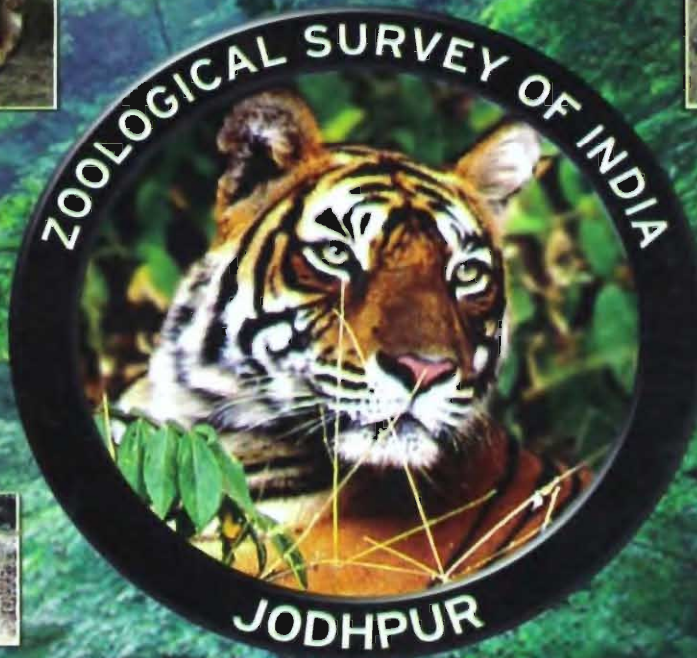




Conservation Area Series, 43

FAUNA OF RANTHAMBHORE NATIONAL PARK RAJASTHAN



ZOOLOGICAL SURVEY OF INDIA

Conservation Area Series, 43

**Fauna of
Ranthambhore National Park
Rajasthan**

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Fauna of Ranthambhore National Park
Conservation Area Series

43

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RANTHAMBHORE NATIONAL PARK : AN OVERVIEW

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INTRODUCTION

Once spread over the country, India's wildlife heritage is now restricted and preserved in the sanctuaries, national parks and reserves of India. With growing attention of naturalists and wildlife lovers across the subcontinent, rich areas of wildlife diversity were recognized and given different status of protection depending upon the need and importance of the flora and fauna. The proclamation of Wildlife (Protection) Act, 1972 became one such instrument in preserving the diverse wildlife in these protected areas. So far India has 97 National Parks and 498 sanctuaries covering an area of approximately 154,931.38 sq km, which amounts to 4.71% of the total land area of the country.

The present day Ranthambhore is one such nature's spot now under protection as National Park and also holds the credit of being most incredible hot spots of Indian wilderness preserved in the pristine environment of northern extremity of central India also declared as Ranthambhore Tiger Reserve.

Ranthambhore-the name comes from the vast fort that stands in the middle of the forest in Sawai Madhopur district of Rajasthan State. The name is derived from two hills in the area, Ran and Thambhore. There is another version, which states that Ranthambhore was once known as Rana-Stambhapura or city with wall of pillars.

Infact, traces of settlement here dates as far back as the 8th century. Ranthambhore Fort, in Sawai Madhopur, Rajasthan is commonly believed to have been built by King Jayant of the Chouhan dynasty in 1110 AD. Some say that king Sapaldaksha, also a Chouhan founded Ranthambhore in 944 AD. Some are of the opinion that a relative of King Hasti of Hastinapura, called Rati Dev was the original founder. Another mythological belief is that the worshippers of Surya or *Suryavanshis* were the original inhabitants of the region.

The Mughal emperor Akbar also fought a battle for the control of the fort and the region in the 16th century. Sawai Madho Singh, the ruler of Jaipur in 1754 requested the Mughal emperor, Ahmed Shah to grant him Ranthambhore Fort in order to curb down the Marathas. On his refusal he fortified the Sherpur settlement of Ranthambhore and named it Sawai Madhopur in 1763, which is now a small town 14 km from Ranthambhore Fort. Later in the century especially before the arrival of British, the

residents of Ranthambhore forests were the Meenas, a tribe who had lived fairly freely and easily in the region. By 1820 Rajputs and Britishers jointly exercised their control to use the Ranthambhore forests as their private hunting reserves. This was the period when animal hunting was organized as game for the royal hierarchy in India. In the later part of the last century the fort and the surrounding forest became the property of the Maharaja of Jaipur, who built a delightful shooting lodge by the lake and limited hunting to two months in the year.

In 1960-61, the Queen Elizabeth II of England and HRH Duke of Edinburgh visited Ranthambhore as guests of Maharaja of Jaipur on a "Royal Shikar". Since hunting became restricted to special guests of Maharaja it resulted in slowing down the destruction of the forest and wildlife of the entire area of Sawai Madhopur, which is now a present day Ranthambhore National Park (Fig. 1).

Today Ranthambhore is one of the many protected areas in India, which began its life as hunting reserves. Nearly all the India's significant conservation laws date from the period since Independence, although there was some legislature activity during the days of the British Raj. The Britishers under various nineteenth century Forest Acts restricted the hunting rights of forest dwellers and later divided forests into shooting blocks. These were opened and closed in accordance with the abundance or scarcity of animals as game, thus providing a measure of control over the hunting exploits of the forest dwellers.

Occasionally laws were passed to protect a single species whose future was deemed uncertain. On the global scale the foundation of the International Union for the Conservation of Nature (IUCN) in 1947 was the event of considerable significance, at India's level, the then government created the Indian Board for Wildlife, which forwarded the proposals in 1953 for establishment of 18 National Parks in the country.

The hunting reserve of His Highness, Maharaja of Jaipur at Sawai Madhopur was declared as Sawai Madhopur Wildlife Sanctuary in 1955. In the 1960's many scientists feared that before long the tiger would become extinct like the cheetah in the 1950's, and felt that new laws should be enforced to avert it. The fate of tiger spurred the Indian Government to introduce new laws to protect the country's remaining wildlife. WWF-I in 1969 was launched and later in 1972 a census of tiger was undertaken to count the dropping population from an estimated 40,000 to 1800. This prompted the Government to pass wildlife (Protection) Act in 1972 and also to launch Operation Tiger known as Project Tiger in 1973. With the launch of Project Tiger in India, the former Sawai Madhopur Wildlife Sanctuary was included as Ranthambhore Tiger Reserve amongst the first nine tiger reserves declared in 1973. Later in 1980 a part of Sawai Madhopur Wildlife Sanctuary with an area of 392.50 sq km was declared Ranthambhore National Park by designating 274.5 sq km as core area and 118 sq km as buffer area from within the Ranthambhore Tiger Reserve.

In order to accommodate increasing wildlife population of this region, the adjoining forest area of Karauli and Sapotara Tehsil with an area of 674 sq km was notified as Kela Devi sanctuary in 1983. Subsequently in 1984, the forest area

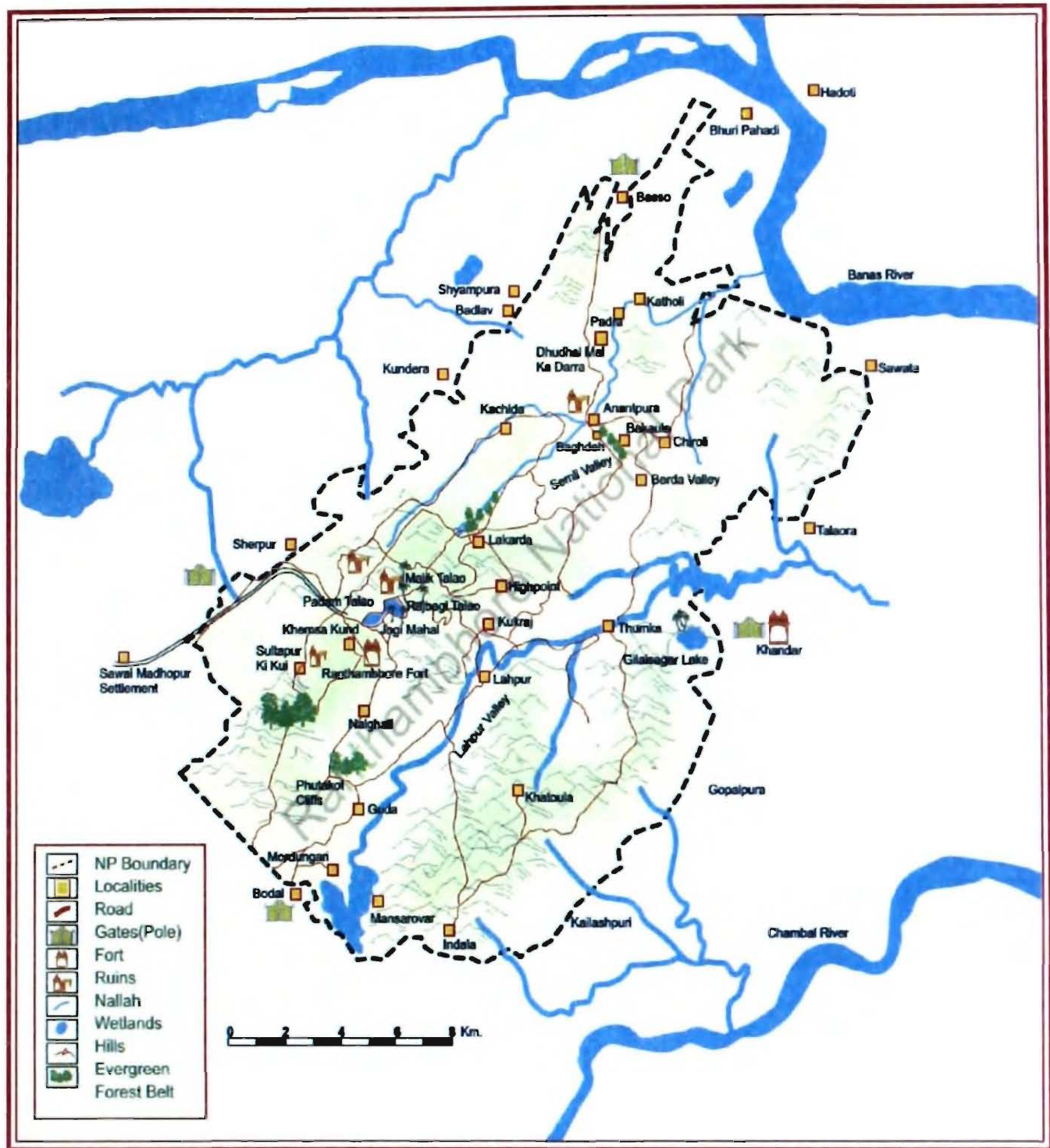


Fig.1. Ranthambhore National Park

towards the south west of Ranthambhore National Park was also notified as Sawai Mansingh Sanctuary with an area of 127.60 sq km. These Sanctuaries and the surrounding reserved and protected forest of 132.9 sq km and Kwalji closed area (part) 7.58 sq km are now part of the bigger umbrella named as Ranthambhore Tiger Reserve (Fig. 2) with a wider canvas encompassing other smaller nearby sanctuaries and other forest areas (Table 1).

Table 1. Existing Area under Ranthambhore Tiger Reserve.

Protected Zone	Area (Sq Km)
Ranthambhore National Park	329.50
Sawai Mansingh Sanctuary	127.60
Kwalji Closed Area	7.58
Kela Devi Sanctuary	674.00
Other Forest Area	132.96
Total	1334.64

The entire Ranthambhore Tiger Reserve area of 1334.64 sq. km is under protection for the unique species-tiger with more area underway (Table 2) to be added to Ranthambhore Tiger Reserve (Anon, 1999-2000). At present the Ranthambhore National Park (274.5 sq km) is managed as the core area while the remaining forest is managed as a buffer area.

Table 2. Proposed Area for extention under Ranthambhore Tiger Reserve

Proposed Area	Area (Sq Km)
Ramgarh Vishdghary Sanctuary	307.00
Area transfered from Bundi Division(Kwalji Closed Area Part)	25.98
Area transfered from Tonk Division(Kwalji Closed Area Part)	3.78
Area transfered from Karauli Division	44.14
Proposed area of Bundi Division to be included in RTR	167.53
Proposed area of Tonk Division to be included in RTR	13.55
Proposed area on Karauli Division to be included in RTR	54.08
Proposed area of Dholpur Division to be included in RTR	
(a) Van Vihar Sanctuary (25.60)	
(b) Other Forest Areas (461.79)	487.39
Total Proposed Area	1103.45

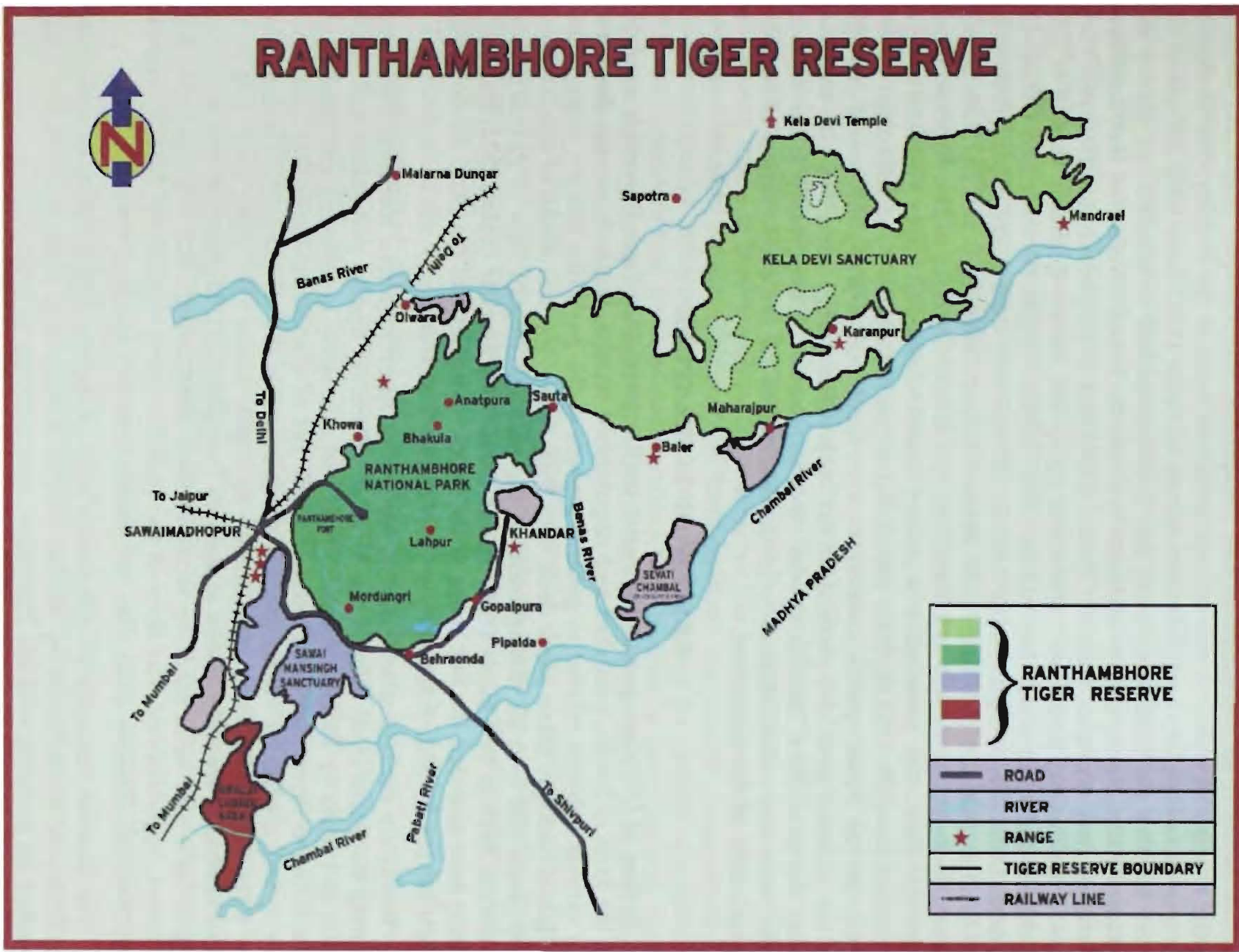


Fig. 2.

The Ministry of Environment and Forests has taken several important steps in order to explore, conserve and manage protected areas of the country. The Zoological Survey of India (ZSI) and Botanical Survey of India (BSI) have been entrusted the work to carry out studies on fauna and flora respectively of selected sanctuaries and national parks. Since ZSI was assigned to assess the faunal diversity of Ranthambhore National Park a project entitled "Faunal Resources of Ranthambhore National Park, Sawai Madhopur, Rajasthan" was taken up by the Desert Regional Station of ZSI, Jodhpur under the supervision of Dr. N.S. Rathore, Joint Director and Officer-in-charge, DRS, ZSI, Jodhpur. Many faunistic surveys were undertaken during 1999-2003 by Dr. N.S. Rathore, Scientist-E, Dr. Sanjeev Kumar, Scientist-C and Dr. Ram Sewak, Asstt. Zoologist, to collect and document the faunal diversity of the Ranthambhore National Park. The permission to collect invertebrates and lower vertebrates were obtained from the CWLW, State Forest Department, State Govt. of Rajasthan for the study period. Some specific techniques were employed to study the faunal diversity of the national park and permission for such methodology used was also obtained from the authorities. Data on various other parameters of importance to the national park were also collected so as to project strategies for the conservation of valuable faunal taxa of the ecosystem.

REVIEW OF LITERATURE

Review of literature reveals that work on Ranthambhore Tiger Reserve is available in the form of books, published and unpublished reports, research papers, thesis and on various subjects related to general aspects of the park like history, cultural and religious heritage. Some paper deals with legal issues, medical health of animals, flora and fauna and over all management of the park. An overall view of Ranthambhore National Park is by Thapar (1987-1988); Israel and Sinclair (1989). Sharma (1991-1993) have recorded the folk songs of the people living around the park. Anwar (1993) sketches the history of the area over 1000 years in Hindi.

Works on various miscellaneous aspects of Ranthambhore National Park were during the years 1988-1993 in the form of reports on human population and tigers; milk and tigers by Rathore (unpublished) and case study mentioning and quantifying the different threats by Khan (unpublished). Lot of unpublished grey literature exists on various aspects by Verma (unpublished) describes the religious Shri Ganesh Yatra to Fort Ranthambhore; One comes to know about the glory and valour of Ranthambhore from the works of Rathore (unpublished). Mention of Ranthambhore tigers have also been made by many in their publications (Kayasth, unpublished; Sharma, unpublished). The flora of the park has been worked out by (Chundawat, unpublished; Sharma, 1983; Das and Singh, 1995 and Singh, 2004).

The work on management and planning are of Rathore (1984-1989); an assessment of Biological conservation by Mathur (1987). Rodgers and Panwar (1988 and 1993) worked on planning wild life Protection Area Network in India.

Most of the published literature is on Tigers of Ranthambhore and villagers' interaction. Mention of tigers of Ranthambhore have been done by Singh (1959) in

his book on “Tigers of Rajasthan”; Chaudhary and Chakrabarti (1979) mentions the striking features of biotope of the nine tiger reserves including Ranthambhore Tiger Reserve; Vardhan (1979) wrote about shifting of villages from Ranthambhore; Rathore, *et al.* (1983) described the period of tigers in Ranthambhore between 1976 to 1982; life of tiger between 1982-1985; family life of three tigresses between 1985 to 1988; worship of tiger over centuries and visuals narrating the story of Ranthambhore tigers between 1988 to 1991 and a children’s book which uses Ranthambhore’s tigers as the visuals to explain the natural history of tiger has been published respectively by Thapar (1986, 1987-1988, 1989, 1992, 1999, 2004). Mention of Ranthambhore tigers have also been made by many in their publications (Rathore, *et al.*, 1983; Thapar and Rathore, 1985 and 2000; Rathore, 1993; Roagers and Bhattacharjee, 1986; Sankhala, 1993; Sahu and Sharma, 1993; Ives, 1995; Helmut and Denzau, 1996; Kumat (1992) inquired into the missing tigers of Ranthambhore National Park; Khan (1993) on scientific management of buffer zone; Prey selection by tiger is described by Karanth and Sunquist (1995); Shah and Manoj (1996) records the period of 1990-1995 in the life of tiger at Ranthambhore; Breeden and Wright (1997) also makes mention of Ranthambhore Tiger in his publication; an intra-specific fight among tigers at Ranthambhore Tiger Reserve has been narrated by Chaudhary (1999) and detailed account of History of Ranthambhore and wildlife conservation in India with special reference to Ranthambhore accounting for census of wildlife; veterinary considerations for tiger conservations were studied by Singh (2000); flora and fauna existing up to 1998 has been summarized in “Ranthambhore Beyond Tigers” by Chaudhary (1997 and 2000).

Dr. Karanth in 1999 undertook the first scientific study of estimating the tiger population through “camera trap method” His works on tigers are published in books and journals (Karanth, 2001 and 2003). Census data-2005 on Ranthambhore Tiger Reserve is by Singh (2005).

Interactions of the villagers with the National Park and the concerned authorities are by Berkmuller *et al.* (1989) who conducted studies on grazing and lopping pressures; Singh (1991) has described in detail the encounters of villagers and forest officials and the reason for launching up of first eco-development programme as a remedy to the crisis that arose when villagers living around the Ranthambhore Tiger Reserve forcibly started grazing their cattle’s into the core area of the park. Bannerjee and Srinivasan (1993) worked on formulating a strategy to reduce dependence of the villagers on Ranthambhore National Park. Ward (1993) in his publication has a section devoted to Ranthambhore and the life of some of the tiger wallahs that have fought for Ranthambhore.

Sethi and Mandal (1994) have worked on energy consumption around Ranthambhore National Park. Satellite interpretation studies have been done by ISRO, CAZRI (1992-1998) and habitat characterization and GIS studies have been done by Devkota *et al.* (1999).

The major work on Ranthambhore National Park is in the form of review reports by Thaper (1987-88); a report on Project Tiger by Ministry of Environment and Forest

(Anon, 1993 and Jain, 2001); report on bio-diversity conservation through Eco-development by UNDP (1994); World Bank Staff appraisal report on Eco Development Project on Ranthambhore by Anon (unpublished); various reports by the Field Director, Ranthambhore National Park, State Forest Department, Rajasthan (Anon, 1994, 1995 and 1999-2000); research works in the form of number of papers presented at the Symposium on "Habitat Conservation-fresh vision in 2000 and beyond, Sawai Madhopur", organized by State Forest Department and Tiger Conservation: Gosain (2000) on law related to tigers; Singh (2000) on veterinary considerations for the Tigers; Joshi (2000) and Chauhan (2000) work relates to tiger-man-conflict. Impact assessment studies on Ranthambhore Sanctuary have been vividly described by Sharma (2000) and Chatterjee and Pande (2003).

Dalal (1998) has written on adventure tourism; a comprehensive useful guide for the tourists by Sippy and Kapoor (2001) gives a wholesome picture of Ranthambhore and its managerial aspects with review on academic work for the general awareness of the public and for effective eco-tourism.

The fauna was worked out by Thapar (1982) who, described Ranthambhore Fortress as a haven for Indian Wildlife; Kumar (2000) completed M.Sc. dissertation on "Ungulate Density and Biomass in the Tropical Semi-Arid Forest of Ranthambhore India" Faunal listing along with general aspects of Ranthambhore Tiger Reserve has been mentioned by Chaudhary (1997, 1999 and 2000). Bird listing has also been done by Reddy (1999) and Andheria (2000). Some stray research articles on sighting of one or two avian species are by Ranjitsinh (1999) who reported the presence of painted spurfowl; Andheria (2002) sighted rock bunting and Srinivas (2002) reported a large congregation of Black-Shouldered kite. Recently an attempt has been made to study population of avian diversity by line transect method by Kumar and Sivaperuman (2005). An account of fauna on Ranthambhore National Park has been mentioned in Project report on "Inventorisation of Faunal Resources in National Parks of Rajasthan and Gujarat" by Desert Regional Station, Zoological Survey of India (Rathore, 2004); Snakes of Ranthambhore are being worked out by Rathore and Khandal (2005).

The review of literature clearly reveals that only emphasis has been made to conserve the bigger species like tiger along with few other mammals and recording of avian diversity. However, some listing of other vertebrates group like pisces, amphibians and reptiles have been just touched upon. No documentation of smaller groups of vertebrates and invertebrates as a whole has been done in the recent past.

Attempts were made by Zoological Survey of India, Jodhpur to work out the invertebrate and vertebrate faunal diversity existing in the Ranthambhore National Park represented so far by a total of 536 species. However, the present reporting is still incomplete as vast majority of invertebrates and vertebrates especially lower invertebrates, arthropods including soil arthropods, entomofaunal groups, fishes, reptiles and smaller mammals are under the process of identification. Many more species are yet to be recorded, as the studies were restricted to a few days of the years from 1999 to 2003. The faunal diversity, their availability and abundance,

behavioural changes with the change of topography, climate, vegetation, soil and water, their interdependence on each other and the entire food web and food pyramids need intensive study and diversity indices to be worked out on the basis of seasonal population fluctuations not only of the Ranthambhore National Park but other areas falling under the umbrella of Ranthambhore Tiger Reserve.

STUDY AREA

Ranthambhore National Park is situated amidst the hilly ranges of the Aravalli's and the Vindhya's in between the confluence of the rivers Chambal and Banas. The National Park is located between 76° 23' to 76° 39' E longitude and 25° 84' to 26° 12' N longitude in the Swaimadhopur district of Rajasthan. The Ranthambhore Park is 15 km. away to the east of the Sawai Madhopur town. The town is well connected by railway network and metalled roads (Fig. 3).

The total area of the park is 392.50 sq km out of which 274.5 sq km is core area and 118 sq km is buffer zone. The area comes under the Indian bio-geographic zone: the semi-arid and the biotic province-4B Gujarat-Rajwara. Outside the core area of the park, Jogi Mahal an old palace of the Maharaja turned into guesthouse, allow visitors a glimpse of the opulent lifestyles of the past and supports present day tourism in the area.

Remnants of the old villages like Anantpura, Chiroli, Kachida and Bherda in the north; Lakarda and Lahpur in the middle and Guda in the south inside the core areas are seen. The Sikargarhs and the ruins of archaeological significance of the earlier Maharajas still exist in the Park (Fig. 1). Many of the ruins have water tanks and smaller water bodies like Talab as traditional sites harvesting run-off of the monsoon precipitation. The park has six perennial wetlands and many seasonal water bodies including springs within the core area and the buffer zone, which supports the entire wildlife of the National Park.

There are numerous villages along the boundary of the core area and the buffer zone. To the north of the Ranthambhore Railway Station exist the villages of Ranwali, Kundera, Mokhali, Chakeri and Shampur. Towards the north on the right banks of Banas River are Khat, Padana, Bhuri Pahari, Baso and Doongri. Surial and Manipura lie along the Dausa road. The Sawata, Talabra, Moi Khan and Khandar are villages on the eastern margins of the sanctuary. In the south lies the Chhan, Behraoda, Bodal and Kushalipura or all along the tarred road like Dolatpura and Pali. The existence of these villages is mainly due to motorable-metalled roads, railroads and rich fertile alluvial soil supporting agriculture. In all it is surrounded by 54 villages.

