period of eleven months. Three months after birth the little foal is strong enough to run with the herd and face the rigours of



desert life. In six months it can rival any of its elders in speed.

In spite of the unapproachable terrain and its natural shyness, the wild ass is one of the most endangered animals of the world. Its numbers in the Little Rann of Kachchh is a mere thousand. It is in grave danger of becoming extinct.

Vinod Tiwari
(CEE-NFS)

ECOLOGICAL RELATIONSHIP AMONG TURTLES IN NATIONAL CHAMBAL SANCTUARY

Under "Turtle Ecology Project" of Wildlife Institute of India research studies on the ecological relationships among turtles in the National Chambal Sanctuary have been conducted. Data was collected on species diversity, population structure, feeding and breeding habits. Process of the data is under progress.

A brief report of the work done in the project is presented here :

Study area

The study was conducted in the National Chambal Sanctuary. The National Chambal Sanctuary is declared over the Chambal river and emphasis was given to the Gharial conservation management in the sanctuary. The length of the sanctuary is around 400 kms (map) and it is under the sanctuary management of the State Forest Departments of Madhya Pradesh, Uttar Pradesh and Rajasthan.

Species identification

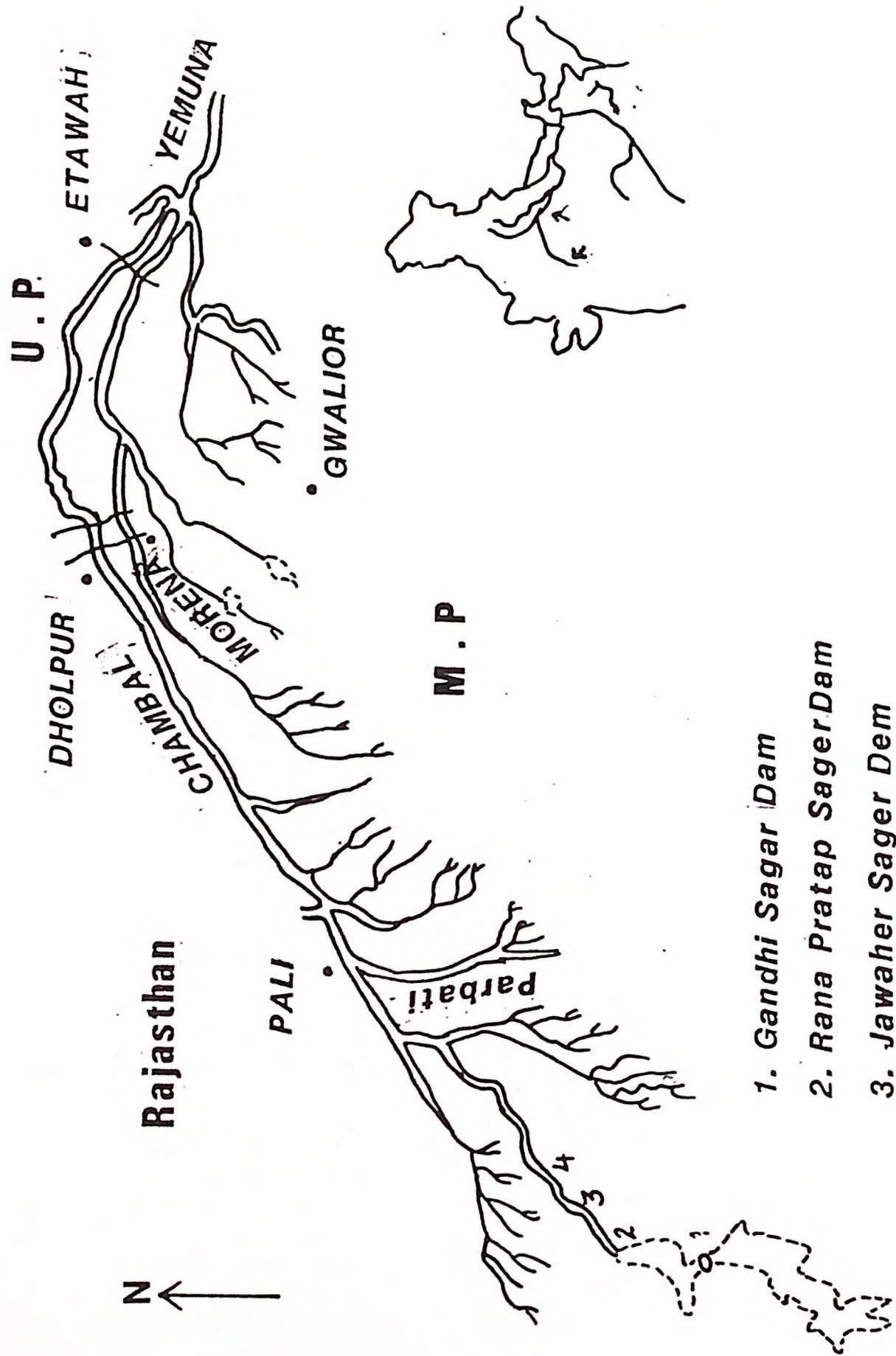
Seven species of freshwater turtles are identified in the Chambal river (table-3).

Feeding habit study

Turtles were collected by various methods (by hand, net and hooks with line). Common turtle species were sacrificed and stomach contents were analysed to study the food and feeding habits. Faecal samples were also collected after keeping the turtles in captivity for two or more days. Hatchlings and juveniles were reared in captivity and their feeding habits were studied.

Feeding habits of different turtle species are give in table-4.

NATIONAL CHAMBAL SANCTUARY



Breeding habit study

Detailed studies were conducted on the breeding behaviour of Kachuga species. Studies on the nesting season, nesting habits, egg incubation, hatching, rearing of hatchlings were conducted.

A brief data on breeding of Kachuga sp. is given in table-5.

Breeding of softshell turtles is entirely different with that of hardshell turtles. Their nesting sites are hard to locate. They mostly lay eggs during August-October. More nesting surveys are proposed to locate new nesting sites of softshell turtles.

Status

It is difficult to make the population estimates of freshwater turtles. Through the nesting female count and by turtle capture it is presumed that among 7 species of turtles in the Chambal river four species are common and are rare (table-6).

Threats

The reasons for decline in turtle population in the Chambal river are given in table-6.

Recommendations for management

Measures suggested for turtle conservation management are given in table-6.

FRESHWATER TURTLES IN THE NATIONAL CHAMBAL SANCTUARY

Family	Genus	Species	
Emydidae	Kachuga	tentoria	
		dhongoka	
		kachuga	
	Hardella	thurgii	
Trionychidae	Trionyx	gangeticus	
		Chitra	indica
		Lissemys	punctata

BREEDING HABIT STUDY

	Kachuga		
	tentoria	dhongoka	kachuga
Body size	22.5	44.1	51.6
Clutch size	6.2 (3-12)	23.6 (16-35)	19.7 (15-30)
Nesting season	Oct-Jan	Dec/Feb-April	
Egg Length(mm)	47.5	59.9	70.9
Width(mm)	27.5	36.1	41.6
Weight(g)	21.4	44.2	57.4
Incubation period(days)	117-160	60-160	60-160
Hatchling Cl(mm)	37.7	52.7	56.8
Weight(g)	11.9	23.4	29.1

STATUS

<u>Kachuga tentoria</u>	- Common
<u>K.dhongoka</u>	- Common
<u>T.gangeticus</u>	- Rare
<u>C.indica</u>	- Common
<u>H.thurgii</u>	- Rare

THREATS

Predation (Jackal, Birds)
Flooding
Sand collection
Agricultural practices
Drowning in fishing nets

MANAGEMENT(RECOMMENDATIONS)

Control of predation
Egg transplanting
Wire mesh cover
Central hatcheries
Head-starting programme

R. J. Rao

A HIGH PRICE FOR WILDLIFER

Shri K.M. Chinnappa Range Forest Officer, Nagarhole National Park was taken under arrest by Police on a charge of abetting the murder of a villager in Kothur in Virajpet taluk of Karnataka. It is believed that Shri K. Thammaiah a coffee planter had earlier shot and killed a sambhar stag near Nagarhole National Park. A scuffle between him and the forest guard who went to investigate a stag killing after which the forest guard alledged to have shot Shri Thammaiah who later died in hospital on 30/01/1988 and the forest guard, Shri Chengappa is absconding.

The people who are inimical with forest guard Shri Chengappa took advantage of the situation and went and set fire to the house of Shri Chengappa and lodged fabricated charge with the Police that Range Forest Officer, Shri is indirectly responsible for death of Shri Thammaiah as the gun was fired which killed Shri Thammaiah on the instigation under the instructions of Shri Chengappa. Shri Chengappa has been taken under arrest on 01/02/1988 and currently under the judicial custody at Virajpet, facing a case of abetting of murder.

Shri Chinnappa has a very long standing service in Nagarhole National Park and known for his hard and honest and disciplined work and is a recipient of Chief Minister Gold Medal for his achievement during 1985 for taking strict measures to stop poaching and illegal felling of trees in Nagarhole National Park areas. Because of his strictness the miscreants have been nursing ill-will towards him. These miscreants have taken advantage of this accident and have pressurized Police to take such action that a hard working field officer is facing a case for an offence of abetting of murder. It is unfortunate that the Police had played into the hands of miscreants.

Following this, the Nagarhole National Park has been closed to public and tourist for an indefinite period and various sections of the people are pleading hard to take action against the

miscreants and to bring proper justice to keep the morale of wildlife protection staff who risk their lives towards discharge of their duties.



STUDENTS IMBIBE THE CONSERVATION SPIRIT

The Hindu Weekly edition of April 3, 1988 published an article on a nationwide movement by the people of Kodaikanal for creating an awareness about Nature and the Ecosystem. The credit for creating this awareness goes to the Anglade Institute of Natural History, Sacred Hearts College, Shenbaganur Kodaikanal. The programme was funded by the Union Ministry of Environment.

Students were given training on nature conservation and eco-development in batches. The programme lasted for 3-days in which the students underwent visual instructions, field work and manual training. An evaluation of the whole process was done through questionnaire and discussions.

The students though unfamiliar with the concept of eco-training camp, were enthusiastic even before the actual training started. The students who have joined this movement have done more than just create gardens in their neighbourhood.

The authorities attached to this programme were of the opinion that the potential existed for students to become part of the movement to make their places of living green and believed that such camps should be organised more often in different places.

ANNOUNCEMENTS

V CERTIFICATE COURSE ANNOUNCEMENT

The Institute has announced the V Certificate Course in Wildlife Management for in-service Forest Range Officers to be held in Wildlife Institute of India, Dehradun from 1st May, 1988 to end of July, 1988.

X DIPLOMA COURSE ANNOUNCEMENT

Announcement for the X Diploma Course in Wildlife Management is made for in-service Forest Officers to be held at Wildlife Institute of India, Dehradun from 1st August, 1988 to 30th April, 1989.

Slide Programmes in WE Faculty

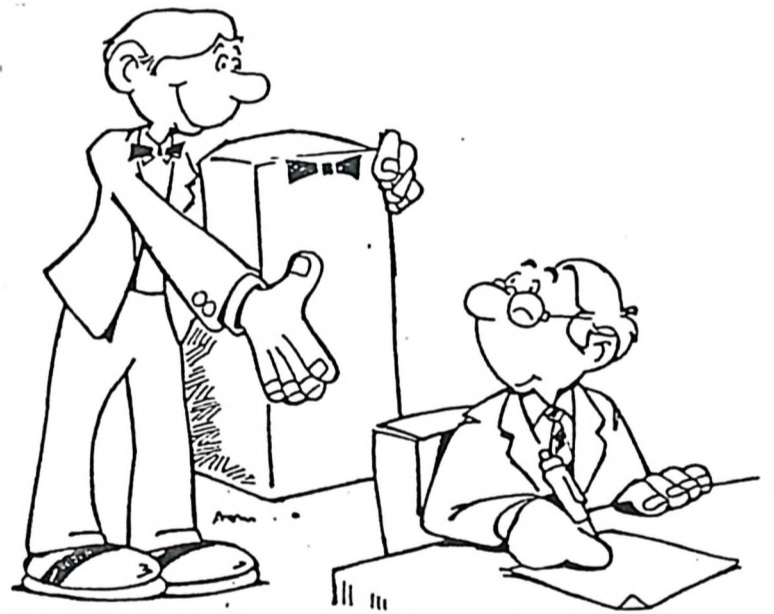
1. FAO and the environment
2. Land, Food & People
3. Growing fuelwood we need
4. Genetic conservation
5. Forestry extension
6. Extension agent at work
7. Sabab's underwater paradise
8. Understanding wetland ecosystems
9. White-winged wood duck and the disappearing rainforest
10. The fauna of India
11. The Great Jungle bungle
12. Conserve today for a better tomorrow
13. Vanishing forests
14. The leathery turtles of trengganu
15. Understanding Mangrove ecosystems
16. Saving the plant that save us
17. Wonders around you
18. The Asian Elephant
19. Lord of the Jungle
20. The Greater One-horned Rhinoceros
21. Protecting our heritage
22. The environmental crisis
23. Planning for survival
24. Why the forest must be saved
25. If the land dies
26. Integrated watershed management
27. Why the soil must be saved
28. Extension in forest
29. Extension work and teaching aids.

NEW FACES

Three new faces have joined our Institute. On behalf of all the staff we welcome them and look forward for a fruitful co-operation.

Kishore Rao, IFS from Union Territory Cadre has joined as Scientist-C in the Wildlife Management Faculty. Previously he was Joint Director (Wildlife), Ministry of Environment, Forest & Wildlife, New Delhi.

Dr S.N. Prasad joined as Scientist-B in Wildlife Biology Faculty. He was associated with Indian Institute of Sciences, Bangalore.



Jagjeet Singh joined as Administrative Officer on deputation from Controller of Defence Accounts (Air Forces).

LIST OF 16m.m.FILMS IN W.I.I.

1. About Sharks (Col) 12 Mts.
2. Adaptation of Birds (Col) 10 Mts.
3. Animal Communications (Col) 13 Mts.
4. Animal Immobilisation Te-chniques (Col) 25 Mts.
5. Big Boss (Col) 25 Mts.
6. Birds That Migrate (Col) 16 Mts.
7. Cobra: The Snake God Part I & II (Col) 55 Mts.
8. Conserving our Environment: Pollution Crisis (Col) Mts.
9. Coral Reefs (Col) 23 Mts.
10. Deterioration of Water (Col) 20 Mts.
11. Drought of Cendtury (Col) 30 Mts.
12. Ecosystem: Struggle for Survival (Col) 22 Mts.
13. Elephants Eye View (Col) 25 Mts.
14. Empty Desert (Col) 25 Mts.
15. Faste-st Thing on Four Legs (Col) 25 Mts.
16. Fighting forest Fires with Hand Tools (Col) 22 Mts.
17. Follow that Tiger (Col) 25 Mts.
18. Forest from Dawn of Time (Col) 30 Mts.
19. How Rhinoceros Returned (Col) 32 Mts.
20. Ganges Gharial (Col) 55 Mts.
21. Great Indian Rhino (Col) 25 Mts.
22. Great One Horned Rhinoceros (Col) 26 Mts.
23. Green Earth or Dry Desert (Col) 12 Mts.
24. Guindy National Park (Col) 25 Mts.
25. Introduction to Biological Sciences:Behavioural Biology (Col) 17 Mts.
26. Introduction to Biological Sciences: Ecological Biology (Col) 17 Mts.
27. Introduction to Biological Sciences: E-volutionary Biology (Col) 25 Mts.
28. Introduction to Biological Sciences: Science of Animal Behaviour (Col) 14 Mts.
29. Land of the Tiger (Col) 52 Mts.
30. Last of the Wild Part I,II & III (Col) 2 hrs.
31. Last Round up (Col) 52 Mts.
32. Leather Backs & Loggerheads (Col) 25 Mts.
33. Leopard that Changed it's Spot (Col) 25 Mts.
34. Life in Tropical Forest (Col) 30 Mts.
35. Long African Day (Col) 20 Mts.
36. Marshes of Bharatpur (Col) 25 Mts.
37. Panda (Col) 23 Mts.
38. Preserve or Perish (Col) 20 Mts.
39. Price on their Heads (Col) 25 Mts.
40. Rise & Fall of Elephant Marsh (Col) 25 Mts.
41. Snake Bite (Col) 27 Mts.
42. Snakes of India (Col) 26 Mts.
43. Snake & Snake Parks (Col) Mts.
44. Sunderbans (Col) 52 Mts.
45. Tiger of Kanha (Col) 26 Mts.
46. Tool Users (Col) 14 Mts.
47. Tough Near The Top (Col) 25 Mts.
48. Twelve Hours at Water Hole (Col) 25 Mts.
49. Vanishing Lion-Tailed Macaque (B&W) 22 Mts.
50. Zoos' of the World Part I & II (Col) 52 Mts.

1026

NEWSLETTER

पुस्तकालय Library

भारतीय वन्य जीव संस्थान, देहरादून
 Wildlife Institute of India, Dehra Dun
 पत्तिका नं०
 ACC No
 सामग्री का नं०
 DATE
 प्रकाशक
 वितरक, Supplier
 हस्ताक्षर/Signature



WILDLIFE INSTITUTE OF INDIA

Vol. 3 Nos. 3 & 4

May. - August 1988



CONTENTS

Editorial	
Developments at the Institute	1
Research & Projects	7
Workshops & Seminar	12
Special Features	14
Publications	25
Announcement	26

Editor : R. N. Acharya

Art Work : Asha Jain

Word Processor : H.C. S. Rajwar & V Sukumar

Wildlife Institute of India

P. O. New Forest

Dehra Dun - 248006

Phones : 27021 to 27028

(Ext 334)

28760 (Director)

27724 (F.A.O)

83334 (Wildlife Extension Faculty)

83394 (Account Sec.)

83324 (Adm. Sec.)

Telex : 585/258 FRI IN

Editorial

This issue of the WII Newsletter includes both the nos. 3 and 4 and thus covers May through Aug, 1988. These months have been hectic, marked by the end of the first phase of FAO/UNDP Project which has been in operation from the beginning of this Institute. This has been one of the longest run field projects of FAO/UNDP. In fact, this project has proved to be of immense help for WII in its endeavour towards establishing a niche for itself in the field of Wildlife science in India.



The person instrumental in this project, Dr. J.B. Sale an eminent Wildlife biologist in his own right, has made very valuable contributions to the Institute in numerous ways while being the Chief Technical Advisor of this project. In fact, in his almost a decade long stay in India, he had been involved with the Crocodile Breeding Project and the Rhino Reintroduction Project (in Dudhwa National Park) to name a few. He has been given a touching farewell in July '88 by the Faculty members and the staff of the Institute. We wish him all the best in his life.

This issue includes a study on elephants of Rajaji National Park; comments on a write-up on Dudhwa Rhino Project appeared in the Times of India; a report on 5th Certificate Course in Wildlife Management; and an article on Gir lions, among others.

RNAchary

DEVELOPMENTS AT THE INSTITUTE

V CERTIFICATE COURSE IN WILDLIFE MANAGEMENT

The course commenced on 1st May, 1988 with 14 participants (13 Range Forest Officer and 1 Asstt. Conservator of Forests) from 10 states and Union Territories viz. Tamil Nadu, Karnataka, Andhra Pradesh, Maharashtra, Madhya Pradesh, Himachal Pradesh, Assam, Meghalaya, Andaman & Nicobar Islands and Dadra Nagar Haveli.

The entire 13-weeks course curriculum contained 8-weeks class room lectures and 5-weeks field tours. The class room lectures mostly covered theoretical aspects of three broad-based components of wildlife disciplines i.e. Wildlife Biology, Wildlife Management, and Law extension and Socio-economic studies. All teaching inputs as far as possible were backed up with practical demonstrations, open discussions, film shows, and slide projections.

An integral part of the course curriculum was - two field tours - which are direct demonstration towards improved use of wildlife technique and developing managerial artistry. First among this is the 'technique tour' which was conducted in Chilla part of Rajaji N.P. from 21st May to 1st June, 1988. The objective of this tour was to orient the trainees toward interpreting animal evidences and behaviour, and train them how to keep records of data. Trainees were also demonstrated with various field methods such as : animal capture, animal estimation and census, habitat evaluation and impact assessments etc.

In addition to these trainees were also exposed to various wildlife conflict areas. Use and erection of modern wildlife barrier such as power fencing was demonstrated on them. Radio-telemetric study its scope and use in determining elephant movement and habitat utilization to develop a improved management strategies was thoroughly impressed on trainees. Trainees during their field trips located and monitored the radio-collared mahna elephant and found it using the Motichur-Chilla corridor across the Chilla power channel. Few trainees were lucky enough to see a tiger and 10' King cobra during their animal tracking exercise in Dholkhand area of Rajaji N.P.