Administratively the area is divided into two main tehsils : the Khandar in the east and north and larger Sawai Madhopur in the west and south. On the basis of these two tehsils for the sake of proper administrative control and maintenance, the entire sanctuary is subdivided in two main groups named after their respective tehsils and each comprises of five main blocks, two in Sawai Madhopur Tehsil as Block - A on the west and north-west and Block - B on the south. The three Khandar blocks are referred

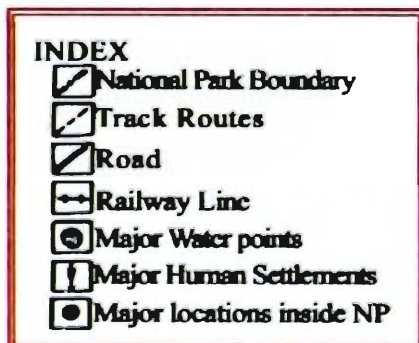
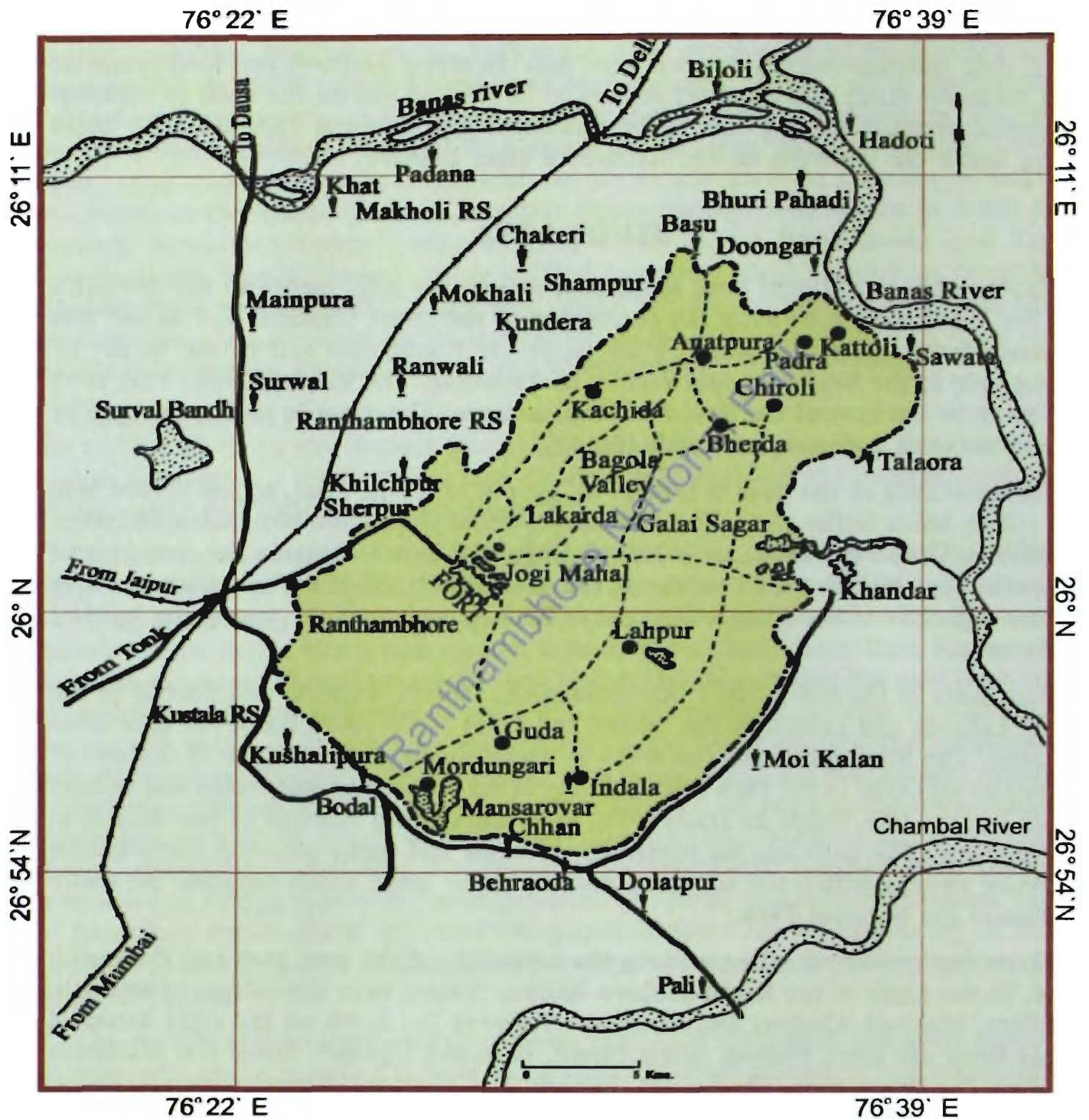


Fig. 3. Location map of Ranthambhore National Park

to as Khandar A, B and C on the north, middle and southeast respectively (Table 3). Each of these blocks are further subdivided into 164 compartments of different sizes mainly on the basis of natural barriers like mountain spurs, streamlets, plain lands, valleys etc.

Table 3. Administrative Units of Ranthambhore National Park

Block's Name	Division	Location	Compartments No.
Sawai Madhopur	Block A	West and North-West	47
Sawai Madhopur	Block B	South	20
Khandar	Block A	North	39
Khandar	Block B	Middle	22
Khandar	Block C	South-East	36

For the first time a major attempt was made by the survey parties of Desert Regional Station of ZSI, Jodhpur to collect the invertebrate faunal diversity by using high luminous screen light method in the National Park. Day-Night sampling from various habitats within the park was made and observations recorded on the vertebrate sightings during different hours of the day. In all there were a total of 19 sampling sites including water bodies within the National Park selected to study various animal groups and other parameters of faunal importance (Fig. 4). The GPS coordinates of 17 of these sites were also recorded to interpret the distribution and congregation of species with reference to habitat preference and abundance of macro and micro niches within the national park (Table 4). The duration of the study period was from 1999-2003.

Table 4. Localities surveyed during 1999-2003 (GPS Co-ordinate of collection sites).

Sl. No.	Name of the Locality	GPS Coordinates
1.	Kachida area	26° 02' 45" N; 76° 27' 27" E
2.	Jogi Mahal Mori	26° 01' 63" N; 76° 27' 20" E
3.	Padam Talab	26° 01' 50" N; 76° 27' 34" E
4.	Before Bagdeh	26° 05' 51" N; 76° 32' 13" E
5.	Lakarda	N.A.
6.	Malik Talab	26° 05' 50" N; 76° 32' 12" E
7.	Bakaula area	26° 02' 65" N; 76° 28' 67" E
8.	Lahpur area	26° 59' 38" N; 76° 29' 10" E
9.	Bodal area	25° 59' 57" N; 76° 26' 93" E
10.	Mansarovar	26° 55' 34" N; 76° 26' 38" E

Sl. No.	Name of the Locality	GPS Coordinates
11.	Dhudhal Mal Ka Darra	26° 06' 70" N; 76° 32' 80" E
12.	Anantpura area	26° 05' 52" N; 76° 32' 44" E
13.	Sultanpur Ki Kui area	26° 00' 49" N; 76° 27' 47" E
14.	Nalghati	N.A.
15.	Gilai Sagar area	26° 01' 41" N; 76° 34' 91" E
16.	Indala area	25° 55' 88" N; 76° 29' 32" E
17.	High Point area	26° 01' 80" N; 76° 29' 38" E
18.	Raj Bagh area	26° 01' 86" N; 76° 28' 04" E
19.	Ranthambhore Fort Gate	26° 01' 43" N; 76° 27' 41" E

CLIMATE

Ranthambhore National Park is a representative of a habitat where well-defined spring, summer, rainy, autumn and winter seasons of the year can be experienced at the fullest. Climate is subtropical with rainfall as high as 900 mm and relative humidity ranging from 35 to over 75 %. The temperatures varies from 48° C in summer to as low as 2° C in winters. The habitat of the animals also changes with the change in temperatures. Generally the winds are calm and quite and cool with hot winds blowing in the summer accompanied by thunderstorms and dust storms or gales at times. The direction and intensity of wind is very indicative of the change of climate in the Park and plays an important role in the local movement of the fauna and dispersal of derelict forms. The overall climate plays an important role in the distribution of the animal groups which are either found in particular niches or pockets or spread throughout whereas bigger animals restrict themselves to water points, dense vegetation and the ruins.

Aravalli ranges protrude 350 m to 450 m AMSL in this region. The steep slopes and undulating almost flat crests of the Aravallis girdle the park. During the rainy season the water flows in the form of seasonal springs from these sloppy terrains. The area represents a transitional belt of climate blending from arid-semiarid-arid northeast to the sub-humid-humid of the southeast. It is dominated by westerly winds, which strike the Aravalli's resulting into heavy downpour in the area.

HYDROLOGY AND DRAINAGE

Sustenance of life is dependant on water. The Banas in the north and Chambal in the south collect the waters from Aravalli hills with most of the streams being seasonal but carrying huge flows of water in time of heavy downpour. The entire area is thus having rich alluvial soil, easy availability of ground water at shallow depths and



storage of surface water in natural tanks and nullahs. Inside the core area are few natural wetlands having water availability throughout the year. Notable among them are Gilai sagar and Mansarovar reservoirs, which are artificially created by damming the rivers; these are supplying water for the irrigation to nearby villages also. Wildlife dependency on this lake arises only in extreme summer when other water bodies dry up. Padam Talab, a vast shallow lake on the banks of which stands the famous Jogi Mahal, provides water throughout the year. Another big lake is Raj Bagh with availability of water; Malik Talab, a large depression dries on occasions when the monsoon is delayed or due to scanty rainfall in the area. Lahpur Lake, formed by damming of the river is another small water body, where excess water spread over the surrounding area in rainy season, giving rise to marshy habitat. The lake almost dries by March and is then artificially filled.

Besides these six permanent wetlands about hundred or more seasonal water points exist in the park. Many of them are in the form of old scattered ruined pools constructed by the Maharajas. Other water points are in the form of depressions in the flat areas or cesspools in the narrow valley. Some important water points of Ranthambhore National Park are shown in Fig. 5.

Sitamata Spring, Pir Khera, Kandull, Mishar Darrah, Japkan, the Banas and the Chambal are perennial flowing water points found in Sawai Madhopur blocks of Ranthambhore National Park. These disappear gradually in severe summers. Relatively larger sized water points are Kushlipura, Devpura, Dualada Ka Tharna, Khemsya Kurd, Hati Patta, Kirmi Khora and Bhata Ki Pass Nala.

Majority of wild animals congregate around Padam Talab, Rajbagh Lake, Lahpur Lake and Nalghati wetlands, which have availability of water throughout the year. The drainage is flowing towards south and southeast. The streams and nullahs of the southeast drain into the Banas River and those of south into the Chambal River. Most of streams are controlled and flowing along the Bagda Nalla, Padam and Rajbagh Talab.

GEOLOGY

Geologically, the Ranthambhore National Park is divided into the eastern side and the western side. The eastern side is occupied by the Vindhyan and the western side by the Aravalli hills.

Pre-Aravalli rocks comprise of quartzites, mica schists, gneisses and migmatites. The rocks of Vindhyan super group comprise sandstones, shale, limestone and breccia. They are separated from the Pre-Aravalli's and Delhi's by a "Great Boundary Fault"

The Aravalli outcrop from several continuous ridges and groups of small hills striking in a northeast to southwest direction are ancient crystalline and metamorphic rocks with gneisses and schist's and covered by red sandy soils most suitable for Dhok (*Anogeissus pendula*) forests.

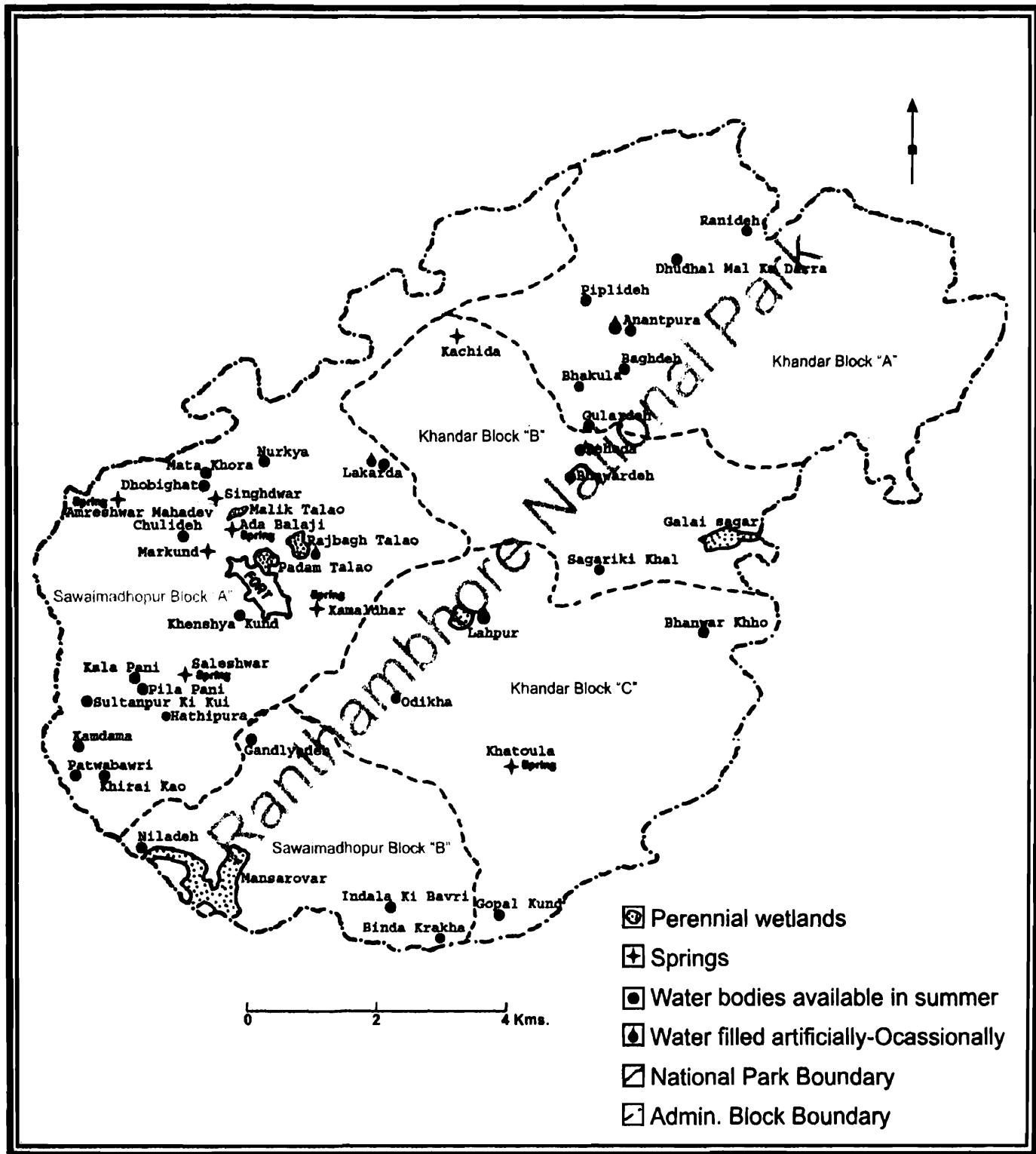


Fig. 5. Wetlands and seasonal water holes in Ranthambhore National Park

The geology of the southeastern region is mostly shared by these two rock systems. This distribution is mainly determined by the two important faults, which occur 12 miles apart and run in the northeast to southwest directions. The southeastern fault known as "Great Boundary Fault of Rajputana" passes through Phalodi-Bodal Lohpur-Chiroli and Quadeen. It is along this fault that Gwalior is brought against Vindhya. The north-eastern fault is not very clear owing to the large spreads of alluvium under which it lies but is a real fault and important in effects. The lower Vindhya are generally confined between these two faults.

RELIEF FEATURES

The overall landscape is of importance in studying the ecological niches of various faunal species. The topography generally comprises of low hills and parallel ranges of the Aravalli and Vindhya Mountain System. The general relief varies from 250 to 450 m ASML. The highest cliff point is 482 m AMSL. In the Sawai Madhopur block the Aravalli system prevails. The two main ranges the Salawai Dang and the Ranki Dang remains covered with fairly dense forest. To the south of these ranges are Rawarina Dungar hills on the lowlands, which were the villages of Sheopura, Halada, Kheri, Bhagwarpora and Todra. These have been evacuated as were coming under the buffer zone of the Park.

In the South, outside the limits of park lies a village Chhan, Behraonda, Khund, Phiriya, and Mordoongri located in the flood Zone of Chambal River in between the confluence point of Banas and Chambal. The area in their immediate vicinity is an open scrubbed with small patch of open mixed forest of khar trees. In the north, outside the park are Shyampura, Endwa, Basu, Doongri, Garhi and Sawata Kalan villages along the fertile alluvial plains of Banas River.

GEOMORPHOLOGY

The topography of Ranthambhore National Park varies from gentle slopes to steep vertical rocky escarpments. A unique geomorphologic feature of this sanctuary is that the hill ranges of two different systems of mountains of the Aravalli's and the Vindhya's meet along the Great Boundary Fault. The conical hillocks of the older Aravallis are juxtaposed with the flat-topped hills of the Vindhya are known as "Dang" Dangs have shallow soils with less moisture retention after rains and thus vegetation is sparse dominated by grasslands. Depth of soil is enough to retain moisture and support mixed healthy forests in valleys. The landforms of this region have fluvial denudation and structural origins. Flood plains are confined along the Banas. Denudational hills of Quartzites brecciated rocks and limestone and buried pediplains a slates/schists having less than 5 metres of mantle and a regolith cover of 5 metres besides buried pediplains on limestones and shales having flat to undulating plains carved out on the Vindhya; shales having shallow soil cover and with profound soil cover upto 5 metres. Hills of structural origin on limestone and quartzites have high rising ridges with steep slopes.

HUMAN SETTLEMENT AND POPULATION

The core area of the sanctuary is entirely free from any human population while the buffer zone villages portray a density of less than 100/km² which is normal as these villages have only substantive farming on the limited agricultural areas (Sharma, 2000). Indala is the only village left with some population in the buffer zone at present.

Sole occupation of the locals is fire wood selling and livestock rearing, both of which are being easily pursued in the fringe zone by legal and illegal methods. A tribe called "Meenas" dominates the hilly ravenous and eroded lands of this mountainous area around Ranthambhore National Park. Till recently the agriculture was poor due to undulating terrain factors and labour intensive nature of the cultivation. But now due to development of better agricultural practices, provision of electricity on the wells and tube wells, availability of hybrid seeds and fertilizers these areas have rich harvest of wheat, mustard and groundnuts, which fetch cash money to pheasants. The present population is now also engaged in other activities like trade, transport, cottage and small-scale industries and official jobs. With the growing population of the region various other means of livelihood have developed based on illegal activities like poaching of birds, harvesting of fishes from the waterbodies and trafficking of forest produce which has adversely effected the development of the region particularly with respect to wildlife protection and conservation of the whole area of Ranthambhore Tiger Reserve.

FLORA

The national park has a vast assemblage of plant communities and associations ever changing according to seasons, terrain and proximity of wetlands. The entire park becomes fascinatingly green in August with profuse undergrowth of ephemerals. The open savannahs are enveloped with different grass association providing most superb camouflage to wildlife.

The vegetation cover of the park is typical Tropical dry forest seen all along the eastern slopes of Aravallis. According to Champion and Seth (1968) the forest of Ranthambore can be grouped under northern Tropical dry deciduous and Dry mixed deciduous forest comprising mainly of *Anogeissus pendula*, *Butea* forests, *Acacia catechu* and *Boswellia serrata* and northern tropical thorn forest which are represented by *Ziziphus* and *Euphorbia* scrubs. With the setting up of winter the grass turns pale and the foliage becomes copper brown. In the late winters red-brown and yellow dominates due to the pre-ponderance of flame of the forest, *Butea monosperma* and dhok, *Anogeissus pendula* in the area, which also becomes bare soon after the rains. The slopes of hills and flat dangs have vast stretches of grasslands. The grasses are a good food source and hiding niches for the wildlife. About 76 species of grasses have been reported from the area (Singh, 2004). The valleys have a profound growth of larger evergreen trees and they form a thick canopy throughout the year. However, the Gurjan tree density is very less which once dominated the ecosystem. In spring

the entire forest is stark, leafless and bare dry with the ground covered with a thick litter of dry fallen leaves forming thick cushion on the floor of the forest giving refuge and shelter to soil dwelling animals especially arthropods, annelids, molluscs and micro-organisms. The entire National Park has large number of wetlands both seasonal and perennial, which provides variable terrain for the growth of hydrophytes throughout the National Park supporting aquatic wildlife. Hydrophytes may be free floating (*Spirodela polyrhiza*, *Utricularia stellaris*); fixed, floating with floating leaves and attached at surface by roots (*Ipomea aquatica*, *Nymphaea nauchali*, *N. pubescens*, *Nelumbo nucifera*); surface submerged (*Hydrilla verticillata*, *Najas graminea*, *Lagarosiphon alternifolia*, *Zennichellia palustris*); attached submerged (*Ottelia alisnoides*); amphibious emerged (*Typha angustata*, *Limnophila indica*, *Ipomea carnea fistulosa*, *Sagittaria guayanensis*) and marshland (*Ammania baccifera*, *A. multiflora*, *Phyla nodiflora*). *Ficus bengalensis*, *Flacourtia indica* and *Phoenix sylvestris* are few commonly seen tree species around. The National Park still has cultivated fields of villagers with growing crops like cereals, pulses, vegetables, oil seeds fruits and some common species of condiments. The growth and prevalence of wide variety of vegetation including many exotic species which might have been introduced into the area since pre-historic time or in the recent past either by National agencies or through their commercial route is seen in the park due to wide range of habitats climatic factors, variable physiography, soil types and geographical features available within the boundary of national Park. So far 135 such exotic species have been recorded (Singh, 2004). The flora of Ranthambhore National Park has been worked out by Botanical Survey of India, Jodhpur. About 539 species of angiosperms and complete absence of gymnosperms except for few species of ferns have been recorded from the park Singh (2004).

The oldest of the trees are seen in the form of a banyan tree at the Jogi Mahal. *Ficus* species are scattered and mainly seen in the developing wastelands of the park. Many of these areas have become bare due to continuous felling of trees and over grazing. The last remains of the parent vegetation have almost vanished in the developing wastelands within the park. Regeneration is negligible due to biotic pressure and topsoil becoming inferior quality. The common casually seen trees of this area includes *Acacia leucophloea*, *Acacia catechu*, *Acacia nilotica*, *Anogeissus pendula*, *Prosopis juliflora*, *Cassia fistula*, *Balanites aegyptiaca*, *Butea monosperma*, *Ficus benghalensis*, *Salvadora oleoides*, *Syzygium cumini*, *Diospyros melanoxylon*, *Moringa oleifera*, *Mitragyna parvifolia*, *Flacourtia indica*, *Holoptelea integrifolia*, *Launea coromandelica*, *Tamarindus indica*, *Bauhinia racemosa* and *Ziziphus mauritiana*. Shrubs, herbs and climbers are more common than the trees mainly *Grewia flavescens*, *Capparis decidua*, *Capparis sepiaria* and *Adhatoda vasica*. Plants like *Sterculia urens*, *Euphorbia neriifolia* are common on the steep slopes and *Argemone mexicana* and *Caltropis procera* common on sandy plains. Vegetation is also seen around the old buildings and ruins of the park represented by meadow herbs like *Kickxia ramosissima*, *Lindenbergia indica*, *Glossocardia bosvallea*, *Verbascum chinense*, *Dipteracanthus patulus* etc. Some trees like *Ficus benghalensis* and *F. religiosa* are seen penetrating the wall of the monuments. Once Ranthambhore

National Park was harbouring a variety of plant communities representing India's rich traditional medicinal, industrial, religious heritage supporting wildlife in a pristine natural tropical moist deciduous ecosystem, which has almost disappeared and has resulted into dry tropical conditions.

FAUNA

Hanuman langurs on an old banyan tree are there to welcome as one makes one's entry in the Ranthambhore National Park. India has such a vast variety of dazzling wildlife that one is reluctant to reveal a predilection but there is something special about Ranthambore National Park, best known for its tigers but many other mammals are also seen in abundance. Besides common langur, wild boar, spotted deer, Indian gazelle, sambhar and blue bull (nilgai), the park supports sizeable population of leopard, sloth bear, porcupine, caracal and score of other wild species. Bird life is profuse and colourful. Both passerine and non-passerine groups of avian diversity are seen in plenty. Peacocks strut everywhere and conoys of quails fly like blown leaves. Purple moorhen can be seen sulking among the reeds. Wetlands are the most favourable spots for watching shore and upland birds within the National Park. Trees are full of chirping birds and as the season changes the bird life also changes automatically with scores of migratory species taking refuge during winter and making this place their roosting and staging ground.

Among the reptiles crocodiles can be seen in almost all big wetlands of the park along with turtles. Forest is thronged with lizards like *Varanus* and holes and crevices are full of snakes. Croaks of amphibians can be heard along the water bodies more prominently after rains. Almost all the water bodies at sometime or the other harbour fishes whereas perennial sources have vast assemblage of fresh water fishes in their impoundments.

The chirping of crickets or whistling of a cicada on a calm night indicates that park is certainly full of minute creatures invincible but plenty marking their presence in numerous ways.

The invertebrate faunal composition of species across the animal kingdom from protozoa to mollusca dominates every niche of the park. They are the part of unseen life support system of the national park. So far no studies have been conducted on this mega assemblage of animals.

In the present study, Zoological Survey of India made an attempt to document invertebrate and vertebrate faunal diversity. From protozoa to mammals all the faunal groups were either collected or recorded by field sightings. Entomo-faunal groups were collected at 15 selected sites within the core/buffer area of the National Park by using high luminous screen-light method for the first time (Fig. 4). High intensity luminous bulbs were operated by generator against the screen to attract entomo-faunal elements of the park. Sites were also selected to collect the diverse animal groups and species besides insects found in different habitat within the National Park. Avian species diversity was estimated by line transect method and point count

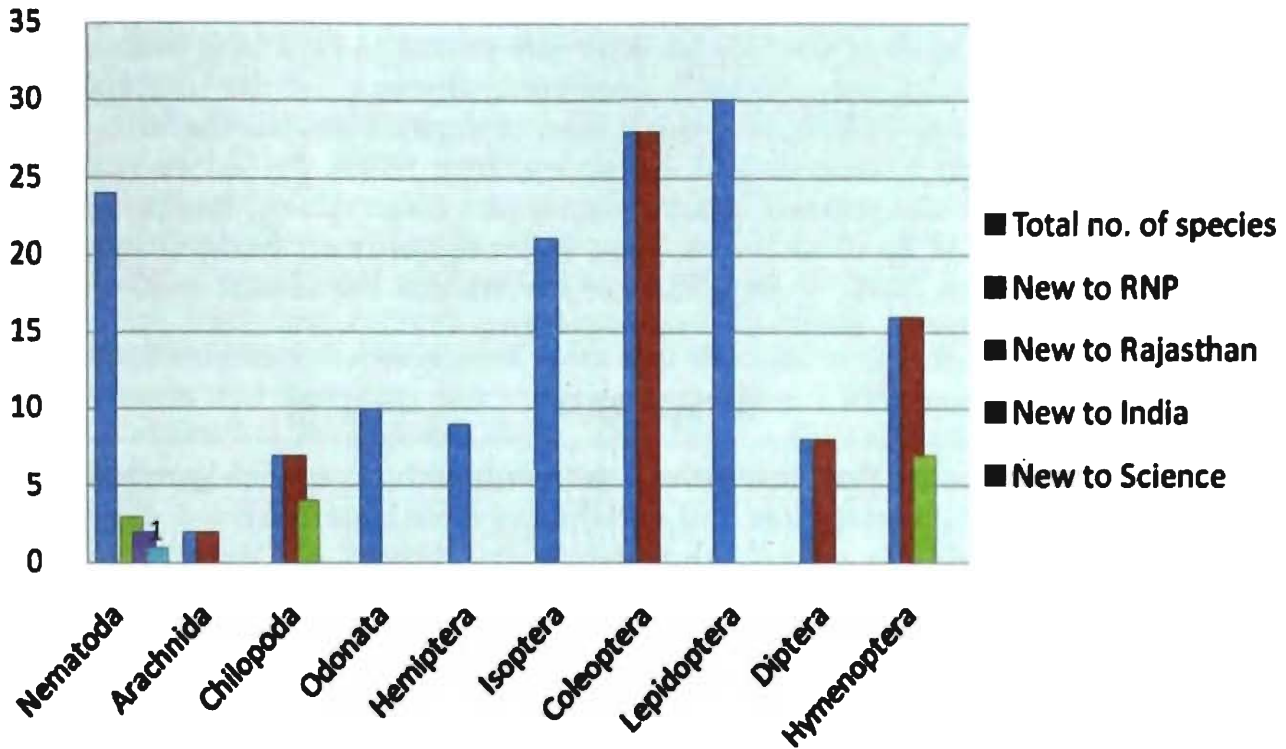
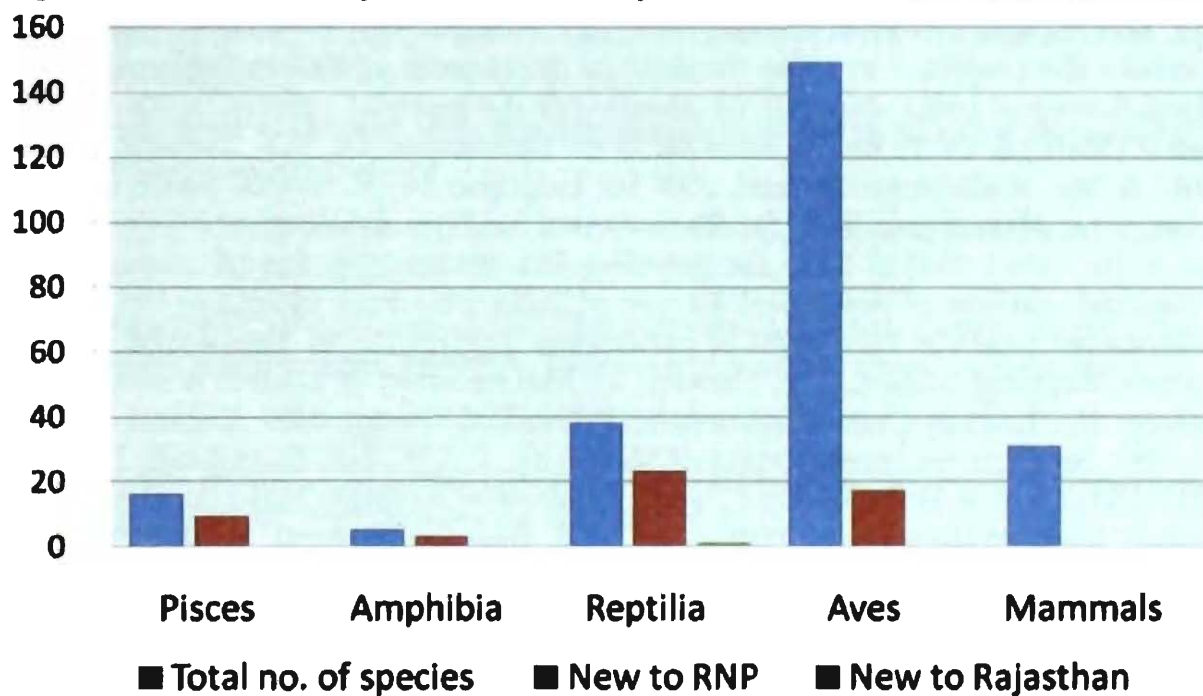
method. Soil samples were collected from suitable moist habitats to study the nematode fauna of the National Park. The pugmarks, fallen feathers, excreta, left-over of kills, bones were also collected to record the presence of animal in the park area and their presence in that habitat as interpreted. The vast assemblage of invertebrate faunal groups such as zooplankton, annelids, arachnids, other arthropods including entomofaunal groups and molluscs are still under the process of identification as far as possible except where group experts are not available. A total of 394 species of animals have been recorded in the present study from the Ranthambhore National Park (RNP) (Table 5). Among them 113 species are recorded for the first time from RNP, 15 species from Rajasthan, 2 species from India and 1 new to science.

Table 5. Summary of Faunal Species Recorded from Ranthambhore National Park.

Invertebrates		Vertebrates	
Order	Species No.	Order	Species No.
Soil and Plant Nematodes	24	Pisces	16
Arachnida : Scorpions	02	Amphibians	05
Chilopoda : Scolopendromorpha	07	Reptiles	38
Insecta : Isoptera	21	Aves	149
Insecta : Hemiptera	09	Mammals	31
Insecta : Odonata	10		
Insecta : Coleoptera : Scarabaeidae	28		
Insecta : Lepidoptera : Heterocera	30		
Insecta : Diptera	08		
Insecta : Hymenoptera : Formicidae	16		
Subtotal	155		239
Total	394		

Out of 584 species reported so far, 394 species have been recorded from RNP in the present study (Fig. 6 and Fig. 7). Among 155 species of invertebrates identified, 15 species are new to Rajasthan and 2 new to India, one species new to science. Nine species of fishes, three species of amphibians, seven species of lizards and sixteen species of snakes have been added to the existing known fauna on reptiles of RNP. One species of snake *Argyrogena fasciolatus* (Shaw) has been reported for the first time from Rajasthan by Rathore and Khandal (2005). Kumar and Sivaperuman (2005) have also recorded seventeen species of birds for the first time from RNP limits. Besides, large collection of invertebrates and fishes are under identification.

Among the important groups collected from the park area are zooplankton, annelids, arachnids, crustaceans, insects, molluscs, some 50-60 species of fresh water

Fig. 6. Faunal Diversity of Invertebrate Species of Ranthambhore National Park**Fig. 7. Faunal Diversity of Vertebrate Species of Ranthambhore National Park**

fishes and smaller mammals. Some 40 species of butterflies and 31 species of spiders have been identified by the scientist of Tiger Watch organization and will be included in the forthcoming publications on fauna of Ranthambhore National Park. Due to protection and conservation of the habitat, RNP has proved to be a land bank of rich germplasm. All the species are uniformly distributed through out the national park having habitat preference and sharing some kind of dependence on the niches of a specific nature especially grasslands and wetlands (Plates I-VII). Faunal elements are far and many but still unexplored. Apart from tiger conservation, Ranthambhore National Park as part of Ranthambhore Tiger Reserve needs attention of scientific organizations and State Govt. of Rajasthan to inventorize the faunal status of this protected area for its better health and management.

SUMMARY

Ranthambhore National Park has proved to be a land bank of rich germplasm. A total of 394 species of invertebrates and vertebrates have been recorded during the present study. All the species are uniformly distributed through out the national park having habitat preference and sharing some kind of dependence on the niches of a specific nature especially grasslands and wetlands. Faunal elements are far and many but still under explored and require further studies. Apart from tiger conservation Ranthambhore National Park as part of Ranthambhore Tiger Reserve needs attention of scientific organizations and State Govt. of Rajasthan to inventorize the faunal status of this protected area for its better health and management.

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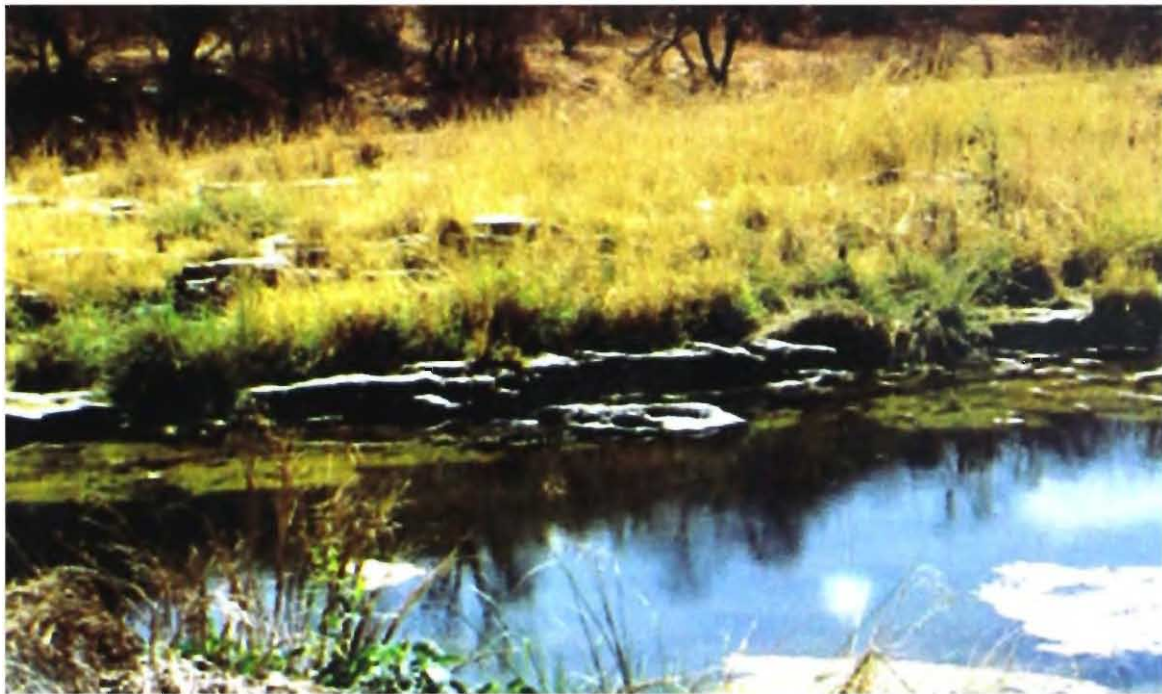
Cattle grazing at Ranthambhore core area



Flame of the Forest at Ranthambhore



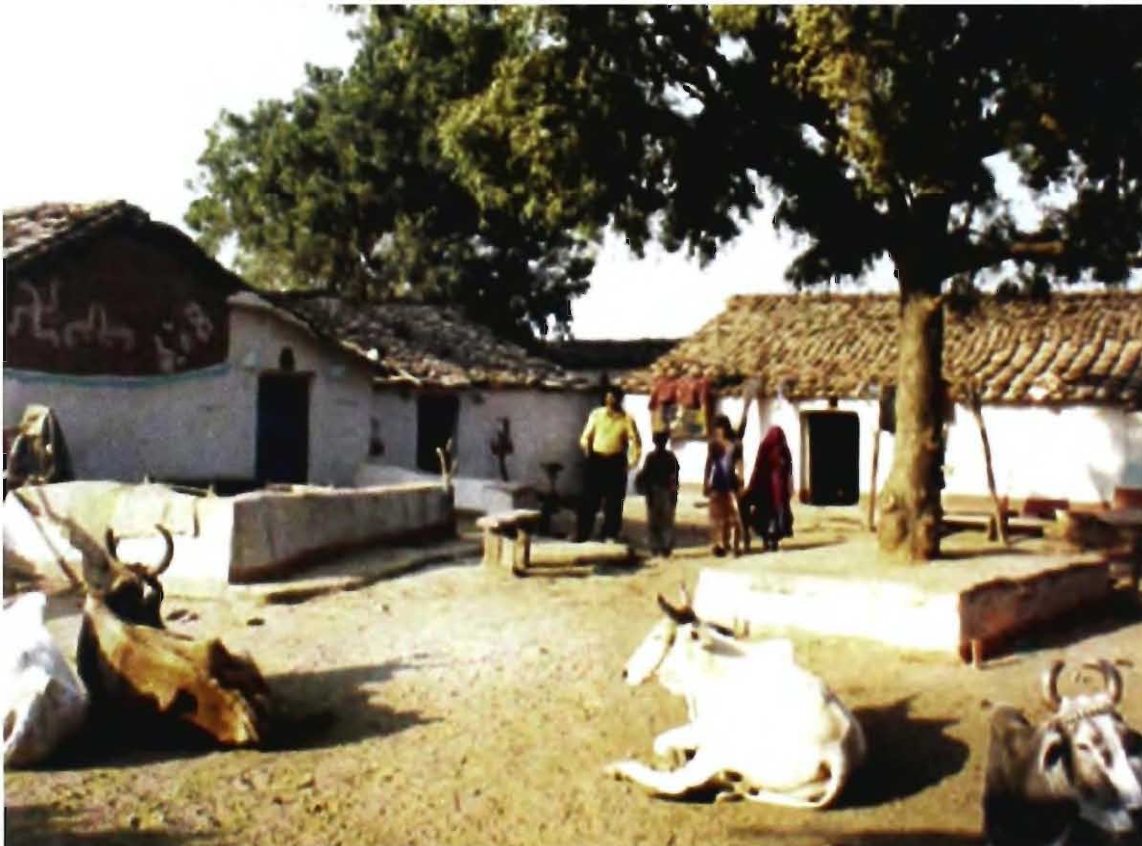
Sunset at Ranthambhore



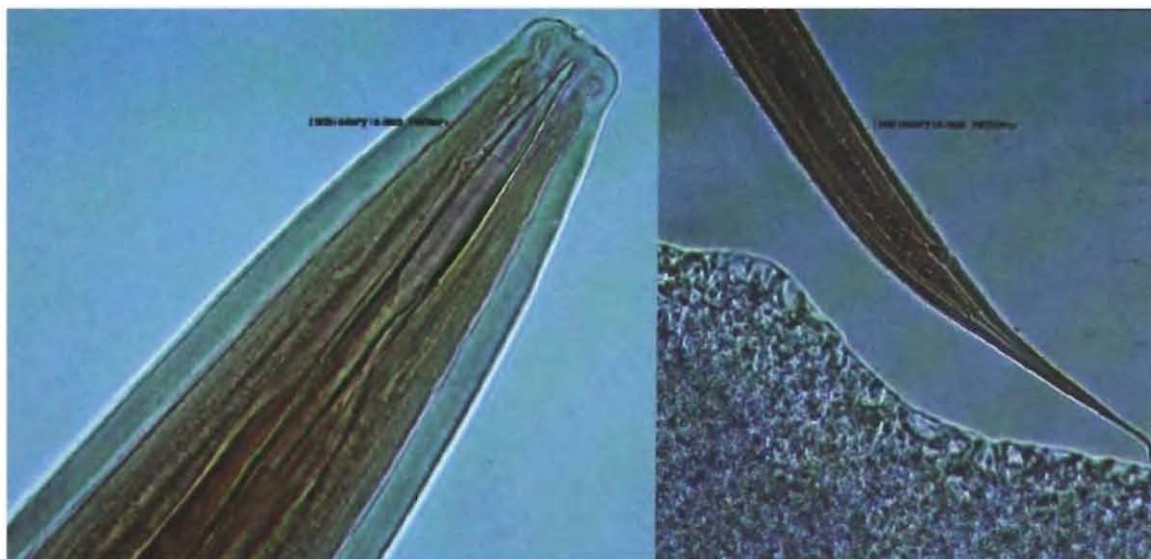
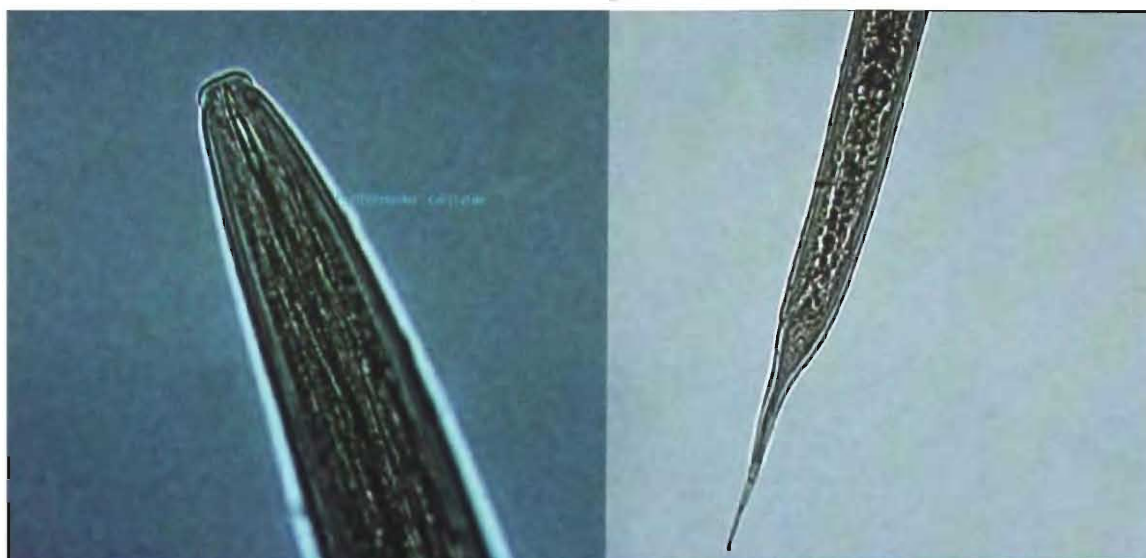
Wetland at Ranthambhore



Dhudhal Mal Ka Darra A Water hole at Ranthambhore



Village at Ranthambhore

***Ischiodorylaimus rathori******Prothorneneme capitatum******Crocothemis serilia******Trithemis aurora***

Invertebrate Fauna of Ranthambhore National Park



Scolopendra mersitans



1. *Mesobuthus tamulus indicus*
2. *Compsobithus acute carinatus rugosius*



Heliocoprion gigas



Hypolimnast bolina



Precis lemonias



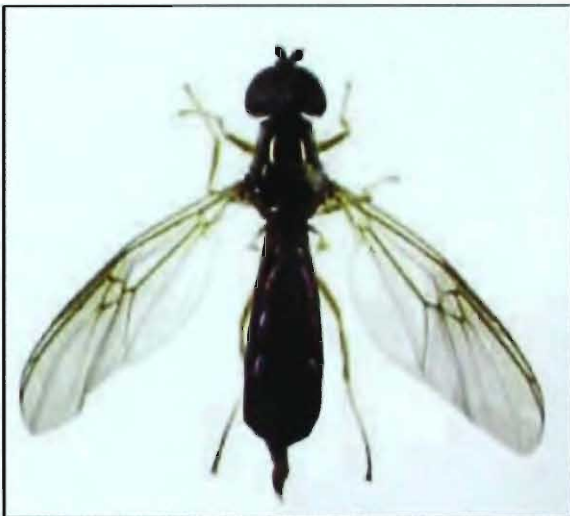
Precis lemonias



Eurema hecabe



Apis dorsata

Diptera of Ranthambhore National Park***Psychoda alternata******Clogmia albipunctata******Sargus metallinus******Tabanus (Tabanus) striatus******Anthrax distigma******Eristalinus arvorum***

Insect Fauna of Ranthambhore National Park



Copris repertus



Onthophagus catta



Dorylus (Typhlopone) labiatus



Anochetus taylori



Camponotus (tanaemyrmex) variegatus



Camponotus dichrous

Lepidoptera (Moth) Fauna of Ranthambhore National Park*Herse convolvuli convolvuli**Psilogramma menephron
menephron**Diaphania stolalis**Asota caricae**Mocis undata**Spirama retorta*

Amphibians and Reptiles of Ranthambhore National Park



Bufo melanostictus



Hoplobatrachus tigerinus



***Calotes versicolor* Juvenile and adult**



Mabuya macularia



Enhydrys seiboldi

Reptiles of Ranthambhore National Park



Hemidactylus leschenaulti



Ophisops microlepis



Crocodylus palustris

Avian Fauna of Ranthambhore National Park



Ardeola grayii



Ciconia episcopus



Vanellus indicus



Burhinus oedicnemus



Stema aurantia



Coracias benghalensis

Avian fauna of Ranthambhore National Park



Francolinus pondicerianus



Dendrocitta vagabunda



Otus bakkamoena



Psittacula krameri



Psittacula cyanocephala



Streptopelia chinensis



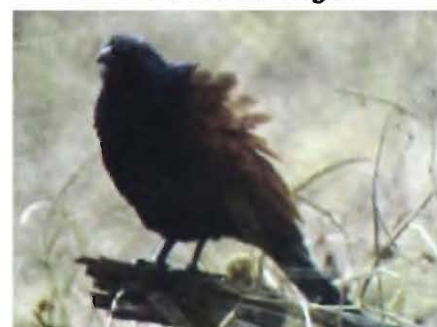
Turdoides striatus



Phalacrocorax niger



Halcyon smyrnensis



Centropus sinensis



Threskiornis melanocephalus



Casmerodius albus



Himantopus himantopus



Gallinago gallinago

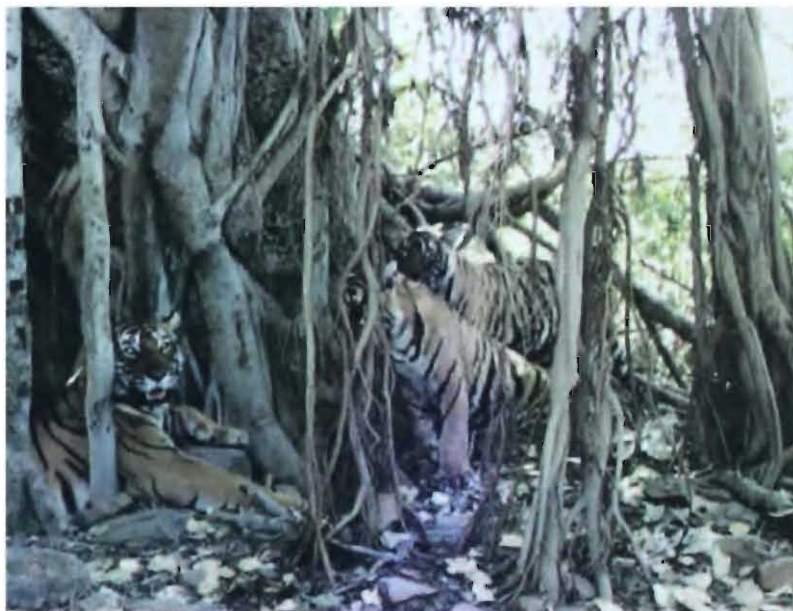


Pandion haliaetus



Ceryle rudis

A photo feature on Tiger – *Panthera tigris* in Ranthambhore National Park



Mammals of Ranthambhore National Park



Vulpes bengalensis



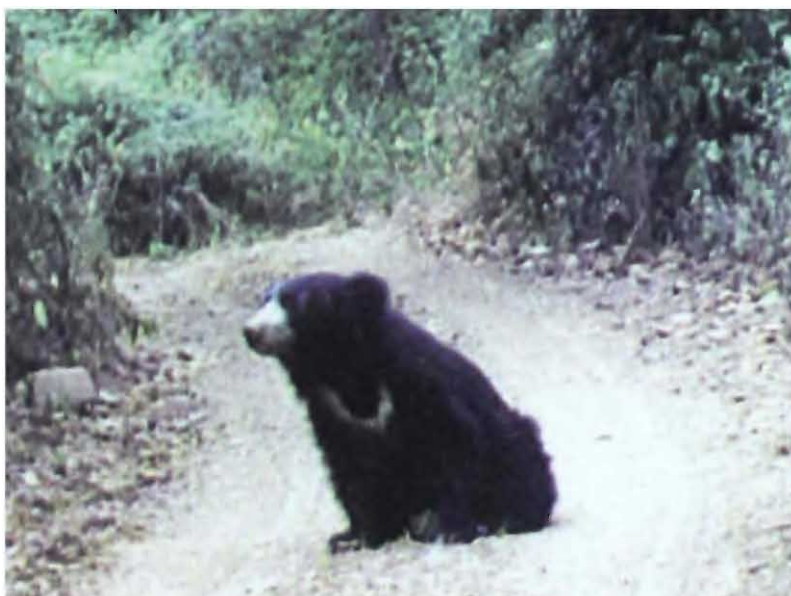
Felis chaus



Herpestes edwardsii



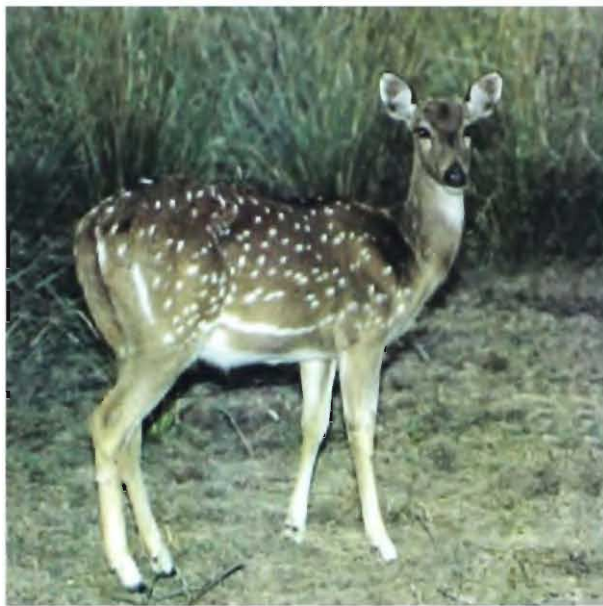
Paradoxurus hermaphroditus



Melursus ursinus



Suncus murinus

Mammals of Ranthambhore National Park*Sus scrofa**Semnopithecus entellus**Axis axis**Cervus unicolor**Boselaphus tragocamelus**Gazella bennettii*

PLANT AND SOIL NEMATODES

PADMA BOHRA AND QAISER H. BAQRI

Desert Regional Centre, Zoological Survey of India, Jodhpur

INTRODUCTION

Baqri and Bohra (2003), Bohra and Baqri (2005) have already published two papers reporting one new genus two new species from Ranthambhore National Park. The present paper report the species of plant and soil nematodes from soil samples collected by ZSI survey parties of Desert Regional Station, Jodhpur during 1999-2003 from Ranthambhore National Park, Rajasthan. These samples yielded 24 species belonging to 22 genera of 12 families under four orders *viz.*, Tylenchida, Aphelenchida, Dorylaimida and Mononchida. The brief descriptions, besides information on their hosts/habitats and localities are being provided below.

MATERIAL AND METHODS

Nematodes were fixed in hot 4% formalin and mounted in anhydrous glycerin. All the specimens included in the present study have been deposited and registered in National Zoological Collection of Zoological Survey of India, Jodhpur.

Order TYLENCHIDA Thorne, 1949

Family HOPLOLAIMIDAE, Filipjev, 1934 (Wieser, 1953)

1. *Hoplolaimus indicus* Sher, 1963

Material examined : 5 females, 2 males.

Measurement : Females (5) : L = 1.02-1.40 mm; a = 22-36; b = 7.5-9.7; c = 42-65; V = ¹⁰⁻¹¹52-57^{10 11}.

Males (2) : L = 0.94-1.30 mm; a = 26-36; b = 7.9-10.1; c = 31-38; T = 50-55.

Description : Female : Lip region hemispheroid, marked by 3 4 annules. Stylet robust, 30 34 µm long, basal knobs tulip shaped. Female reproductive system amphidelphic. Epiptygma single or double. Spermatheca filled with sperms. Tail with 8 13 annules.

Male : Spicules arcuate and cephalated, 37-48 µm long. Gubernaculum 12-20 µm long. Tail conoid. Bursa terminal.

Habitat and locality : Collected from soil around roots of unidentified grasses at Ranthambhore National Park, district Sawai madhopur, Rajasthan.

Order APHELENCHIDA Siddiqi, 1980

Family APHELENCHIDAE Fuchus, 1937 (Steiner, 1949)

2. *Aphelenchus avenae* Bastian, 1865

Material examined : 5 females, 2 males.

Measurements : Females (5) : L = 0.55-0.86 mm; a = 25-39; b = 4.9-6.9; c = 27-35; V = 74-78.

Males (2) : L = 0.63-0.81 mm; a = 27-33; b = 5.5-5.9; c = 24-29; T = 48-57

Description : Female : Lip region bluntly rounded to flattened, not offset from body marked with 3-4 faint annules. Lateral fields marked by 10-14 incisures. Stylet 10-12 μ m long, slightly thickened at base. Oesophagus typical of the genus. Reproductive system mono prodelphic. Post uterine sac reaching about half way from vulva to anus. Tail bluntly rounded, 16-33 μ m long, about 0.7-1.0 anal body width long.

Male : Spicules slender, 28-30 μ m long. Gubernaculum 14-16 μ m long. Tail conical and enveloped by a bursa.

Habitat and locality : Collected from soil around roots of unidentified grasses at Ranthambhore National Park, district Sawai madhopur, Rajasthan.

3. *Ischiodyrallaimus rathori* Bohra & Baqri, 2005

Material examined : 8 females, 5 males.

Measurements : Females (8) : L = 2.67-2.99 mm; a = 32.5-35.0; b = 4.5-4.8; c = 14.1-15.8; c' = 4.8-5.3; V = ¹⁶⁻¹⁷ 41-43 ¹⁹⁻²¹.

Males (5) : L = 2.37-2.55 mm; a = 30.5-36.5; b = 3.9-4.0; c = 75-84; c' = 0.65-0.77; T = 58-60.