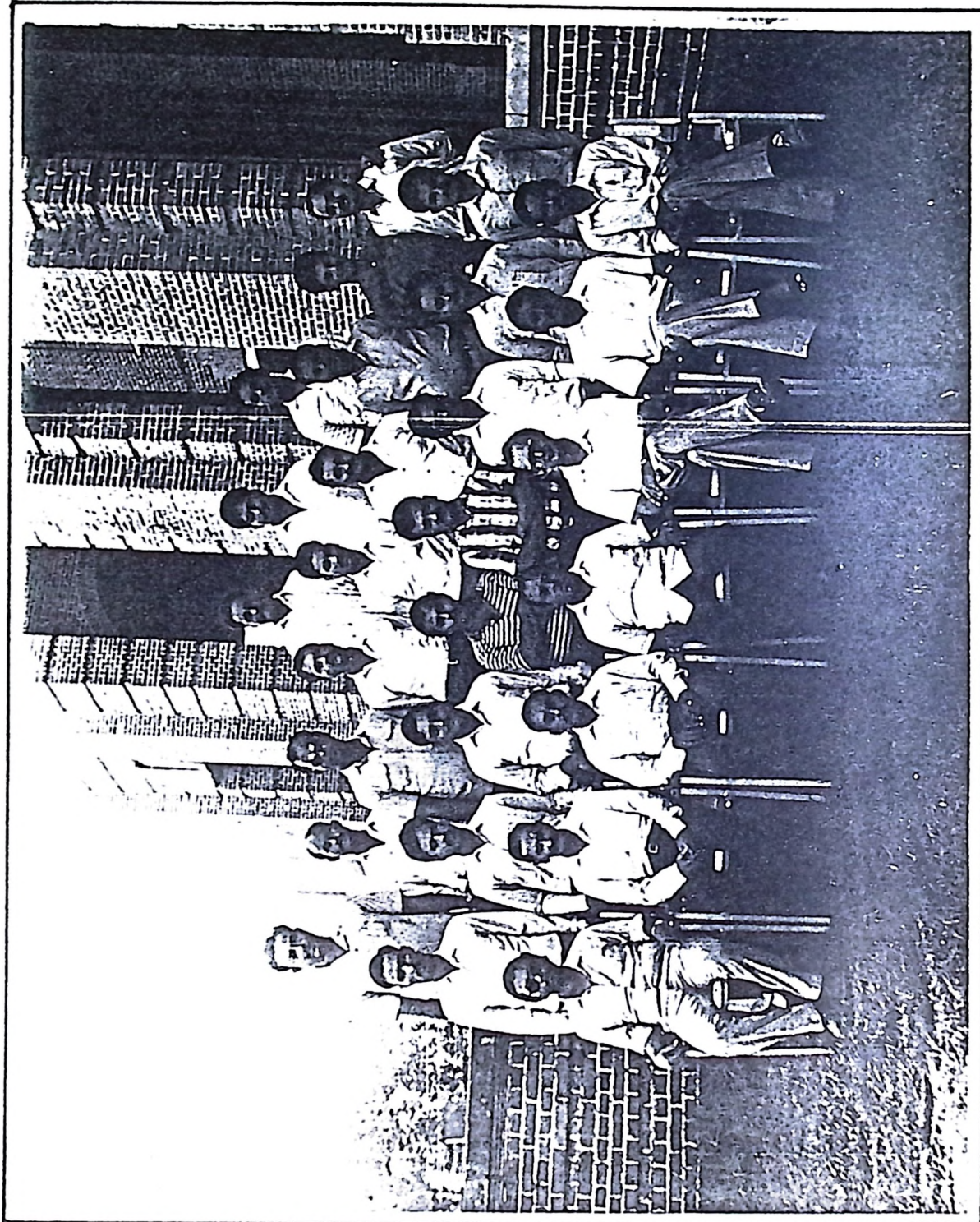
The Trainees made their second tour i.e. Management tour from 8th June to 26th June, 1988 to various National Park and Sanctuaries viz. Panna, Bandhavgarh and Kanha all are in M.P. The objective of this tour was to familiarize the Range officers with various problems of newly created protected areas and demonstrate them how various levels of scientific management can bring favourable changes in the habitat and make it conducive to the wildlife. Problems related to wildlife in peripheral and outside protected areas were also examined by trainees by interviewing the villagers. Cattle lifting, often Man-eating and crop damage problems were the issue came out for discussion and arguments

During the management tour trainees also visited the crocodile breeding and rearing centre at Kukrail Lucknow. The role of such rearing centre in conserving India's endangered crocodile species through

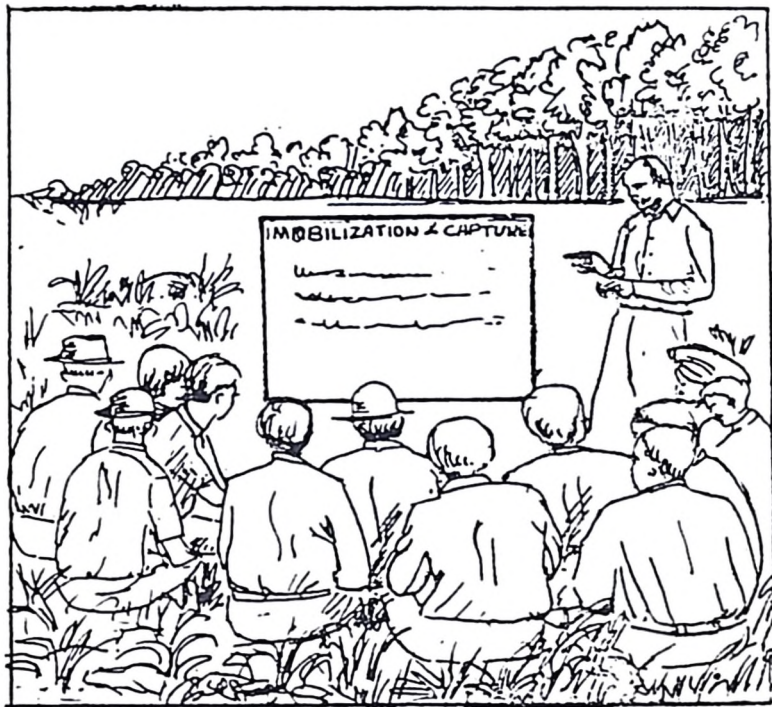
V CERTIFICATE COURSE IN WILDLIFE MANAGEMENT

WILDLIFE INSTITUTE OF INDIA, DEHRA DUN

1988



active management such as 'grow and release' was shown to them. Efforts of restocking and subsequent free range management problems of released gharials in National Chambal Sanctuary were pointed out to them. Importance of follow up monitoring programme of released crocodiles was well realized by the trainees. Beside this trainees were also exposed to modern method of zoo keeping and Management at Prince Wales Zoological Garden at Lucknow. Trainees also visited a wetland in Kaeoladev N.P. at Bharatpur and learned the management problem of that unique ecosystem.



After each tour trainees were asked to write their tour journals with proper guidance from faculty. The tour journals reflected their understanding about the subject. Apart from regular lectures, series of popular lectures on varied topics were also organized by the various faculty members of Institute and by the visiting experts on the discipline. Remarkable of them were lectures on Narmada Valley Project by Prof. Shekar Singh of Environment Division of Indian Institute of Public Administration and a lecture by Prof. James Teer, Welder Wildlife Foundation, Texas, USA on 'Ecology of Cervids'.

In order to break the monotony of regular routine class wildlife film shows were organized which were quite relaxing and educative too.

Before ending the course performance of the trainees was assessed by written theory examination containing three papers on the whole course and practicals i.e. two tour journals.

All the 14 trainees were declared passed. Following trainees got distinction through award of prizes:

Wildlife Conservation Silver Medal

'Top trainees':

Shri Suvarna Mahadev
and
Shri Sumukh Joshi

Institute Prize 'Best Practical Wildlifer':

Shri C.P. Durga Gowda

Institute Prize for 'Wildlife Management':

Shri Jotishmoy Dutta

S. Chowdhury
Course-in-Charge
V Certificate Course

DIGITAL IMAGE ANALYSIS
TRAINING 18/07/88 TO 29/07/88 HELD
AT R.R.S.S.C., DEHRADUN

The Regional Remote Sensing Service Centre of National Natural Resources Management at Dehradun has conducted ten day course on 'Digital Image Analysis from July 18-29, 1988.'

The Course was conducted to acquaint professional persons with the state of art digital image processing

techniques using VAX 70 with pericolour 2000 graphic terminals. That the digital analysis has several advantages over conventional manual interpretation was amply illustrated in the brief course.

The digital data of SPOT, IRS AND MSS was analysed for Dehradun, Ramganga and Delhi scenes in the above duration. Mapping of vegetation at broad levels of physiognomy and possibly at the level of vegetation associations. There is a good potential of using these techniques for mapping of cover, and other habitat features.

S.N.Prasad

OVERSEAS TRAINING

Dr. (Miss) Asha, Scientist-A, Wildlife Biology Faculty has gone to Colorado State University, USA for training in techniques for assessment of environmental impact upon wildlife habitat, using computer based systems approach. The training is for four months starting from 1st June, 1988.

Shri V.B. Mathur, Scientist-B, Wildlife Management Faculty has gone to Oxford University and IUCN Conservation Monitoring Centre, U.K. for training in methods of field data collection and computer analysis for developing national wildlife data base system.



VISIT OF DR. G.S. KAWAT, SCIENTIST-B TO COLORADO STATE UNIVERSITY, USA FOR TRAINING IN HABITAT EVALUATION PROCEDURES

The above training programme commenced from 19th of January under the supervision of Prof. Robert S.Cook, Department Head, Fishery and Wildlife Biology, Colorado State University for six months. the programme was conducted under cooperation of the FAO/UNDP project of the United Nations within the Wildlife Institute of India, Dehradun. Following are the salient features of the training :

A/Courses taken during Spring Semester(Jan.19 - May,06):

- NR 561 :Habitat Evaluation Procedures
- RS 533 :Range Habitat Ecology
- FW 561 DV:Advance topics - GIS Habitat Seminar
- NR 510 :Geographic Information Systems - Theory
- FW 360 :Principles of Wildlife Management
- FW 661 :Design of Wildlife Research
- EY 501A :Synecology Seminar

B/Workshops/Seminars attended:

Conference of the Colorado Chapter on Wildlife - Colorado Springs, Co. Jan.29-30.

Workshop on Habitat Evaluation Procedures - Phoenix, Arizona, March 14-18.

53rd North American Wildlife Conference - Louisville, Kentucky, March 20-23.

Resource Technology 88 (An International Symposium) - Fort Collins, Co. June 21-23.

C/Field Work:

i. Participated in the 'Winter Mule Deer Census' organized by Colorado Division of Wildlife using Snow shoes at Hot Springs Feb.12-13.

ii. Study of Wildlife Habitats in Managed Forests of Georgia and Alabama May 15-19.

iii. Measurement of habitat variables for Black capped chickadee at Tamarak Park May 24-25.

iv. Study of Elk habitat management and banding of Great Grey owl chicks in Starkey National Forest - La Grande, Oregon June 13-19,

D/Reports/Projects:

Developed habitat suitability index models for (i) Sambar (ii) Himalayan Musk deer.

On my way back from USA, I visited Royal Botanic Gardens, Kew (UK) and spent 5 days in the Herbarium and Library. In addition, I visited with Dr. John Hall, Department of Forestry and Wood Sciences, University College of North Wales, Bangor to learn about the computer aided ecological analysis using DECORANA (Detrended Correspondance Analysis and Reciprocal Averaging) software. I also visited some of the alpine pastures in Snowdonia National Park and discussed about

rare/endangered plant monitoring, management problems etc.

I came back to New Delhi on 15th July, 1988.

G.S.Rawat

TRAINING COURSE IN REMOTE SENSING APPLICATION

In recent years, techniques of remote sensing application in forestry and ecology emerged as a science for evaluating animal habitat. To familiarize with fundamentals and principles of this technique two faculty officers Dr. P.K. Mathur and myself were deputed to the Indian Institute of Remote Sensing, Dehradun from 27th June, 1988 to 8th July, 1988.

The course named as 'Orientation Course on remote sensing application to forestry and ecology' contained 3-days base course which was common to other users of various fields such as geology, agriculture and soils, and coastal processes and marine resources. This part infact, was more practical demonstration of related equipments used in extracting information from aerial photograph, digital image processing and ground truth informations.

The main course related to forestry and ecology started with interpretation of aerial photograph for qualitative analysis and mapping. Use of multispectral remote sensed data for vegetation study and their utility in assessing habitat qualities was impressed thoroughly. Lectures related to measurement of crown count, density, diameter and tree height were told to us with supported practical demonstrations.

A field visit to nearby Timli RF area was undertaken to demonstrate use of various field equipments for measuring ground truth information. Subsequently, by taking few ground truth plots or 'training sets' in the field a composite map of whole area was generated on the computer according to the various classifications of the forest and land use pattern. The course also had few group discussions among the participating trainees and respective faculty on various uses of remote sensed data.

The course finally ended with distribution of certificates in a valedictory function on 8th July, 1988. On the whole the course curriculum was quite useful to us and we hope that, in future, it will help us in integrating remote sensing approach in wildlife research.

S. Chowdhury

M.Sc WILDLIFE TECHNIQUES TOUR

M.Sc. Wildlife students from 21st May to 9th June 1988 went on the techniques tour to Sariska Tiger Reserve- a dry deciduous habitat and a drought affected area and Kedarnath Musk Deer Sanctuary- a high altitude ecosystem. Such selection of contrasting study sites enabled the students to learn to use varied techniques.

In Sariska, techniques related to describing habitat characteristics, animal population estimation, study of food habits, assessing health condition of prey and quantifying porcupine damage to vegetation were taught. During this period due to severe drought, several Sambar, Chital and a few Nilgai died in Sariska. Jaws of these dead animals were collected and wherever possible we collected bone marrow to assess the health conditions of the animals.

Kedarnath was a contrast to Sariska- lush green and cool. The students and the faculty members had even to gasp for breath while trekking upto alpine meadows.

The students were given an introduction to the flora and distribution of plants with respect to altitude. Diversity of plant species in alpine grassland at an altitude of 3850 meters was studied. An association analysis of topography and broad vegetation units was attempted in the altitudinal zone of 2000-3000 meters. Census techniques applicable to Kedarnath was discussed. Behavioural studies using focal and scan sampling techniques were done in the musk deer enclosure. Sixty five bird species were identified and a team of three went beyond Tunganath and saw thirteen Himalayan tahr.

Dr. S.P. GOYAL
Course-in-Charge

X DIPLOMA COURSE IN WILDLIFE MANAGEMENT STARTED

The X Diploma Course in Wildlife Management started from 1st August, 1988 at the Institute. This course will be in operation till the end of April, 1989. So far, 19 officer trainees from 13 states have joined the course. The diploma course classes are in full swing. They will be shortly going on the orientation tour to Rajaji National Park.

RESEARCH AND PROJECTS

AN UPDATE ON THE SNOW LEOPARD RESEARCH PROJECT IN LADAKH

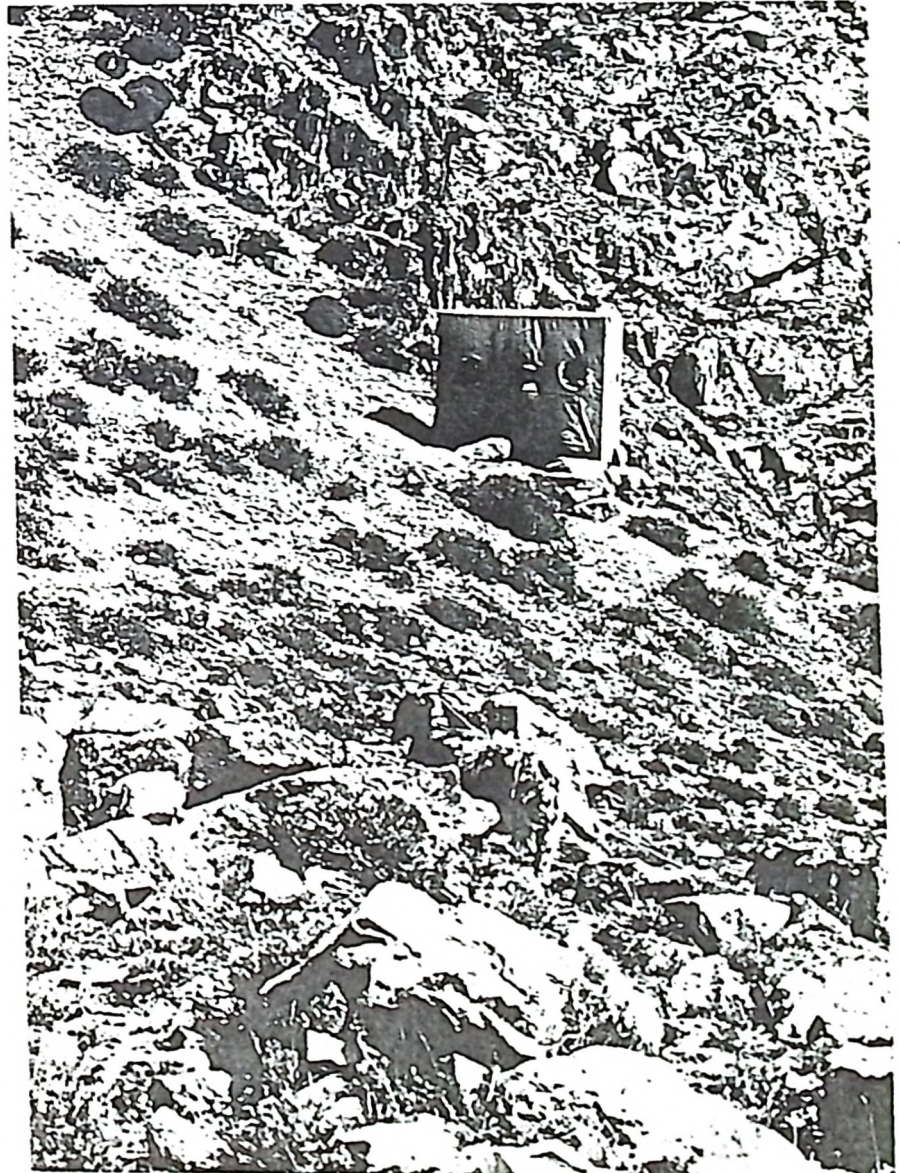
This summer (June 02-14, 1988) I visited the study area of R.S. Chundawat (Raghu) in the Hemis High Altitude National Park which is situated in the picturesque Zaskar mountains. I was unprepared for the dramatic change in the landscape as one crosses the Central Himalayan range into the Trans Himalayas, while flying into Leh from Srinagar. From green snowcapped mountains the landscape changes to a brown, very broken, rocky and desert-like environment, where vegetation is sparse and mainly restricted along streams and water courses and moist valley patches. Reference to the Ladakh landscape as a "Moonscape" therefore, does not seem to be too much of an exaggeration.

I was advised a day's rest at Leh to get used to the rarefied atmosphere. A day later we undertook the long and arduous trek from Leh across the Indus river into the national park and upto Rumbak where Raghu has his base camp. This trek is some 25-30 km long and one gains about 3,000 feet in altitude over this distance. After halting at Rumbak for the night we were off the next morning to our camping site along Hursing Nalla, a location which Raghu had earlier visited and selected for our camp.

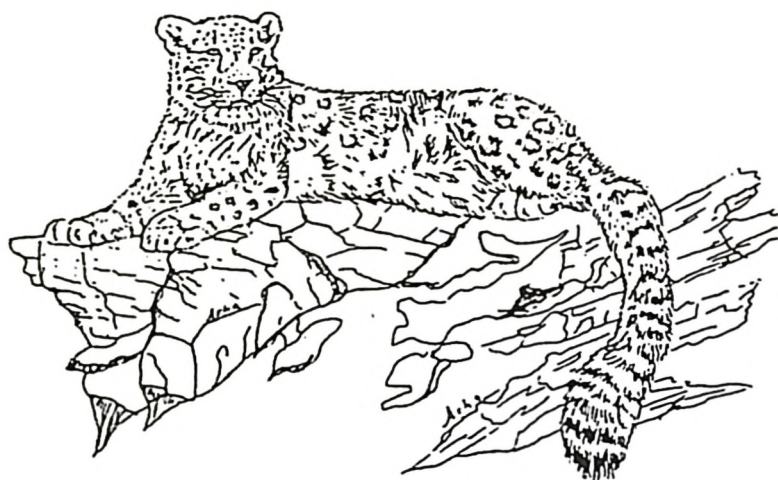
The main purpose of my visit was to help Raghu trap and radio-collar snow leopards to enable him to study their movement patterns and establish individual home ranges. Fresh evidence, in the form of markings, scrapes, scats and tracks, had been noticed in the region and hence its selection as the most

suitable area for our operation. There was even fresh signs of a snow leopard having scavenged on a horse which had died nearby owing to old age.

After surveying the entire area we set up foot snares at seven points where snow leopard movement had been noticed in the recent past. The idea was that once snow leopard was caught in the snare, it would be immobilized by using a mixture of Ketamine Hydrochloride and Xylazine



Hydrochloride delivered through a Dist-Inject dart pistol/rifle. In addition, we tied live sheep baits at two locations and set up hides to watch over them (see accompanying photograph). The snare sites were monitored at least twice each day, in the very early mornings and late afternoons. Unfortunately, no snow leopard obliged us during the few days of our effort and presumably they had moved on to higher areas as the summer had already well advanced in June. At the time of our establishing the camp there was evidence of at least 3 animals using the area.