Description : Females : Body slightly ventrally curved in posterior half upon fixation, tapering gradually towards both extremities. Lip region amalgamated marked with slight depression, flat at apex. Odontostyle 40-41 μ m long; its aperture 11-12 μ m. Guiding ring 18-19 μ m from anterior end. Odontophore 42-44 μ m long. Basal expanded part of oesophagus occupies 46-48 % of neck length. Vulva transverse slit. Reproductive system amphidelic. Prerectum 192-200 μ m or 5.0-5.2 anal body width long. Rectum 54-55 μ m or 1.3-1.5 anal body-width long. Tail 168-212 μ m elongate conoid with rounded terminus 4.4-5.3 anal body-width long, with two caudal pores on each side.

Male : Spicules 65-75 μ m long. Lateral guiding pieces 15-16 μ m long. The supplements consists of an adanal and 21-24 ventromedians. The ventromedian supplements are arranged in two fassicles while 3-4 irregularly spaced supplements

are present in between the two fassicles. Prerectum 397-427 μm or 9.2-9.7 anal body-width long. Tail 28-34 μm short bluntly rounded, 0.65-0.77 anal body width long, five caudal pores on each side.

Type Habitat and locality : Collected from soil around water body at Ranthambhore National Park, district Sawai madhopur, Rajasthan.

Remark : The detailed description of *Ischiodorylaimus rathori* new species has been published by the authors in 2005, from the brief description provided above is based on the types collected from the type locality (Ranthambhore National Park, district Sawai madhopur, Rajasthan).

Order DORYLAIMIDA Pearse, 1942

Family DORYLAIMIDAE De Man, 1876

4. *Mesodorylaimus mesonyctius* (Kreis, 1930) Andrassy, 1959

Material examined : 3 females, 2 males.

Measurement : Females (3) : L = 1.30-1.37 mm; a = 27-32; b = 4.8-5.4; c = 16-19; V = ^{11 12} 49-52^{11 12}

Males (2) : L = 1.23-1.25 mm; a = 27-28, b = 4.4-5.0; c = 44-45; T = 45-50.

Description : Female : Lip region marked by a constriction. Odontostyle 12 14 μm long, its aperture 3-4 μm . Odontophore 16 18 μm long. Guiding ring at 7-8 μm from anterior end. Basal portion of oesophagus 39 45% of oesophageal length. Prerectum 80-105 μm or 4.0-4.3 anal body width long. Tail 60-75 μm or 3.0-3.5 anal body width long.

Male : Spicules 38-43 μm long. Ventromedian supplements nine, spaced irregularly. Tail short, rounded conoid, 27-28 μm long or 0.9-1.2 anal body width long.

Habitat and locality : Collected from soil around roots of unidentified grasses at Ranthambhore National Park, district Sawai madhopur, Rajasthan.

5. *Laimydorus baldus* Baqri & Jana, 1982

Material examined : 5 females, 2 males.

Measurements : Females (5) : L = 2.11-2.44 mm; a = 34-36; b = 4.8-5.1; c = 10.8-11.8; V = ^{12 14} 43-48^{13 15}.

Males (2) : L = 2.37-2.41 mm; a = 33-35; b = 4.7-4.9; c = 115-118; T = 50-55.

Description : Female : Lip region marked by a depression from body. Odontostyle 24-25 μm long, aperture 42-46% of odontostyle length. Guiding ring 14-15 μm from anterior end. Odontophore 29-30 μm . Basal part of oesophagus occupies 46-52% of neck region. The 'Z' organs observed in middle of uteri. Tail elongate filiform, 190 224 μm or 7-8 anal body-width long.

Male : Spicules 53-55 μm long. Lateral guiding pieces rod shaped, 8-9 μm long. Prerectum 230 μm or 8 anal body width long. Supplements consist of an adanal pair and a series of 24 contiguous ventromedians. Tail bluntly rounded, 21-22 μm or 0.8 anal body-widths long.

Habitat and localities : Collected from soil around roots of unidentified grasses at Ranthambhore National Park, district Sawai madhopur, Rajasthan.

6. *Thornenema mauritanum* (Williams, 1959) Baqri & Jairajpuri, 1969

Material examined : 5 females.

Measurements : Females (5) : L = 1.02-1.65 mm; a = 26-36; b = 5.2-6.0; c = 6.3-7.1; V = 32-34^{10 13}.

Description : Female : Lip region rounded, narrower than body, marked by a slight depression, moderately sclerotized. Odontostyle 13-16 μm long, aperture 4-5 μm . Odontophore 22-25 μm . Basal expanded part of oesophagus occupies 38-46% of oesophageal length. Female reproductive system mono opisthodelphic. Tail filiform with smooth rounded terminus, 143-260 μm or 8-10 anal body width long.

Male : Not found.

Habitat and locality : Collected from soil around roots of unidentified grasses at Ranthambhore National Park, district Sawai madhopur, Rajasthan.

7. *Prothornenema capitatum* Baqri & Bohra, 2003

Material examined : 3 females, 2 males.

Measurements : Females (3) : L = 1.03-1.10 mm; a = 28-32, b = 5.7-5.8; c = 9.1-14.6; V = 15-15.8 46 42^{15.5-15.6}.

Males (2) : L = 1.03-1.11 mm; a = 32-33, b = 5.7-6.0; c = 54-58; T = 56-60.

Description : Female : Lip region cap like set off from the body constriction, with moderate labial and post labial sclerotization. Odontostyle 10-11 μm ; its aperture 4 μm or 30-36% odontophore length. Odontophore 12-13 μm long. Guiding ring 6-7 μm or one lip region width from anterior end. Basal expanded part of oesophagus 30-34% of neck region. Reproductive system amphidelphic. Prerectum 50-55 μm or 2.6-3.0 anal body width long. Tail elongate conoid to filiform 72-120 μm long 3.7- 8.1 anal body width long.

Male : Spicules 30 μm long or 1.5 times anal body width long. Lateral guiding pieces 6-7 μm long. Ventromedian supplements contiguous 15-17 in numbers. Prerectum 75-80 or 3.9-4.2 anal body width long. Tail 19 μm or about one anal body width long, short conoid with broadly rounded terminus.

Habitat & locality : Collected from soil around roots of lasora (*Cordia dichotoma*) in October 2000 at Ranthambhore National Park, district Sawai madhopur, Rajasthan.

Remarks : The detailed description of *Prothornenema capitatum* new genera and new species has been published by the authors in 2003, from the brief description provided above is based on the types collected from the type locality. (Ranthambhore National Park, district Sawai madhopur, Rajasthan).

8. *Sicaguttur sartum* Siddiqi, 1971

Material examined : 5 females.

Measurements : Females (5) : L = 1.09-1.97 mm; a = 23-30, b = 5.5-6.6; c = 6.1-6.4; V = $8^9 36-42^{9\ 11}$

Description : Female : Lip region rounded, narrower than adjoining body, marked by depression. Labial sclerotization prominent. Odontostyle 15-18 μ m, aperture 4-5 μ m. Odontophore 20-24 μ m. Basal expanded part of oesophagus 42-44% of oesophageal length. Prerectum 80-97 μ m or 2.0-2.5 anal body width long. Tail 177-305 or 4.2-6.7 anal body width long, tapering to an acute or subacute tip.

Male : Not found.

Habitat and locality : Collected from soil around roots of unidentified grasses at Ranthambhore National Park, district Sawai madhopur, Rajasthan.

Family APORCELAIMIDAE Heyns, 1965

9. *Aporcelaimellus heynsi* Baqri & Jairajpuri, 1968

Material examined : 5 females.

Measurements : Females (5) : L = 1.02-1.33 mm; a = 24-26; b = 3.0-4.6; c = 26-33; V = $10^{11} 50-53^{10\ 11}$

Description : Female : Lip region offset from body by constriction. Lips separate, subangular. Odontostyle 13-15 μ m long, aperture 9 10 μ m. Odontophore 18-20 μ m long. Guiding ring 6-7 μ m from anterior end. Basal expanded portion of oesophagus occupies 50-53% of neck region. Tail conoid with rounded terminus, 38-40 μ m long or 1.5-1.6 anal body width long.

Male : Not found.

Habitat and locality : Collected from soil around roots of unidentified grasses at Ranthombore National Park, district Sawai madhopur, Rajasthan.

Family QUADSIANEMATIDAE Jairajpuri, 1965

10. *Eudorylaimus chauhani* (Baqri & Khera, 1975) Andrassy, 1986

Material examined : 3 females.

Measurements : Females (3) : L = 1.29-1.75 mm; a = 21-24; b = 4.0-5.0; c = 33-40; V = $9^8 48-53^{10-11}$

Description : Female : Body slightly ventrally curved upon fixation. Lips region set off by constriction, slightly wider than adjoining body. Odontostyle 14-18 μm long; aperture 4-5 μm 27-28% of the odontostyle length. Guiding ring 6-7 μm long from anterior end. Odontophore 33-36 μm long Basal expanded part of oesophagus occupies 40-50% of neck region. Female reproductive system amphidelphic. Tail dorsally convex conoid, 38-43 μm or 0.8-0.9 anal body width long, with acute terminus.

Male : Not found.

Habitat and locality : Collected from soil around roots of unidentified grasses at Ranthambhore National Park, district Sawai madhopur, Rajasthan.

11. *Ecumenicus monohystera* (deMan, 1880) Thorne, 1974

Material examined : 3 females.

Measurements : Females (3) : L = 1.07-1.64 mm; a = 27-30; b = 5.0-5.7; c = 35-43; V = 36-38^{7 11}

Description : Female : Lips set off. Odontostyle 12-15 μm long; aperture 3-4 μm . Guiding ring 6-7 μm long. Basal expanded part of oesophagus occupies 41-42% of neck region. Female reproductive system mono opisthodelphic. Tail convex conoid, 30-38 μm or 1.6-1.7 anal body width long.

Male : Not found.

Habitat and locality : Collected from soil around roots of unidentified grasses at Ranthambhore National Park, district Sawai madhopur, Rajasthan.

12. *Discolaimus major* Thorne, 1939

Material examined : 5 females.

Measurements : Females (5) : L = 1.4-2.63 mm; a = 32-36; b = 3.9-4.5; c = 46-58; V = ^{11 12}47-48^{11 12}

Description : Female : Lip region discoid. Lateral hypodermal chords with well developed 70-80 glandular bodies. Odontostyle 22-25 μm long; aperture 50-52% of odontostyle length. Guiding ring single. Odontophore 30 35 μm long. Basal expanded part of oesophagus occupies 50-55% of oesophageal length and surrounded by a conspicuous muscular sheath. Female reproductive system amphidelphic. Tail 30-35 μm or 1.2-1.5 anal body width long, conoid.

Male : Not found.

Habitat and locality : Collected from soil around roots of unidentified grasses at Ranthambhore National Park, district Sawai madhopur, Rajasthan.

13. *Discolaimium mukhtarpuriense* Baqri & Jairajpuri, 1969

Material examined : 3 females.

Measurements : Females (3) : L = 0.80-0.87 mm; a = 25-32; b = 3.8-4.2; c = 28-29; V = $^{10}1153-55^{10}11$

Description : Female : Lip region set off. Lateral chords with well developed, 60 glandular bodies. Odontostyle 14-16 μ m long; its aperture 5-6 μ m. Guiding ring single. Odontophore 15-17 μ m long. Basal expanded part of oesophagus occupies 33-36% of neck region. Female Reproductive system amphidelphic. Tail 28-30 μ m or 1.2 anal body width long, convex conoid, with a rounded terminus.

Male : Not found.

Habitat and locality : Collected from soil around roots of unidentified grasses at Ranthambhore National Park, district Sawai madhopur, Rajasthan.

14. *Discolaimoides bulbiferus* (Cobb, 1906) Heyns, 1963

Material examined : 5 females.

Measurements : Females (5) : L = 1.40-1.65 mm; a = 46-55; b = 4.0-5.2; c = 35-36; V = $^81045-53^810$

Description : Female : Lip region expanded, offset by constriction. Lateral glandular bodies 80-90 in entire length. Odontostyle 15-17 μ m long; aperture about half of odontostyle length. Odontophore 22-25 μ m long. Basal expanded part of oesophagus occupies 52-56% of oesophageal length. Female reproductive system amphidelphic. Tail 40-45 μ m or 1.8 anal body width long, conoid with rounded terminus.

Male : Not found.

Habitat and locality : Collected from soil around roots of unidentified grasses at Ranthambhore National Park, district Sawai madhopur, Rajasthan.

15. *Latocephalus conicaudatus* Baqri & Bohra, 2003

Material examined : 3 females.

Measurements : Female (3) : L = 1.85-2.07 mm; a = 61.9-62.8; b = 5.4-5.9; c = 38-40; V = $^{0.81-0.86}34-35^{6.2-6.3}$

Description : Female : Lip region set off by constriction wider than adjoining body; Odontostyle 12 μ m long its aperture 5.7 μ m. Odontophore rod-like, 22-23 μ m long. Guiding ring 5-6 μ m from anterior end. Basal expanded part of oesophagus occupies 52-54% of neck region. Female reproductive system mono opisthodelphic. Anterior uterine sac 15-16 μ m about 43-50% of corresponding body-width long. Prerectum about 35-36 μ m or 1.5 anal body width long. Tail 50-52 μ m convex-conoid with rounded tip, about 2.2 anal body width long, with two caudal pore on each side.

Male : Not found.

Habitat and locality : Collected from soil around roots of lasora (*Cordia dichotoma*) at Ranthambhore National Park, district Sawai madhopur, Rajasthan.

Remark : The detailed description of *Latocephalus conicaudatus* new species has been published by the authors in 2003, from the brief description provided above is based on the types collected from the type locality. (Ranthambhore National Park, district Sawai madhopur, Rajasthan).

Family NORDIIDAE Jairajpuri and A. H. Siddiqi, 1964

16. *Kochinema farodai* Baqri & Bohra, 2001

Material examined : 5 females.

Measurements : Females (5) : L = 0.96-1.08 mm; a = 29-32; b = 4.1-4.5; c = 30-33; V = ^{10 11}52-54^{10 11}

Description : Female : Lip region distinctly off set from body, wider than adjoining body. Odontostyle 17-19 µm long. Odontophore 19-22 µm long, rod like. Guiding ring 10-11 µm from anterior end. Expanded part of oesophagus occupies 41-44% of the neck length. Female reproductive system amphidelphic. Tail 32-35 µm long, 1.4-1.6 anal body width, convex conoid with rounded terminus.

Male : Not found.

Habitat and locality : Collected from soil around roots of unidentified grasses at Ranthambhore National Park, district Sawai madhopur, Rajasthan.

17. *Kochinema caudatum* Baqri & Bohra, 2001

Material examined : 2 females.

Measurements : Females (2) : L = 0.81-0.95 mm; a = 25-30; b = 3.7-4.2; c = 24-27; V = ^{12 13}54-57^{12 13}

Description : Female : Lip region offset from body, wider than adjoining body. Odontostyle 36-38 µm long. Odontophore 30-32 µm long. Guiding ring 28-30 µm. Basal expanded part of oesophagus occupies 37-40% of oesophageal length. Female reproductive system amphidelphic. Tail 32-35 µm long, conoid with rounded tip, 1.6-1.7 anal body width long.

Male : Not found.

Habitat and locality : Collected from soil around roots of unidentified grasses at Ranthambhore National Park, district Sawai madhopur, Rajasthan.

Family LONGIDORIDAE Thorne, 1935

18. *Longidorus pisi* Edward, Mishra & Singh, 1964

Material examined : 2 females.

Measurements : Females (2) : L = 2.79-3.12 mm; a = '111-115; b = 10-11; c = 91-93; V = ^{7 8}53-54^{7 8}

Description : Female : Body long and slender, open c shaped upon fixation. Lip region flattened anteriorly. Amphids large, pouch like. Odontostyle 60-62 μm long. Odontophore 37-38 μm long. Guiding ring 30-32 μm from anterior end. Prerectum 150-152 or about 8.8 anal body width long. Tail dorsally convex, ventrally flattened or very slightly concave, 30-34 μm or about 2.0 anal body width long, with roundly conoid terminus.

Male : Not found.

Habitat and locality : Collected from soil around roots of unidentified grasses at Ranthambhore National Park, district Sawai madhopur, Rajasthan.

Remarks : This species is being reported as a new record from the state.

Family XIPHINEMATIDAE Dalmasso, 1969

19. *Xiphinema orbum* Siddiqi, 1963

Material examined : 1 female.

Measurements : Females (1) : L = 2.73 mm; a = 68; b = 6.9; c = 47; V = 31^{10}

Description : Female : Lip region rounded, distinctly set off from body. Odontostyle 90 μm long. Odontophore 59 μm long. Guiding ring at 80 μm or about 8 lip region width from anterior end. Basal expanded part of oesophagus 20% of neck length. Female reproductive system amphidelphic, but the anterior genital branch and the ovary is greatly reduced. Prerectum 69 μm or 2.8 anal body width long. Tail elongate conoid, 57 μm or 2.3 anal body width long.

Male : Not found.

Habitat and locality : Collected from soil around roots of unidentified grasses at Ranthambhore National Park, district Sawai madhopur, Rajasthan.

Remarks : This species is being reported as a new record from the state.

Family TYLENCHOLAIMIDAE Filipjev, 1934

20. *Tylencholaimus nagaurensis* Baqri & Bohra, 2001

Material examined : 3 females.

Measurements : Females (3) : L = 0.64-0.74 mm; a = 19-22; b = 3.6-4.0; c = 32-33; V = $19^{20}64-67$.

Description : Female : Lip region cap like, off set from body by a constriction, twice as wide as high. Lips amalgamated with their inner parts elevated forming a marked perioral disc. Odontostyle 8-9 μm long. Odontophore 10-11 μm , with small basal thickenings. Basal expanded portion of oesophagus 37-39% of neck region. Female reproductive system mono prodelphic. Prerectum 40-42 μm or about 2.2-2.5 anal body width long. Rectum 20-22 μm or about one anal body width long. Tail convex conoid with rounded terminus, 20-22 μm or about 1.0-1.2 anal body-width long.

Male : Not found.

Habitat and locality : Collected from soil around roots of unidentified grasses at Ranthambhore National Park, district Sawai madhopur, Rajasthan.

21. *Tylencholaimus paracrassus* Monteiro, 1970

Material examined : 1 female.

Measurements : Females (1) : L = 0.57 mm a = 25; b = 3.6; c = 30; V = ¹⁴59¹⁴

Description : Female : Body selender lip region off set by a deep constriction. Odontostyle 9 µm long, aperture 1/3 of odontostyle length. Odontophore 10 µm long, with basal swelling. Basal expanded portion of oesophagus 50% of neck length. Female Reproductive system amphidelphic. Prerectum 68 µm or 3.5 anal body-width long. Tail convex-conoid with rounded terminus 19 µm long or 1.1 anal body width long.

Male : Not found.

Habitat and locality : Collected from soil around roots of unidentified grasses at Ranthambhore National Park, district Sawai madhopur, Rajasthan.

Remarks : This species is being reported as a new record from the state.

Family LEPTONCHIDAE, Thorne, 1935

22. *Leptonchus granulatus* Cobb, 1920

Material examined : 4 females.

Measurements : Females (4) : L = 0.9-1.14 mm; a = 24-30; b = 5-6; c = 57; V = ⁶59-60⁶ ⁹

Description : Female : Body almost straight upon fixation. Lip region set off by constriction, lips and papillae distinct. Labial framework prominent. Odontostyle 9-10 µm long, with narrow lumen and small aperture. Odontophore 10-12 µm long, arcuate. Basal pyriform bulb which occupies 18-25% of neck region. Female reproductive system amphidelphic. Intestine prerectum junction located anterior to vulva, prerectum 420-450 µm or 16-21 anal body width long. Tail bluntly conoid, 17-20 µm or one anal body width long.

Male : Not found.

Habitat and locality : Collected from soil around roots of unidentified grasses at Ranthambhore National Park, district Sawai madhopur, Rajasthan.

Family NYGOLAIMIDAE Thorne, 1935

23. *Aquatides aquaticus* (Thorne, 1930) Thorne, 1974

Material examined : 5 females.

Measurements : Females (5) : L = 1.80-2.06 mm; a = 39-42; b = 5.0-5.2; c = 81-82; V = ¹³ ¹⁴47-52¹³ ¹⁵

Description : Female : Body almost straight upon fixation. Lip region continuous with body, labial papillae elevated. Tooth linear, 15-18 μm or equal to lip region width. Basal expanded part of oesophagus occupies 45-48% of oesophageal length, enclosed in a conspicuous sheath forming basal pockets. Cardiac glands well developed. Female reproductive system amphidelphic. Prerectum 65-75 μm or 2-3 anal body width long. Tail 22-25 μm long, shorter than anal body width, convex conoid or bluntly rounded.

Male : Not found.

Habitat and locality : Collected from soil around roots of unidentified grasses at Ranthambhore National Park, district Sawai madhopur, Rajasthan.

Remarks : This species is being reported as a new record from the state.

Order MONONCHIDA Jairajpuri, 1969

Family MYLONCHULIDAE Jairajpuri, 1969

24. *Mylonchulus minor* (Cobb, 1893) Andrassy, 1958

Material examined : 2 females.

Measurements : Females (2) : L = 1.06-1.14 mm; a = 31; b = 3.0; c = 29-31; V = 7-8 57-64⁷⁻⁸

Description : Female : Lip region 20-21 x 5-6 μm . Amphidial apertures 3-4 μm wide, located at 8-9 μm from anterior end. Buccal cavity 23-25 x 14-15 μm . Dorsal tooth situated in anterior half of buccal cavity, its apex at 17-18 μm or 72-73% of the buccal cavity from base. Subventral walls with 5-6 transverse rows of denticles. Submedian teeth present. Reproductive system amphidelphic. Tail arcuate conoid with rounded terminus, 36 μm or 1.4-1.6 anal body width long. Caudal glands tandem. Spinneret terminal.

Male : Not found.

Habitat & locality : Collected from soil around roots of unidentified grasses at Ranthambhore National Park, district Sawai madhopur, Rajasthan.

SUMMARY

The soil samples brought by the ZSI tour parties from Ranthambhore National Park, district Sawai madhopur, Rajasthan yielded the following 24 species of plant and soil nematodes : *Hoplolaimus indicus* Sher, 1963; *Aphelenchus avenae* Bastian, 1865; *Ischiodorylaimus rathori* Bohra & Baqri, 2005; *Mesodorylaimus mesonyctius* (Kreis, 1930) Andrassy, 1959; *Laimydorus baldus* Baqri & Jana, 1982; *Thornenema mauritianum* (Williams, 1959) Baqri & Jairajpuri, 1967; *Prothornenema capitatum* Baqri & Bohra, 2003; *Sicaguttur sartum* Siddiqi, 1971; *Aporcelaimellus heynsi* Baqri & Jairajpuri, 1968; *Eudorylaimus chauhani* (Baqri & Khera, 1975) Andrassy, 1986; *Ecumenicus monohystera* (deMan, 1880) Thorne, 1974; *Discolaimus major* Thorne, 1939; *Discolaimium mukhtarpuriense* Baqri & Jairajpuri, 1969; *Discolaimoides*

bulbiferus (Cobb, 1906) Heyns, 1963; *Latocephalus conicaudatus* Baqri & Bohra, 2003; *Kochinema farodai* Baqri & Bohra, 2001; *Kochinema caudatum* Baqri & Bohra, 2001; *Longidorus pisi* Edward, Misra & Singh, 1964; *Xiphinema orbum* Siddiqi, 1963; *Tylencholaimus nagauriensis* Baqri & Bohra, 2001; *Tylencholaimus paracrassus* Monteiro, 1970; *Leptonchus granulosus* Cobb, 1920; *Aquatides aquaticus* (Thorne, 1930) Thorne, 1974; *Mylonchulus minor* (Cobb, 1893) Andrassy, 1958. *Longidorus pisi* Edward, Misra & Singh; *Tylencholaimus paracrassus* Monteiro, 1970 and *Aquatides aquaticus* (Thorne, 1930) Thorne, 1974 are being recorded for the first time from the Rajasthan state.

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ARACHNIDA : SCORPION

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INTRODUCTION

The Scorpion fauna of India including Rajasthan has been worked out by Tikader and Bastawade (1983). Scorpions are represented in India by five families. Out of these, three families viz. Buthidae, Ischnuridae and Scorpionidae have been reported from Rajasthan. Whereas, family Chaerilidae and Scorpionsinidae (=Vaejovidae) have not been reported so far from the State Bastawade (2004).

This manuscript includes two species of scorpions belonging to sub-family Buthinae of family Buthidae. All the specimens were collected from under the stones from different moist habitat within the protected area of the national park. Both the species are confined to the state of Rajasthan. Two species belonging to two genera and one family under one order are recorded from Ranthambhore National Park, Sawai Madhopur, Rajasthan.

SYSTEMATIC ACCOUNT

Phylum ARTHROPODA

Class ARACHNIDA

Order SCORPIONIDA

Family BUTHIDAE

Sub Family BUTHINAE

Genus *Campsobuthus* Vachor

1. *Campsobuthus acute-carinatus rugosulus* (Pocock)

Genus *Mesobuthus* Vachor

2. *Mesobuthus tamulus indicus* (Pocock)

Distinguishing characters of family BUTHIDAE

Legs furnished with a single pedal spur.

Dorsal arm of movable finger of chelicerae furnished with four minute teeth on inner margin. Sternum generally triangular and narrowed in front
..... Family BUTHIDAE

III and IV pair of legs always furnished with a tibial spur
 Subfamily BUTHINAE

Key to the genera of subfamily Buthinae

1. Pedipalp tarsus provided always with four linear distal granules just proximal to terminal tooth 2
- Pedipalp tarsus provided with three or four non-linear granules or a row of distal granules just proximal to terminal 3
2. Posterior median carinae of carapace joining with central median carinae and forming a single straight carinae, strongly spiniform posteriorly. Inferior lateral carinae of V caudal segment evenly granular Genus **Campsobuthus**
3. Lateral carinae of carapace very weak sometimes not developed. Posterior median and central median carinae forming a lyre form configuration, pedipalp tarsus always furnished with four non linear granules just proximal to terminal tooth, ventral surface of vesicle granular and always provided with a subaculear nodule Genus **Mesobuthus**

Family BUTHIDAE

Subfamily BUTHINAE

Genus **Campsobuthus** Vachor

Campsobuthus acute-carinatus rugosulus (Pocock)

1900. *Buthus acute-carinatus rugosulus* (Pocock), *Fauna British India, Arachn.*, 20-21.

Material examined : 1 Male, 28.xi. 2002, Indala, Reg. : 10398/5-7854/A; 1 Male, 14.x.2003, Indala, Reg. : 723/6-7857/A, coll. S. Kumar.

Distribution : India : Rajasthan, Gujarat, Madhya Pradesh.

Genus **Mesobuthus** Vachor

Mesobuthus tamulus indicus (Pocock)

1900. *Buthus tamulus indicus* (Pocock), *Fauna British India, Arachn.*, 25.

Material examined : 1 Female, 30.x.2001, Fakiri Talab, Reg. : 8414/5-7852/A, coll. N.S. Rathore & R. Sewak; 1 Female, 28.xi.2002, Indala, Reg. : 10398/5-7853/A; 1 Female, 10.x.2003, Malik Talab, Reg.: 626/6-7855/A; 1 Female (immature), 13.x.2003, Galai sagar, Reg. : 705/6-7856/A; 1 Female, 14.x.2003, Raj Bagh Talab, Reg. : 756/6-7858/A, coll. S. Kumar.

Distribution : India : Rajasthan.

SUMMARY

Two species viz. *Campsobuthus acute-carinatus rugosulus* (Pocock) and *Mesobuthus tamulus indicus* (Pocock) belonging to one family under one order are new records from Ranthambhore National Park.

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CHILOPODA : SCOLOPENDROMORPHA

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INTRODUCTION

The present paper deals with a very small collection of Scolopendrid centipedes collected by the scientists of Desert Regional Station, Zoological Survey of India, Jodhpur from Ranthambhore National Park, Rajasthan. On identification the collection was found referable to seven species viz. *Scolopendra morsitans* Linnaeus, *Cormocephalus westwoodi dispar* Porath (Tribe SCOLOPENDRINI); *Asanada brevicornis* Meinert (Tribe ASANADINI); *Rhysida nuda immarginata* (Porath) and *Otostigmus burn-murdochi* Gravely (Tribe OTOSTIGMINAE) of the subfamily Scolopendridae and 3 damaged specimens (2 spp.) of the genus *Cryptops* (Family CRYPTOPIDAE), which are beyond identification. Out of these seven species *Cormocephalus westwoodi dispar* Porath, *Otostigmus burn-murdochi* Gravely and *Cryptops* spp. are new additions to the centipede fauna of Rajasthan. However, all the species inventorized here comprises a first record for the fauna of the Ranthambhore National Park.

The centipedes are multisegmented arthropods bearing one pair of legs per segment and 21-23 body segments (23, only in the genus *Scolopendropsis*) belong to the Order Scolopendromorpha of the Class Chilopoda. Not widely divergent in morphological characters the Scolopendrid centipedes have till recently been divided into two families on the basis of the presence or absence of the ocelli on their cephalic plates. Members of the family Scolopendridae (with two subfamilies Scolopendrinae and Otostigminae, based on the shape of spiracles) bear four ocelli on each side of the cephalic plate while the members of the family Cryptopidae (with three subfamilies Cryptopinae, Theatopsinae, based on the size of the anal leg prefemur; and Scolopocryptopinae, bearing 23 pair of legs) are blind and do not bear ocelli.

Lewis (2006) created a third new monogeneric family Mimopidae, which is characterized by the possession of a single ocellus on each side of the head plate, fascicular plates without teeth, 21 pairs of legs and the ultimate legs with numerous small spines and included the genus *Mimops* Kraepelin, 1903, which was hitherto ranked and placed under the sub family Cryptopinae by Attems (1930).

Khanna (1977 a, b; 2005, 2007 and 2008 a). Vazirani and Khanna (1976 & 1977) have documented the centipede fauna of the Rajasthan state. The names of the species documented here are in accordance with their latest status assigned by Khanna (2008

b). The total number of the known species from Rajasthan was eleven, which with present studies has been raised to thirteen, as listed below :

1. *Scolopendra morsitans* Linn**
2. *Scolopendra amazonica* (Bucherl)**
3. *Scolopendra indiae* (Chamberlin)
4. *Scolopendra mirabilis* (Porath)
5. *Cormocephalus pygmaeus* Pocock
6. **Cormocephalus westwoodi dispar* Porath**
7. *Asanada indica* Jangi and Dass
8. *Asanada brevicornis* Meinert**
9. **Otostigmus burn-murdochi* Gravely**
10. *Rhysida nuda immarginata* (Porath)**
11. **Cryptops* sp. 1**
12. **Cryptops* sp. 2**
13. *Paracryptops indicus*

**First Record from Ranthambhore National Park.

*New records from Rajasthan.

SYSTEMATIC ACCOUNT

Class CHILOPODA

Order SCOLOPENDROMORPHA

Family SCOLOPENDRIDAE

Tribe SCOLOPENDRINI

1893. Subfamily Scolopendrinae + Scolopendropsinae. Bollman. *Bull. USNat. Mus.*, **46** : 165.
1914. Scolopendridae. Attems. *Arch. Naturges.*, 80A-4 : 101.
1906. Scolopendrinae. Verhoel T. *Acta Ac, Leop.*, **86** : 435.
1926. Scolopendrini. Attems. in Kukenthal and Krumbach. *Handbook. Zool.*, **4** : 373.

1. *Scolopendra morsitans* Linnaeus, 1758

1758. *Scolopendra morsitans* Linnaeus. *Syst. Xa.*, Ed. **10** : 38.
1903. *Scolopendra morsitans*. Kraepelin. *Mitt. Mus., Hamburg*, **20** : 250.
1977. *Trachycormocephalus jodhpurensis*. Khanna. *Orient. Ins.*, **11**(1) : 151-156. Type Locality : India.

Distribution : India : Assam, Arunachal Pradesh, Andhra Pradesh, A & N Islands., Bihar, Bengal, Delhi, Gujarat, Himachal Pradesh, Haryana, Jammu and Kashmir, Karnataka, Kerala, Maharashtra, Madhya Pradesh, Meghalaya, Manipur, Mizoram, Nagaland, Orissa, Punjab, Rajasthan, Tamilnadu, Tripura, Sikkim, Uttar Pradesh and Uttranchal.

Material examined : Raj Bag Talab. 8.xi.2000, 2 exs. (Reg. 8384/5) Dhudhal Mal Ka Darra; 7.iv.2001, 1 ex. (Reg. 8484/5). Coll. N.S. Rathore; Bagdha water point, 23.xi.2002, 2 exs. (R. No. 10251/5), Coll. Sanjeev Kumar.

Remarks : A very common cosmopolitan species.

Zoogeographical Distribution : In all tropical and temperate zones of the world.

2. *Cormocephalus westwoodi dispar* Porath, 1872

1872. *Cormocephalus dispar*, Porath. *Ofv. Ak. Forh.*, **28** : 1155.

1930. *Cormocephalus (Cormocephalus) westwoodi dispar*, Attems. *Das Tierr., Scolopendromorpha*, **54**(2) : 79.

Distribution : India : Gujarat, Maharashtra.

Elsewhere : South Africa, Transvaal, Natal, Zimbabwe, Madagascar and Sri Lanka (Ethiopian).

Material examined : Mansarovar, 31.iii.2001, 1 ex. (Reg. 8462/5), Coll. N.S. Rathore.

Remarks : Khanna (2001) in his checklist of the Indian species reported this species for the first time from India from the coastal area of Gujarat state. This is the subsequent and first record from Rajasthan from the National Park.

Tribe ASANADINI

1907. Asanadidae, Verhoeff, *Bronn. K.L. Ordng.*, **5** ii : 263.

1914. Asanadini, Attems, *Arch. Naturgesch.*, **8A** **4** : 102.

1930. Asanadini, Attems. *das Tierr.. Scolopendromorpha*, **54**(2) : 121.

3. *Asanada brevicornis* Meinert, 1886

1886. *Asanada brevicornis*. Meinert, *P. Amer. Phil Soc.*, **23** : 189. Type Locality : Kullu (H.P.).

Distribution : India : A & N Isl., Delhi, Haryana, Himachal Pradesh, Gujarat, Rajasthan and Maharashtra.

Elsewhere : Myanmar, Reef Island. New Guinea (Morocco), (Oriental, Ethiopian and Indo-Malayan extending to Australia).

Material examined : Bagdha Water point. 23.xi.2002, 2 exs. (Reg. 10251/5), Coll. Sanjeev Kumar.

Remarks : Another very common species in Aravallis but a first record from Ranthambhore National Park.

Subfamily OTOSTIGMINAE

1903. Otostigminae. Kraepelin. *Mitt. Mus.*, Hamburg., **20** : 29, 64.

1930. Otostigminae, Attems, *Das Tierr.*, *Scolopendromorpha*, **54**(2): 127.

4. *Otostigmus burn-murdochi* Gravely, 1912.

1912. *Otostigmus burn-murdochi*. Gravely, *Rec. Indian Mus.*, **7**(4) : 415-417. Type Locality : Kullu (Himachal Pradesh)

Distribution : India : Himachal Pradesh.

Material examined : Katholi Forest Chowki, 2.iv.2001, 1 ex. (Reg. 8510/5), Coll. N.S. Rathore.

Remarks : Earlier known only from its type locality. Kullu, Himachal Pradesh. Khanna (in press, a and 2004) recorded this species in the Palaerctic region, from Pin Valley, Lahaul Spiti, Himachal Pradesh and from NE in Arunachal Pradesh (Debang Dehang Biosphere Reserve). This is the first record of the species from Oriental region in Ranthambhore National Park, Rajasthan.

5. *Rhysida nuda immarginata* (Porath), 1876

1876. *Branchiostoma immarginatum*. Porath, *Bih. Svenska Ak.*, **4**(7) : 24.

1926. *Rhysida nuda immarginata*. Attems, *Das Tierr.*, *Scolopendromorpha*, **54**(2) : 190.

1985. *Rhysida immarginata*. Koch. *J. nat. Hist.*, **19** : 205-214. Type Locality : Manila, Philippines.

Distribution : Assam, A & N Islands., Delhi, Gujarat, Madhya Pradesh, Maharashtra, Rajasthan, Uttaranchal, Uttar Pradesh and West Bengal.

Elsewhere : West Africa, Myanmar, Philippines, Venezuela, Guatemala (Oriental and Palaearctic).

Material examined : Lahpur Dam, 6.ii.2000, 1 ex. (Reg. 8371/5); Mansarovar. 8.xi.2000, 1 ex. (Reg. 8461/5), Coll. N.S. Rathore.

Remarks : Another tropical species but common in India, a first report from Ranthambhore National Park.

2. Family CRYPTOPIDAE

1881. Cryptopsii. Kohlrausch, *Arch. Naturges.*, **47** : 53.

1930. Cryptopidae. Attems, *Das Tier.*, *Scolopendromorpha*, **54**(2) : 200.

Genus *Cryptops* Leach, 1814

1814. *Cryptops* Leach. *Trans. Linn. Soc. London*, 11 : 384. Type Species : *Cryptops hortensis* Leach.

6. *Cryptops* sp. 1.

7. *Cryptops* sp. 2.

Material Examined : Bagdha Water Point, 12.x.2003, 1 ex. (Reg. 680/6); 9.x.2003. 1 ex. (Reg. 599/6), Indala, 14.x.2003, 1 ex. (R.No.722/6), Coll. Sanjeev Kumar.

Remarks : Only three species of this genus viz. *Cryptops kempfi* Silvestri. 1924. (Type Locality : Siju caves (Assam)).

Distribution : India : Arunachal Pradesh and Assam. *Cryptops doriae* (Locality : Siju caves (Assam)).

Distribution : India : Maharashtra and Uttaranchal.

Elsewhere : Indo-china Java. Myanmar. Nepal, New Guinea. (Indo-Malayan extending to Australia) and *Cryptops sitosior* Chamberlin 1959 (Type Locality : India?), of this large genus are reported from India, of which *Cryptops doriae* has been reported by Khanna (2001) from Maharashtra. Since the material is damaged and beyond identification but on identification running close to *C. doriae*, the further identification could not be carried out. However, this is again a new record of the genus from Rajasthan state, India.

Note : In addition to above one example of the millipede (Diplopoda) and one centipede of the Order Geophilomorpha have been collected which could not be identified due to lack of literature.

SUMMARY

Seven species of the Scolopendrid centipedes have been reported in this paper, four of which are a new record from Rajasthan, including one genus from the protected area the Ranthambhore National Park.

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INSECTA : ODONATA

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INTRODUCTION

Odonata (Damsel and Dragonflies) includes some of the most ancient and beautiful insects ever roamed the earth, as well as some of the largest flying invertebrates ever to have lived. For some 270 million years, odonates with their four long independent membranous wings and long bodies have remained unchanged in their essential form and are dominant invertebrate predators in ecosystem. They were the first creatures to truly command the air of this earth. They are amphibious hemi-metabolous insects having the aquatic egg and larval (nymph) stages, while the adults are terrestrial, both larvae and adults are predator. They are some of the best hunters in the insect world. Their powerful acrobatic flight enables them to catch many small organisms. Now a days they are extensively used in controlling causative agents of malaria and filarial, and of insect pests in different ecosystems on the global basis (Kumar, 2002).

Approximately 6,000 species and subspecies belonging to 630 genera in 28 families of Odonata are known from all over the world (Tsuda, 1991), out of which 499 species and subspecies of Odonata under 139 genera belonging to 17 families are reported from India (Prasad and Varshney, 1995). They are among the dominant invertebrate predators in ecosystems. Being predators both at larval and adult stages, they play a significant role in the food chain of forest ecosystem (Vashishth *et al.*, 2002). In addition to this, their value as indicators of quality of the biotope is being increasingly recognized (Subramanian, 2002). The Perusal of literature reveals that no consolidated account is available on the Odonata fauna of Rajasthan, though a few workers contributed i.e. Agarwal (1957) recorded 15 species from Pilani, Rajasthan, Bose and Mitra (1976) recorded 13 species from Rajasthan, Prasad and Thakur (1981), Thakur (1985) and Tyagi and Miller (1991) recorded 23 species from Rajasthan, Prasad (1996) recorded 31 species from Thar Desert of Gujarat and Rajasthan and Prasad (2004) recorded 11 species from Desert National Park, Rajasthan.

The present study is based on the collection of Odonata collected from Ranthambhore National Park, Swaimadhopur, Rajasthan by the survey parties of Desert Regional Station, Zoological Survey of India, Jodhpur. Altogether 10 species belonging to 8 genera, 2 families and 2 sub-orders of order Odonata are reported from Ranthambore National Park, Swaimadhopur, Rajasthan.

MATERIAL AND METHODS

A detailed study and extensive collection of odonates were made by using aerial sweep net in Ranthambore National Park, Swaimadhopur, Rajasthan during 2000-01. The collected individuals in the field were transferred into insect collection paper packs and were brought to the Desert Regional Station, Zoological Survey of India, Jodhpur laboratory, where these were properly stretched, pinned, oven dried for 72 hours at 60° C and preserved in collection boxes. Identification of adult individuals was carried out using identification keys provided by Fraser (1933, 1934 & 1936).

SYSTEMATIC ACCOUNT

Order ODONATA

Sub order ZYGOPTERA

Family COENAGRIONIDAE

1. *Ceriagrion coromandelianum* (Fabricius)

1798. *Agrion coromandelianum* Fabricius, *Ent. Syst.*, (suppl.) : 287.
 1876. *Ceriagrion coromandelianum* : Selys, *Bull. Acad. Belg.*, **42**(2) : 528.
 1933. *Ceriagrion coromandelianum* : Fraser, *Fauna Brit. India Odon.*, **1** : 315-316.
 1967. *Ceriagrion coromandelianum* : Asahina, *Jap. J. Zool.*, **15** : 279.

Material examined : 1 male, Katholi Forest Chowki, 02.iv.2001, Reg. No. V/8524, Coll. N.S. Rathore & party.

Diagnostic characters : Male—Abdomen 28-30 mm; Hindwing 18-20 mm. *Head* : Labium pale yellow; labrum, clypeus, genae, bases of mandibles and frons bright citron-yellow; basal three joints of antennae pale yellow. *Prothorax* and *thorax* uniformly olive-green; laterally citron yellow. *Legs* citron-yellow, with short black spines. *Wings* hyaline, pterostigma golden yellow, framed in brown nervures covering one cell; 11 to 12 postnodal nervures in forewings, 10 to 11 in the hind. *Abdomen* uniformly citron-yellow. *Anal appendages* citron-yellow, the inferiors tipped with black; superiors about half the length of segment 10.

Distribution : India : Throughout India.

Elsewhere : Sri Lanka, Myanmar, Malaysia, China.

2. *Ischnura aurora* (Brauer)

1858. *Agrion delicatum* : Hagen, *Verh. zool. bot. Ges. Wien.*, **8** : 479.
 1933. *Ischnura delicata* : Fraser, *Fauna Brit. India Odon.*, : 360-362.
 1991. *Ischnura aurora aurora* : Tsuda, *A distributional list of World Odonata*, : 34.

Material examined : 1 male, Dhudhal Mal Ka Darra, 01.iv.2001, Reg. No. V/8493, Coll. N.S. Rathore & party.

Diagnostic characters : Male-Abdomen 16-20 mm; Hindwing 10-12 mm. *Head* : Labium white; labrum citron-yellow, with the base narrowly bordered with black; anteclypeus pale olive-green; postclypeus bronzed black; bases of mandibles, genae, frons, and the three basal joints of antennae pale grass-green; vertex bronzed black; eyes a beautiful olive-green, dark olive above. *Prothorax* bronzed black on dorsum, the sides and anterior lobe blue. *Thorax* bronzed black on dorsum, marked with narrow grass-green antehumeral strips. *Legs* pale citron-yellow; anterior and middle pairs of femora with a short black strip on the outer side of the distal half. *Wings* hyaline; pterostigma differing in the fore and hindwings, that of forewings slightly broader than long, kite-shaped, rose-red for its proximal half, hyaline for the distal, inner and posterior borders thick, black; in the hindwing much smaller, about half the size, uniform pale grey. *Abdomen* citron-yellow, except segments 8 to 10, which are azure blue. *Anal appendages* pale ochreous, tipped with black; superiors about as long as segment 10, triangular as seen both from above and the side; inferiors broad at extreme base, the apex turned slightly up and tipped with black; of almost equal length to the superiors.

Distribution : *India* : Throughout India.

Elsewhere : Sri Lanka, Myanmar, Malaysia, Borneo, New Guinea, Australia, Philippines and Samoa.

Suborder ANISOPTERA

Family LIBELLULIDAE

3. *Acisoma panorpoides* Rambur

1842. *Acisoma panorpoides* Rambur, *Ins. Neurop.*, : 28.

1936. *Acisoma panorpoides panorpoides* : Fraser, *Fauna Brit. India Odon.*, 3 : 330-331.

Material examined : 1 male, Kachida, 07.xi.2000, Reg. No. V/8380, Coll. N.S. Rathore & party.

Diagnostic characters : Male-Abdomen 15-18 mm; Hindwing 16-21 mm. *Head* : Labium creamy-white; labrum pale yellow; face and frons palest azure-blue; eyes blue, behind glossy black spotted with yellow. *Prothorax* black, with the anterior border of anterior lobe, mid-dorsum of middle lobe, and posterior border and mid-dorsum of posterior lobe pale yellow. *Thorax* azure-blue marbled with black; sutures all narrowly black. *Legs* black, femora striped with yellow. *Wings* hyaline; distal antenodal complete; discoidal field with 2 rows of cells; pterostigma pale yellow between black nervures, covering rather more than 1 cell; membrane brownish. *Abdomen* azure-blue, marked with black. *Anal appendages* : superiors very long, nearly straight, acute at apex and spined beneath nearly to base, white or yellow above, black beneath; inferior very broadly triangular, white at middle, bordered with black.

Distribution : India : Arunachal Pradesh, Assam, Bihar, Chandigarh, Himachal Pradesh, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Manipur, Meghalaya, Orissa, Punjab, Rajasthan, South India, Uttar Pradesh and West Bengal.

Elsewhere : Sri Lanka to Philippines and China, Java, Sumatra and the Celebes.

4. *Brachythemis contaminata* (Fabricius)

1793. *Libellula contaminata* Fabricius, *Ent. Syst.*, **2** : 382.

1868. *Brachythemis contaminata* : Brauer, *Verh. Zool. bot. Ges. Wien.*, **18** : 736.

1936. *Brachythemis contaminata* : Fraser, *Fauna Brit. India Odon.*, **3** : 365-366.

Material examined : 1 male, Katholi Forest Chowki, 02.iv.2001, Reg. No. V/8522, Coll. N.S. Rathore & party.

Diagnostic characters : Male-Abdomen 18-21 mm; Hindwing 20-23 mm. **Head** : Labium pale ochreous; labrum reddish-ochreous; eyes violaceous-brown above, pale olivaceous laterally and beneath; occipit brown. **Prothorax** ochreous, with dark reddish-brown strips traversing anterior and posterior borders of middle lobe; **thorax** olivaceous-brown, ferruginous, dorsally marked with an obscure reddish-brown humeral strip and two obscure brownish strips on each side. **Legs** ochreous, femora dark brown or blackish on extensor surface. **Wings** hyaline, reticulation reddish, with a broad bright orange fascia extending from base to within 2 to 3 cells of pterostigma in forewing and as far as that organ in the hind; pterostigma rust-red, posterior border brown; membrane pale reddish-brown or carneous. **Abdomen** reddish-ochreous, marked with obscure dorsal and subdorsal brown strips; segments 8 and 9 often black on mid-dorsum. **Anal appendages** ferruginous.

Distribution : India : Throughout India.

Elsewhere : Sri Lanka, Myanmar, China, Formosa, Philippines, Java and Sumatra.

5. *Crocothemis servilia servilia* (Drury)

1770. *Libellula servilia* Drury, *III. Ex. Ins.*, **1** : 112.

1936. *Crocothemis servilia servilia* : Fraser, *Fauna Brit. India Odon.*, **3** : 345-347.

Material examined : 3 males & 1 female, Bakaula, 03.xi.2000, Reg. No. V/8297; V/8298; V/8299; V/8301, Coll. N.S. Rathore & party.

Diagnostic characters : Male-Abdomen 24-35 mm; Hindwing 27-38 mm. **Head**: Labium ferruginous; labrum blood-red bordered diffusely with darker red; anteclypeus pale red, rest of face and frons bright blood-red; occipit bright orange; eyes blood-red above, purple laterally, paler below. **Prothorax** ferruginous, with a spot on middle of anterior lobe and borders of posterior lobe brighter rust-red; middle lobe ridged transversely, this ridge bearing a ruff of stiff reddish hairs. **Thorax** bright ferruginous, often blood-red on dorsum. **Legs** ochreous. **Wings** hyaline, bases of all marked with rich amber-yellow to as far distal as the cubital nervure in forewing and to first antenodal nervure nearly to *arc* and including the tornal angle in hindwing; apices of

wings lined narrowly with pale brown in old specimens; pterostigma dark ochreous between blackish nervures; membrane dark reddish-brown. *Abdomen* blood-red, segments 8 and 9 with mid-dorsal carina blackish. *Anal appendages* blood-red.

Distribution : India : Throughout India.

Elsewhere : Mesopotamia, Sri Lanka, Myanmar, South Asia to Japan, Philippines, Australia and Sundaic Archipelago.

6. *Orthetrum pruinsum neglectum* (Rambur)

1842. *Libellula neglecta* Rambur, *Ins. Neurop.*, : 86.

1909. *Orthetrum pruinsum neglectum* : Ris, *Cat. Coll. Selys fasc.*, 9 : 181.

1936. *Orthetrum pruinsum neglectum* : Fraser, *Fauna Brit. India Odon.*, 3 : 311-312.

Material examined : 1 male, Katholi Forest Chowki, 02.iv.2001, Reg. No. V/8523, Coll. N.S. Rathore & party.

Diagnostic characters : Male-Abdomen 28-31 mm; Hindwing 32-36 mm. *Head* : Labium, labrum, and face ochreous to pale reddish-brown; frons anteriorly and above dark brown; vesicle and occiput dark reddish-brown; eyes blue-black above, bluish-grey below. *Prothorax* and *thorax* reddish-brown to dull purple according to amount of pruinescence present. *Legs* black, reddish-brown at base of femora. *Wings* hyaline, enfumed pale brown especially towards apices in old adults, and with a reddish-brown basal marking extending distalwards in hindwing to first antenodal nervure; only a vestige of this in forewing; pterostigma reddish-brown to black, covering 2 cells; membrane black. *Abdomen* bright vermilion-red in subadults, purplish-red in adults, due to pruinescence. *Anal appendages* red.

Distribution : India : Throughout India.

Elsewhere : Sri Lanka, Myanmar, Tibet, China.

7. *Orthetrum sabina* (Drury)

1770. *Libellula sabina* Drury, *III, Exot. Ins.*, 1 : 114-115.

1889. *Orthetrum sabina*: Kirby, *Trans. Zool. Soc. Lond.*, 12 : 302.

1936. *Orthetrum sabina sabina* : Fraser, *Fauna Brit. India Odon.*, 3 : 300-302.

Material examined : 3 males, Bakaula, 03.xi.2000, Reg. No. V/8292; V/8300; V/8302, Coll. N.S. Rathore & party.

Diagnostic characters : Male-Abdomen 30-36 mm; Hindwing 30-36 mm. *Head* : Labium yellow, middle lobe brownish to black; labrum, face, and frons yellowish; frons very deeply notched so as to form two triangular facets in front; vesicles black tipped with yellow; eyes greenish. *Prothorax* bright yellow, with anterior and middle lobes blackish brown posteriorly; *thorax* greenish-yellow, marked with black as follows : sutures all finely black; an antehumeral strip narrow and is outlined in black. *Legs* black, anterior femora yellow on inner surface. *Wings* hyaline; only slightly enfumed

at apices and borders of wings; pterostigma black with middle ochreous, covering 2 cells; membrane dark brown; are situated opposite the second antenodal nervure or between the first and second. *Abdomen* greenish-yellow, marked with black as follows: Apical borders and jugal sutures of segments 1 to 3 all finely black; segments 4 to 6 with a broad oval dorsal black spot on basal third of segments which is continued finely along mid-dorsal carina to become confluent with very broad apical black rings on 4 and 5 and a narrow one on segment 6; segments 7 to 9 black; 10 with base broadly, apical border finely black and with two small black baso-dorsal points. *Anal appendages* as long as segment 9, creamy-white in colour, with a row of very small black teeth or spines below superiors.

Distribution : India : Throughout India.

Elsewhere : Somaliland, Mesopotamia, Persia to Samoa and Australia.

8. *Trithemis aurora* (Burmeister)

1839. *Libellula aurora* Burmeister, *II & b, Ent.*, **2** : 859.

1868. *Trithemis aurora* : Brauer, *Verh. zool. bot. Ges. Wien.*, **18** : 177.

1936. *Trithemis aurora* : Fraser, *Fauna Brit. India Odon.*, **3** : 383-385.

Material examined : 1 male, Bakaula, 03.xi.2000, Reg. No. V/8296, Coll. N.S. Rathore & party.

Diagnostic characters : Male-Abdomen 21-29 mm; Hindwing 24-34 mm. *Head* : Labium dark ochreous; labrum dark brown; face and front of frons ochreous, changing to reddish above; vesicle and upper surface of frons metallic violaceous; occiput brown; eyes crimson above, brown laterally changing to lilaceous beneath. *Prothorax* reddish-brown, anterior lobe pale brown, anterior half of middle lobe and base of posterior lobe black. *Thorax* dull purple due to a thin pruinescence overlaying a reddish ground-colour; an obscure superior humeral brown strip and a narrow black strip on postero-lateral suture with an angular black line crossing it. *Legs* black, tibiae and tarsi ferruginous on flexor surface. *Wings* hyaline, with crimson reticulation and a broad amber-yellow fascia at base of wings, with darker brown rays in subcostal and cubital spaces. *Abdomen* swollen dorso-ventrally at base, then slightly constricted at segment 3 and again dilated fusiformly, depressed and rather broad; violaceous throughout, segment 9 laterally at ventral border and segment 10 at base marked with black. *Anal appendages* red.

Distribution : India : Throughout India.

Elsewhere : Sri Lanka, Myanmar, Philippines, Java.

9. *Trithemis festiva* (Rambur)

1842. *Libellula festiva* Rambur, *Ins. Neurop.*, : 92.

1868. *Trithemis festiva* : Brauer, *Verh. zool. bot. Ges. Wien.*, **18** : 736.

1936. *Trithemis festiva* : Fraser, *Fauna Brit. India Odon.*, **3** : 387-389.

Material examined : 1 male, Katholi Forest Chowki, 02.iv.2001, Reg. No. V/8525, Coll. N.S. Rathore & party.

Diagnostic characters: Male—Abdomen 22-28 mm; Hindwing 26-32 mm. **Head** : Labium blackish-brown; labrum dark olivaceous-brown or black with base brown; anteclypeus black; postclypeus dark olivaceous-brown; frons dark brown in front, metallic violet above, as well as vesicle; occiput dark brown; eyes dark brown above with purple reflex, bluish-grey laterally and beneath. **Prothorax** dark blue; **thorax** black, coated with a thin purplish pruinescence. **Legs** black. **Wings** hyaline, with a dark opaque brown mark at base of hindwing, dark rays in subcostal and cubital spaces as far as cubital nervure and extending in a curve posteriorly as far as the limit of membrane, which is dark with paler attached border; pterostigma black. **Abdomen** black, segments 1 to 3 with a thin bluish pruinescence. **Anal appendages** black.

Distribution : India : Throughout India.

Elsewhere : Sri Lanka, Myanmar.

10. *Pantala flavescens* (Fabricius)

1798. *Libellula flavescens* Fabricius, *Ent. Syst. Suppl.*, : 285.

1861. *Pantala flavescens* : Hagen, *Syn. Neur. N. Amer.*, : 142.

1936. *Pantala flavescens* : Fraser, *Fauna Brit. India Odon.*, 3 : 414-416.