Our team consisted of Raghu, myself, Norbu the Wildlife Range Officer Incharge of the National Park, the local forest guard and field assistants. We were also accompanied by the husband and wife team of Ashish and Joanna Chandola who were making a film on the snow leopard and himalayan wildlife and hoped to film the trapping and radio-collaring operation. We were joined on June 10th by the Director and unfortunately, owing to a medical emergency we had to prematurely abandon our operation. The snares were de-activated and the baits removed.

After our return from Ladakh I received a letter from Raghu

mentioning that when he had gone back to our camp site he found tracks of a large snow leopard over four snare locations! The same animal had even crossed over the very site where I had pitched my tent! Hard luck for both of us you might say!

Dr. G.S. Rawat who has recently returned from the U.S. has now gone to the study location to help Raghu in the identification of plant species, and vegetation and habitat mapping and classification. Later this year, perhaps in October, it is proposed to resume our effort to trap and radio-collar at least a couple of snow leopard.

Kishore Rao

INTERESTING OBSERVATIONS ON BIRDS

Justus Joshua who has been studying the endangered Grizzled Giant Squirrels in Srivilliputhur Reserve Forest in Tamil Nadu reports a few of his observations on birds.

1. On 22/03/87 two Lesser Goldenbacked woodpeckers (Dinopium benghalense) were seen feeding on the pulp of ripe mangoes. Woodpeckers are generally insectivorous.
2. On 21/08/87 twice a Whitebellied Drongo (Dicrurus caerulescens) was seen sitting on the back of a flying Black Eagle (Ictinaetus malayensis). Everytime the drongo sat the eagle was able to shake it off after flying jerkily and trying to attack it by it's beak. He has seen this happening twice earlier.
3. On 09/03/88 a Rufousbellied Hawk Eagle (Hieraetus kienerii) a rare bird, was seen killing and feeding on a

Roseringed Parakeet
(Psittacula krameri). This predation occurred when six parakeets were chattering and fighting for a hole in an Albizia lebbeck tree at a height of 12 meters. The eagle caught the parakeet by the head with it's talons, held it in that position for four minutes, removed the feathers for 24 minutes and then ate the flesh for 56 minutes. After that it flew off with the remains held by the talons.

4. One hole in an Albizia lebbeck at a height of 13 meters was used by three pairs of Large Green Barbets (Megalaima zeylanica) successively. The first pair was seen incubating and feeding the young by the end of April, 1988. The second pair occupied the hole after two days and was seen feeding the chicks by the end of May and the third pair fledged the chicks on 24/06/88. It appears hole nesters are having accommodation problems!

A.J.T.Johnsingh

COMMENTS ON THE CONTROVERSIAL STATEMENT MADE BY SHRI SHARAT PRADHAN TIMES OF INDIA, JUNE 14, 1988, LUCKNOW.

1. The operation for tiger translocation in DNP was not put off. It was attempted between 1st to 20th of June, 1988. There were no controversies regarding the technical feasibilities that I am aware of. The technique is well established. Only the additional precautions were discussed in a meeting of the Rhino sub-committee and with the U.P. Forest Department officials.

2. The term 'novel idea' appears to have been used in a derogatory sense. Experiments are needed in wildlife management and this was a carefully planned experiment addressing the objectives of the rhino reintroduction programme.

3. There would always be debates over the success of an experiment.

4. The experiment with the dummy has been looked into. There is nothing wrong with the principles. Such experiment has proved successful in the Sunderbans. A proper experiment had not been set up in Dudwa. The conclusions are not correct.

5. The experiment was designed to address the efficiency of the new power fence in matters of its ability to prevent the re-entry of tigers in the rhino reintroduction areas (RKA). Such monitoring was provided to judge the success of the experiment.

6. Trapping feasibility was not questioned by any expert that I am aware of. Dr. Sale never backed out of the experiment. It was for the Institute to decide as to who should undertake the work in consideration to the commitments of officers. Dr. Sale had his own assignments to attend to. The translocation team was selected with due thought to the experience of individuals. Dr. Sale was very much involved in planning the operation. As such the statement that he backed out of the plan in view of its unsoundness is very unfair and amounts to gross distortion of facts. To my knowledge he had conveyed the facts to the paper.

7. Rhino calf predation by tigers is a field reality. Such incidents have been reported time and again from Kaziranga. However any comparison between the Kaziranga situation which has 1000+ rhinos and RKA which is seeking to establish a rhino population beginning with only 7

rhinos is at once odious. The RRA cannot afford recruitment losses on account of tiger predation for obvious reasons. No veteran conservationist will ever propose the far fetched idea of captive breeding of rhinos and release in the wild as is being done in the crocodile project. Such comparisons do not deserve any further comment. The entire issue is presented out of context. This is an excellent example of ill informed and poor journalism.

Dudhwa tiger trapping plan put off

By SHARAT PRADHAN
The Times of India News Service
LUCKNOW, June 13.

THE plan to trap tigers straying into the fenced rhinoceros area in the Dudhwa National Park has been put off in view of controversies regarding the technical feasibility of the scheme. The plan had been drafted following the mysterious death of a first-born rhinoceros calf, whose forest officials alleged, had been killed by a tiger. The allegation, however, could not be confirmed as the body of the baby rhino had been consigned to the flames without further inquiries or a post-mortem.

Since the death of the first rhino calf in Dudhwa in December 1987 had been a setback to the government's ambitious plan to rehabilitate the animal in its original home, the matter was taken up at the highest level. The specially constituted rhino sub-committee of the Union ministry for environment finally embarked upon a novel idea to "save" the animal in Dudhwa by trapping the tigers that had reportedly strayed into the fenced area.

ELECTRIC FENCE

According to a spokesman of the wildlife department, the area in which

the rhino rehabilitation programme was launched had been enclosed by a 24-km electric fence. Since the fence was not very high and there was about 45-cm gap below the fence, the tigers could easily jump over the fence or crawl underneath it. With a view to preventing this the state's forest department had now decided to reduce the gap to 20 cms and also raise the height of the fence to nine feet.

Whether such a modification would really help in keeping the tiger away is debatable. In view of past experience it is said that the fence may prove to be an exercise in futility. Mild electric current, it has been observed in the past, failed to deter tigers from attacking human dummys installed in Dudhwa to create fear in the wild cat. Though the tiger would initially recoil on receiving the electric shock it would later attack the dummy with greater fury.

At present, there are seven rhinos in the 21-sq km fenced area where at least four tigers are suspected to have infiltrated. Of the two protected species, the rhino is regarded as more precious. Wildlife officials had hoped that once the infiltrating tigers were tranquillised and trapped to be carted outside the fenced territory, the "predation menace" would be over.

It is learnt that a few wildlife experts expressed their reservations about the feasibility of the trapping plan. The FAO expert at the wild life institute of India, Dr John B. Sale, who was earlier scheduled to lead to trapping operation in Dudhwa is understood to have backed out of the project.

Veteran conservationist feel that if tiger predation was really a problem, rhino breeding could be conveniently done in captivity. A similar experiment has proved successful in the case of the crocodile, which is bred in captivity in Lucknow and later released into the Chambal river.

and eaten a portion thereof the tiger did not return on the kill. The second kill was dragged by the tiger in tall grass. The tiger, a big male played hide and seek for two days and we almost got him on the second day within the tall grass, but only almost. Riding elephants panicked before the roaring and charging tiger at the crucial moment of darting, spoiling the aim and ruining the opportunity. It was good fortune that the tiger did not jump on top any of the leading two elephants which were mounts of my team mate Shri A.N. Singh, Research Officer, P.T. Corbett and myself. The tiger was only a few meters away on a raised mound and in arguably angry! He later cleanly escaped into the tall grass. We had used baiting to attract tigers employed visit on machan and also conducted silent drive in the operation. We estimated no more than three tigers to be using the RRA very occasionally.

Unfortunately heavy rains during the last three days brought down the curtains on the operation. The stay was not without its other moments of excitement. The two male rhinos, Raju & Banke kept fighting throughout. On two occasions Raju was forced to break through the power fence. Riding elephants were employed at night and during day to successfully get him back into the RRA on the first occasion. Second time it took two days of intensive search to locate him and it was decided to have him enclosed in a smaller area by putting up another power fence as he refused to go near the RRA and was badly injured. While some of us were examining the pugmarks of a tiger one day at a water hole which was surrounded by tall narkul, I was unaware of a tiger coming through it at a distance of 15 meters. He was earlier on sitting under a tree just beyond. Shri A.N. Singh who was on high ground saw the tiger getting up and walk through. He gave a timely

A separate report has been filed on the tiger translocation operation. No tiger could be captured for reasons of very low intensity of tiger activity during the 20 day period in June. Continuous tying of 6 baits at prime locations turned up a tiger only twice. In the first instance after having made the kill

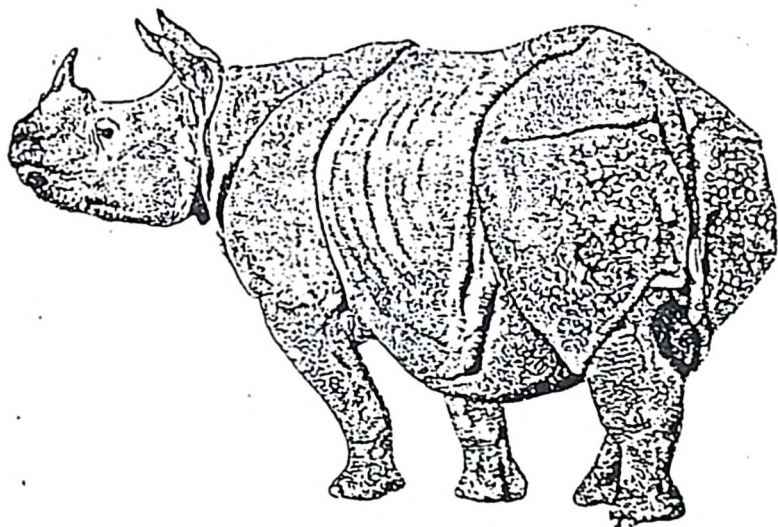
warning which averted a possible accident. Two days later as the Sonaripur Range Officer was riding a motorcycle back to his Headquarters a tiger ran after him for some distance. The motorcycle proved to be much the faster!

status of the Bengal florican. Distribution of tigers in the outlying sugar cane fields was evaluated.

The Director, DNP provided well organised facilities and support.

V.B.Sawarkar

We had an armed encounter with dacoits in 6th of June evening at a tourist focal point Banke tal. There were six of them and they had shot a hog deer and a wild boar. Shri A.N. Singh displayed exemplary courage in holding the dacoits at bay for almost 45 minutes till more fire power and men could be arranged. The miscreants disappeared in the gathering dusk. Later, intensive search proved unfruitful.



The visit was extremely useful in other matters. It enabled assessment of the various management problems especially the alarming situation of the swamp deer decline. A separate report has been filed on the status of the swamp deer. We provided tiger census training to the staff of DNP and re-conducted the tiger census. There were useful discussions and observations on the

WORKSHOPS AND SEMINARS

CONFERENCE ON INTEGRATING IMPACT ASSESSMENT INTO PLANNING PROCESS

Recently, I attended the VII Annual Meeting of the International Association for Impact Assessment which was held at the Griffith University in Brisbane, Queensland, Australia from July 4-10, 1988. This meeting was attended by over 350 professionals from around the world. Besides myself there were three other Indians - a Professor from the Madurai Kamraj University, another from the Government P.G. College at Chhindwara, and a representative from the Institute for Social Change at Madras who also represented the Commonwealth Human Ecology Council in India.

The participants represented diverse professional fields, but constituted three main groups - the academics, government agency representatives and the private consultants. It was interesting to see the interdependence among these three groups as each needed the other to survive in the business of impact assessment, which apparently is very big business, especially in the developed/industrial world.

The theme of the Conference was "Integrating Impact Assessment into the Planning Process", and the role of E.I.A. in assuring Sustainable Development was sought to be highlighted. In addition to poster presentations and exhibits there were 7 concurrent sessions which made it very difficult to choose which session to attend as papers of ones interest were being presented in more than one session at the same time. Some examples of topics covered by the various sessions and papers are :

1. Public Participation in the Planning Process.
2. Integrated Environmental Planning Applications to Coastal Zones in Developing Countries.
3. Selection of Social Impact Tolerance Indicators for Park Planning.
4. EIA procedures in selected Third World Countries.
5. Sustainable Tourism Development: The Role of Carrying Capacity.
6. People, Ecology and Impact Assessment.
7. Measuring Social Impact of the World Heritage Listing of Queensland's Rain Forests.
8. An EIA of a Potential Mining Development within a National Park.

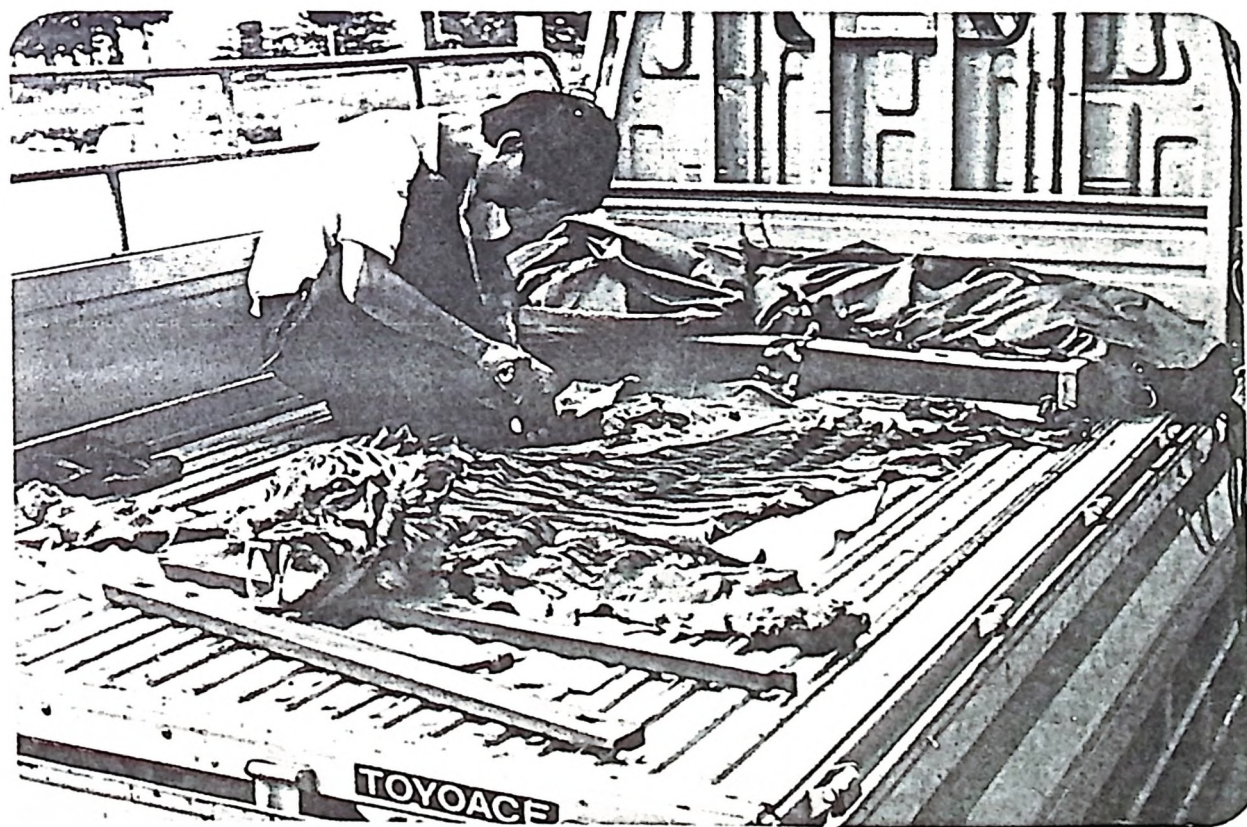
Over 200 papers were presented during the Conference in the various concurrent sessions. Both Environmental and Social Impacts were covered and a large number of case study material was used to illustrate these impacts and discuss different methodologies and techniques for measuring/assessing them. I presented a paper in one of the sessions. The title of my paper was, "The Social Consequences of Protected Areas Development on Resident and Neighbouring Populations". I have with me a copy of the abstracts of the different papers presented at the conference which I will be happy to share with interested faculty members.

Kishore Rao

Sidelight:

On my way back from Australia I spent some time in Singapore. I will not here dwell upon the many delights which this island nation has to offer but draw your attention to the picture which appears below, As luck would have it, I chanced upon this scene right in the middle of a busy commercial area of the city - - Serangoon Road, more popularly known by the name of Little India. In case you can't make out from ^{the} picture, a tiger skin is being cured on the back of a truck. The man was busy in removing bones from the legs of the tiger skin and extracting the claws. The skin was wet and very high. On enquiry I learnt that the skin had been acquired from somebody who had brought it from Bangladesh (does this raise some doubts in your minds about the real origins of the skin?). The skin was being offered for S\$ 5,000/- and each claw for S\$ 40/-. No, I did not buy any part of it !.

Kishore Rao



SPECIAL FEATURES

LION CHARGES!

"Beep, beep, beep" the radio signals were beating into my ear drums. We were on the trail of the radio-collared adult male lion in the Acacia-Zizyphus woodland in the eastern tract of Gir. The signals very clearly indicated that the lion was close by and he was resting. He had not moved much from the previous day's location. Last afternoon we had sighted the collared male resting, in the shade of a Capparis thicket, fully gorged. His male partner was not to be seen. Earlier we had inspected remains of a huge bullock, freshly killed and eaten by at least two male lions, hardly 200 meters away. Crows were scavenging on the remains.

These lions had a reputation for being very aggressive. I had been charged at least on half a dozen occasions. Taking all this into account, we maintained complete silence as we picked our way in the thorn bush, peering around every bush and thicket to locate the lion. We would have been searching for about twenty minutes when I very nearly bumped into these two massive lions. Turning around a large Acacia-Zizyphus Thicket I saw the male lions fast asleep in the shade, overlooking a dry river bed. Not wanting to disturb them, I signalled my trackers (Wazir and Guga) to stop and retreated behind the cover of vegetation. The telemetry equipment, useful as it is for locating lions can prove to be cumbersome and constraining while moving in the jungle. Moreover, I was keen to photograph these lions, taking advantage of the fact that they were sleeping and would allow fairly close approach, which would normally not be possible.

I had knelt down to dismantle the headphones and the antenna, while Wazir moved up to take a look at the lions. Then it was all "ACTION". I



THE PROJECT MUST MAKE THEM TO REALISE THAT WE ARE HERE TO SAVE THEM

heard loud growls and whirled around to see the radio collared lion charging straight for Wazir. Wazir, immediately reacted by throwing a piece of wood at the lion. By then the lion was barely 5 meters from him. This served to stop the lion. He turned back but only momentarily. He whirled around to charge once again.

Initially Guga and I were too surprised to react. The pace of events got the better of us. The few moments that we gained, when the lion turned back, enabled us to pick up the "kuvadi" (the small axe,

which almost everybody carries while walking in Gir) and rush to the rescue of Wazir. Giga threw another stick and Wazir added one more. Having to face three axe waving and shouting men, who showed no intention of backing off and the three missiles (pieces of dry/rotten wood); the lions retreated in great haste into the riverine tract, grunting and growling all along. this was indeed a very close shave.

This charge was also rather atypical as we had caused absolutely no provocation but for our close presence. This was March 1988. Two years after I had commenced field work in Gir. This WII project (GIR LION PROJECT) aims at gathering quantified information on predation and ranging patterns of the sole surviving wild population of Asiatic lions. An important component of this study is to compare the ecology of lions in eastern and western tracts of Gir. These tracts vary in vegetation cover, water availability, prey densities and human disturbance levels. All of which would have very profound influences on lion behaviour.

So far the most significant differences that I have noticed is that the lions in the east are either very shy or very aggressive.



This contrasts with the rather placid nature of the lions in Gir West. Lions in Gir West prey largely on wild ungulates—Chital and Sambar, but the lions in East prey almost exclusively on domestic stock. This is a reflection on increased availability of domestic stock and the paucity of wild prey.

Lions have also charged on me in the West. In fact I had my baptism to lions, by being charged. I had gone along with the forest department shikaris for locating the lions one evening in March 1986. We located a large male who was soon attracted to the roadside by a buffalo bait. For a couple of hours tourists came to view the animal and at dusk they all departed. Then the bait was offered to the lion. One leap he was on the bait, breaking the neck of the buffalo with the impact and sinking in his canines. I was watching, totally fascinated from a distance of 30 meters. Then it happened. One second he was on the buffalo and the next a couple of meters from me. Growling, whipping his tail and snarling. His blood smeared face added to the effect. I was totally shaken and somehow was able to shout, wave my hands and back off, as a couple of shikaris rushed to my rescue.

Over the many months since March 1986 I have walked and driven through hundreds of kilometers in the lion's domain. Working with large cats has been a most fascinating experience and this privilege is thanks to the Gujarat Forest Department and the Wildlife Institute of India. Even now, every lion sighting brings a thrilling feeling in me and I hope that everything goes on well for me to complete this study by December 1989.