Material examined : 1 male, Katholi Forest Chowki, 02.iv.2001, Reg. No. V/8523, Coll. N.S. Rathore & party.

Diagnostic characters : Male—Abdomen 29-35 mm; Hindwing 38-40 mm. **Head** : Labium variably pale brown or yellowish, with middle lobe and borders of lateral lobes dark brown; labrum bright ochreous broadly bordered with black; anteclypeus pale olivaceous-yellow; postclypeus and frons bright golden-yellow or orange; vesicle bright ochreous; eyes reddish-brown above, bluish laterally and beneath. **Prothorax** rich ochreous, with a transverse belt of dark reddish-brown between anterior and middle lobes; **thorax** olivaceous or ferruginous, coated thickly with yellowish hairs, paler laterally. **Legs** black, bases and extensor surface of all femora yellowish. **Wings** hyaline, with base of hindwing pale golden-yellow as far distal as anal loop and with a narrow apical brown spot limited to posterior border of wing; pterostigma bright ochreous or reddish-brown. **Abdomen** bright ochreous, dorsum tinted with bright brick red, sides of segments 1 to 4 pale yellow; segments 8 to 10 with sharply-defined black mid-dorsal pyriform spots. **Anal appendages** ochreous, changing to black towards apex; superiors about as long as segments 9 and 10 taken together, slim, but dilated at apical half and acuminate at apex.

Distribution : India : Throughout India.

Elsewhere : Sri Lanka, Myanmar and Tibet.

SUMMARY

During present study 10 species belonging to 8 genera, 2 families and 2 sub-orders of order Odonata are reported from Ranthambhore National Park, Swaimadhopur, Rajasthan.

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INSECTA : ISOPTERA

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INTRODUCTION

Termites belonging to the order Isoptera, commonly known as white ants are one of the most abundant terrestrial animals on earth. Termites are social insects. Castes include winged reproductives or alates, soldiers and workers. Because of their destructive habits these tiny creatures are able to draw their attention from the very beginning of human civilization.

The termite fauna of Ranthambhore National Park has until recently been unknown. The first author made an intensive collection of termites in Ranthambhore National Park, 'Tiger Reserve' for five years (1999-2003). The present communication is based on the study of this collection. Altogether 21 species belonging to 4 genera and 2 families are reported here.

SYSTEMATIC ACCOUNT

Class INSECTA

Order ISOPTERA

Family RHINOTERMITIDAE

Subfamily COPTOTERMITINAE

1. *Coptotermes heimi* (Wasmann)

2004. *Coptotermes heimi* Rathore and Bhattacharyya, *Rec. zool. Surv. India, Occ. Pap. No.*, **223** : 18.

Caste known : Soldier and worker.

Material examined : Forest area on Seyar road, 10 Km from Sawai madhopur, 30 soldiers, 17 workers, ex. from log, 1.x.1987, R. C. Sharma coll., Raj Bagh Talab and around, 22 soldiers, 11 workers, ex. under wood pieces, 9.xi.2000, N. S. Rathore coll., Fakiri Talab and around, 4 soldiers, ex. under twig, 30.iii.2001, N. S. Rathore and R. Sewak coll., Mansarovar and around, 6 soldiers, 2 workers, ex. under log, 31.iii.2001, N. S. Rathore and R. Sewak coll., Dhudhal Mal Ka Darra, 20 soldiers, 10 Pseudoworkers, 2 workers, ex. under twig, 1.iv.2001, N. S. Rathore and R. Sewak coll.

Distribution : India : Assam, Delhi, Gujarat, Haryana, Karnataka, Kerala, Madhya Pradesh, Meghalaya, Orissa, Punjab, Rajasthan (Jaisalmer, Jaipur, Jodhpur, Nagaur, Pali, Sikar, Sawai madhopur, Udaipur), Uttar Pradesh, West Bengal.

Elsewhere : Bangladesh, Bhutan, Java, Oman, Nepal, Pakistan.

Family TERMITIDAE

Subfamily AMITERMITINAE

2. *Amitermes baluchistanicus* Akhtar

1974. *Amitermes baluchistanicus* Akhtar, *Pakistan J. Zool.*, 6(1 & 2) : 93.

Caste known : Soldier and worker.

Material examined : Indala 23 Km from Ranthambhore, 4 soldiers, 2 workers, ex. from log, 28.xi.2002, N. S. Rathore and S. Kumar coll., Raj Bagh Talab and around, 7 soldiers, ex. from Dhok tree (central part and root zone), 15.x.2003, N. S. Rathore and S. Kumar coll.

Distribution : India : Ranthambhore National Park, Sawai madhopur.

Elsewhere : Pakistan: Mastung, Baluchistan.

3. *Amitermes belli* (Desneux)

2004. *Amitermes belli* Rathore and Bhattacharyya, *Rec. zool. Surv. India, Occ. Pap. No.*, 223 : 24.

Caste known : Soldier, worker.

Material examined : Ranthambhore Tiger Reserve, 5 soldiers, 5 pseudoworkers, 10 workers, ex. from log, 2.x.1987, R. C. Sharma coll. Indala, Ranthambhore National Park, 1 soldier, 33 workers, ex. from tree trunk, 14.x.2003, N. S. Rathore and S. Kumar coll.

Distribution : India : Delhi, Madhya Pradesh, Gujarat, Rajasthan (Barmer, Bundi, Jaipur, Jaisalmer, Jodhpur, Kota, Nagaur, Sawai madhopur, Udaipur).

Elsewhere : Pakistan.

Subfamily MACROTERMITINAE

4. *Odontotermes assmuthi* Holmgren

2004. *Odontotermes assmuthi* Rathore and Bhattacharyya, *Rec. zool. Surv. India, Occ. Pap. No.*, 223 : 34.

Caste known : Soldier, worker.

Material examined : Ranthambhore Tiger Reserve (2 lots), 12 soldiers and 4 workers, ex. under log, 2.x.1987, R. C. Sharma coll., Anantpura and around, 2 soldiers, 2 workers, ex. from wooden twig, 4.xi.2000, N. S. Rathore coll., Lakarda and around,

2 soldiers, ex. under log, 9.xi.2000, N. S. Rathore coll., Fakiri Talab, (3 lots), 24 soldiers, 37 workers, ex. under log, 30.iii.2001, N. S. Rathore and R. Sewak coll., Dhudhal Mal Ka Darra (3 lots), 32 soldiers, 36 workers, ex. under log, 1.iv.2001, N. S. Rathore and R. Sewak coll.

Distribution : India : Assam, Bihar, Gujarat, Jammu and Kashmir, Karnataka, Maharashtra, Madhya Pradesh, Punjab, Tamil Nadu, Orissa, West Bengal, Uttar Pradesh and Rajasthan (Sawai madhopur).

Elsewhere : Pakistan, Bangladesh.

5. *Odontotermes bellahunisensis* Holmgren and Holmgren

2004. *Odontotermes bellahunisensis* Rathore and Bhattacharyya, *Rec. zool. Surv. India, Occ. Pap. No.*, **223** : 34.

Caste known : Imago, soldier, worker.

Material examined : Lakarda Chowki, 5 soldiers, 15 workers, ex. under stone, 2.xii.1999, R. Sewak coll.; Atal Sagar, 6 soldiers, 5 workers, ex. under stone, 31.iii.2001, N. S. Rathore and R. Sewak coll.; Indala, 7 soldiers, 30 workers, ex. from mound, 15.x. 2003, N. S. Rathore and S. Kumar coll.

Distribution : India : Andhra Pradesh, Assam, Bihar, Gujarat, Karnataka, Maharashtra, Rajasthan (Jhunjhunu, Nagaur, Sikar, Sawai madhopur, Udaipur), Tamil Nadu, Uttar Pradesh, West Bengal.

Elsewhere : Pakistan.

6. *Odontotermes boveni* Thakur

1997. *Odontotermes boveni* Chhotani, *Fauna of India, Isoptera (Termites)*, **2** : 460.

Caste known : Soldier, worker.

Material examined : Mansarovar and around, 16 soldiers, 13 workers, ex. under log, 31.iii.2001, N. S. Rathore and R. Sewak coll.

Distribution : India : Madhya Pradesh, Rajasthan (Sawai madhopur), Uttar Pradesh.

Elsewhere : Nepal.

7. *Odontotermes brunneus* (Hagen)

2004. *Odontotermes brunneus* Rathore and Bhattacharyya, *Rec. zool. Surv. India, Occ. Pap. No.*, **223** : 35.

Caste known : Imago, soldier, worker.

Material examined : Mansarovar, 1 soldier, 7 workers, ex. under stone, 31.iii.2001, N. S. Rathore and R. Sewak coll.; Baghda water point, 1 soldier, 2 workers, ex. under log, 23.xi.2002, N. S. Rathore and S. Kumar coll.; Indala, 2 soldiers, 2

workers, ex. from log, 28.xi.2002, N. S. Rathore and S. Kumar coll.; Baghda, 11 soldiers, 15 workers, ex. under tree trunk, 15.xi.2003, N. S. Rathore and S. Kumar coll.; Raj Bagh, 5 soldiers, 12 workers, 15.x. 2003, ex. from mound, N. S. Rathore and S. Kumar coll.

Distribution : India : Andhra Pradesh, Gujarat, Karnataka, Kerala, Maharashtra, Orissa, Rajasthan (Sawai madhopur, Tonk), Tamil Nadu, Uttar Pradesh.

Elsewhere : Sri Lanka.

8. *Odontotermes feae* (Wasmann)

2004. *Odontotermes feae* Rathore and Bhattacharyya, *Rec. zool. Surv. India, Occ. Pap. No.*, **223** : 37.

Caste known : Imago, soldier, worker.

Material examined : Lakarda and around, 15 soldiers, 20 workers, ex. under log, 9.xi.2000, N. S. Rathore coll.

Distribution : India : Assam, Gujarat, Karnataka, Madhya Pradesh, Orissa, Rajasthan (Sawai madhopur, Sirohi), Tamil Nadu, West Bengal.

Elsewhere : Bangladesh, Bhutan, Myanmar, Nepal, Sri Lanka, Thailand, Vietnam.

9. *Odontotermes giriensis* Roonwal and Chhotani

2004. *Odontotermes giriensis* Rathore and Bhattacharyya, *Rec. zool. Surv. India, Occ. Pap. No.*, **223** : 38.

Caste known : Imago, soldier, worker.

Material examined : Lakarda and around, 7 soldiers, 9.xi.2000, ex. under log, N. S. Rathore coll.; Raj Bagh, 1 soldier, 6 workers, 15.x.2003, ex. Dhok tree trunk (central part and root zone), N. S. Rathore and S. Kumar coll.

Distribution : India: Arunachal Pradesh, Assam, Delhi, Gujarat, Manipur, Meghalaya, Orissa, Rajasthan (Nagaur, Sawai madhopur, Sikar), Tripura, Uttar Pradesh. **Elsewhere**: Bangladesh.

10. *Odontotermes gurdaspurensis* Holmgren and Holmgren

2004. *Odontotermes gurdaspurensis* Rathore and Bhattacharyya, *Rec. zool. Surv. India, Occ. Pap. No.*, **223** : 39.

Caste known : Imago, soldier, worker.

Material examined : Rambheet, Sawai madhopur road, Ranthambhore National Park, 3 soldiers, 1 worker, ex. under stone, 6.xii.1999, R. Sewak coll.; Lahpur dam and around, 1 soldier, 2 workers, ex. from twig, 6.xi.2000, N. S. Rathore coll.; Lahpur dam and around, 4 soldiers, ex. from mound, under log 6.xi.2000, N. S. Rathore coll.; Raj Bagh Talab, 22 soldiers, 37 workers, ex. under log, 8.xi.2000, N. S. Rathore coll.; Malik Talab, 10 soldiers, 13 wokers, ex. under stone, 10.x.2003, N. S. Rathore and S.

Kumar coll.; Indala, 28 soldiers, 41 workers, ex. under log, 14.x.2003, N. S. Rathore and S. Kumar coll.

Distribution : India : Gujarat, Haryana, Himachal Pradesh, Jammu & Kashmir, Madhya Pradesh, Maharashtra, Punjab, Rajasthan (Ajmer, Banswara, Bharatpur, Jodhpur, Nagaur, Sawai madhopur, Udaipur), Uttar Pradesh, West Bengal.

Elsewhere : Pakistan.

11. *Odontotermes indicus* Thakur

2004. *Odontotermes indicus* Rathore and Bhattacharyya, *Rec. zool. Surv. India, Occ. Pap. No.*, **223** : 41.

Caste known : Imago, soldier, worker.

Material examined : Fakiri Talab, 3 soldiers, 3 workers, ex. under log, 30.iii.2001, N. S. Rathore and S. Kumar coll.; Dhudhal Mal Ka Darra, 10 soldiers, 19 workers, ex. under log, 10.x.2003, N. S. Rathore and S. Kumar coll.; Baghda water point (3 lot), 14 soldiers, 43 workers, ex. under log, 23.xi.2002, N. S. Rathore and S. Kumar coll.; Indala, 7 soldiers, 12 workers, ex. under log, 28.xi.2002, N. S. Rathore and S. Kumar coll.; Dhudhal Mal Ka Darra, 7 soldiers, 11 workers, ex. under stone, 11.x.2003, N. S. Rathore and S. Kumar coll.

Distribution : India : Gujarat, Maharashtra, Orissa, Rajasthan (Sawai madhopur).

12. *Odontotermes kushwahi* Roonwal and Bose

2004. *Odontotermes kushwahi* Rathore and Bhattacharyya, *Rec. zool. Surv. India, Occ. Pap. No.*, **223** : 42.

Caste known : Imago, soldier, worker.

Material examined : Raj Bagh around, Ranthambhore National Park, 1 soldier, ex. from mound, 15.x.2003, N. S. Rathore and S. Kumar coll.

Distribution : India : Gujarat, Maharastra, Rajasthan (Jodhpur, Sawai madhopur, Udaipur), Tamil Nadu.

13. *Odontotermes latiguloides* Roonwal and Verma

2004. *Odontotermes latiguloides* Rathore and Bhattacharyya, *Rec. zool. Surv. India, Occ. Pap. No.*, **223** : 42.

Caste known : Soldier, worker.

Material examined : Fakiri Talab and around, 6 soldiers, 18 workers, ex. under log, 30.iii.2001, N. S. Rathore and R. Sewak coll.

Distribution : India : Gujarat, Haryana, Punjab, Rajasthan (Banswara, Bhilwara, Dungarpur, Jaipur, Jhunjhunu, Jodhpur, Nagaur, Sawai madhopur, Sikar, Sirohi).

14. *Odontotermes lokanandi* Thakur

2004. *Odontotermes lokanandi* Rathore and Bhattacharyya, *Rec. zool. Surv. India, Occ. Pap. No.*, **223** : 42.

Caste known : Soldier, worker.

Material examined : Baghda water point, 20 soldiers, 52 workers, ex. from tree trunk, 12.x.2003, N. S. Rathore and S. Kumar coll.

Distribution : India : Gujarat, Himachal Pradesh, Jammu & Kashmir, Rajasthan (Karauli, Sawai madhopur), Uttar Pradesh.

Elsewhere : Bangladesh, Pakistan.

15. *Odontotermes malabaricus* Holmgren and Holmgren

2004. *Odontotermes malabaricus* Rathore and Bhattacharyya, *Rec. zool. Surv. India, Occ. Pap. No.*, **223** : 43.

Caste known : Soldier, worker.

Material examined : Indala Village, 10 soldiers, 8 workers, ex. under stone, 3.xii.1999, R. Sewak coll.

Distribution : India : Gujarat, Karnataka, Kerala, Rajasthan (Sawai madhopur), Tamil Nadu, Uttar Pradesh.

16. *Odontotermes obesus* (Rambur)

2004. *Odontotermes obesus* Rathore and Bhattacharyya, *Rec. zool. Surv. India, Occ. Pap. No.*, **223** : 43.

Caste known : Imago, soldier, worker.

Material examined : Forest area, on Seyar road 10 Km from Sawai madhopur, 6 soldiers, 6 workers, ex. under stone, 1.x.1987, R. C. Sharma coll.; Raj Bagh Talab area, (2 lot), 12 soldiers, 21 workers, ex. under log, 8.xi.2000, N. S. Rathore coll.; Katholi Forest Chowki, ex. under Stone, 1 soldier, 2.iv.2001, N. S. Rathore and R. Sewak coll.

Distribution : India : Andhra Pradesh, Assam, Gujarat, Haryana, Madhya Pradesh, Punjab, Rajasthan (Ajmer, Barmer, Bikaner, Bundi, Jaipur, Jaisalmer, Jalore, Jhalawar, Jhunjhunu, Jodhpur, Kota, Nagaur, Sawai madhopur, Sikar, Udaipur), Tamil Nadu, Tripura, Uttar Pradesh, West Bengal.

Elsewhere : Bangladesh, Myanmar, Pakistan.

17. *Odontotermes paralatiguloides* Thakur

2004. *Odontotermes paralatiguloides* Rathore and Bhattacharyya, *Rec. zool. Surv. India, Occ. Pap. No.*, **223** : 44.

Caste known : Soldier, worker.

Material examined : Lakarda and around, 5 soldiers, 21 workers, ex. from mound, 9.xi.2000, N. S. Rathore coll.; Mansarovar and around (3 lots), 14 soldiers, 24 workers, ex. under stone, 31.iii.2001, N. S. Rathore and R. Sewak coll.

Distribution : India : Assam, Haryana, Himachal Pradesh, Jammu & Kashmir, Karnataka, Meghalaya, Punjab, Rajasthan (Sawai madhopur), Uttar Pradesh, West Bengal.

Elsewhere : Bangladesh, Bhutan, Myanmar, Pakistan.

18. *Odontotermes redemanni* (Wasmann)

2004. *Odontotermes redemanni* Rathore and Bhattacharyya, *Rec. zool. Surv. India, Occ. Pap. No.*, **223** : 44.

Caste known : Imago, soldier, worker.

Material examined : Anantpura Village, 2 soldiers, 4 workers, ex. under stone, 6.xii.1999, R. Sewak coll.; Lahpur Dam and around, 7 soldiers, 7 workers, ex. under log, 6.xi.2000, N. S. Rathore coll.; Malik Talab and around, 7 soldiers, 8 workers, 3.xi.2000, ex. from tree trunk, N. S. Rathore coll.; Raj Bagh Talab and around, 3 soldiers, 3 workers, ex. under log, 8.x.2000, N. S. Rathore coll.; Baghda water point (2 lot) 18 soldiers, 60 workers, ex. from tree trunk, 12.x.2003, N. S. Rathore and R. Sewak coll.

Distribution : India : Andhra Pradesh, Bihar, Gujarat, Jammu & Kashmir, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Orissa, Rajasthan (Nagaur, Sawai madhopur, Sirohi), Tamil Nadu, Tripura, West Bengal.

Elsewhere : Sri Lanka.

19. *Microtermes mycophagus* (Desneux)

2004. *Microtermes mycophagus* Rathore and Bhattacharyya, *Rec. zool. Surv. India, Occ. Pap. No.*, **223** : 47.

Caste known : Imago, soldier, worker.

Material examined : Lahpur dam area, 2 soldiers, 5 workers, 6.xi.2000, ex. from ground, N. S. Rathore coll.; Katholi forest area, 8 soldiers, 9 workers, 2.vi.2001, ex. under stone, N. S. Rathore and R. Sewak coll.

Distribution : India : Delhi, Gujarat, Haryana, Punjab, Rajasthan (Alwar, Barmer, Bikaner, Churu, Jaipur, Jaisalmer, Jalore, Jhunjhunu, Jodhpur, Nagaur, Sawai madhopur, Sikar).

Elsewhere : Pakistan.

20. *Microtermes obesi* Holmgren

2004. *Microtermes obesi* Rathore and Bhattacharyya, *Rec. zool. Surv. India, Occ. Pap. No.*, **223** : 49.

Caste known : Imago, soldier, worker.

Material examined : Raj Bagh Talab and around, 6 soldiers, 65 Workers, ex. under log, 8.xi.2000, N. S. Rathore coll.; Malik Talab and around, 7 soldiers, 50 workers, ex. from tree trunk, 3.xi.2000, N. S. Rathore coll.

Distribution : India : Bihar, Gujarat, Madhya Pradesh, Orissa, Punjab, Rajasthan (Barmer, Jaipur, Jaisalmer, Jodhpur, Kota, Nagaur, Sawai madhopur, Sikar, Udaipur), West Bengal.

Elsewhere : Bangladesh, Bhutan, Cambodia, Myanmar, Pakistan, Sri Lanka, Thailand, Vietnam.

21. *Microtermes unicolor* Snyder

2004. *Microtermes unicolor* Rathore and Bhattacharyya, *Rec. zool. Surv. India, Occ. Pap.* No., **223** : 49.

Caste known : Imago, soldier, worker.

Material examined : Malik Talab and around, 11 soldiers, 109 workers, ex. from tree trunk, 3.xi.2000, N. S. Rathore coll.; Raj Bagh Talab and around, 1 soldier, 21 workers, ex. under log, 8.xi.2000, N. S. Rathore coll.; Baghda water point, 2 soldiers, 10 workers, ex. from tree trunk, 12.x.2003, N.S. Rathore and S. Kumar coll.

Distribution : India : Gujarat, Himachal Pradesh, Jammu & Kashmir, Punjab, Rajasthan (Barmer, Ganganagar, Jaisalmer, Jalore, Jodhpur, Sawai madhopur), Uttar Pradesh.

Elsewhere : Pakistan.

SUMMARY

A total of 21 species distributed under 2 families and 4 genera have been reported from Ranthambhore National Park.

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- Rathore, N.S. and Bhattacharyya, A.K. 2004. Termite (Insecta Isoptera) Fauna of Gujarat and Rajasthan-present state of knowledge. *Rec. zool. Surv. India, Occ. Pap.* No., **223** : 1-77.

INSECTA : HETEROPTERA (AQUATIC AND SEMI AQUATIC)

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INTRODUCTION

The aquatic and semi-aquatic groups of Insects represent a significant level of diversity (Ghosh, 1996). They play an important role in fresh water ecosystems as polyphagous and carnivorous insects in different trophic levels. Because of their diverse habitats and dispersal capabilities, aquatic and semi aquatic hemipterans serve as zoogeographical indicators (Jordon, 1951; Hungerford & Matsuda, 1958). Some of the aquatic bugs are key stone predators and their abundance is essential to the existence of animal communities in an aquatic habitat (Murdoch *et al*, 1984).

Inspite of 79 genera and 284 species accommodated in 15 major families of aquatic and semi aquatic Hemiptera known from India (Thirumalai, 1999; 2002; Press), little information on water bugs of Ranthambhore National Park is available. Perusal of literature indicates paucity of information on water bugs of Rajasthan belonging to the infraorders Gerromorpha and Nepomorpha except for the reporting of 28 species under 19 genera accommodated in 9 families of aquatic and semi-aquatic bugs (Bhargava, 1985; Thirumalai 2002, Press; Thirumalai & Ramakrishna, 2002). The present account is based on the collection made available to the authors from the national park of Rajasthan. The inventory comprises of 9 species accommodated under 7 genera and 5 families, which forms the first report of this group from the national park. Under each species, citation for the original description and other accompanying work necessary to understand the taxon or its occurrence in India is given.

SYSTEMATIC LIST

INFRAORDER GERROMORPHA

Superfamily HYDROMETROIDEA

Family HYDROMETRIDAE

Subfamily HYDROMETRINAE

Genus *Hydrometra* Latreille

1. *Hydrometra greeni* Kirkaldy

Superfamily GERROIDEA

Family GERRIDAE

Subfamily GERRINAE

Genus ***Aquarius*** Schellenberg

2. *Aquarius adalaidis* (Dohrn)

Subfamily HALOBATINAE

Tribe METROCORINI

Genus ***Metrocoris*** Mayr

3. *Metrocoris communis* (Distant)

INFRAORDER NEPOMORPHA

Superfamily NEPOIDEA

Family BELOSTOMATIDAE

Subfamily BELOSTOMATINAE

Genus ***Diplonychus*** Laporte

4. *Diplonychus annulatus* (Fabricius)

5. *Diplonychus rusticus* (Fabricius)

Subfamily LETHOCERINAE

Genus ***Lethocerus*** Mayr

Subgenus ***Lethocerus*** Mayr

6. *Lethocerus (Lethocerus) indicus* (Lepeletier & Serville)

Family NEPIDAE

Sub family NEPINAE

Tribe NEPINI

Genus ***Laccotrephes*** Stål

7. *Laccotrephes griseus* (Güerin-Ménéville)

8. *Laccotrephes ruber* (Linnaeus)

Superfamily NOTONECTOIDEA

Family NOTONECTIDAE

Subfamily ANISOPINAE

Tribe ANISOPINI

Genus ***Anisops*** Spinola

9. *Anisops campbelli* Brooks

SYSTEMATIC ACCOUNT

1. *Hydrometra greeni* Kirkaldy

1898. *Hydrometra greeni* Kirkaldy *Entomologist*, **31** : 2.
 1903. *Hydrometra vittata* (Stål) : Distant, *Fauna British India*, **2** : 170.
 2004. *Hydrometra greeni* Kirkaldy : Thirumalai, *Rec. zool. Surv. India*, **102**(1-2) : 64.
 2006. *Hydrometra greeni* Kirkaldy : Thirumalai & Suresh Kumar, *Fauna of Biligiri Rangaswamy Temple Wildlife Sanctuary, Conservation Area Series*, **27** : 81.

Diagnostic characters : Anteclypeus conical, seventh abdominal strigite in male with a deep depression, fringed with short stiff hairs. In India this species occurs from near sea level to over 1500 meters elevation. Its habitats include ponds, swampy areas, rocky up and low land streams, lakes, flooded paddy fields.

Material examined : 1 Male, 8.x.2003, Kachida, Reg. : 570/6, Coll : S. Kumar; 2 Male, 1.iv.2001, Dhudhal Mal Ka Dara, Reg. : 8496/5, Coll : N.S. Rathore & R. Sewak all from Ranthambhore National Park, Rajasthan.

Distribution : India : (Very widely distributed); Bangladesh; China; Nepal; Sri Lanka; Sumatra; Thailand & Vietnam.

2. *Aquarius adelaidis* (Dohrn)

1860. *Gerris adelaidis* Dohrn, *Stettin. ent. Ztg.*, **21** : 408.
 1896. *Gerris spinolae* Leth & Ser., *Cat. gen. Hemiptera*, **3** : 63.
 1903. *Gerris spinolae* (Leth. & Ser.) : Distant, *Fauna British India*, **2** : 180.
 1990. *Aquarius adelaidis* (Dohrn) : Andersen, *Steenstrupia*, **16**(4) : 61.
 2004. *Aquarius adelaidis* (Dohrn) : Thirumalai, *Rec. zool. Sur. India*, **102**(1-2) : 59.

Diagnostic characteristics : The first antennal segment is the longest, the head, rostrum, pronotum and forelegs are black. The hind margin of pronotum is brownish yellow; forewing dark brown in macropterous forms with dark brownish veins; the hind margin of the 7th sternum with a large triangular impression in middle. This is one of the very common species inhabiting the permanent water bodies in India, with both macropterous and apterous forms. This species is found in all lentic habitats and recorded from deep wells in Southern India.

Material examined : 1 Male (winged). 2 Female, 5 Male (Br) and 1 immature, 24.xi.2002, Dhudhal Mal Ka Darra, Reg. : 10292/5 Coll : S. Kumar all from Ranthambhore National Park, Rajasthan.

Distribution : India; Bangladesh; China; Indonesia; Myanmar; Nepal; Philippines; Sri Lanka; Thailand; Vietnam.

3. *Metrocoris communis* (Distant)

1910. *Euodus communis* Distant, *Ann. Mag. nat. Hist.*, **5**(8) : 151.

1929. *Metrocoris communis* (Distant), Esaki, *Ann. Mag. nat. Hist. Soc.*, **4**(10) : 419.
1965. *Metrocoris communis* (Distant) : Den Boer, *Zool. Verh. Leiden.*, **74** : 13.
1993. *Metrocoris communis* (Distant) : Thirumalai, *Chen & Nieser, Steenstrupia*, **19**(2) : 49.
2002. *Metrocoris communis* (Distant) : Thirumalai, *Rec. zool. Surv. India*, **100**(1-2) : 65.
2006. *Metrocoris communis* (Distant) : Thirumalai & Suresh Kumar, *Zool. Surv. India Fauna of Conservation Area Series*, **27** : 77.