Ravi Chellam

NO TIME FOR NOSTALGIA.... NO TIME TO DREAM

A hundred years ago,
the moon may have shone brighter;
A hundred years ago,
Man's shadow on eath was lighter.
A hundred years ago,
the noble wolf did hereabouts howl,
Where now pedigree dogs,
from their kennel-bungalows growl.
A hundred years ago,
A mighty king..I might have been,
Sovouring that unspoilt Nature,
as one now dreams.
Or else that century ago,
A lowly slave..I might have been,
Knowing only Nature's wrath,
far from the stuff of dreams.
O but a century ago.....!
Just a hundred years ago.....!
What might have been,might have been;
too comlex it is to speculate,
And all my dreams, if anything,
are just a bit too late.
I was not born,
in that long past age;
My time is now,
current battles to wage.
I must not rue what I have missed,
but try to save what we all have left.
Make it last, at least, the century ahead,
or leave coming generations totally bereft.
We haven't the time for nostalgia,
We haven't the time to dream;
Our present and our Future,
an unending nightmare seem.
Work now that, at least some
of our dreams come true;
That our children do not,
have our mistakes to rue.
Yesterday is long dead,
and Tomorrow might soon die,
So for that uncertain Tomorrow,
answer Today's cry.

Madhusudan V Katti
M.Sc. (Wildlife Biology)

MOVEMENTS AND HABITAT UTILIZATION BY ELEPHANTS IN WESTERN UTTAR PRADESH

A. Khan, JRF
J.B.Sale,
S.Chowdhury

INTRODUCTION

- All five population of Asiatic Elephant (*Elephas maximus*) in India are threatened by the loss and severe degradation of habitat, including it's fragmentation.

- This study focuses on the portion of the north-western population in Rajaji National Park U.P. an area of 840 sq. Kms, comprising three former sanctuaries Chilla, Motichur, and Rajaji astride the Ganges.

- Average rainfall is 150 cm. and the hilly terrain is covered by deciduous forest types, such as Siwalik sal. There is a seasonal scarcity of water.

- In addition to heavy grazing and lopping, habitat quality has been greatly reduced by the construction of a power channel and other development works, seriously impeding elephant movements across the Ganges.

OBJECTIVES

- Research, which aims to provide a basis for improved management of this disrupted population, has the following specific objectives:

- Determine the year round movement pattern of elephants in Rajaji N.P. and contiguous forest areas.

- Assess the effect of forest management practices and human activities, such as cattle grazing and development projects on

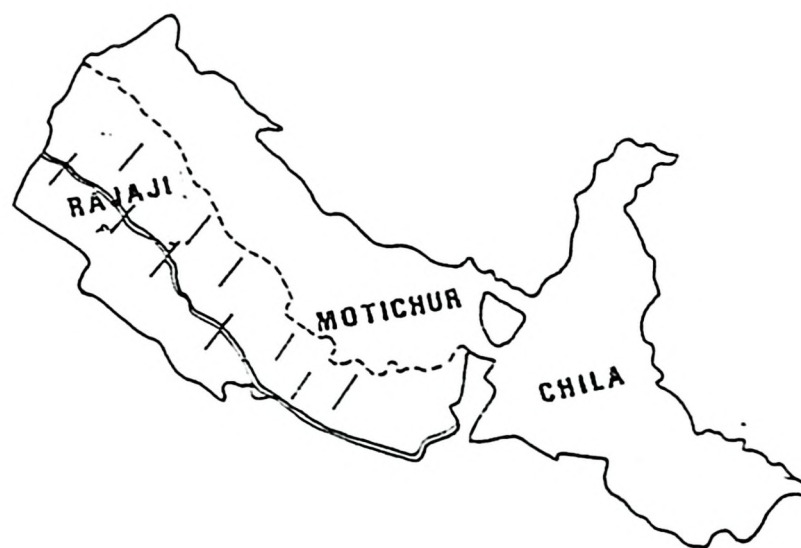
(a) elephant movements and

(b) habitat utilization pattern.

- Evaluate key habitat factors (food, water and human disturbances) which influence the seasonal pattern of habitat occupance.



PRESENT DISTRIBUTION OF ELEPHANTS IN INDIA



DISTRIBUTION OF TRANSECTS IN STUDY AREA

GANJARRAN BLOCK - TREES LAS OBTAINED BY PCQ1

Tree Density = 566 trees/ha.

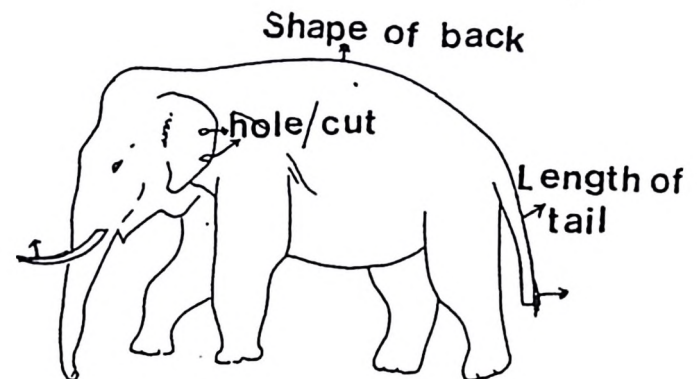
Name of Species	Density per ha.
<i>Dalmanella philippensis</i>	111
<i>Lagerstroemia parviflora</i>	60
<i>Ehretia laevis</i>	55
<i>Shorea robusta</i>	53
<i>Dalbergia sissoo</i>	48
<i>Acacia catechu</i>	38
<i>Millettia velutina</i>	35
<i>Kedia calycina</i>	35
<i>Bauhinia malabarica</i>	18
<i>Tectona grandis</i>	15
<i>Casuarina romboldiana</i>	13
<i>Zizyphus xyloperga</i>	13
<i>Bandia dumetorum</i>	09
<i>Cassia fistula</i>	09
<i>Terminalia belerica</i>	07
<i>Grewia elastica</i>	07
<i>Litsea glaucescens</i>	05
<i>Butea monosperma</i>	02
<i>Salmalia malabarica</i>	02
<i>Embliza officinalis</i>	02

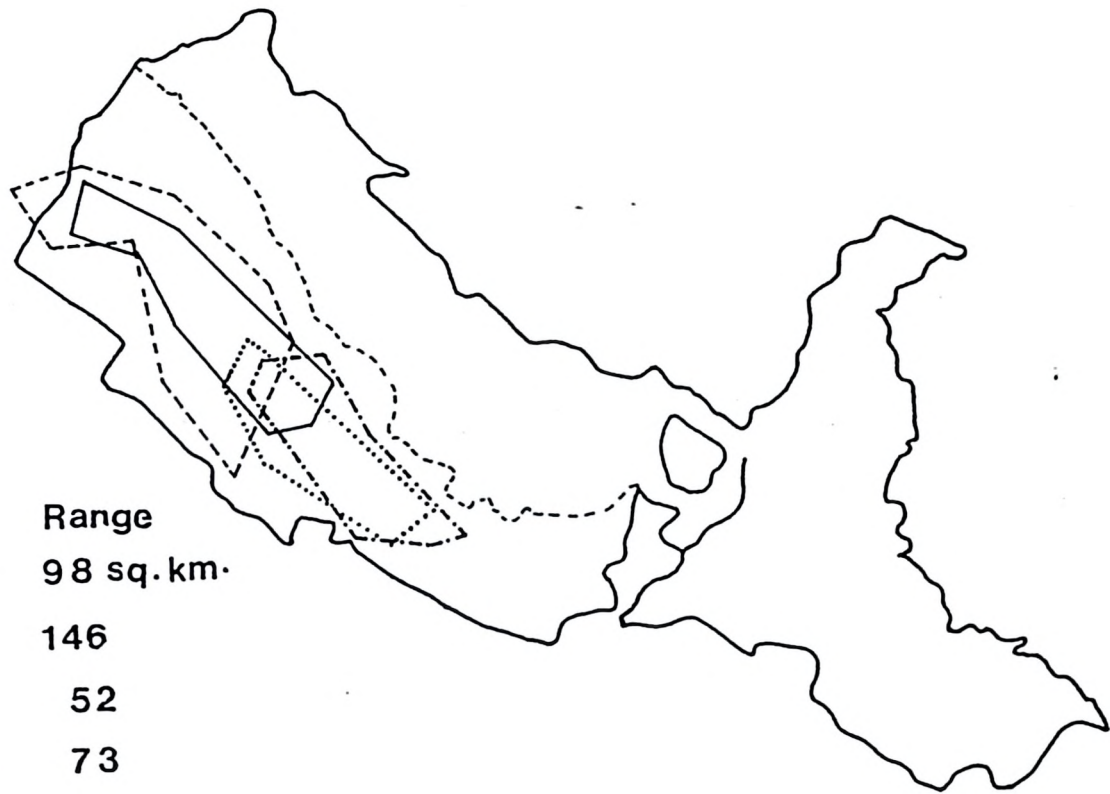
HABITAT STUDIES

- A basic understanding of study area habitat is being sought by:-
- Mapping of broad vegetation types and terrain.
- Estimation of density and species composition of trees and shrubs by point centred quarter (P.C.Q.) transects in each forest block.
- Mapping of seasonal water availability.
- Recording of disturbance factors, including human settlements, cattle densities, frequency of grazing and lopping.
- Specimen of results are illustrated.

MOVEMENTS

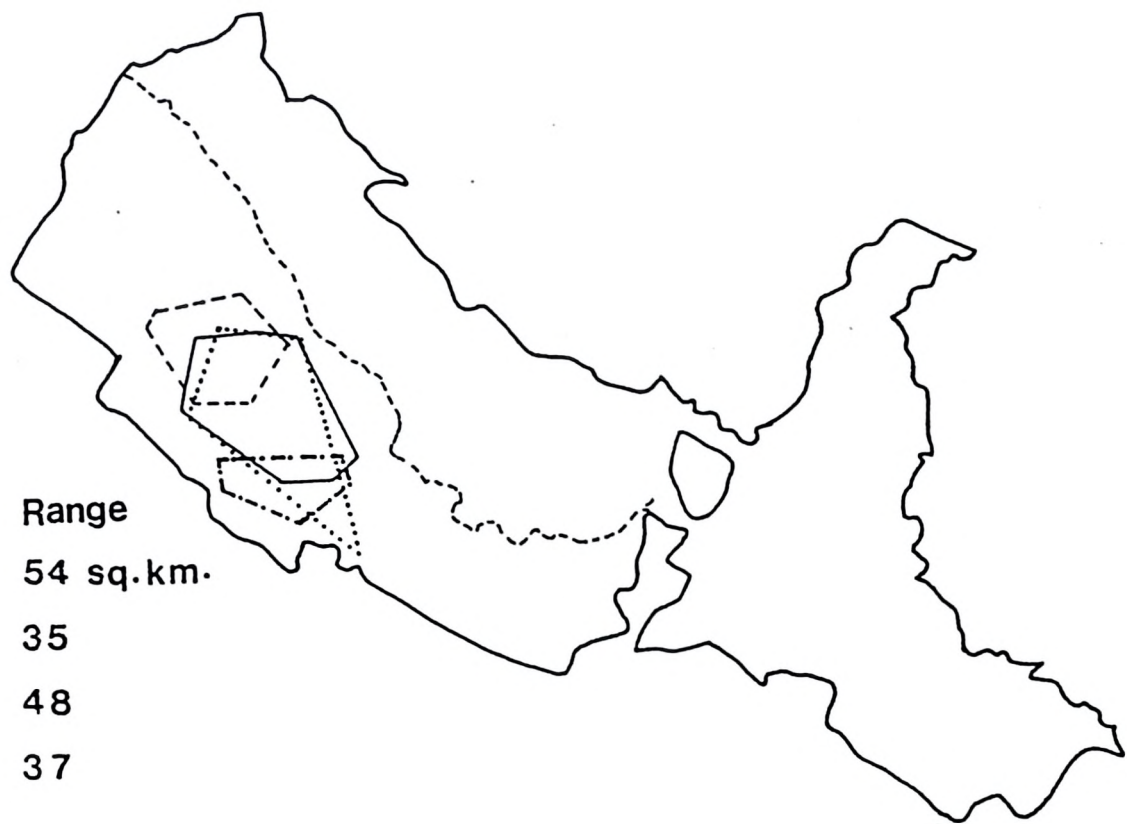
- Information is obtained by direct and indirect methods.
- Individuals identified by either morphological characters (see Diag.) or Radio-collars provide information on movements and seasonal range.
- Information on habitat occupancy is obtained from
 - (i) Direct observations of elephants,
 - (ii) By indirect evidences (Feeding signs and dung) recorded monthly from fixed transects (see map), and
 - (iii) Dung counting in dry river beds, (except monsoon).
- Preliminary information from fixed transects and river bed dung counts is summarized in map 3 showing relative habitat occupancy.





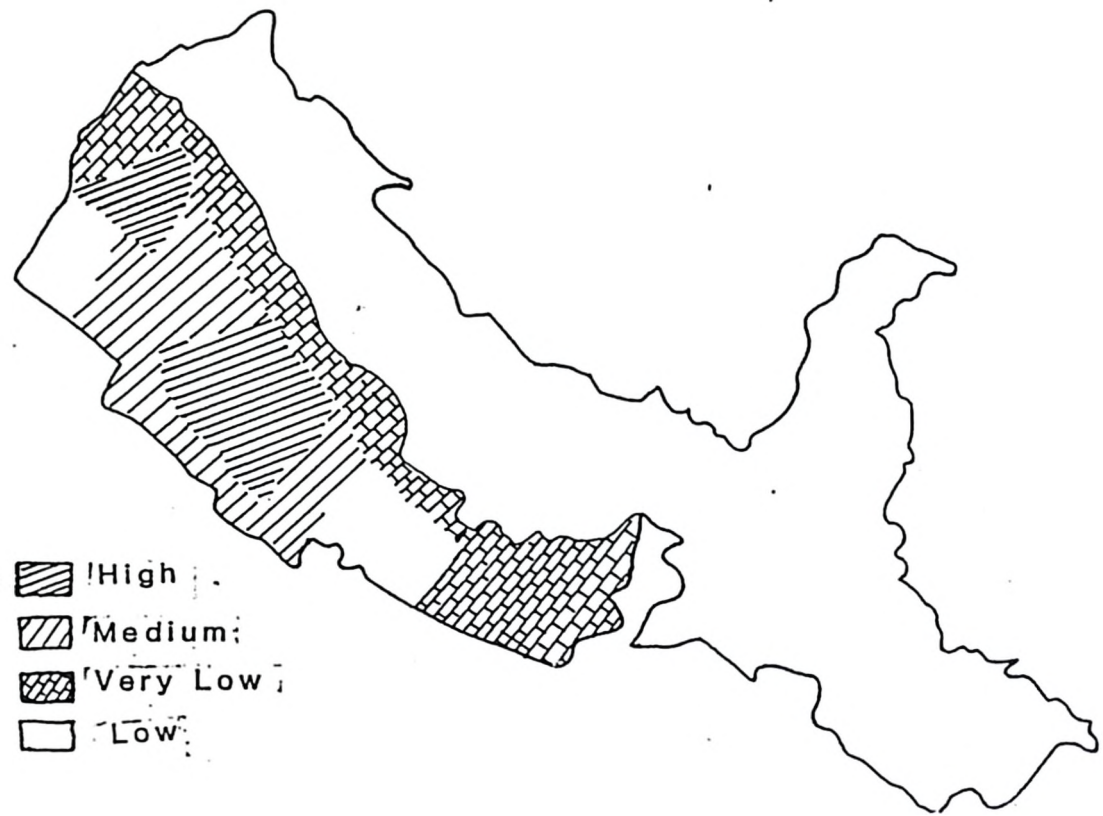
Season	Range
Winter	98 sq. km.
Summer	146
Monsoon	52
Post monsoon	73

1. Seasonal ranges of a radio-collared male



Code No.	Range
MT-1	54 sq. km.
S-1	35
DG-1	48
SP-1	37

2. Home ranges of four identified bulls



3. Relative habitat occupancy by elephants

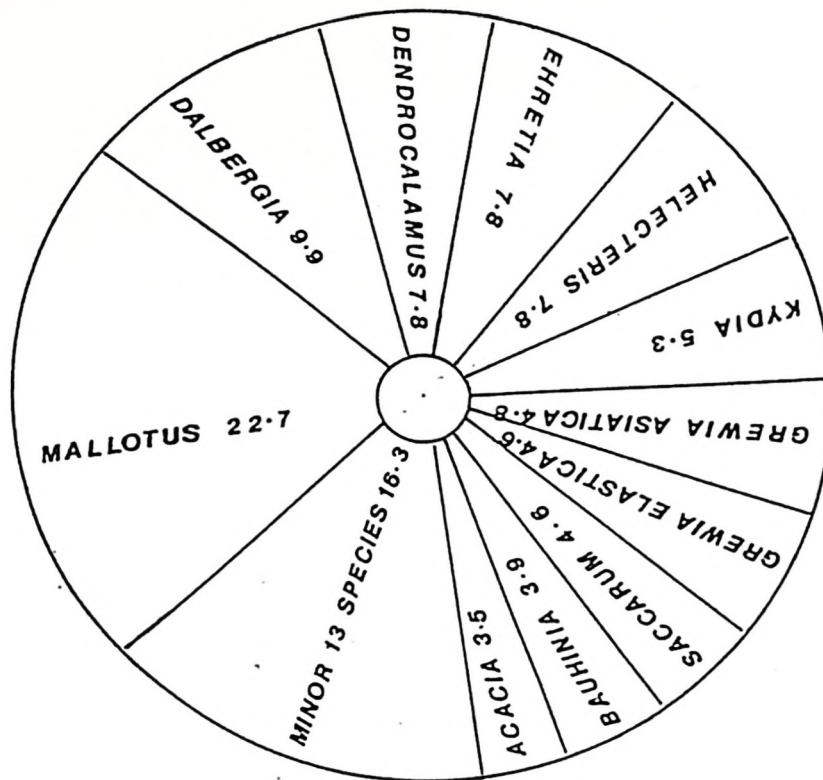
HABITAT UTILISATION

FEEDING STUDIES

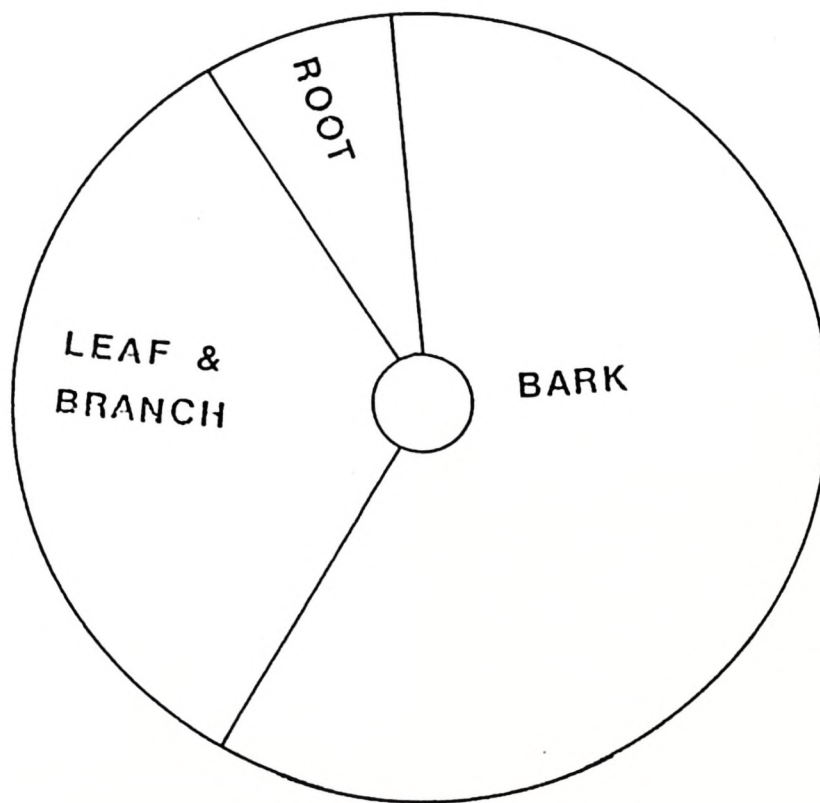
- By recording numbers of direct observation of foraging per plant species and plant parts (leaf and branch, bark and roots).
- Indirect information is also obtained on feeding via fixed transects.

USE OF WATER

- Observation of drinking and wallowing are recorded and data will be examined by time of day and seasons.