Diagnostic characters : A small (4.5 to 5.8 mm) oval, black and yellow water strider with black marking on dorsal side of head and thorax. The pronotum of wingless forms with 'T' shaped black pattern and the winged form with a median black longitudinal stripe almost reaching tip with a pair of lateral black stripes on posterior lobe. The 7th ventral segment of female with a tuft of dark brown hairs on either side laterally. *M. communis* found abundant in still or smooth flowing shaded streams, where they stroke and glide across the surface.

Material examined : 1 Male (Apterous), 23.xii.2002, Bagdha water point, Reg. : 10254/5, Coll : S. Kumar all from Ranthambhore National Park, Rajasthan.

Distribution : India; Afghanistan; Iran; Iraq; Oman.

4. *Diplonychus annulatus* (Fabricius, 1781)

1781. *Nepa annulata*, Fabricius, *Carol. Ernest. Bokhnii. Hamburgi et Kiloni*, 333.
1832. *Belostoma marginata* Gray, *Griffith's Animal King., Insecta.*, **2** : 248.
1863. *Sphaerodema annulatum* (Fabricius) : Dufour, *Ann. Soc. Entomol. France*, **4**(3) : 397.
1906. *Sphaerodema annulatum* (Fabricius) : Distant, *Fauna British India*, **3** : 35.
1995. *Diplonychus annulatus* (Fabr.) : Polhemus et al, *Proc. Entomol. Soc. Washington*, **97** : 651.
2002. *Diplonychus annulatus* (Fabr.) : Thirumalai, Metha & Sharma, *Res. Bull. Punjab Univ.*, **52** : 157.
1833. *Sphaerodema rotundata* Laporte, *Systematique Hemipteres, zoologie*, Paris : 18.
1985. *Abedus sangameshwari* Rupavathi, Ph.D Dissertation, Nagarjuna University, Andhra Pradesh, 169.

Diagnostic characters : Size more than 20 mm with greatest expense of hemelytra which together size up the body length. The fore tarsus is two segmented.

Material examined : 1 Male and 1 Female, 1.iv.2001, Dhudhal Mal Ka Darra, Reg. : 8495/5, Coll : N.S. Rathore & R. Sewak all from Ranthambhore National Park, Rajasthan.

Distribution : India; China.

5. *Diplonychus rusticus* (Fabricius)

1781. *Nepa rustica* Fabricius, *Species insectorum*, **2** : 333.
 1776. *Nepa plana* Sulzer, abgek. *Gesch. Insect*, 92.
 1863. *Appasus marginicollis* Dufour, *Ann. Soc. Ent. France*, **4**(3) : 393.
 1868. *Diplonychus rusticus* (Fab) : Mayr, *Zoolog. TeilWien*, 188.
 1871. *Diplonychus rusticum* (Fab) : Mayr, *Verh. zool.-bot. Ges. Wien*, **21** : 437.
 1906. *Sphaerodema rusticum* (Fab.) : Distant, *Fauna British India*, **3** : 36.
 1915. *Sphaerodema rustica* (Fab) : Bergroth, *J. Bombay nat. Hist.*, **24** : 179.
 1934. *Diplonychus rusticum* (Fab) : Lundblad, *Arch. Hydrobiol. Suppl.*, **12** : 55.
 1961. *Diplonychus rusticus* (Fab.) : Lauck & Menke, *Ann. Entomol. Soc. Amer.*, **54** : 649.
 1980. *Diplonychus indicus* Venkatesan & Rao, *J. Bombay. nat. Hist. Soc.* **77** : 299.
 2005. *Diplonychus rusticus* (Fab.) : Thirumalai & Suresh Kumar, *Rec. zool. Surv. India*, **105** : 13.

Diagnostic characters : This species has a single segmented fore tarsus with small claw, pale lateral basal margins of pronotum and its head length is shorter than the width between the eyes. This species is commonly found in fishponds and voraciously feeds on fish fry, mosquito larvae and other aquatic invertebrates.

Material examined : 1 Female, 1.iv.2001, Dhudhal Mal Ka Darra, Reg. : 8495/5, Coll : N.S. Rathore & R. Sewak; 4 B&, 3 Male, 8.x.2003, Kachida, Reg. : 568/6; 4 Female, 1 Male, 9.x.2003, Bagdha, Reg. : 606/6; 1 Female, 1 Male, 13.x.2003, Gilai sagar, Reg. : 710/6; 2 Female, 1 Male, 10.x.2003, Malik Talab, Reg. : 630/6, Coll : S. Kumar all from Ranthambhore National Park Rajasthan.

Distribution : India; Australia; China; Indonesia; Japan; Malaysia; Myanmar; New Guinea; New Zealand; Sri Lanka; Thailand.

6. *Lethocerus (Lethocerus) indicus* (Lepeletier & Serville)

1825. *Belostoma indica* Lepeletier & Serville, *Encycl. Meth*, **X** : 272.
 1871. *Belostoma indicum* Lepeletier & Serville, Mayr, *Verh. zool. bot. Ges. Wien*, **21** : 426.
 1901. *Amorgius indicus* Kirkaldy, *Entomologist*, **34** : 51.
 1906. *Belostoma indicum* (Lepeletier & Serville) : Distant, *Fauna British India*, **3** : 38.
 1911. *Belostoma indica* Lepeletier & Serville) : D'Abreu, *J. Bombay nat. Hist.*, **20** : 883.
 1927. *Lethocerus indicus* (Lep. & Serv.) : Torre-Bueno, *Bull. Brooklyn Entomol. Soc.*, **22** : 30.
 1934. *Lethocerus indicus* (Lep. & Serv.) : Lundblad, *Arch. Hydrobiol. Suppl.*, **12** : 52.
 1939. *Lethocerus indicus* (Lep. & Serv.) : Hafiz & Ribeiro, *Rec. Indian Mus.*, **41**(4) : 432.
 1995. *Lethocerus indicus* (Lep. & Serv.) : Polhemus et al., *Cat. Het. Palaerctic region*, **1** : 23.

2004. *Lethocerus indicus* (Lep. & Serv.) : Thirumalai, *Rec. zool. Surv. India*, **102**(1-2) : 67.

Diagnostic characters : The 'giant Indian water bug' large, elongate, dorsoventrally flattened brown aquatic bug; divergent yellow line on anterior lobe of pronotum broad; eyes twice as long as wide and elongate. Members of this genus are found in deeper water bodies such as pond, lakes, flooded paddy fields etc.

Material examined : 3 Male, 5 Female, 11.x.2003, Dhudhal Mal Ka Darra, Reg. : 796/6; 2 Female and 1 Male, 15.x.2003, Raj Bagh Talab, Reg. : 778/6, Coll : N.S. Rathore & S. Kumar all from Ranthambhore National Park, Rajasthan.

Distribution : India; China; Indonesia; Malaysia; Myanmar; Pakistan; Sri Lanka.

7. *Laccotrephes griseus* (Güerin-Méneville)

1844. *Nepa griseus* Güerin-Méneville, *Iconogr. Regne. Anim. Ins.*, : 352.

1910. *Laccotrephes griseus* (Güerin-Méneville) : Distant, *Fauna British India*, **5** : 314.

1947. *Laccotrephes griseus* (Güerin-Méneville) : Hafiz & Pradhan, *Rec. Indian Mus.*, **45** : 363.

1988. *Laccotrephes griseus* (Güerin-Méneville) : Ravishankar and Venkatesan, *Entomon*, **13** : 227.

1989. *Laccotrephes griseus* (Güerin-Méneville) : Thirumalai, *Misc., Occ. Pap, Rec. zool. Surv. India*, **118** : 28.

1994. *Laccotrephes griseus* (Güerin-Méneville) : Thirumalai, *Misc. Occ. Pap. Rec. zool. Surv. India*, **165** : 21.

2004. *Laccotrephes griseus* (Güerin-Méneville) : Thirumalai, *Rec. zool. Surv. India*, **102** : 66.

Diagnostic characters : This species can be identified by the presence of slightly hooked and symmetrical parameres, abdominal appendages shorter than the body, presence of an obtusely rounded tooth at the base of the anterior femora. This species is commonly found in Peninsular India. It is a very sluggish species often found under weeds or at the bottom of slow or stagnant waters.

Material examined : 1 Female, 1 Male, 31.iii.2001, Mansarovar, Reg. : 8466/5, Coll : N. S. Rathore & R. Sewak all from Ranthambhore National Park, Rajasthan.

Distribution : India; Malaysia; Myanmar; Seychelles; Sri Lanka; Thailand.

8. *Laccotrephes ruber* (Linnaeus)

1764. *Nepa ruber* Linnaeus, *Mus. Lud. Ulr.*, : 165.

1906. *Laccotrephes ruber* (Linn.) : Distant, *Fauna Brit. India*, **3** : 18.

1947. *Laccotrephes ruber* (Linn.) : Hafiz & Pradhan, *Rec. Indian Mus.*, **45** : 364.

1981. *Laccotrephes robustus* Stål : Selvanayagam & Rao, *J. Bombay, Nat. Hist.*, **78** : 621.

1989. *Laccotrephes ruber* (Linn.) : Thirumalai, *Misc., Occ., Pap., Rec., zool., Surv. India*, **118** : 29.

1994. *Laccotrephes ruber* (Linn.) : Thirumalai, *Misc. Occ. Pap. Rec. zool., Surv, India*, **165** : 22.

2004. *Laccotrephes ruber* (Linn.) : Bal & Basu, *Zool. Surv. India, State Fauna*, **10** : 298.

2006. *Laccotrephes ruber* (Linn.) : Thirumalai & Suresh Kumar, *Rec. zool. Surv. India*, **105** : 11.

Diagnostic characteristics : This is a common species with wide distribution in the Indo-Australian region and is largely found inhabiting rivers, streams, tanks, etc. The abdominal appendices are distinctly longer than the body, the prosternum is convex in the middle and has a curved and hook shaped male paramere.

Material examined : 3 Male, 8.xi.2000, Raj Bagh Talab, Reg. : 8386/5, Coll : N. S. Rathore all from Ranthambhore National Park, Rajasthan.

Distribution : India; China; Japan; Nepal; Pakistan & Taiwan.

9. *Anisops campbelli* Brooks

1951. *Anisops campbelli* Brooks, *Kans. univ. Sci. Bull.*, **34** : 322.

1964. *Anisops campbelli* Brooks : Lansbury, *Ann. zool. Warszawa*, **22** : 213.

2001. *Anisops campbelli* Brooks : Thirumalai, *Fauna conservation area*, **11** : 117.

2004. *Anisops campbelli* Brooks : Thirumalai, *Rec. zool. Surv. India*, **102**(1-2) : 65.

Diagnostic characteristic : The interocular space in male projects anteriorly into a very short cephalic horn. The parameres are asymmetrical with the left very deeply excavate on the posterior margin. The ovipositor with two rows of longitudinal teeth and seven tooth-like lateral setae near apex. It is almost entirely confined to the Indian subcontinent.

Material examined : 3 Female, 9 Male, 11.x.2003, Dhudhal Mal Ka Darra, Reg. : 660/6, Coll : S. Kumar all from Ranthambhore National Park, Rajasthan.

Distribution : India; Myanmar.

DISCUSSION

Information on families, habitats, species of Gerromorpha and Nepomorpha known from world, India, Rajasthan and Ranthambhore National Park are provided in the Table 1. The aquatic and semi aquatic groups of insects are overall indicators of both recent and long-term environmental conditions (Thirumalai & Raghunathan, 1988; Patrick & Palavage, 1994; Ramakrishna, 2000). Inventorisation of aquatic insect resources becomes a high priority area to study the functional aspects of community structure incorporated in food webs that provides information on energy flow (Ananthakrishnan, 1999). The present report of 9 species of water bugs from Ranthambhore National Park, represents about 32.2 % & 3.2 % of the group so far known from Rajasthan and India respectively. Thus, the present study reaffirms the necessity of further intensive systematic exploration of this group from the National Park.

Table : 1. Families, habitats, species of Gerromorpha & Nepomorpha associated with water.

Family	Habitat	World	India	Rajasthan	RNP
	Infraorder GERROMORPHA				
Gerridae	(water striders)-surface of fresh & brackish waters (sea)	696	79	6	2
Hebridae	(velvet water bugs)-marshes & wet riparian mosses				
	Infraorder Nepomorpha	192	15	—	—
Hydrometridae	(water measurers)-surface of calm waters	125	3	1	1
Mesoveliidae	(water treaders)-vegetated banks of ponds & lakes	46	3	1	—
Vellidae	(riffle bugs)-surface of ponds & streams, also brackish	876	31	1	—
	Infraorder Nepomorpha				
Aphelocheiridae	(bottom bugs) lentic & lotic	63	5	—	—
Belostomatidae	(giant water bugs)-ponds, on vegetation	143	6	3	3
Corixidae	(water boatmen)-fresh & brackish lentic waters	552	48	5	—
Gelastocoridae	(toad bugs)-shorelines, in mud & plant debris	103	4	—	—
Helotrephidae	(beetle back-swimmers) ponds & lakes on vegetation	171	13	—	—
Naucoridae	(creeping water bugs)-lentic & lotic, stones & vegetation	325	17	—	—
Nepidae	(water scorpions)-ponds, on vegetation	230	24	4	2
Notonectidae	(back-swimmers)-ponds and lakes	347	31	6	1
Ochteridae	(shore bugs)-stream margins, pond vegetation	36	1	—	—
Pleidae	(pygmy back-swimmers)-ponds & lakes, on vegetation	36	4	1	—

SUMMARY

The present paper deals with nine species of aquatic bugs collected from Ranthambhore National Park belonging to six families. Many species are predaceous in nature and also attracted to light.

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INSECTA : COLEOPTERA : SCARABAEIDAE

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INTRODUCTION

The beetles are one of the largest and predominant insect order in the animal kingdom and they greatly differ in size, structure, habit and adaptability and play very important role in national economy and found through out the world. The beetles found in the dung of herbivorous mammals are popularly known as "Dung Beetle" or "Dung Roller" and largely depends for their food, and are abundantly found in rainy season. The dung beetles as a whole can be pronounced as useful to mankind as Coprinae because not a single species of Coprinae is known to feed upon living matter or any substances of commercial value. The various species of Coprinae serve as an intermediate hosts for parasitic worms of domestic animal which causes disease. They also break down tones of animal excrement (dung) and remove from the soil surface to make clean and healthy environment and at the same time much of it incorporate into the soil to increase the soil fertility.

The present study is based on the collection of dung beetles collected from "Ranthambhore National Park" by the parties of Desert Regional Station, Zoological Survey of India, Jodhpur during 1999 to 2003. A total of 28 species belonging to 11 genera have been recorded for the first time and collected from the dung of various species of small and large mammals. Research works referred in this paper are by (Arrow, 1931; Balthasar, 1963; Biswas, 1978 a & b; Biswas & Chatterjee, 1985; Gorden & Oppenheimer, 1975; Sewak, 1985, 1986, 1991, 2004 a & b, 2005, 2006). The taxonomic data of dung beetles from "Ranthambhore National Park" will be helpful to taxonomist, economic entomologist and biodiversity worker for the future research plans.

SYSTEMATIC ACCOUNT OF DUNG BEETLE

Class INSECTA

Order COLEOPTERA

Suborder POLYPHAGA

Superfamily SCARABAEOIDEA

Family SCARABAEIDAE

Subfamily COPRINAE

Tribe I SCARABAEINI

Genus 1 ***Gymnopleurus*** Illiger

1. *Gymnopleurus cyaneus* Fabricius*

2. *Gymnopleurus miliaris* Fabricius *

Tribe II COPRINI

Genus 2 ***Heliocopris*** Burmeister3. *Heliocopris gigas* Linnaeus*Genus 3 ***Catharsius*** Hope4. *Catharsius molossus* Linnaeus*Genus 4 ***Copris*** Geoffroy5. *Copris repertus* Walker*6. *Copris numa* Lansberge*7. *Copris cribratus* Gillet*8. *Copris furciceps* Felsche*Genus 5 ***Disphysema*** Harold9. *Disphysema candezei* Harold*Genus 6 ***Onthophagus*** Latreille10. *Onthophagus troglodyta* Wiedemann*11. *Onthophagus catta* Fabricius*12. *Onthophagus seniculus* Fabricius*13. *Onthophagus kuluensis* Bates*14. *Onthophagus semicinctus* D'orbigny*15. *Onthophagus angus* Gillet*16. *Onthophagus tragus* Fabricius*17. *Onthophagus ensifer* Boucomont18. *Onthophagus cervus* Fabricius*Genus 7 ***Liatongus*** Reitter19. *Liatongus martialis* Harold*Genes 8 ***Oniticellus*** Serville20. *Oniticellus pallipes* Fabricius*21. *Oniticellus cinctus* Fabricius*Genus 9 ***Drepanocerus*** Kirby22. *Drepanocerus exsul* Sharp*Genus 10 ***Onitis*** Fabricius23. *Onitis siva* Gillet*

- 24. *Onitis lama* Lansberge*
- 25. *Onitis philemon* Fabricius*
- 26. *Onitis castaneus* Redtenbacher*
- 27. *Onitis brahma* Lansberge*

Genus 11 ***Chironitis*** Redtenbacher

- 28. *Chironitis indicus* Lansberge*

Key to the tribes of Subfamily COPRINAE

- 1. Middle coxae not widely separated; middle tibia with one terminal spur SCARABAEINI
- Middle coxae widely separated, middle tibia with two terminal spurs 2
- 2. Posterior legs extremely long, the tarsi filiform Sisyphini
- Basal joint of the hind tarsus much longer than the second 3
- 3. Posterior legs not extremely long, tarsi more or less flat and tapering COPRINI
- Basal joint of the hind tarsus not much longer than the second PANELINI

Tribe 1. SCARABAEINI

The body is rather depressed and legs are very slender, middle and hind tibiae are narrow and dilated at the each end, bearing a single terminal spur and tarsi filiform. The clypeus is produced into two or more lobes at front margin and ocular lobes are prominent. The male and female are generally alike and ball rollers.

The tribe consists of two genera *Scarabaeus* and *Gymnopleurus*. The two species of *Gymnopleurus* have been recorded from Ranthambhore National Park.

Genus 1 ***Gymnopleurus*** Illiger 1803

- 1803. *Gymnopleurus* Illiger, *Mag. Ins.*, 2 : 199.
- 1807. *Gymnopleurus* Latreille, *Gen. Crust. Ins.*, 2 : 78.
- 1856. *Gymnopleurus* Lacordaire, *Gen. Col.*, 3 : 73.
- 1931. *Gymnopleurus* Arrow, *Fauna of British India including Ceylon and Burma* (Coleoptera Lamellicornia Coprinae), 3 : 46-48.
- 1963. *Gymnopleurus* Balthasar, *Monographie der Scarabaeidae und Aphodiidae der Palaearktischen und Orientalischen Region* (Coleoptera Lamellicornia), 1 : 177-182.

Diagnostic Characters : Small broad and depressed. The clypeus is completely fused with the ocular lobes and produced into two or four short teeth at front margin. The prothorax is large and convex, having several patches dorsally. The fore legs are

short and stout and the front tibia is armed with three external teeth. The all six tarsi are filiform. The scutellum is visible. Male and female are almost alike and ball rollers.

Key to Species of Genus *Gymnopleurus*

1. Clypeus with four teeth and upper surface without hairy clothing *cyaneus* Fabricius
- Upper surface with hairy clothing *miliaris* Fabricius

1. *Gymnopleurus cyaneus* Fabricius

1971. *Copris cyaneus* Fabricius, *Ent. Syst. Suppl.*, p. 34.

1840. *Gymnopleurus indicus* Castest, *Hist. Nat.*, 2 : 73.

1840. *Gymnopleurus impressus* Castest, *Hist. Nat.*, 2 : 73.

1931. *Gymnopleurus cyaneus* Arrow, *Fauna of British India including Ceylon and Burma* (Coleoptera Lamellicornia Coprinae), 3 : 49-50.

Material examined : Amaghati, 2 exs., 4.xii.1999, coll. R. Sewak.

Diagnostic Characters : Broadly oval and not very convex. The clypeus is with four blunt teeth at its anterior edge and the sides of the prothorax are strongly rounded. The front femur is having a tooth placed at two-third of its length from the base. The middle tibia is scarcely and hind tibia distinctly serrate. The all six tarsi are present.

Distribution : India : Rajasthan : Sawai madhopur and also recorded from Andhra Pradesh, Gujarat, Haryana, Karnataka, Tamil Nadu, Uttar Pradesh and West Bengal. Elsewhere: Bangladesh and Sri Lanka.

2. *Gymnopleurus miliaris* Fabricius

1725. *Scarabaeus miliaris* Fabricius, *Syst. Ent. App.*, p. 817.

1931. *Gymnopleurus miliaris* Arrow, *Fauna of British India including Ceylon and Burma* (Coleoptera Lamellicornia Coprinae), 3 : 50-51.

Material examined : Rambheet, 4 exs., 6.xii.1999, coll. R. Sewak.

Diagnostic Characters : Broadly oval and not very convex. The upper surface is closely clothed with minute grey setae. The clypeus is having four blunt lobes at its front edge. The prothorax is having a ring of five spots along with a centrally located spot, one on each side near the lateral pit, two spots adjoining the basal margin of each, one near the middle and one upon the apical callus. The front tibia is armed with three external strong teeth and the middle and hind tibiae are coarsely serrate. The front femur has two sharp carinae along its anterior margin.

Distribution : India : Rajasthan : Sawai madhopur and also recorded from Gujarat, Haryana, Himachal Pradesh, Jammu & Kashmir, Karnataka, Madhya Pradesh, Maharashtra, Orissa, Tamil Nadu and Uttar Pradesh.

Elsewhere : Sri Lanka.

Tribe 2. COPRINI

The head and prothorax are generally bearing horns, tubercle and carinae. The legs are not very slendered; middle and hind coxae are far apart and more or less parallel. The middle and hind tibiae are dilated towards the extremity and the middle with two and hind with one terminal spur. The middle and hind tarsi are more or less flattened.

The tribe Coprini consists of the most commonly found genera and species of dung beetles those are known with an ample of morphological variation in size and forms. The twenty six species belonging to ten genera have been recorded from Ranthambhore National Park.

Key to Genera of Tribe Coprini

1. Prothorax with one lateral carina, and 1st antennal joint of club shining.....*Heliocopris* Burmiester.
- First joint of antennal club not shining 2
2. Antennal club entirely pubescent *Catharsius* Hope
- Prothorax without carina and elytra with one lateral carina 3
3. Prothorax with a strong deep basal median groove *Copris* Geoffroy
- Prothorax without a strong deep basal median groove 4
4. Wing less, elytra very much narrowed at the shoulder *Disphysema* Harold
- Winged and the terminal margin of front tibia not at right angle to the inner margin, anterior angle of prothorax not hollowed 5
5. Middle and hind tibiae not dilating from base to extremity *Onthophagus* Latreille
- Middle and hind tibiae dilating from base to extremity 6
6. Scutellum present, elytra not fringed before the hind margin *Liatongus* Reitter
- Elytra fringed before the hind margin 7
7. Sides of the abdomen exposed above *Oniticellus* Serville
- Sides of the abdomen not exposed above 8
8. Clypeus bidented and scutellum distinct *Drepanocerus* Kirby
- Prothorax with two basal impression near the middle 9
9. Scutellum very minute and front tarsi absent in male and female *Onitis* Fabricius
- Scutellum not very minute and front tarsi present in female *Chironitis* Lansberge

Genus 2 *Heliocopris* Burmeister 1846

1846. *Heliocopris* Burmeister, *Gen. Ins. Col.*, **10** : 27, figs. 1-8.
 1856. *Heliocopris* Lacordaire, *Gen. Col.*, 98.
 1931. *Heliocopris* Arrow, *Fauna of British India including Ceylon and Burma* (Coleoptera Lamellicornia Coprinae), **3** : 84-85.
 1963. *Heliocopris* Balthasar, *Monographie der Scarabaeidae und Aphodiidae der Palaearktischen und Orientalischen Region* (Coleoptera Lamellicornia), **1** : 297-300.

Diagnostic Characters : Body large, broad and massive. The head is large with cephalic horn or carina. The clypeus is rounded or slightly in the middle. The eyes are not very deeply divided and antennae nine jointed. The prothorax is with complete basal groove. The front coxae prominent, middle long nearly parallel and not very widely separated and the hind coxae with stridulatory ridges at the inner end within the coxal cavities. The abdomen is completely covered by elytra.

The single species of the genus *Heliocopris gigas* has been recorded from Ranthambhore National Park.

3. *Heliocopris gigas* Linnaeus

1764. *Scarabaeus gigas* Linnaeus, *Mus. Lud. Ulr*, p. 16.
 1775. *Scarabaeus midas* Fabricius, *Syst. Ent.*, p. 21.
 1789. *Scarabaeus midas* Olivier, *Ent.*, **1**(3) : 99, Pl. 20, Fig. 183.
 1819. *Scarabaeus midas* Latreille, *Mem. Mus. Hist. Nat.*, **5** : 18, Fig. 11.
 1840. *Copris isidis* Castelnau, *Hist. Nat.*, **2** : 76, Pl. IV, Fig. 5.
 1868. *Heliocopris endersoni* Bates, *Col. Hefte*, **4** : 88.
 1928. *Heliocopris gigas* Arrow, *Trans. Ent. Soc. Lond.*, p. 74, Pl. 5, Figs. 3 & 4.
 1931. *Heliocopris gigas* Arrow, *Fauna of British India including Ceylon and Burma* (Coleoptera Lamellicornia Coprinae), **3** : 86, Pl. IV, Fig. 1-4.
 1963. *Heliocopris gigas* Balthasar, *Monographie der Scarabaeidae und Aphodiidae der Palaearktischen und Orientalischen Region* (Coleoptera Lamellicornia), **1** : 300-302, Pl. XII, Fig. 2.

Material examined : Gilai Sagar Dam, 2 exs., 7.xii.1999, coll. R. Sewak.

Diagnostic Characters : Broad and very convex. The clypeus is hollowed and its margin with two prominence on each sides. The prothorax is short and broad and with a steep anterior declivity bearing reddish hairs. The elytra are having sutural border, sloping strongly from the suture to each side and the sutural region is strongly rounded from base to apex. The pygidium is smooth and shining with very sparse fine scattered punctures. The metasternal shield is densely clothed with hair. In the male the outer margin of the clypeus at the junction of the ocular lobes is produced upward as a pair of long slightly curved parallel cephalic horns and the prothorax is dorsally produced forward in the middle as broad, tapering horizontal process which

is truncated at its extremity. The female is having a sharply elevated transverse cephalic carinae and prothorax with slight broadly rounded prominence in the middle.

Distribution : India : Rajasthan : Sawai madhopur and also recorded from Bihar, Gujarat, Karnataka and Uttar Pradesh.

Elsewhere : Africa, Arabia, Egypt, Pakistan.

Genus 3 *Catharsius* Hope 1837

1837. *Catharsius* Hope, *Col. Man.*, **1** : 21.

1846. *Catharsius* Burmeister, *Gen. Ins. Col.*, **10** : 27.

1848. *Catharsius* Erichson. *Ins. Deutschl.*, **3** : 761.

1931. *Catharsius* Arrow, *Fauna of British India including Ceylon and Burma* (Coleoptera Lamellicornia Coprinae), **3** : 92.

1963. *Catharsius* Balthasar, *Monographie der Scarabaeidae und Aphodiidae der Palaearktischen und Orientalischen Region* (Coleoptera Lamellicornia), **1** : 304-305.

Diagnostic Characters : Broad, Compact and very convex. The head is broad and semicircular. The prothorax is completely margined at the base. The middle coxae are long, parallel and far apart. The middle and hind tibiae are strongly dilated from base to extremity. The middle tibia with two and hind tibia with one terminal spur. The scutellum is wanting. The elytra consist of seven striae and completely cover the abdomen.

The single species *Catharsius molossus* has been recorded from Ranthambhore National Park, Sawai madhopur.