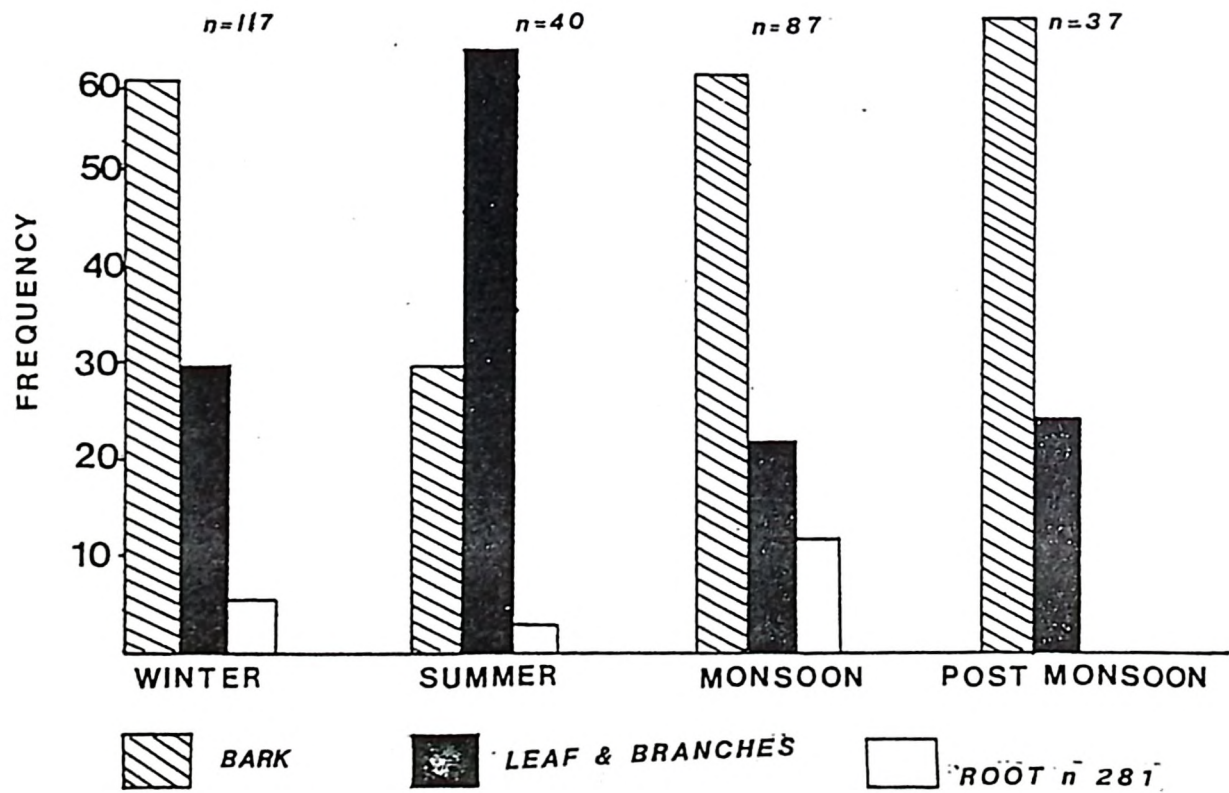
Frequency of plant species foraged n 281



Foraging frequency of plant parts

SEASONAL FREQUENCY OF MAJOR PLANTS FORAGED

Sl. No.	Name of species	Percentage of occurrence in Forage			
		Winter n=117	Summer n=40	Monsoon n=87	Post Monsoon n=37
1.	<i>Mallotus philippensis</i>	26.4	30.5	16.0	17.6
2.	<i>Ehretia laevis</i>	08.5	13.8	09.1	Nil
3.	<i>Grewia elastica</i>	06.8	Nil	Nil	Nil
4.	<i>Kydia calycina</i>	06.8	Nil	08.0	Nil
5.	<i>Bauhina purpurea</i>	06.8	Nil	Nil	Nil
6.	<i>Saccarum Spp.</i>	05.9	Nil	13.7	Nil
7.	<i>Helicteris isora</i>	05.1	13.8	Nil	17.6
8.	<i>Acacia catechu</i>	05.1	Nil	Nil	Nil
9.	<i>Dalbergia sissoo</i>	Nil	05.5	17.5	11.7
10.	<i>Grewia asiatica</i>	Nil	05.5	17.5	11.7
11.	<i>Bauhinia malabarica</i>	Nil	05.5	Nil	Nil
12.	<i>Dendrocalamus strictus</i>	Nil	Nil	10.3	29.4



Seasonal frequency of plant parts foraged

LOST IN THE RAINFOREST

In June 1988, I had been to the Kalakadu Wildlife Sanctuary in Tamil Nadu to trek from Netteri Dam in the Sanctuary to Muthukuzhivayal a cardamom plantation, in Upper Kothayar Reserve Forest in Kanyakumari district. There is a proposal to annex this forest with the Sanctuary. These forest areas would become part of the proposed Kalakadu-Mundanthurai Tiger Reserve, the seventeenth Tiger Reserve in the country. The Government of India has issued a notification to this effect in April, 1988. When I worked in these hills during 1982-84 I never had the chance to trek along this route, which is used largely by cane-poachers, although I have covered other parts of the proposed Tiger Reserve.

While going on such a trek one has to inform the local forest officers well in advance to find a suitable guide to take you through the area. This, I did and the response of the forest department was cordial and immediate. In fact when I reached Netteri dam (altitude, 4500') after trekking through 12 kms of primordial rainforest with two of my local naturalist friends, I found the guide and two forest guards waiting for us. The guide told me that he had worked in this area 15 years ago! The guards were completely new to the area! The time was 1100 hrs and the guards were instructed by their Range Forest Officer to leave me in Muthukuzhivayal and come back to Netteri, where there is a dilapidated Forest Rest House, by the same evening. The RFO had no idea about the forest through which we had to walk!

We started walking at 1130 hrs. Till 1700 hrs, although it was drizzling incessantly, there was rapid progress through dense patches of reeds (Ochlandra travancorica) and rainforests along and across

streams and elephant trails. In several places there were gaur and mouse deer tracks. Giant squirrels and Nilgiri langurs frequently flitted through the dense canopy. Near a stream bed leopard and tiger pugmarks were also seen. In one place an elephant stood feeding amidst the reeds hardly 15 m from the path. We tiptoed past the elephant. One of my naturalist friends, Mr Albert Rajendran, who has been studying pit-vipers of this area, could even locate a short nosed vine snake (Dryophis dispar) and a green pit viper (Trimeresurus macrolepis). In one place we found a comfortable grass hut built by cane smugglers. As our attempts to burn it did not succeed, we pulled it down.

I think the guide made the mistake of selecting the wrong path around 1730 hrs. At 1830 hrs we realized that we were still far from any human habitation. The drizzle continued, leeches crawled up our feet and darkness started shrouding the forest. The guide confessed he was lost.

There was only one option left for us. To halt in the middle of the wet forest would have been suicidal as the leeches would have drained our blood to the last drop. I led the way down to a valley where we had been hearing a river rumbling. Fortunately, as visibility was just fading, we came upon a flat rock in the middle of the river, wetter and colder than the forest floor, but free from leeches. The guards and the guide tried to build up a fire using the newspaper, which we had wrapped around the two loaves of bread, and dry reeds. The wetness of the wood did not succumb to the small fire we had built.

We were not prepared for the night halt in such a place. After sharing the bread and drinking from the river we went to sleep on the wet

rock. I slept from 2000 to 2200 hrs, and thereafter the cold and the constant drizzle did not allow me to sleep. The same was the case with the others.

With the first light of dawn, we packed up our wet belongings, and went up to the place from where we had descended into the valley the previous evening. After two hours of climbing, slipping down and crawling through bushes I picked up an old trail, along which someone had passed cutting saplings, probably a year ago. Now the trek became much easier and after half an hour we entered a cardamom plantation. After talking to the people at the plantation we realized that we were several kilometers from Muthukuzhivayal, our destination and the nearest bus stop was 15 kms away. This did not bother us as the caretaker of the plantation kindly came forward to give us a place to wash and a much needed warm rice meal.

Later as we walked towards the bus stop I looked back at the magnificent forest where we had spent a sleepless night. I was happy that one day these forests would come under the umbrella of Project Tiger, which would further enhance its protection and conserve it for posterity. But a question which made me uneasy repeatedly arose in my mind. How are we going to effectively patrol areas such as the one I walked through, if we don't have proper guides to take Forest Department staff who may be completely new to such areas.

One way of ensuring an effective guide system in an area is to appoint local tribals as guides. Tribals know their area in and out. Mundanthurai has a tribe known as Kanis who are very good in junglecraft. Possibly when

Kalakadu-Mundanthurai becomes a Project Tiger area the Forest Department will be in a position to appoint Kani guides to assist Forest staff to perambulate remote areas which otherwise would remain unknown and would attract illegal activities.

A.J.T.Johnsingh

PUBLICATIONS

THE BIOGEOGRAPHIC PROJECT

The full report "Planning a Wildlife Protected Area in India" consisting of some 600 pages in 2 volumes was completed in March, 1988. The report has been sent to Chief Wildlife Wardens, to the original consultants to the project, and to interested conservationists, for comment, updating and correction of detail.

On receipt of these comments a final version of the report will be produced.

The report is intended to stimulate conservation action. It has within it therefore, data and recommendations at varying scales of detail. For example :

- There is a basic two page Abstract which explains the project and major findings;
- There is a more detailed Executive Summary of 25 pages of text and summary. This lists all recommendations and discusses major conservation issues.

The full report has a lengthy Introduction and Discussion Section which argues the case for greatly improved conservation inputs into the protected area system. The Biogeographic Classification is described in detail, and then all planning recommendations are considered within the 10 Biogeographic Zones of the country.

The second volume contains summaries of recommendations and discussion for each state separately.

The report stresses that improved conservation demands inputs from all segments of society - administrators and politicians, foresters and conservationists, and the people themselves. It points out what is biologically important for wildlife conservation. These words need translation into Action.

W.A. Rodgers

ANNOUNCEMENT

ANNOUNCEMENT OF CAPSULE COURSE IN WILDLIFE MANAGEMENT FOR FOREST OFFICERS

The Wildlife Institute of India has decided to offer a 2 to 3 week regionally organised capsule course in wildlife management for forest officers of and above the rank of ACFs. Such a course will emphasize the basic concepts of conservation, problems of management and strategies and techniques aimed at solving them. It is hoped that this capsule-training will enable the participating officers to visualise major field problems and to apply management capable of mitigating them until a detailed management plan ensures optimum management. Trained officers should also be able to draw up short term adhoc management schemes for PAs so that the scarce funds available for protected area management are gainfully utilised.

Since the main purpose of this capsule course is to rapidly increase the availability of at least minimally trained wildlife officers and because the course is of a very short duration, it is hoped that the states will avail of this to the full extent.

Capsule Course in Wildlife Management-Regional Coverage of Capsule Course : 1988-89

Southern Region

Venue Bandipur National Park
,Karnataka/Mysore.
Time: September, 1988

Karnataka, Kerala, Tamil Nadu, Andhra Pradesh, Maharashtra, Goa, Orissa, Andaman & Nicobar Islands, Lakshadweep, Pondichery, Daman & Diu.

Central and Northern Region

Venue Kanha National Park, M.P/ Jabalpur.
Time: January, 1989

Rajasthan, Gujrat, Madhya Pradesh, U.P., Himachal Pradesh, J & K, Delhi, Chandigarh, Punjab, Haryana.

Eastern Region

Venue Manas Sanctuary, Assam/ Guwahati.
Time: February/March, 1989

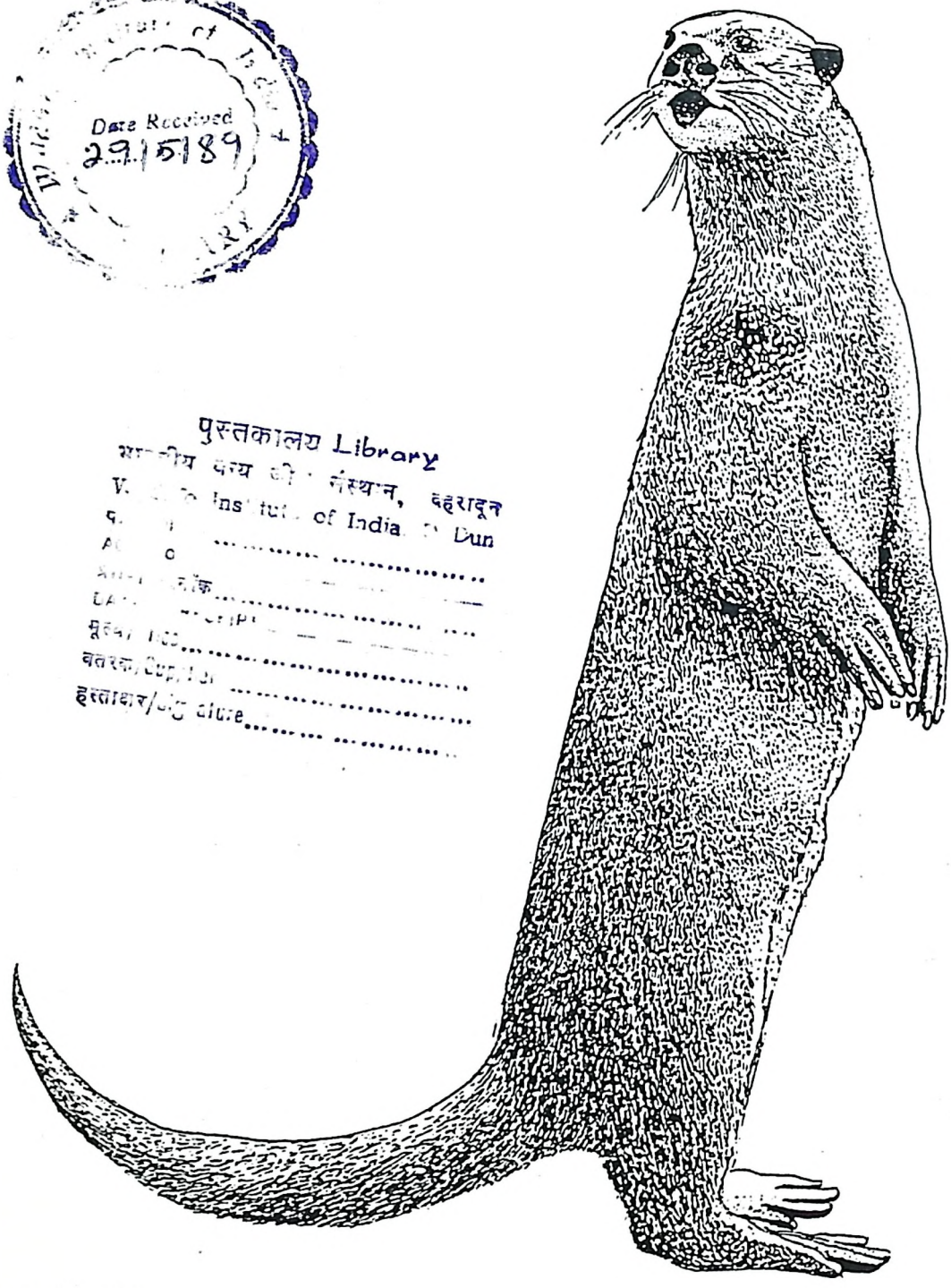
West Bengal, Sikkim, Assam, Bihar, Meghalaya, Arunachal Pradesh, Nagaland, Mizoram, Tripura, Manipur.

2092

NEWSLETTER

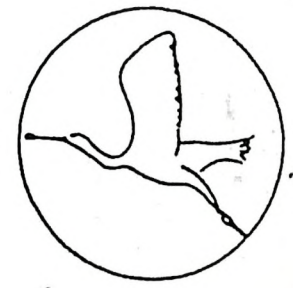


पुस्तकालय Library
 भारतीय वन्य जीव संस्थान, देहरादून
 Wildlife Institute of India, Dehra Dun
 प. नं. १००
 आ. नं. ०
 शाखा नं. ०
 ए. नं. ०
 मूल्य ०.००
 बतारक, ०००००
 हस्ताक्षर/संग्रहकर्ता



WILDLIFE INSTITUTE OF INDIA

VOL. 3 NO. 6
NOVEMBER-DECEMBER, 1988



CONTENTS

Editorial	2
Developments at the Institute:	
Report on Techniques Tour of Xth Diploma Course	3
M.Sc.(Wildlife) Techniques Tour	4
FAO Overseas Fellowship Report	6
Workshops and Seminars:	
International Bamboo Workshop	7
Special Features:	
Breeding of Indian Smooth Otter	8
Viperine Encounters	11
Dholkhand : A Monsoon Experience	14
A Winter Evening at Dholkhand	17
Who is That Calling?	18
An Encounter with a King Cobra in Dholkhand, Rajaji National Park	21
Case of Rectovaginal Prolapse in a Wild Chital	22
Research and Projects:	
Gir Lion Study	23
Evaluation of Mugger Crocodile Restocking by Monitoring	25

Editor : R.N. Acharya
Art : Asha Jain
DTP : V. Sukumar
Word
processing : A. Annathurai

Wildlife Institute of India
P.O. New Forest
Dehradun - 248 006

Phones : 27021 to 27028 (Ext 334)
28760 (Director)
27724 (F.A.O)
83334 (Extension Faculty)
83394 (Account Section)
83324 (Administration Section)

Telex : 585/258 FRI IN

EDITORIAL

With this issue of the WII Newsletter covering November through December '88, we have started using Desk-Top Publishing System. This is part of our attempt to improve the printing and production quality of the Newsletter. We are also increasingly covering the research works done by faculty members and research fellows of the Institute.

During this period the Xth Diploma Course in Wildlife Management was in full swing. The officer trainees were on their Techniques tour, a report is included in this issue. The M.Sc. students also went on their Techniques tour.

The highlights of this Newsletter are: Breeding of Indian Smooth Otter in Captivity by J.H. Desai; Viperine Encounter by Ravi Chellam; Dh'olkhand : A Monsoon Experience by M.V. Katti, etc. Some other interesting features of this issue among others includes Who is That Calling? by J. Kulkarni; Gir Lion Study by A.J.T. Johnsingh; and an article on Mugger Crocodile restocking by V. Vijay Kumar.

R.N. Acharya

DEVELOPMENTS AT THE INSTITUTE

REPORT ON TECHNIQUES TOUR OF X DIPLOMA COURSE

S.N. Prasad & S.P. Goel

The tour comprised of visits and field exercises to three sanctuaries/Tiger Reserves and a visit to National Zoological Park, New Delhi. The details of duration and dates of visit were as follows:

Sanctuary/Tiger Reserve	Duration in Days	Dates
1. Kedarnath Musk Deer Sanctuary	5	28.10.88 to 1.11.88
2. National Zoological Park, New Delhi.	1	3.11.88 to 4.11.88
3. Sariska Tiger Reserve	16	4.11.88 to 20.11.88
4. Keoladeo Ghana Bird Sanctuary	4	21.11.88 to 24.11.88

At Kedarnath Musk Deer Sanctuary. the major field exercises conducted were on :

- structure and composition of alpine meadows at Tunganath
- visit to High altitude plant physiology research lab of Garhwal University
- Musk deer census in Michael Green's study area and
- visit to Musk deer enclosure at Kanchula Kharak.

During the visit to National Zoological Park, Delhi on 3rd and 4th Nov., trainees

looked at the management aspects of Delhi Zoo by visiting different sections viz, Veterinary Hospital, Store etc. and had discussions with Mr. Naidu and Mr. Khan, Director and Joint Director, Delhi Zoo respectively. While visiting zoo, trainees observed the adaptive features of animals. This was followed by brief visit to the National Museum of Natural History.

Sariska Tiger Reserve, Sariska
(Combined programme for Diploma Trainees and New Junior Research Fellows)

Dr. Martin Andrew, Rangeland specialist from Australia gave a talk on estimation of animals' diet, effect on vegetation around watering point, estimation of browse and grass availability and fire as a management tool on 5th November. Later he has demonstrated the rapid method for estimating habitat components in field and use of pocket computer for noting observations.

Exercises were organised on the following from 6th to 10th November:

- Recording of behavioural observations. Trainees spent 12 hrs (0600 - 1800 hrs) on different water holes to record temporal use by animals.

- (ii) Preparation of vegetation map, porcupine damage assessment in different habitats, road side monitoring of animals and peafowl in relation to habitat types, groupsize, sex ratio etc.
- (iii) Visit to Jaipur Zoo. Trainees observed the various Zoo management aspects, currently in practice.

Exercises conducted from 11th to 15th November pertain to animal census techniques viz. king's census, Foot transect and total count. In the afternoons data were analysed and discussed.

Habitat use by animals was also determined by using indirect evidences such as dung abundance.

Animal conditions was noted for sambar and nilgai on the basis of variation in morphological structures.

Rapid techniques to evaluate habitat components viz. available browse and grass cover, canopy cover, terrain etc. and animal occupancy on basis of direct and

indirect signs were organized in different compartments of the Reserve from 16th to 17th November.

Food habits of wild and domestic animals were studied from direct observations. Interspecific comparison was made with respect to food preferences.

During the period 18th to 20th November the trainees involved in evaluating the existing 'signage system' of the park and prepared the new 'signage'. They have also assessed the visitors strength for different months and interviewed a few visitors to assess their perception about the park and park facilities.

Keoladeo National Park, Bharatpur
(21st to 23rd November):

BNHS and park officials gave full support in organising bird watching and assessment of wetland ecosystem. Trainees prepared the bird checklist for aquatic and terrestrial ecosystem. On 23rd afternoon, trainees had indepth discussion on management and research aspects of the park with park officials and BNHS scientists.

M.Sc. (WILDLIFE) TECHNIQUES TOUR

G.S. Rawat

The students of M.Sc. (Wildlife) were taken on techniques tour from 11th Nov. to 8th Dec. 1988. During this tour they visited four different places viz. Keoladeo Ghana National Park, Bharatpur; National Chambal Sanctuary, Morena; Bori Sanctuary, Churna; and Narmada Sagar Project Area, Kiti. Various field exercises were undertaken at different places during the tour.

The students reached Bharatpur on 11th

Nov. and the following field exercises were carried out there :-

- Water and Land bird census techniques.
- Collection of water from different water levels for further analysis in Lanoratory.
- Estimation of Oxygen at different water levels.

- Laboratory analysis of water samples to determine concentrations of different minerals.
- Comparison of productivity between an enclosed area and an area exposed to grazing pressures by wild ungulates, in the grassland area of Bharatpur.
- Visit to the heronery with BNHS project team.
- One morning was spent looking for Pythons.



They visited Chambal Sanctuary, Morena from 16th to 20th Nov., 1988. They carried out the following fields exercises :-

- Transect to estimate prestation pressures on Kachuga tentoria
- Gharial Census operation along 35 Km stretch of Chambal river.
- General census techniques for Mugger & Turtles.
- Otter transects to estimate presence or absence of otters at different places.
- Vegetation transect along the bank of Chambal river to see how vegetation changed away from the bank.

- Sexing of Gharials and Muggers.

The students arrived at Bori Sanctuary, Churna on 23rd Nov. and they carried out the following field exercises :-

- Investigation of giant squirrel habitat and effects of clearing riverine forest.
- Sambar impact on teak plantations.
- Cover mapping and habititat distribution parameters in a mosaic of forest, grassland and plantations.
- Diversity indices of birds, shrubs and herbs in old forest, 15 year old and 1 year old plantation.
- Examination of selection felling and almost clear felling system; including analysis of marking rules and potential environmental impact.
- Analysis of patterns of forest regeneration and community succession, using a preserva- tion plot as a studysite. Detailed data were collected for eventual computer analysis.

The class was at Kitti FRH on the banks of the Narmada in Dewas Forest Division, from 2nd Dec. to 7 Dec., 1988 and follow- ing field exercises were undertaken :-

- Techniques of rapid survey using topo sheets.
- More detailed survey of potential key sites.
- Discussing potential techniques to evaluate specific habitat components.
- Examination of Boswellia felling coupe.

- Discussion of tedu practice.
- Looking at forest fragmentation and village pattern.
- Detailed study of feeding and ranging behaviour of domestic stock.
- Discussion with villagers on MFP,

forest values and possible relocation.

- Discussion on implications of the dam mapping of impact zones etc..

After the completion of the tour on 7th Dec. 1988, the students went their respective places on winter vacation for three weeks.

FAO OVERSEAS FELLOWSHIP REPORT

Asha Rajvanshi

Under faculty development programme of the Wildlife Institute of India, opportunity to faculty members of WII is being extended to gain expertise in specialised subject areas and techniques in wildlife related fields. I was deputed to Colorado State University, Colorado, U.S.A. under F.A.O fellowship for a four months training course from June 1, 1988 to September 30, 1988.



The objectives of the fellowship were :

- (i) Gain exposure to approaches involved in environmental impact assessment.
- (ii) Become familiar with existing techniques for environmental

impact assessment and also learn to develop appropriate and project specific procedures in impact assessment.

- (iii) Generate model of impact-habitat intersections which will facilitate predictions of the effects of proposed development and also assist in designing appropriate protection/compensation for wildlife.
- (iv) Gain some knowledge of system analysis such as GIS.

The entire training programme was coordinated by Dr. Robert Cook, Head, Fisheries and Wildlife Biology Department of Colorado State University, Fort Collins, Colorado, U.S.A. The training programme involved my participation in field surveys and workshops/short courses and review of research projects and thus enabling me to acquire knowledge of the techniques and procedures adopted in the study of aquatic contaminants, environmental impact assessment including selection of alternative sites for their potential as prey base for highly endangered species and determination of presence or absence of such species in wilderness areas.

WORKSHOPS AND SEMINARS

INTERNATIONAL BAMBOO WORKSHOP, COCHIN 14-18 NOVEMBER, 1988

S.N. Prasad

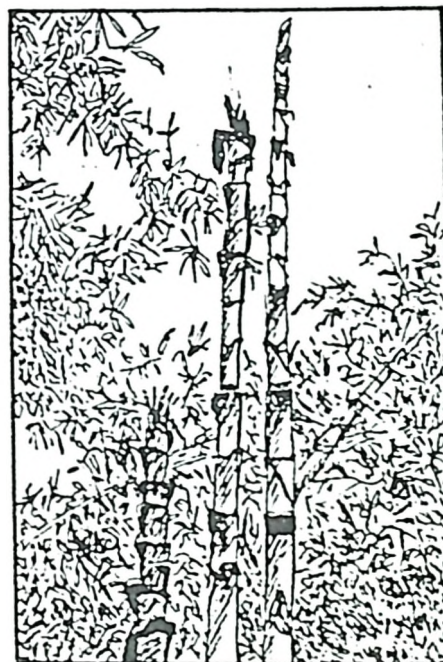
This workshop was organised by the Kerala Forest Research Institute and sponsored by the International Development Research Centre, Canada. There were over 100 participants from all over the world participating in eight sessions. These sessions were :

1. Status report
2. Management of natural bamboo stands
3. Management of Bamboo plantations
4. Propagation
5. Properties and utilization
6. Bamboo as an engineering material
7. Socio-economics and information needs and
8. Panel discussion

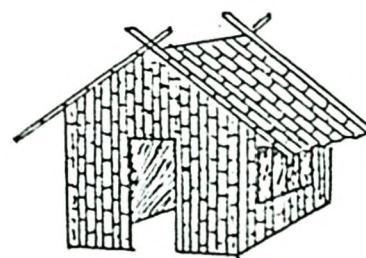
In addition, there was a poster session. In all there were 67 papers presented in these sessions.

A paper on 'Bamboo (Dendrocalamus strictus) resources of outer Himalayas and

Siwaliks of Western Uttar Pradesh : a conservation plea for habitat restoration' was presented by me in the session on management of natural bamboo stands.



The recommendation of the workshop included provision of greater emphasis on Conservation and Ecological aspects of bamboo forest management.



SPECIAL FEATURES

BREEDING OF INDIAN SMOOTH OTTER (Lutrogale perspicillata) IN CAPTIVITY - SOME IMPORTANT REGULATORY FACTORS*

J.H. Desai

ABSTRACT

The paper attempts to provide guidelines and basic essential requirements for breeding the Indian Smooth Otter in captivity on the basis of experience gained from 1968-85 at the National Zoological Park, Delhi.

The three key factors, namely, housing, diet and individual behaviour are discussed and minimum physical parameters regarding housing and diet are attempted as basic requisite that may help in captive breeding of Indian Smooth Otters.

INTRODUCTION

I was prompted to prepare this paper by recollections of the repeated queries addressed to me personally by Directors of some Zoos in India in my capacity as Director of the National Zoological Park, Delhi and coordinator of animal exchange programmes, breeding loan and various other aspects of management relating to Indian Zoos. The queries of various Zoo

Directors were based on their difficulties in breeding the Indian Smooth Otter in captivity. Out of about 40 zoos in India only a very few zoos have been successful in breeding the species; the National Zoological Park, Delhi being the most successful having bred the species regularly since 1968. On the basis of observations made and experience gained in breeding the Otters in the course of over 20 years during my tenure at the National Zoological Park, Delhi, in various capacities. I have come to the conclusion that breeding success is linked to three factors, namely the enclosure, the diet and the behaviour of individual Otters. In case of less successful zoos, I have time and again observed that it is one of these factors at fault which was responsible for the failure.

This paper is intended to provide guidelines and basic parameters that may help in meeting the essential requirements for breeding the Indian Smooth Otter in captivity.

* Paper contributed to "International Asian Otter Symposium" held at Bangalore, India during October, 1988.

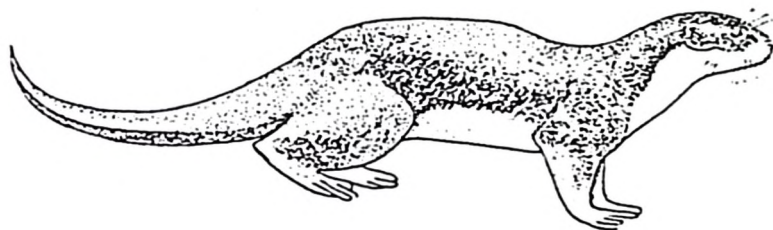
INDIAN SMOOTH OTTER AT THE NATIONAL ZOOLOGICAL PARK : A BRIEF REVIEW

On the recommendations of the Indian Board for Wildlife, the Government of India, decided to establish a Zoological Park in Delhi as per approved plan in December, 1956. With this announcement the preliminary work for constructing the Zoo was taken up in 1957 at the site selected between Purana Quila and Humayun's Tomb. As the work progressed, the animals started arriving and an assortment of mammals and birds such as carnivore cubs, deer, bears, storks, cranes, parrots were housed in temporary make-shift enclosures at the rear corner of the park site.

The first Indian Smooth Otter was obtained by the Park in 1958 but it survived for only seven months, subsequently three more specimens were obtained in as many years. However, due to inadequate housing and management facilities, none of them survived for more than six months. In 1962, a six month old tame female cub was obtained, but she remained alone for three years until early in 1965, when five more Otters, about six months old, arrived. Of these, three failed to survive but one pair settled down well. During this intervening unsettled phase the Zoo staff had also, by trial-and-error, gained basic knowledge and techniques of maintaining Otters in captivity.

A new spacious enclosure for Otters was completed in 1965. All the three specimens, one young pair and an older female were transferred to the new enclosure, where the young pair mated for the first time in August, 1968 and subsequently the young male also mated with older female in the same month. Both females littered in October, 1968, and since then Indian smooth Otters have been breeding regularly in the Park. It has been observed that each female littered in a separate den which she had excavated.

The average gestation period for four litters calculated from the last observed mating to the date of parturition was 61 days (Desai, 1974). This compares with Yadav's record of 63 days at Jaipur Zoo for *Lutrogale* (Yadav, 1967). Average age of females for sexual maturity ranged from 20 to 22 months and they reproduced at the average age of two years. Both parents cared for the young in all cases. The cubs were weaned completely at the age of 18-20 weeks. The Otters were fed daily : 500 gms fish 22-30 cms long each in the morning and evening.



Encouraged by the breeding success, additional enclosure was constructed to accommodate surplus Otters and a trio was shifted to this new enclosure where they bred in 1982. A total of thirty eight cubs in thirteen litters have been born in park from 1968 to 1988.

BASIC PARAMETERS FOR CAPTIVE MAINTENANCE AND BREEDING

Based on experience, it is surmised that the three basic factors essential for breeding the species in captivity are : (i) housing (enclosure), (ii) diet, and (iii) individual behaviour.

(i) Housing (enclosure) :

Being a social species, the Indian Smooth Otter prefers to live in group and adapts very well to zoo life. It is also very active, playful and extrovert by nature. Although

by habits, it is an aquatic animal, it spends considerable time on land, hence, the important point to consider is the land/water ratio while designing an enclosure for the species. It is also a very nimble climber and can easily cross over the fencing around the enclosure, if proper overhang over fencing is not provided while constructing its enclosure. It can also dig through under the fence, hence, proper fixing of chain link fence at the bottom upto a depth of one meter in ground is necessary to prevent escapes.

The Otters also have fossorial habits as they excavate dens/burrows for littering. It has been observed that each female in the group excavates its own den for the purpose, hence, this provision needs to be kept in mind while designing the enclosure. Rubbing, rolling and grooming is another activity in which the Otters engage themselves often to maintain their fur coat in condition for the simple reason that it provides warmth, insulation and buoyancy. For this purpose, it is essential to have a 5 cms thick carpet of sand over the land area to facilitate drying of coat and grooming. Rocks, hollow logs, and trees provide the rubbing areas while vegetation in the form of shrubs and small trees in the enclosure help as retreat areas where the Otters can rest in quiet and privacy. These areas also help the young cubs to remain hidden from public and provide a sense of security.

On the basis of enclosure design and space allocation observed in various Indian and foreign Zoos, it is estimated that the minimum space requirement for a pair of Indian Smooth Otter would be 10 m x 10 m with land and water ratio of 2:1 to 4:1.

(ii) Diet :

It is a common practice to keep Otters exclusively on fish diet. However, for proper maintenance of coat condition and

general health, it is essential that additives like vitamins, vegetable oils, bone meal are added to its diet. Freshly chopped carrots given in small quantity helps in maintaining proper coat condition. Fresh live fish and one day old chicks may be given once or twice a week to provide a change in diet and to sustain a healthy appetite.

(iii) Individual behaviour :

Even if all physical requirements for successful reproduction are fulfilled, the Otters sometimes do not respond due to rivalry among females or males, incompatibility between individuals in a pair or physiological/physical abnormality of an individual.

Rivalry among females or males in a group is not common, however, it has been observed that fights among members in a group take place resulting in isolation of an individual due to fear or aggression by other members of the group. This can be corrected by removal of the erring member from the group. A small harmonious group is better for reproductive success rather than a large group. It is also advisable not to introduce an unknown individual to a group which has settled down well. Wide differences in age, environment and behaviour lead to aggression among members with detrimental results.

Playful activities among males and females become more frequent prior to mating which mostly takes place in water. After the first initial mating, the frequency of mating increases. As the time of parturition approaches, females get busy in excavating the dens/ Burrows. Males are chased away from the den initially, however, later they play an important part in rearing of the cubs. After birth, the cubs are brought out of the den after about four weeks but not allowed by their mothers to wander freely on their own.

Later such excursions become daily events but they are not allowed to enter water till they are about 10-12 weeks old. At this age, the cubs begin to nibble fish, they wean completely at the age of 18-20 weeks.

In conclusion, I would simply wish to add that this paper makes no pretensions of being comprehensive as it touches upon only the key factors involved in breeding the species in captivity and it is presumed that once these basic requirements are met, the Otters in most cases would respond favourably.

VIPERINE ENCOUNTERS

RAVI CHELLAM

Monsoon of 1986. Gir had received continuous heavy showers for nearly ten days from June fifteenth. During these days, clouds darkened the skies and lightning streaked across with dazzling intensity to the accompaniment of deafening thunder. The drenching that the jungles had received, transformed it magically. From a hot, dry, brown dust bowl to a cool, humid, sea of green. This was remarkable. The ability of NATURE to recuperate!

Overnight grass grew to cover the forest floor and hill slopes with a velvety carpet. The trees and shrubs put forth a flush of leaves in various shades of green which was soon followed by blossoms in various colours, dull yellow of Randia, white of Carissa, the vivid yellow of Cassia... Jamun came into fruit. It was a pleasure to walk

along the Hiran river, to pick and devour the Plump luscious fruits, fallen on the leaf litter.

Insects were visible in hordes. The delicate pink, velvet bugs, scorpions in various metallic hues and not to forget the ever bothersome mosquitoes. Mosquitoes which gave me three malarial attacks in less than six weeks.

The reptiles were also visible and energetic. Muggers frolicked in the muddy brown waters of Kamaleshwar reservoir, Star tortoises appeared and went about their business in a stately fashion, huge rat snakes moved ever so swiftly with their glistening coats and perky little Sitana lizards darted around, flashing their nuchal pouches.

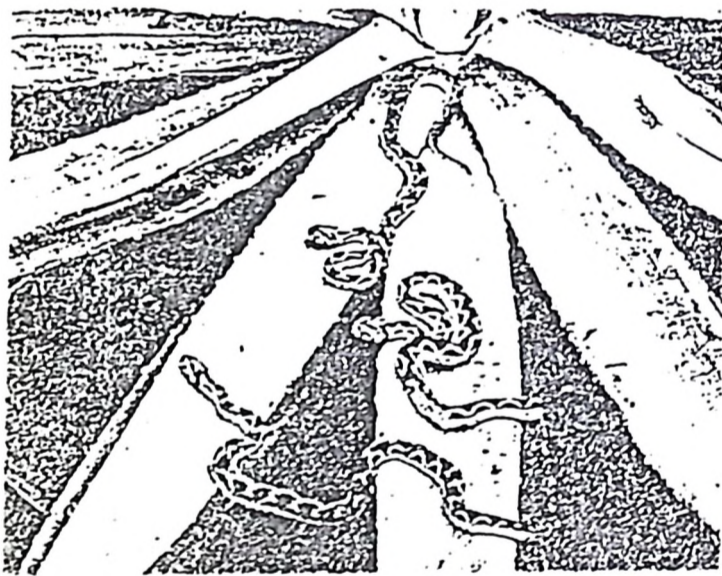
Literature Cited

1. Desai, J.H. (1974) : Observations on the breeding habits of the Indian smooth Otter. Lutrogale perspicillata Int.Zoo Yb.14:123-124.
2. Yadav, R.N. (1967): Breeding the Smooth-coated Indian Otter Lutra perspicillata at Jaipur Zoo. Int.Zoo Yb. 7:130-131.

It was a totally new and an extremely profound experience for me. This tremendous resurgence of life. I had read about it, but to actually feel the grass grow under your feet: it is difficult to put it down in words!

I enjoyed myself thoroughly. Walking extensively through the forest. After the enervating heat of the summer, working in the monsoon was a real pleasure. I used to walk right from dawn to dusk, eating the fruits that were available and drinking the cold water from the fast flowing streams. But large mammal sightings dropped drastically, that was a major disappointment.

It was another morning's work that I was completing. I was walking along a narrow nullah after having caught sight of a chousingha. Stepping gingerly on the wet slippery rocks, jumping across to avoid the marshy bits and enjoying the soft feel of the moist sands, I was lost to the world. Little did I know that I would be so rudely awakened out of my reverie.



I had met the "BIG ONE". The "BIG ONE" inspires more fear in a jungle fearing Indian than even the tiger. The "BIG ONE" is Vipera russelli, the Russell's viper.

Hardly 2 mtrs. away, all curled up and basking in the patchy sunlight was this

snake. I knew that it occurred in Gir but had been lulled into a sense of complacency as I had not seen it during the 20 weeks that I had been working. I stopped immediately and cautiously retreated. Wazir, my tracker shot a quizzical look at me. After I had retreated 5 or 6 long steps, I pointed out the immobile snake and brought out my camera to photograph it.

As I approached it cautiously, this rather small specimen (around 75 cms. long) uncurled itself in a typical yet peculiar serpentine fashion and crawled into the nearby vegetation, thwarting my photographic ambitions. A brief but heart stopping introduction. Since then I have met the "BIG ONE" on four more occasions.

Mid November '86. Winter was creeping in on us. I was searching the Hiran riverine forest for lion kills and lions. At a certain point the vegetation gets to be extremely thick and the bank too slushy to be able to proceed. So I decided to climb up and walk along the high bank for 200 mtrs. before descending down to the river. The river bank was covered with tall grasses and with Helicteres and Carissa bushes. Bending and crawling through the thorny thicket was the most efficient way of perambulation. As I knelt down and put my left palm ahead on the forest floor, I noticed a slight movement in the leaf litter hardly six inches away.

This was a really large viper. Nearly 150 cms. long. I had put my hand right next to its head. I froze, to stay absolutely still as the entire snake moved slowly past my extremely vulnerable hand. To observe the snake at such close quarters was a thrilling yet chillingly frightening experience. Its magnificent chainlink markings gleamed in the morning light. The snake never showed even the slightest sign of aggression.

Winter 1987. Late January and it was

very nearly dusk. I was walking along a road, trying to track some lions. I flushed a jungle cat from a nearby Acacia thicket which seemed to have triggered a vague but loud hissing noise. I searched desperately to locate the source of this sound. Eventually I located the viper curled up on the earth under a prostrate Acacia tree. The heaving of the snake's body with each inhalation and exhalation was a remarkable spectacle. The snake had probably been disturbed by the jungle cat and my close presence and the torch light did not help it to calm down. This loud noise was a warning rather than a threat. In snake's language, it probably meant "Move off, I am frightened" rather than "I am dangerous and I can do plenty of harm".

Late October 1987. I was sitting in the back of the open jeep and driving along the expansive flats between Banej and Chodavadi. It had been a tiring night's work, tracking a pair of male lions, purely based on their roars and pug marks. It was late morning and the fatigue, heat and the bumpy ride was getting the better of me. Suddenly the driver brought the jeep to a screeching halt and a cloud of dust enveloped us. Reversing, he pointed out to a short toed eagle feeding on a freshly killed viper. The raptor anchored the serpent with its talons and was feeding from its ventral side. Disturbed by the human intrusion the eagle flew away. Its flight rather slow and deliberate as it climbed up, above the trees and disappeared.

The snake lay in the dry grass. The broken grass stems and the scattered down feathers bore testimony to the vain struggle of the serpent. I was surprised to find that the snake was still alive, it moved its body but after a few minutes everything ceased. The eagle had used its claws to pierce through the neck and the head of the viper and this had most effectively dealt with the snake. This viper was nearly 150 cms. long. A gravid female.

The eagle seemed to have been picking out the young snakes still in their yolk sacs. I counted eight, one of which was deformed.

The latest encounter occurred around 2000 hrs. on 26/6/88. I was driving back to Sasan from Kankai, feeling rather triumphant at having been able to locate the sub-adult radio-collared male lion after a gap of five months. The headlights picked out about half a dozen red wattled lapwings sitting on the roads and calling away to glory. As I dipped the headlights I noticed a large snake moving across the road and the lapwings took off and flew above it in a threatening fashion. I quickly turned the jeep around to get a better look, for the snake did look like a viper. Sure enough it was. The snake was in all probabilities trying to steal the lapwing eggs off their ground nests, and the lapwings in turn were mobbing it. The snake slithered away into the darkness.

Gir also has the much smaller Saw-scaled viper, which I have seen only once amongst the rocks near Kamaleshwar.

Hailing from the south I have fairly good experience of the rain forests where we have the pit vipers-Bamboo, Malabar and Rock. All three are strikingly coloured, the Bamboopit viper a lovely shade of green and yellow while the Malabar pit viper is largely brown and the Rock pit viper is largely blue. The most striking feature of these pit vipers is the prominent pair of pits in the front of their heads.

The various encounters that I have had with vipers and other snakes have only convinced me that if we are careful and do no harm there is nothing to fear. I must admit that I have been frightened, venomous snakes are potentially very dangerous. It is incumbent that everyone of us who ventures into the forests should be careful. Then close serpentine encounters can also be enjoyable and fascinating experiences.

DHOLKHAND : A MONSOON EXPERIENCE

MADHUSUDAN V. KATTI

Sunday, 31st July 1988. 1300 hrs.

It was drizzling lightly when we decided to have lunch. We left the top of the ridge and came down about 15m. to the shelter of an overhanging Puereria vine, where we had left our belongings. Lunch consisted of moist and rapidly disintegrating bread with peanut butter and jam that were attracting ants. We had eaten the same stuff for breakfast a few hours earlier, when a light drizzle had interrupted our observations.

We had reached Dholkhand the previous evening, after having walked through lush green forest, sparkling in the bright sunshine, a celebration of life in the monsoon. We, i.e. Dr. A.J.T. Johnsingh, Dr. S.P. Goyal, Dr. G.S. Rawat and myself, were now sitting on a ridge opposite the "Goral Cliff", since 0600 hrs. Our objective in sitting on the exposed ridge was to observe the behaviour of Gorals. Dr. Johnsingh has been studying these gorals for over one and a half years now. This summer he completed one year of transect-based studies, estimating the population and distribution patterns of these animals, seasonally. Now we had begun behavioral studies, also to be conducted in all the seasons. The morning had been fairly good and we had been able to observe about 8 animals moving about on the cliff and ridge in front of us. The animals had been feeding through most of the morning and were at present resting. The last we had seen, before a cloud enveloped the cliff and we decided to have lunch, were 3 animals close to the left edge of the cliff, two of which had just left edge on which they had rested. We had also seen three sambar on the flank of the ridge that dropped down from the south-western end of the cliff.

It was still drizzling when, finishing our lunch, Dr. Rawat and myself said bye and

goodluck to Dr. Johnsingh and Dr. Goyal, who took up positions on the ridge once again, waiting for the weather to clear up, as it had intermittently through the morning, and continue observations till evening. We ourselves planned to explore parts of the valleys along the two streams that join up to form the Dholkhand Rau, particularly the rau that flows from the east. We left the ridge and descended down to the valley. Mean while the rain increased and by the time we reached the rau it was pouring fairly heavily. We decided, first, to move up the northern valley for some distance and then cross over the separating ridge to reach the eastern rau. This ridge is where the evening goral transect lies. We entered the northern rau below the huge Ficus tree which marks the beginning of the morning goral transect, which passes over the cliff that Dr. Johnsingh and Dr. Goyal now had under their observation. The water in the rau was clear and I took a drink; it tasted slightly muddy. At this point, the rain really intensified. After trying to seek shelter beneath a bank of the rau overhanging with vegetation for about 15 minutes, we moved on. The volume of water had increased amazingly rapidly and the water was deep brown in colour. This remarkably brought home to me the scale of erosion and the fragility of the Shiwaliks. The run-off was phenomenal and the rate of flow was very high; within minutes we were thigh deep in muddy water. After progressing for about 100m. along the bank we came to a sharp bend in the course of the stream, which we would have to cross, if we were to continue ahead in the valley. The downpour was furious and the torrent of the rau was frightening - effectively and abruptly halting our explorations. We decided to leave here and try our luck in the eastern valley.

So we turned back and headed up the evening transect across the ridge. This area is rich in wildlife and on every previous occasion we had seen several chitals, sambars and other wild animals here. Now, however, there was not a single movement in the jungle, excepting the rapidly accelerating downward fall of the raindrops. The impact of these missiles seemed to have pinned down all life to the earth. Where the ground was not thus covered with life, substantial portions of it were dissolved and carried away. The path, thus, was made up entirely of viscous and slippery mud. We seemed to be the only fools to be venturing out into this thunderous natural phenomenon. Progress was slow as we tried to stay upright against some natural force that seemed to rule that we attain a more horizontal position and establish more intimate contact with Mother Earth! However, we had to keep moving, even if it had to be one step forwards, two steps back; we kept trying to defy this ruling force - thrusting forcefully at the ground with our shoes which appeared to have lost all concept of friction, and clinging to swards of bhabhar grass, which, more often than not, came out into our hands. Eventually we reached the top of the ridge.

From here we looked upon a most awe-inspiring scene - one that was frightening yet profoundly stirring. In front of us, on the opposite side of the valley we overlooked, was another jagged ridge - appearing mysterious and ghostly through the dense curtain of rain and swirling clouds. All around us were the similar ghostly forms of the ragged Shiwalik hills. Far below us, at the base of the grassy slope that fell steeply away from our feet, was the turbulent brown ribbon of the rau. I paused here to let the atmosphere sink into me. It was a breathtaking encounter with the tremendous beauty and sheer power of Nature. I felt very small and insignificant in this vast dynamism of the

cosmos. It would take me a long time to assimilate this experience.

However, now, we had to get down to the valley and across the rau to the rest house, which was still far away. This was an extremely taxing task in a seemingly frictionless world. With great caution, liberally besmattered with mud and aided both, by my bottom and the bhabhar, I eventually managed to get down to the base of the ridge. We walked through a patch of forest to reach the rau - there to be further awed by the sheer power of the water. The rau was a swirling, dark brown, amorphous fluid mass, moving at a tremendous pace. We tested the strength of the current by chucking a few small boulders into the water - only to see them washed away, to our dismay. After a few seconds of despair, however, our searching eyes focused upon a shisham tree that had given up the struggle against gravity, and lay recumbent across the rau, about 25m. downstream from us. Here, we felt, was the bridge that would take us home - since once across this rau, we did not have to cross any more raus before reaching the rest house. Clinging, literally, to straws, we descended down the high bank and onto the roots of the upended tree. The water was rushing in a torrent beneath our feet, tearing away at the tree and carrying a tremendous amount of mud. I had, by now, completely lost confidence in my shoes and negotiated the tree on all fours! Dr. Rawat, a man from the mountains is made of sterner stuff. Lithely, but gingerly, he walked across the tree. So we were across!

We still had a long way to go and sticking to this bank proved much tougher than we expected. After startling, and being startled by, a sambar hind with a fawn and several pittas, we soon ran into a cliff, which, apparently admitted no further progress. We carefully descended to the rau, where a small stream joined it. This stream seemed to be coming through a

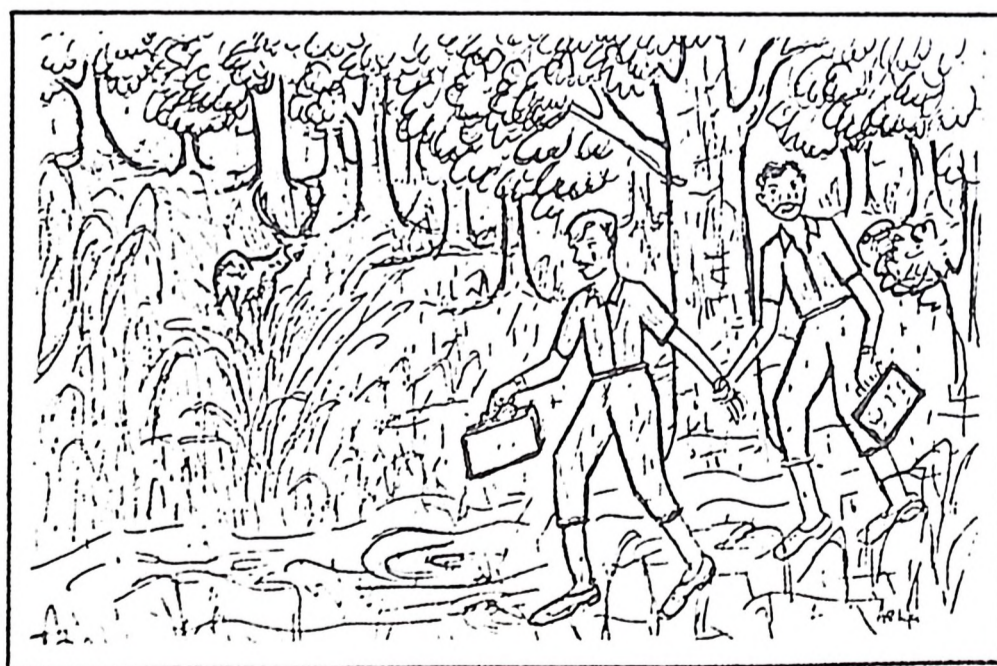
narrow rock channel from behind the cliff, and up this we went Dr. Rawat leading the way enthusiastically and myself trying to recall my seemingly long-forgotten rock-climbing skills. After the initial rock patch, we left the stream and climbed onto the ridge on our right. From here, we only had to descend along the broken electric fence onto the small hillock on which the rest house is situated. We relaxed a bit and the rain too slackened up. Still slipping and falling, we now made much faster progress. With the slowing down of the rain, the birds began to come out. We started hearing the melodious and some apparently throat-clearing calls! The place seemed to be full of pittas and we flushed several adult birds and fledglings. Dholkhand seems to be a good breeding site for pittas before they go on their journey to south to escape the winter. With this respite, after the thrill of the downpour, we too participated in the joy of these birds and other life forms. We arrived at the rest house at around 1600 hrs. having taken almost 2 to 2 1/2 hours for what would normally take an hour.

The rain stopped for a while, but it was drizzling again by the time Dr. Johnsingh and Dr. Goyal arrived back at the rest house. The brief respite had sufficiently ebbed the rous to enable them to come

across safely. Their mudcovered clothes however bore testimony to the treacherous nature of the slopes.

As we cooked and ate our dinner, it began to rain again and we fell asleep to the music of the thunderous downpour outside. Next morning, we had a 13 km. trek ahead of us across several rous, along slippery and muddy roads, amidst the continuing downpour, before we reached the dubious comforts of civilization like a tea stall and a Landrover that refused to start until pushed at Mohand. It was still raining when we got back to Dehradun.

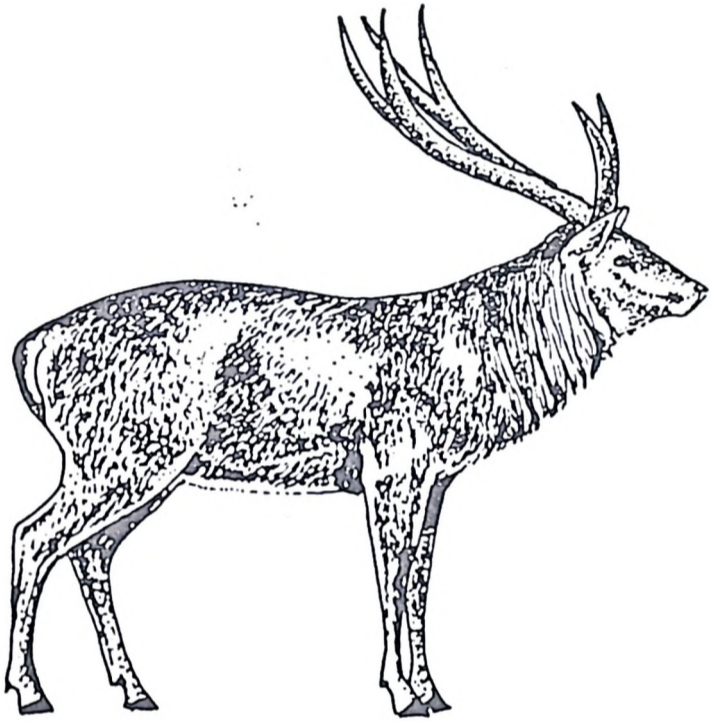
This, my first experience of the phenomenal rainfall at the point of first contact between the heavy monsoon winds and the orography of the Great Himalayan System, will forever remain fresh in my memory. These rains symbolize the revival of life in the annual cycle of life and death for various organisms. These rains also, through the rous that are carrying away the Shiwaliks, carry a warning for us of the power of Nature to strike back at us; we who foolishly think we have mastered Nature. I hope more of us undergo such profound experiences and understand these messages communicated by Nature.



A WINTER EVENING AT DHOLKHAND

G.S. Rawat

When we reached Dholkhand Rest House on the evening of 17th December, 1988 after an afternoon's fieldwork in the Goral ridge, we were surprised to see a throng of tourists milling around. Some were cooking food, some listening to cricket commentary and others relaxing either drinking or eating. We sat quietly in one



corner reading and looking at our data. Suddenly a tiger started calling from the forest opposite the Rest house and the tourists with a puzzled look on their faces looked at us inquisitively. When Dr. Johnsingh explained that it was a tiger calling and requested every one to be quiet. the noise in the Rest House absolutely died down. For several more minutes we could hear the tiger calling and moving southwards. Soon the tourists became very friendly to us, offered us some of the excellent food they had brought with them and after sometime bade good bye to us. We now found the solitude immensely pleasing.

Later Dr. Johnsingh went behind the Rest House, to fetch some firewood for the fire place, but hurriedly came back and called me. When I joined him he pointed out a huge pair of antlers moving in a puddle close to the Rest house. A full grown sambar stag was wallowing there, which we could see only when he stood up. Later the sambar went to a Mallotus tree, thrashed a branch and pawed the ground. While we were observing the magnificent Sambar, again the tiger called this time closer. There were intermittent alarm calls of chital and barking deer. We decided to go closer to the edge of the forest and try to look for the tiger. We saw a herd of elephants and a few chital feeding.

There was no sign of tiger. When it became dark we returned to the Rest House, sat around the fire, warmed our food and had our dinner. It was a moonlit night. We were tempted to go to look for the tiger. But elephants and the cold discouraged us.

We were really fortunate to have had such a wonderful evening. We want to pass on such a nice jungle experience, to several people so that more people would appreciate and enjoy our jungle and ultimately help the government in the conservation of our magnificent forests and wildlife.



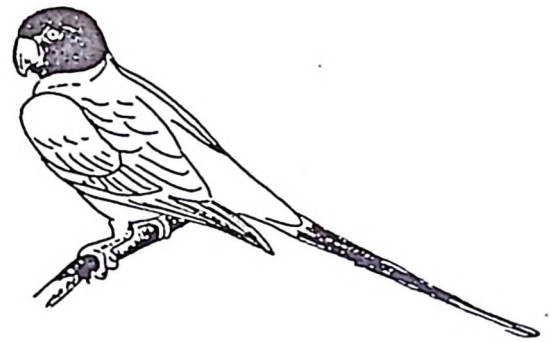
WHO IS THAT CALLING ?

Jayant Kulkarni

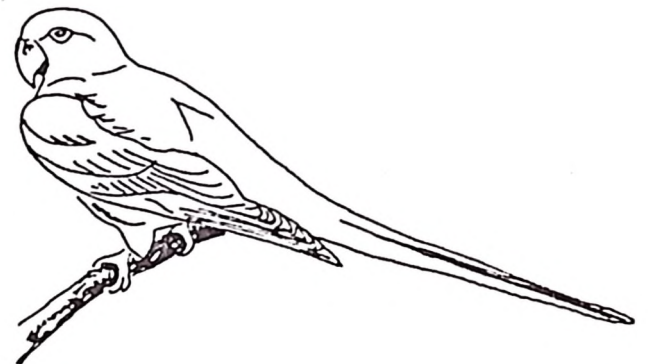
A visitor coming for the first time to the Forest Research Institute (FRI) is bound to be struck by its greenery and sylvan beauty. For one who has travelled from the dusty plains of Uttar Pradesh and passed through the busy city of Dehra Dun, FRI is a small garden of Eden. Groves of pine, teak and bamboo sway gently in the wind. A multitude of other trees, both Indian and exotic, stand in its botanical garden and arboretum, while its expansive lawns make a pleasing contrast. To the north of FRI flows a small river known locally as the Tons. On the slopes of the Tons valley grows a miscellaneous forest composed of sal and other trees. A number of small nalahs flow, down to the Tons and there are overhung with a dense bushy undergrowth. Offering such a variety of habitats and terrain it is no wonder that FRI has a very rich bird-life. As it is located among the foothills of the Himalayas, a number of bird species are found in FRI during the winter, as they escape the cold by taking refuge in its woods, making that season a particularly fruitful one for the birdwatcher. All-in-all a bird-watcher in FRI is a happy individual as he strains his eyes, misses breakfast and gets himself scratched in the underground, while trying to make out the identity of 'that elusive creature' against the green background of the forest canopy. Or a miserable one sometimes as he thinks of the bird that got away without giving him an opportunity to train his binoculars on it.

There's more to birdwatching, however, than mere 'watching', for the sounds that a bird makes can be just as distinctive, so there's a lot of 'hearing' to do. The plaintive call of a Spotted Babbler is quite distinct from cackling of the Jungle Babbler, if one only cares to listen. And

the nightjars are best told apart in the field by their calls. With its variety of birds, it is not surprising that FRI can boast of quite a range in bird calls and songs, and the sounds produced would rival a rock orchestra in variety if not in volume. So one would do well to keep one's ears perked or while taking a walk around FRI.



One of the first birds a person entering FRI is likely to hear are the parakeets. Tree species are found in FRI all round the year, and they can easily be told apart by their calls. The Blossom-headed Parakeet is the smallest and it gives a sweet tooce-tooce call as it daskes overhead among the tree-tops. It is the best 'talker' of all Indian parakeets. The



Rose-ringed Parakeet gives a variety of shrill calls. "Keeao, keeao" it screams as it perches on a high branch, or goes "Kee-ak, kee-ak just for a change. The

harkest call is given by the Alexandrine Parakeet, and sounds like a guttural krrrr produced from the deepest recesses of its throat. In winter the Slaty-headed Parakeet joins in with a harsher version of the Blossom-headed Parakeet's tooee-tooee.

The Barbets are the drummers of the avian orchestra. In the lazy summer afternoons when other birds are taking their siesta, the Large Green Barbets gamely beats on. With its loud incessant Kutroo- kutroo, kutroo it makes its presence known to all who care to hear. In Hindi literature it is known as basanta and its call heralds the onset of spring.

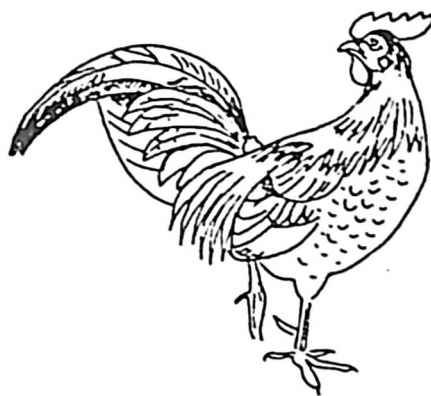


As the days grow warmer the fluty melodious whistle of the Golden Oriole is heard quite often. The role of prima donna of FRI birds would fit the Oriole well. With its beautiful yellow plumage its appearance is in keeping with its sweet voice.

The cuckoos are a vocal lot and their, calls are very individualistic. As the kanhel berries ripen on the hills in the summer months, the Indian Cuckoo perches high up in the trees and announces, "ka-phal pa-kyo". Its found-note call is very musical and distinctive. The call of Common Hawk-Cuckoo gives away its morbid thoughts. Starting on a low note it calls

"brain fee-ver, brain fee- ver" in a rising crescendo mounting progressively to frontic shrillness, breaking off abruptly. No wonder it is also known as the Brain Feyer Bird. The melodious koo-koo call of the koel is famous in Indian lore and in the plays of Kalidas. The 'Cuckoo' is the bird from which the family gets its name. Its oft-repeated musical kuk-koo call to unmistakable and carries for quite a distance. The call of the Pied Crested Cuckoo is a plaintive but pleasant pee-pee- pin often uttered when in flight. It is well known as the herald of, the rains as its arrival and departure are synchronous with the south-west monsoon. As one negotiates the undergrowth in the well-wooded parts of FRI one comes across some birds which are more often heard than seen.

The male of the Red Jungle Fowl is often found skulking with his harm in the pine and bamboo groves of FRI. He gives his characteristic crowing call in the early hours of the morning and towards dusk. Being the precursor of the domestic fowl his call is reminiscent of the cocko-dvodle-doo only somewhat shriller and more abrupt. He calls more during March and April to show that this breeding season has begun.



As one goes down to the Tons valley the Rusty-cheeked Scimitar Babbler gives its abrupt call from the thickets; only it's not

one call at all but a duet. The male gives a loud fluty double-note whistle quee-pee, answered immediately with a 'quip' by the female. Its call can be heard from quite a distance in the jungle. The orange headed Ground Thrush has a typical thrush song with a variety of rich whistling notes. It sings mainly in the morning and evening in summer and during the monsoons.

In winter the Orange-headed Ground Thrush becomes silent and the Himalayan Whistling Thrush takes over, as it comes down from the hills. It begins singing mainly in late winter. Its song is a series of aimless up and down whistles which keeps on and on without a break, sounding for all the world like and itinerant schoolboy.

The Indian Tree Pie has quite a repertoire. Its calls range from a harsh rattling ka'-ka-ka-ka-ka to a variety of metallic bob-o-link. As it begins its call it stretches up its heads at a peculiar angle, then lowers it as the call ends, looking quite ludicrous.

As night approaches and most birds are preparing to go to bed some birds wake up, and go about their daily business. One such night bird is the Collared Scops Owl. Choosing a nice secluded branch where it can't easily be seen it makes a

soft questioning 'wut' at intervals of a few seconds.



The nightjars are found mainly along the Tons Valley. As their name suggest they are very much creatures of the night. The longtailed Nightjar starts calling soon after dusk, and, with a few breaks, continues till dawn. Choosing an upright pole or a leafless branch it goes chaunk chaunk-chaunk repeated 50 times or more, sounding like an axe or a hammer hitting a plank. The Franklin's Nightjar often calls while on the wing, as it flits, over the dry river-bed. It gives out a long drawn out 'shurite' or sweesh' once very few seconds sounding like a whip swishing through the air.

With patience and practice the songs and calls of birds become as familiar as the voices of old friends. So next time you here a chirp from the bush or a squawk from the trees you could well ask yourself, "Who is that calling?"



AN ENCOUNTER WITH A KING COBRA IN DHOLKAND, RAJAJI NATIONAL PARK

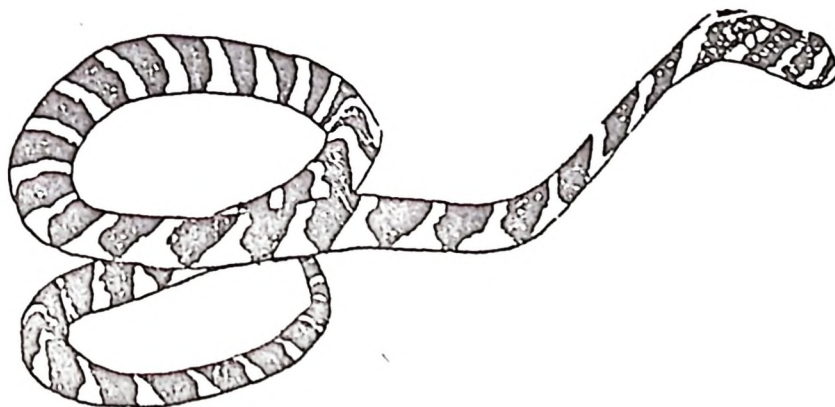
A.J.T.Johnsingh

It was late evening on 16th October '88. We were a km. north of Dholkand Forest Rest House with the new Research Fellows observing elephants. When the elephants started moving in our direction unaware of our presence we silently and hurriedly left the place. We hardly covered 150-200' when I found myself 2-3' close to a snake which was sliding through 2-3' tall grass. My first reaction was to jump and run. While running I had a good glimpse of the snake and identified it a king cobra. I ran for 15-20', stood behind a Mallotus tree and tried to find out where the snake had gone. To my surprise I found that the snake was also coming around the tree in my direction. It stopped, however, when it was 10-12' away from me, raised its hood for a foot and a half, retreated its body to form three loops, opened its flesh red mouth and lunged towards me. Although the snake was c 9' long this way it could come closer to me only by 4-5'. When I saw the snake shooting forward I also jumped back by 3-4'. The snake however, did not press home its charge, swiftly turned back and disappeared in the tall grass. At least three Research fellows could observe this encounter.

There are several anecdotes written about the aggressiveness of king cobra. I think most of them are false. This was my

fourth sighting of king cobra in Rajaji - Corbett belt. In May '88 while taking certificate course trainees I saw a 11' long king cobra near a stream of water in the middle of Dholkand rau. When we approached 10-12' close to the snake it raised its hood for 2' and when we moved back immediately it slid away. Thrice we approached and retreated and everytime raising of hood and sliding away happened. There was no sign of aggression but only a threat display. But during the last encounter there was aggression. This was largely because the vegetation was dense, I was about to step on the snake, ran parallel to the snake and stood almost blocking its retreat. All these possibly made the snake more alarmed and as a good incident to support the saying 'attackis the best form of defence' it came for me. But it did not press home its attack. Once I jumped back it also turned back and moved away. This aggression was possibly an exaggerated form of a threat display.

Nevertheless, I would advise any one walking in Dholkand area especially through tall grass to be extremely careful. It may be good to walk with 4-5' long strong stick; not to kill this endangered species when encountered but to poke the grass before walking through.



CASE OF RECTOVAGINAL PROLAPSE IN A WILD CHITAL

K. SANKAR

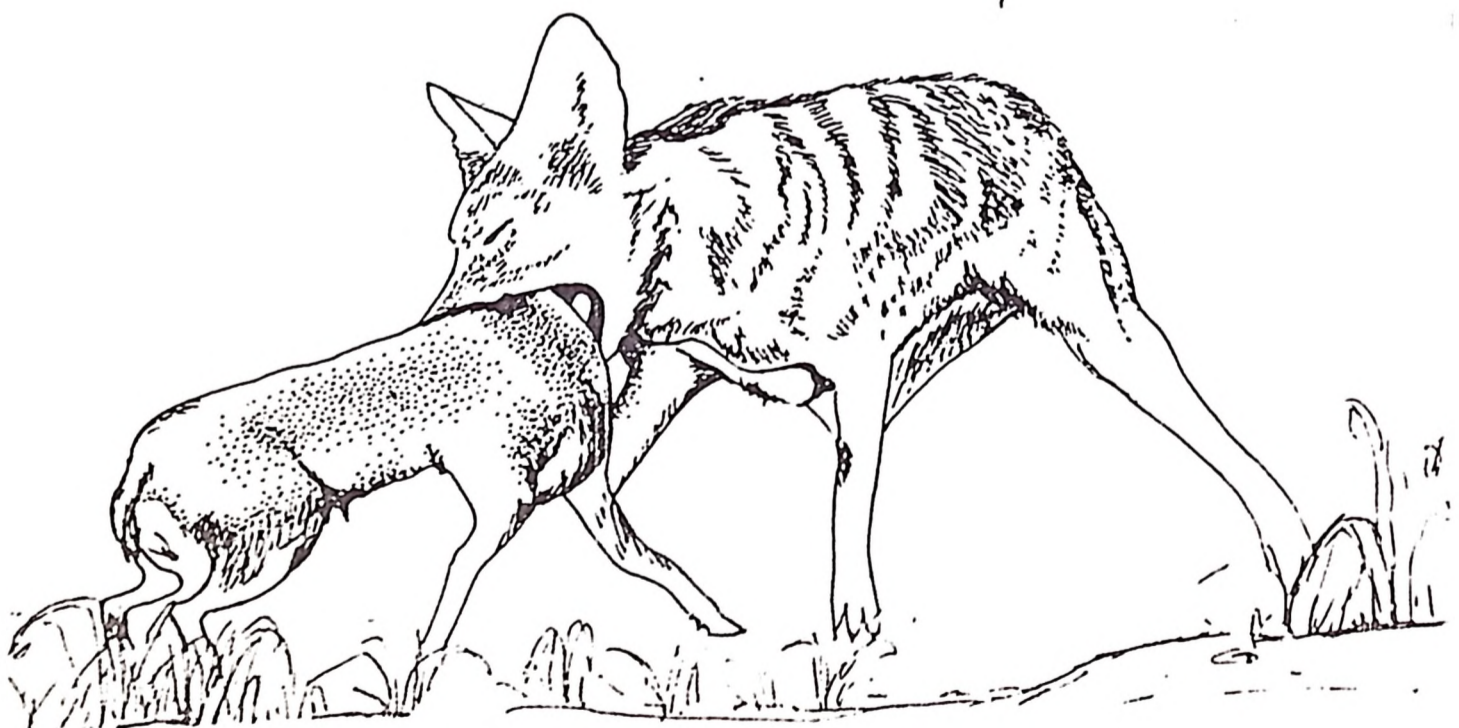
In the evening of the February '88 in Sariska Tiger Reserve, Rajasthan, a chital doe was seen resting near a wallow with some portions of intestine including rectum hanging outside. Soon it got up and walked for a short distance and layed down near a Capparis bush. Meanwhile a jackal came to the place where the chital was previously resting, sniffed, tracked and started chasing the chital doe. After 200 metres of chase chital was cornered and killed by jackal. However, the jackal had to soon abandon the kill because of the disturbance caused by tourists going in a vehicle.

Based on the presence of milk in the engarged udder and the tucked-up abdomen, I concluded that the animal had

given birth recently. As it happens in domestic ungulates, the retention of placenta or weakening of peritoneal muscle or Dystokia might lead to either prolapse of vaginal mass alone or vaginal and rectal mass together (vaginal prolapse or recto vaginal prolapse). This has been reported in wild ungulates in captivity (Fowler, 1978). Animals in wild with this post-partum condition may have little chance of survival and they fall easy prey to the predators, even to a solitary jackal as it happened in this case.

Reference:

Murray E. Fowler, D.V.M. 1978. Zoo and Wild Animal Medicine. W.B. Saunders Company, London.



RESEARCH AND PROJECTS

GIR LION STUDY

A.J.T. JOHNSINGH

Plentiful lion tracks, old and new, along with the banks of Sudavi river indicated that the area was heavily used by lions. Sudavi ness (ness = cattle camp) is six km north of Chodavadi in Central Gir. The date was 19th November 88 and we were on a mission to radio collar lions for the ongoing WII research on lions. Seeing the abundant lion tracks we decided to concentrate our efforts to radio collar one lion for the Central Gir in Sudavi. Accordingly as planned we reached Sudavi early next morning and were greeted by chital alarms along the river bank. Possibly the lions were hunting. We selected a fairly open plateau near the river and tied the buffalo calf, the bait, in the middle of the plateau. I climbed a Wrightia tinctoria tree, 12-15m to the east of the bait and set on a bare branch 5-6m from the ground. I was confident that if I don't move the lions won't see me.

We had the best choice in our bait. As soon as others left, the calf, unaware of my presence in the tree, started calling. Soon there were langur and chital alarms in the east hardly 500m from me. After a few minutes a pair of sambar belled and bolted from behind and ran down to the river to my left. Within seconds I heard rustling sounds in the bushes behind. Slowly when I looked behind I could see several lions advancing through the bushes. The leading lioness when she came to the edge of the bushes. 30m

from the calf, ran forward right under my tree and killed the calf. I waited for few seconds took a careful aim at the left shoulder of the lioness and fired the dart. With a growl the lioness ran away from the kill for 10-15m and looked all around with the dart stuck to its shoulder. Meanwhile other members of the pride, two adult lionesses and three a year old cubs joined her. Although my tree had scanty leaf cover they failed to see me as the morning sun was right behind me. The darted animal came back to the kill four minutes later. This time with greater power she tugged at the kill, broke the rope and ran into the scrub followed by other lions. Later, however, we found her in a deep nullah where she was collared quickly.

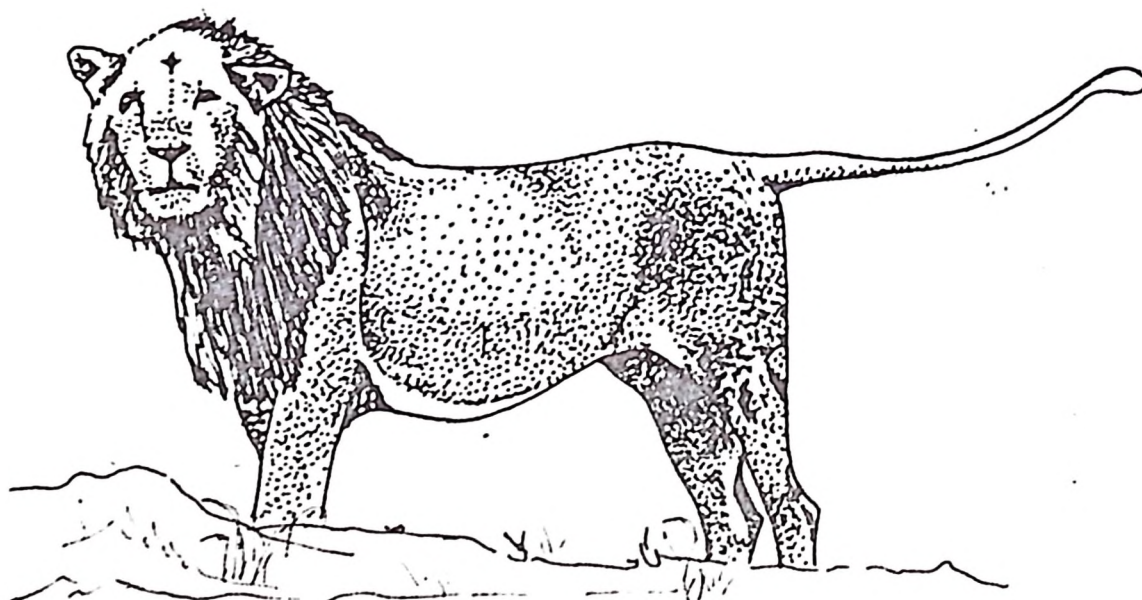
Chodavadi female as she is called now, is one of the four lions (2 lions and 2 lionesses) collared during the fourth "Operation radio-collar" programme. This time the team besides myself had Dr. P.K. Mallik who had his introduction to wildlife in Gir, Ravi Chellam and Jamal Khan our research fellows and their able assistants. Always some one from Gujarat forest department was with us to help us in logistics. The first collaring, infact recollaring, was done on Janwadla lion on 15th Nov. He was earlier darted and collared by Shri H.S. Panwar, Director of WII and Dr. J.B. Sale the then Principal Investigator of the project. But as the

antenna of the collar was broken he had to be recollared. This time Mr. Rawal ACF from Gujarat Forest department darted him. Other two animals collared were Bhimchas lioness on 22nd Nov. and Leriya lion on 23rd Nov. Bhimchas lioness, an aggressive mother, was found alone with a 15 month old cub and Leriya lion when darted was also alone. All the lions were tranquilized with a mixture of ketamine hydrochloride and rompun and recovery of all the lions were smooth.

Now Ravi Chellam, Senior Research Fellow monitoring the lions has six radio collared lions. Dharam was collared on 31.1.87. In the company of Veer, his male coalition partner he swayed over a territory of 120 sq.km. around Sasan. Now he is a nomad after Veer's death at the end of August '87. Other collared lions are Janwadla lion living in a pride of 5-6 lions roaming over a territory of nearly 190 sq.km., Chodavadis and Bhimchas lionesses, Leriya lion and the young lion.

The young lion was collared on 30.1.87 near Sasan. Then possibly he was 20 months old and he left his natal area at the end of Jan.88 and was relocated near Kankai, 30 km. from Sasan, in June 88. He was equipped with a solar-powered collar which unfortunately has a history of malfunctioning. Ravi Chellam last saw him near Kankai on 30.6.88 in the company of another young male. Our best efforts to relocate him this time to recollar did not succeed.

Year nineteen eighty nine is going to be crucial for the project as for the first time in the history of Gir lions five radio collared lions are going to provide us crucial information on their ranging and predation patterns. Ravi is determined to stay with the lions as much as possible to make use of their unique opportunity and collect the valuable information which would help us planning long term conservation strategies for the Gir lion.



EVALUATION OF MUGGER CROCODILE RESTOCKING BY MONITORING AND LONG TERM MANAGEMENT IMPLICATIONS

V.VIJAY KUMAR

INTRODUCTION

Crocodile conservation project began during the year 1975, with the objective of increasing the crocodile population in the country. Several states took up this project adopting the strategy of collecting eggs from the wild, hatching and rearing them in captivity and then reintroducing stocks into the wild. Andhra Pradesh is one of the states which has reintroduced around 258 mugger crocodiles in five different sanctuaries.

OBJECTIVES

1. Survival of reintroduced crocodiles, their movement and dispersal either upstream or downstream.
2. To monitor the population trend following reintroduction of captive reared stock.
3. Study the reproductive success by monitoring the nests, hatching, hatchling survival and their dispersal.
4. Recruitment into the breeding population by the reintroduced mugger.
5. To find out if the different age and size class crocodiles have a different habitat preference, and if so, find whether release size and sites are ideal.

STUDY AREA

Muggers are known to inhabit all kinds of fresh water habitats ranging from ponds, river, lake and reservoir. For a comparative study, the three study areas chosen in Andhra Pradesh are:

1. Manjira wildlife sanctuary (Reservoir)
2. Ethipothalla sanctuary (waterfalls)
3. Siwaram sanctuary (Fast flowing river).

Out of these three study areas, Manjira and Siwaram have wild populations where in 1985 the Forest Department released 10 and 15 crocodiles respectively. In Ethipothalla there was no wild population until 8 crocodiles were released by the Forest Department during 1977-78.

Some findings on the habitat preference by various size class muggers in the three study areas are discussed here.

All the three study area nests were located during 1987 nesting season. From the presence of wild populations and 1987 nesting survey, it is assumed that all the three study areas have all size class crocodiles for study purpose.

METHODS

For the purpose of habitat preference studies the crocodiles were divided into

three size classes (<1m, 1-1.5m and >1.7m) and the habitat in the following three types:

1. Overhanging shoreline vegetation and from the shoreline to a depth of 1m. with emergent aquatic vegetation.
2. Upto a depth of 3m. with submerged vegetation and
3. Open water with no vegetation depth above 3m.

Sightings of the crocodiles were recorded in the habitat mapping sheets. Not only the crocodiles, but details about their habitat, water depth, water temperature and air temperature were also recorded.

RESULT:

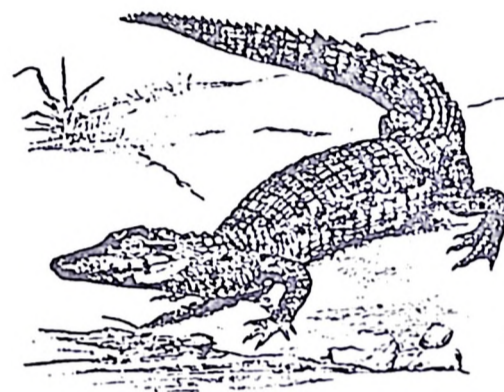
SIGHTINGS OF CROCODILES IN THREE STUDY AREAS

Crocodile size	Habitat type	Manjira (Reservoir)		Ethipohalla (Waterfalls)		Siwaram (River)	
		No. of Sightings	Percentage	No. of Sightings	Percentage	No. of Sightings	Percentage
<1m.	1	5	100.00	46	100.00	51	100.00
	2						
	3						
1-1.5m.	1	9	69.23	19	83.36	5	100.00
	2	4	30.77	1	4.55		
	3			2	9.09		
>1.7m.	1	39	66.10	13	30.95	9	34.62
	2	12	20.34	13	30.95	11	42.31
	3	8	13.56	13	38.10	6	23.06
Total sightings/ total survey		77/20		110/19		82/13	

In all the three study areas the <1m size class prefer habitat type 1 and 1-1.5m size mostly prefer habitat type 1 and shows little overlap in other habitat types but the adults show overlap in all the three

habitat types in the three study areas.

On seeing the percentage of availability of habitat types (three study areas), one (2.2- 11.5%) and two (4.5-18.4%) are very much less than habitat type three (70.1-93.30). This gives an idea that the crocodiles are not forced to go to habitat types 1 & 2 but they actually prefer these habitat types. Then the question arises as to why they prefer these habitats.



Preference of the habitat may be due to the following reasons:

1. **COVER:** In case of crocodile or any amphibious forms water is the major cover. But the shoreline vegetation in the habitat type 1 also can give cover to some extent.
2. **FOOD:** The analysis of 31 faecal samples of crocodiles throw some light about the food habits of different size class crocodiles.
 - <1m - Insects, fish fingerlings, small frogs.
 - 1-1.5m - Insects, crab, small fishes, frogs.
 - >1.7m - Animal hairs, bird feathers, bones, fish fins.

The fish collection in Manjira also gives some proof. Out of 671 fish collected, 579 (86.29%) are from habitat types 1 and 2. Out of the 579 fishes 405 (69.95%) are <20cm in length and 174 (30.05%) are 20-30cm. The fish collected in habitat type 3 are above 30cm in length. Occurrence of small size class fishes in habitat 1 provide more food to hatchlings.

Insect collection in Manjira also gives some proof. A total of 176 random scoops were made, equal in all three habitat types, 41 successful attempts were made all in habitat type 1.

CONCLUSION

These insect and fish collection proves the presence of food items in all the habitat types. In winter >30000 migratory birds visited Manjira sanctuary and most of

them roost on island or shoreline vegetation (*Ipomea cornea*) and permanent roosting of thousands of egrets on the shoreline vegetation is very common in Manjira.

1. Availability of below 20cm size fishes and insects keep the hatchlings and yearlings in habitat type 1.
2. Presence of Insects, crabs, molluses and small fishes (20-30cm) make the sub-adults to overlap habitat 1 and 2.
3. Availability of food in all the habitat types make the adults to overlap all the three habitat types.