4. *Catharsius molossus* Linnaeus

1758. *Scarabaeus molossus* Linnaeus, *Syst. Nat. ed.*, p. 347.

1789. *Scarabaeus molossus* Oliver *Ent.*, **3**(1) : 100, pl. 19, fig. 25.

1801. *Copris ursus* Fabricius, *Syst. Eleuth.*, **1** : 43.

1931. *Catharsius molossus*, Arrow, *Fauna of British India including Ceylon and Burma* (Coleoptera Lamellicornia Coprinae), **3** : 94-95.

1963. *Catharsius* (s. str.) *molossus* Balthasar, *Monographie der Scarabaeidae und Aphodiidae der Palaearktischen und Orientalischen Region* (Coleoptera Lamellicornia), **1** : 307-309.

Material examined : Dhudhal Mal Ka Darra; Malik Talab, 5 exs., 6.xii.1999, coll. R. Sewak; 10.x.2003, coll. S. Kumar.

Diagnostic Characters : Broadly oval and very convex, partially clothed with reddish hairs beneath. The head is broad, with front margin almost imperceptibly excised in the middle. The sides of the prothorax are rounded, the front angles are broadly truncate and the hind angles almost obsolete, and the lateral scars are large and deep. The metasternal shield is acutely angular in front and longitudinally grooved in its hinder part. The front tibia is armed with three external teeth; the

middle and hind tibiae are broad and crenate at the extremity. The male is having a conical, median cephalic horns, broad and a little fattened behind at the base, sharply pointed at the tip. The prothorax has a steep declivity in front, the upper edge of which forms a sharp ridge feebly convex in the middle and curved with its extremities. The head of the female has a short and pointed process and the prothorax with nearly straight ridge.

Distribution : India : Rajasthan : Sawai madhopur and also recorded from Arunachal Pradesh, Assam, Bihar, Andaman & Nicobar, Gujarat, Haryana, Himachal Pradesh, Karnataka, Kerala, Maharashtra, Meghalaya, Orissa, Sikkim, Tamilnadu, Uttar Pradesh and West Bengal.

Elsewhere : Sri Lanka.

Genus 4 *Copris* Geoffroy 1762

1762. *Copris* Geoffroy, *Ins. Des. Env. De Paris*, 87.

1785. *Copris* Fourcroy, *Ent. Paris*, 1 : 13.

1856. *Copris* Lacordaire, *Gen. Col.*, 3 : 96.

1931. *Copris* Arrow, *Fauna of British India including Ceylon and Burma* (Coleoptera Lamellicornia Coprinae), 3 : 102.

1963. *Copris* Balthasar, *Monographie der Scarabaeidae und Aphodiidae der Palaearktischen und Orientalischen Region* (Coleoptera Lamellicornia), 1 : 317-319.

Diagnostic Characters : Compact, convex or little depressed. The head is broad, more or less semicircular and clypeus notched in the middle at front margin. The prothorax is broad and transverse and its front margin furnished with membranous fringe and hind margin with a deep median groove. The middle coxae are long and nearly parallel. The tarsi are short and basal joint about twice as long as the second. The scutellum is wanting. The elytra are not very short, having eight striae and single lateral carina.

The four species of the genus *Copris* have been recorded from Ranthambhore National Park.

Key to the species of Genus *Copris*

1. The side of the metasternum closely punctured and sparsely setose. Elytra feebly striate *repertus* Walker
 - Prothorax without sharp anterior declivity 2
2. Elytra deeply striate and clypeus feebly notched and elytra feebly notched in the middle at front margin *numa* Lansberge
 - The clypeal margin not notched in the middle at front margin 3
3. Prothorax and elytra strongly punctured *cribratus* Gillet
 - Elytra lightly striate. Prothorax, elytra and metasternal shield well punctured and not smooth behind *furciceps* Felsche

5. *Copris repertus* Walker

1858. *Copris repertus* Walker, *Ann. Mag. Nat. Hist.*, **3**(2) : 208.

1877. *Copris claudius* Harold, *Ann. Mus. Civ. Genova*, **10** : 48.

1886. *Copris repertus* Lansberge, *Tijds. Ent.*, **29** : 11.

1931. *Copris repertus* Arrow, *Fauna of British India including Ceylon and Burma* (Coleoptera Lamellicornia Coprinae), **3** : 126-127, pl. X, figs. 8 & 9.

1963. *Copris repertus* Balthasar, *Monographie der Scarabaeidae und Aphodiidae der Palaearktischen und Orientalischen Region* (Coleoptera: Lamellicornia), **1** : 351-352.

Material examined : Galai Sagar Dam; Rajbagh, 3 exs., 7.xii.1999, coll. R. Sewak and 15.x.2003, coll. S. Kumar.

Diagnostic Characters : Broadly oval and highly convex and covered with reddish bristles beneath. The head is semicircular and the clypeus is deeply notched in the middle. The prothorax is strongly grooved longitudinally in the middle, the front angles are truncate and the hind angles almost obsolete. The front tibia is broad and armed with four external teeth and nearly straight. The male bears a slendered slightly compressed erect cephalic horn and with a minute tooth near the base on each side and female with short transverse elevated cephalic carina.

Distribution : India : Rajasthan : Sawai madhopur and also recorded from Arunachal pradesh, Bihar, Gujarat, Karnataka, Maharashtra, Madhya Pradesh, Pondicherry, Tamilnadu and Uttar Pradesh.

Elsewhere : China, Myanmar and Sri Lanka.

6. *Copris numa* Lansberge

1986. *Copris numa* Lansberge, *Tizds. Ent.*, **29** : 19.

1931. *Copris numa* Arrow, *Fauna of British India including Ceylon and Burma* (Coleoptera Lamellicornia Coprinae), **3** : 121-122, pl. X, fig. 14.

1963. *Copris numa* Balthasar, *Monographie der Scarabaeidae und Aphodiidae der Palaearktischen und Orientalischen Region* (Coleoptera Lamellicornia), **1** : 364-365.

Material examined : Amaghati; Rambheet Village, 11 exs., 4.xii.1999 & 6.xii.1999, coll. R. Sewak.

Diagnostic Characters : Narrowly oval and moderately convex, covered with reddish bristles beneath. The clypeus is feebly excised in the middle at front margin and with a very short conical cephalic process just in front of the eyes. The median prothoracic groove is extended from basal groove to in front of the middle, and the front angles are truncate and hind angles obsolete. The middle and hind tibiae are trilobed at the extremity. The front tibial spurs of the male are blunt and slightly spatulate and the female front tibial spurs are pointed.

Distribution : India : Rajasthan : Sawai madhopur and also recorded from

Arunachal Pradesh, Assam, Gujarat and Uttar Pradesh.

Elsewhere : Borneo, Malaya Peninsula, Myanmar, Sumatra and Tenassrim.

7. *Copris cribratus* Gillet

1927. *Copris cribratus* Gillet, *Ann. Soc. Ent. Belg.*, **67** : 253.

1931. *Copris cribratus* Arrow, *Fauna of British India including Ceylon and Burma* (Coleoptera Lamellicornia Coprinae), **3** : 129.

1963. *Copris cribratus* Balthasar, *Monographie der Scarabaeidae und Aphodiidae der Palaearktischen und Orientalischen Region* (Coleoptera Lamellicornia), **1** : 373-374.

Material examined : Gilai Sagar Dam, 5 exs., 7.xii.1999, coll. R. Sewak.

Diagnostic Characters : Chocolate brown and more reddish beneath, the bristles are only present on the legs and the punctures with pale minute setae. The front clypeal margin is strongly bidentate at the middle. The front angles of the prothorax are broadly rounded and prominent and hind angles almost obsolete. The front tibia is broad and armed with four sharp external teeth.

Distribution : India : Rajasthan : Sawai madhopur and also recorded from Arunachal Pradesh, Gujarat, Kerala, Meghalaya and Uttar Pradesh.

8. *Copris furciceps* Felsche

1910. *Copris furciceps* Felsche, *Deutsche. Ent. Zeitscher*, p. 348.

1931. *Copris furciceps* Arrow, *Fauna of British India including Ceylon and Burma* (Coleoptera Lamellicornia Coprinae), **3** : 130-131.

1963. *Copris (Paracopris) furciceps* Balthasar, *Monographie der Scarabaeidae und Aphodiidae der Palaearktischen und Orientalischen Region* (Coleoptera Lamellicornia), **1** : 372.

Material Examined : Malik Talab, 8 exs., 4.xii.1999, coll. R. Sewak.

Diagnostic Characters : Oval and not very convex. The head is very smooth and shining in front, strongly and closely punctured behind. The prothorax is densely punctured; the front angles are blunt and hind angles obsolete. The elytra are lightly striate and closely punctured. The metasternal shield is well punctured except along the middle line of the anterior part. The front tibia is armed with four sharp external teeth.

Distribution : India : Rajasthan : Sawai madhopur and also recorded from Arunachal Pradesh, Gujarat, Meghalaya and Uttar Pradesh.

Elsewhere : Myanmar.

Genus 5 *Disphysema* Harold

1873. *Disphysema* Harold, *Col. Hefte*, **11** : 102.

1931. *Disphysema* Arrow, *Fauna of British India including Ceylon and Burma* (Coleoptera

Lamellicornia Coprinae), 3 : 140.

1963. *Disphysema* Balthasar, *Monographie der Scarabaeidae und Aphodiidae der Palaearktischen und Orientalischen Region* (Coleoptera Lamellicornia), 2 : 612-613.

Diagnostic Characters : Small, wingless and narrow waisted. The head is without sutures, ocular lobes are not separated from the clypeus, which is bidentate in front. The prothorax is broad, convex and the front angles are sharply produced and the base is strongly rounded. The scutellum is absent. The elytra are reduced, united and very convex, and the sides are very rounded. The legs are stout and long, front tibiae armed with four strong external teeth and the middle and hind tibiae are dilating from base to extremity.

The single species *Disphysema candezei* has been recorded from Ranthambhore National Park.

9. *Disphysema candezei* Harold

1863. *Disphysema candezei* Harold, *Col. Hefte*, 11 : 102.

1931. *Disphysema candezei* Arrow, *Fauna of British India including Ceylon and Burma* (Coleoptera Lamellicornia Coprinae), 3 : 140-141.

1963. *Disphysema candezei* Balthasar, *Monographie der Scarabaeidae und Aphodiidae der Palaearktischen und Orientalischen Region* (Coleoptera Lamellicornia), 2 : 613.

Material examined : Rajbagh, 33 exs., 15.x.2003, coll. S. Kumar.

Diagnostic Characters : Dull, sooty black and very convex. The head and prothorax are closely and uniformly covered with small roundish granules. The clypeus is deeply notched in the middle and produced two teeth at anterior margin. The prothorax is convex and wider than elytra, and the front angles are very sharply produced and hind angles obsolete and the base is rounded. The elytra are very short, convex and shoulders strongly contracted. The tibiae are distinct, not deep, and with flat and opaque intervals. The metasternal shield is sparingly uniformly punctured. The posterior tarsi are rather long. The male is differentiating from the female by presence of large prothorax, wider elytra and elongate front tibiae.

Distribution : India : Rajasthan : Sawai madhopur and also recorded from Tamilnadu.

Remark : Collected from Hyena dung.

Genus 6 *Onthophagus* Latreille 1802

1802. *Onthophagus* Latreille, *Hist. Nat. Crust. Et. Ins.*, 3 : 141.

1856. *Onthophagus* Lacordaire, *Gen. Col.*, 3 : 105.

1856. *Onthophagus* D'orbigny, *L'Abeille*, 29 : 126-132

1883. *Proagoderus* Lansberge, *Notes Leyed. Mus.*, 5 : 15.

1913. *Proagoderus* D'orbigny, *Ann. Soc. Ent. France*, 132 : 493.

1917. *Proagoderus* Marcus, *Arch. F. Nat.* A10, **133** : 1.
1931. *Onthophagus* Arrow, *Fauna of British India including Ceylon and Burma* (Coleoptera : Lamellicornia : Coprinae), **3** : 159-162.
1963. *Onthophagus* Balthasar, *Monographie der Scarabaeidae und Aphodiidae der Palaearktischen und Orientalischen Region* (Coleoptera : Lamellicornia), **2** : 153-168.

Diagnostic Characters : Rather short, compact, smooth or clothed with hairs or setae. The clypeus is fused with ocular lobes and variable in shape. The lateral margin of the prothorax are angulated in the middle and rounded at the base. The legs are stout, femora thick and front tibia armed with four but occasionally with three external teeth. The middle and hind tibiae are dilating greatly from base to extremity. The elytra are covering the abdomen and having a single lateral carina and seven striae.

The nine species of the genus *Onthophagus* have been recorded from Ranthambhore National Park, Rajasthan.

Key to the species of Genus *Onthophagus*

1. Prothorax strongly, closely punctured and front angles acute *troglodyta* Wiedemann
- Prothorax not strongly, closely punctured 2
2. Prothorax sparsely granulate in the middle, finely scattered and front angles not very sharp *catta* Fabricius
- Prothorax not sparsely granulate in the middle 3
3. Prothorax sparsely punctured with blunt front angles. Elytra opaque, intervals flat and minutely punctured *seniculus* Fabricius
- Prothorax not sparsely punctured. Elytral interval not flat 4
4. Elytra shining and eyes very small *kuluensis* Bates
- Elytral intervals sparsely granulate 5
5. Entirely black *semicinctus* D'orbigny
- Elytral intervals not sparsely granulate 6
6. Elytral intervals very finely and sparingly punctured *angus* Gillet
- Very convex and prothorax very closely punctured 7
7. Not very convex and prothorax not very closely punctured *ragus* Fabricius
- Prothorax strongly and very closely punctured 8
8. Uniformly dark above and front margin of the head rounded *ensifer* Boucomont

- Greenish black and prothorax less closely punctured *cervus* Fabricius

10. *Onthophagus troglodyta* Wiedemann

1828. *Onthophagus troglodyta* Wiedemann, *Zool. Mag.*, **2**(1) : 20.
 1925. *Onthophagus spitiensis* Gillet, *Ann. Soc. Sci. Broux*, **44** : 235.
 1931. *Onthophagus troglodyta* Arrow, *Fauna of British India including Ceylon and Burma* (Coleoptera : Lamellicornia : Coprinae), **3** : 207-208, Fig. 22.
 1963. *Onthophagus* (s. str.) *troglodyta* Balthasar, *Monographie der Scarabaeidae und Aphodiidae der Palaearktischen und Orientalischen Region* (Coleoptera : Lamellicornia), **2** : 565-566, Fig. 216 & 217.

Material examined : Anantpura Village, 3 exs., 30.xi.1999 & 6.xii.1999, coll. R. Sewak.

Diagnostic Characters : Very short, convex and globular. The head is short, not very broad and ocular lobes not very prominent, and the clypeus is a little emarginated in the front. The prothorax is strongly, closely punctured and the front angles are acute, lateral margin feebly sinuate and base is strongly rounded. The elytra are deeply striate and stria closely punctured, 7th stria nearly straight and parallel to 6th and the intervals are slightly convex, minutely and sharply granular. The clypeus of the male is feebly emarginated and vertex having a flat plate and a pair of short, curving, divergent, cephalic horns and the clypeus of the females are distinctly emarginated and frons divided by curved carina.

Distribution : India : Rajasthan : Sawai madhopur and also recorded from Uttar Pradesh.

11. *Onthophagus catta* Fabricius

1787. *Scarabaeus catta* Fabricius, *Mant. Inst.*, **1** : 12.
 1787. *Scarabaeus gazella* Fabricius, *Op. Cit.*, **2** : 377.
 1798. *Copris metallicus* Fabricius, *Ent. Syst. Suppl.*, 281.
 1798. *Copris antilops* Fabricius, *Op. Cit.*, 32.
 1931. *Onthophagus catta* Arrow, *Fauna of British India including Ceylon and Burma* (Coleoptera : Lamellicornia : Coprinae), **3** : 230-231.

Material examined : Kachida; Indala village and Dhudhal Mal Ka Darra, 8 exs., 8th, 11th, 14th x.2003, coll. N.S. Rathore & S. Kumar.

Diagnostic Characters : Broadly oval and convex, smooth and moderately shining. The head is semicircular, clypeus strongly reflexed anteriorly and separated from the frons by a strong, feebly curved carina. The prothorax bears granules in middle part and scattered punctures behind. The elytra are striate and with flat intervals. The pygidium bears an angulated basal carina and a few scattered punctures. The vertex of the male bears a pair of slendered horns and prothorax having two-

minute prominence, which are separated by a slight groove.

Distribution : India : Rajasthan : Sawai madhopur and also recorded from Arunachal Pradesh, Gujarat, Haryana, Himachal Pradesh, Karnataka, Maharashtra, Punjab, Uttranchal, Uttar Pradesh and Tamil Nadu.

Elsewhere : Africa, Arabia, Pakistan, Cambodia, Myanmar, Madagascar and Srilanka.

12. *Onthophagus seniculus* Fabricius

1781. *Scarabaeus seniculus* Fabricius, *Spec. Ins.*, 1 : 23.

1931. *Onthophagus seniculus* Arrow, *Fauna of British India including Ceylon and Burma* (Coleoptera : Lamellicornia : Coprinae), 3 : 235-236.

Material examined : Dhudhal Mal·Ka Darra; Bagdha; Indala village, 30 exs., 6.xii.1999, coll. R. Sewak; 11th, 12th, 13th & 14th x.2003, coll. N.S. Rathore & S. Kumar.

Diagnostic Characters : Broadly oval, moderately compact, smooth, not very shining above. The head is having a straight, parallel carina and the basal joint of the antennae has serrate anterior edge. The prothorax has smooth, shining excavation just behind the front margin and horizontal prominence behind each excavation. The clypeus of the male is curved upward a little in front and its sides are nearly straight and the front tibia is little elongate with rather small teeth. The head of the female is almost semicircular in outline and the dorsal prothoracic prominence is slightly rounded.

Distribution : India : Rajasthan : Sawai madhopur and also recorded from Arunachal Pradesh, Gujarat and Uttar Pradesh.

Elsewhere : Malay Peninsula, Myanmar, China and Indo-China.

13. *Onthophagus kuluensis* Bates

1891. *Onthophagus kuluensis* Bates, *Entom. Suppl.*, 34 : 12.

1931. *Onthophagus kuluensis* Arrow, *Fauna of British India including Ceylon and Burma* (Coleoptera : Lamellicornia : Coprinae), 3 : 292-293.

1963. *Onthophagus kuluensis* Balthasar, *Monographie der Scarabaeidae und Aphodiidae der Palaearktischen und Orientalischen Region* (Coleoptera : Lamellicornia), 2 : 409-410.

Material examined : Katholi Forest Chowki, 11 exs., 6.iv.2001, coll. N.S. Rathore & R. Sewak.

Diagnostic Characters : Oval and moderately convex. The head is broad; the clypeus is nearly straight in front and separated from the frons by a straight carina. The front angles of the prothorax are blunt, lateral margin feebly curved in front and the base is obtusely angulated in the middle. The male is having a pair of nearly parallel horns, connected by a ridge and female with straight carina on vertex.

Distribution : India : Rajasthan : Sawai madhopur and also recorded from

Arunachal Pradesh, Gujarat, Haryana, Himachal Pradesh, Jammu & Kashmir, Uttranchal and Uttar Pradesh.

15. *Onthophagus semicinctus* D'orbigny

1897. *Onthophagus semicinctus* D'orbigny, *Ann. Soc. Ent. France*, **64** : 242.

1898. *Onthophagus semicinctus* D'orbigny, *L'Abeille*, **29** : 215

1907. *Onthophagus bufo* Arrow, *Ann. Mag. Nat. Hist.*, **7**(19) : 420.

1931. *Onthophagus semicinctus* Arrow, *Fauna of British India including Ceylon and Burma* (Coleoptera : Lamellicornia : Coprinae), **3** : 294.

1963. *Onthophagus* (s. str.) *semicinctus* Balthasar, *Monographie der Scarabaeidae und Aphodiidae der Palaearktischen und Orientalischen Region* (Coleoptera : Lamellicornia), **2** : 518, Fig. 208.

Material examined : Indala village, 3 exs., 14.x.2003, coll. N.S. Rathore & S. Kumar.

Diagnostic Characters : Oval and not very convex. The head is broad with strongly rounded ocular lobes. The clypeus is a little produced and excised at the front margin. The front angles of the prothorax are not sharp, lateral margins straight in front and sinuate behind and the base is rounded. The male with a pair of unconnected parallel cephalic horns, sloping obliquely backwards. The female is with slightly curved frons carina along with straight carina.

Distribution : India : Rajasthan : Sawai madhopur and also recorded from Gujarat and Maharashtra.

Elsewhere : Pakistan.

16. *Onthophagus angus* Gillet

1925. *Onthophagus angus* Gillet, *Ann. Sci.Broux.*, **44** : 233.

1931. *Onthophagus angus* Arrow, *Fauna of British India including Ceylon and Burma* (Coleoptera : Lamellicornia : Coprinae), **3** : 286-297.

1963. *Onthophagus* (s. str.) *angus* Balthasar, *Monographie der Scarabaeidae und Aphodiidae der Palaearktischen und Orientalischen Region* (Coleoptera : Lamellicornia), **2** : 267.

Material examined : Indala village, 2 exs., 24.xi.2002, coll. S. Kumar.

Diagnostic Characters : Oval and not very convex. The head is broad and semi-circular, anterior margin strongly reflexed, elevated and bilobed in the middle and with large eyes. The prothorax is strongly punctured, lateral margins nearly straight in front and sinuate behind. The front angles of the prothorax are blunt and hind angles obsolete. The elytra are striate, stria slightly punctured and the intervals are flat, opaque, minutely sparsely punctured. The pygidium is opaque and sparingly punctured. The metasternal shield is sparingly punctured. The male is having a transverse cephalic tubercle just behind the carina and prothorax is sloping in the

middle of the front margin and female with narrowly vertical prothorax in front, along with a blunt tubercle on each side of the middle.

Distribution : India : Rajasthan : Sawai madhopur and also recorded from Bihar, Jharkhand, Karnataka, Madhya Pradesh, Maharashtra, Orissa and West Bengal.

16. *Onthophagus tragus* Fabricius

1792. *Scarabaeus tragus* Fabricius, *Ent. Syst.*, 1 : 56.

1914. *Onthophagus tragus* Boucomont, *Ann. Mus. Ci.v. Genova*, 44 : 229.

1931. *Onthophagus tragus* Arrow, *Fauna of British India including Ceylon and Burma* (Coleoptera : Lamellicornia : Coprinae), 3 : 303-304.

1963. *Onthophagus (Colobonthophagus) tragus* Balthasar, *Monographie der Scarabaeidae und Aphodiidae der Palaearktischen und Orientalischen Region* (Coleoptera : Lamellicornia), 2 : 557-558.

Material examined : Malik Talab; Anantpura Village; Gilai Sagar, 5 exs., 4th, 6th & 7th xii.1999, coll. R. Sewak.

Diagnostic Characters : Broadly oval and not very convex. The head is with large eyes. The clypeal margin is feebly bilobed in the middle and the sides are bluntly angular. The front angles of the prothorax are blunt, lateral margin straight in front and feebly sinuate behind and the base is gently rounded. The male is having two parallel cephalic horns arise from the inner margin of the eyes. The front tibia is armed with four external teeth and having a small terminal spur. The vertex of the female has a strong tubercle and front tibia with an elongate strongly curved spur.

Distribution : India : Rajasthan : Sawai madhopur and also recorded from Gujarat, Karnataka and Orissa.

Elsewhere : Java, Myanmar, South China and Tonkin.

17. *Onthophagus ensifer* Boucomont

1914. *Onthophagus ensifer* Boucomont, *Ann. Mus. Civ. Genova*, XLVI : 220.

1931. *Onthophagus ensifer* Arrow, *Fauna of British India including Ceylon and Burma* (Coleoptera : Lamellicornia : Coprinae), 3 : 334-335, fig. 41.

1963. *Onthophagus (s. str.) ensifer* Balthasar, *Monographie der Scarabaeidae und Aphodiidae der Palaearktischen und Orientalischen Region* (Coleoptera : Lamellicornia), 2 : 342.

Material examined : Kachida, 3 exs., 14.x.2003, coll. N.S. Rathore & S. Kumar.

Diagnostic Characters : Oval and moderately convex. The head is not very broad and the clypeus and the ocular lobes are rounded. The front angles of the prothorax are a little produced and fairly sharp. The lateral margins are straight in front and sinuate behind. The male is having very long slendered, slightly flattened, backwardly directed and curved cephalic horn, arises from the middle of the frons and extending up to the middle of the body. The female is having a curved carina in

place of horn.

Distribution : India : Rajasthan : Sawai madhopur and also recorded from Andhra Pradesh, Arunachal Pradesh, Gujarat, Kerala and Uttar Pradesh.

18. *Onthophagus cervus* Fabricius

1798. *Copris cervus* Fabricius, *Ent. Syst. Suppl.*, p. 31.

1798. *Copris nuchidens* Fabricius, *Ent. Syst. Suppl.*, p. 31.

1801. *Copris cervus* Fabricius, *Syst. Elueth.*, 1 : 46.

1877. *Onthophagus ceylonicus* Harold, *Ann. Mus. Civ. Genova*, 10 : 61.

1931. *Onthophagus cervus* Arrow, *Fauna of British India including Ceylon and Burma* (Coleoptera : Lamellicornia : Coprinae), 3 : 348-350, fig. 45.

Material examined : Gilai Sagar, 6 exs., 7.xii.1999, coll. R. Sewak.

Diagnostic Characters : Oval and moderately convex. The head is not very broad, clypeus is a little produced and the vertex is having a pair of backwardly sloping horns, broad at the base but not united. The prothorax is fairly, strongly, not very closely but evenly punctured and with intermixed small punctures. The front angles are rather sharp, lateral margin straight in front and sinuate behind, and the base is rounded. The elytra are finely striate, intervals slightly convex and rather finely but evenly punctured. The pygidium is punctured with intermix large and small punctures. The male and female are distinguished by presence of horns in male and carina in female.

Distribution : India : Rajasthan : Sawai madhopur and also recorded from Andaman and Nicobar Island, Arunachal Pradesh, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Pondicherry, Uttaranchal and West Bengal.

Elsewhere : Sri Lanka.

Genus 7 *Liatongus* Reitter 1893

1893. *Liatongus* Reitter, *Verh. Ver. Brunn.*, 31 : 166.

1931. *Liatongus* Arrow, *Fauna of British India including Ceylon and Burma* (Coleoptera : Lamellicornia : Coprinae), 3 : 362.

1963. *Liatongus* Balthasar, *Monographie der Scarabaeidae und Aphodiidae der Palaearktischen und Orientalischen Region* (Coleoptera : Lamellicornia), 2 : 78-79.

Diagnostic Characters : Very small and rather elongate in shape. The scutellum is present. The elytra are elongate and without posterior fringe of bristles or setae. The pygidium has a sharp ridge parallel to base. The antennae are eight jointed and the head of the male is generally with horns and oftenly thorax also.

The single species *Liatongus martialis* Harold has been founded from Ranthambhore National Park.

19. *Liatongus martialis* Harold

1897. *Oniticellus martialis* Harold, *Col. Hefte.*, **14** : 227

1931. *Liatongus martialis* Arrow, *Fauna of British India including Ceylon and Burma* (Coleoptera : Lamellicornia : Coprinae), **3** : 371, fig. 51.

1963. *Liatongus martialis* Balthasar, *Monographie der Scarabaeidae und Aphodiidae der Palaearktischen und Orientalischen Region* (Coleoptera : Lamellicornia), **2** : 98.

Material examined : Indala village, 5 exs., 14.x.2003, coll. N.S. Rathore & S. Kumar.

Diagnostic Characters : Broadly oval and convex. The head is closely punctured and the clypeus is rounded. The prothorax is unevenly punctured and the front angles are strongly bluntly produced. The elytra are strongly striate, striae deeply punctured and intervals are convex and deeply punctured. The pygidium is opaque. The metasternal shield is sparsely punctured and longitudinally channeled along the middle. The male is having a slendered curved cephalic horn arising between the eyes and the prothorax is strongly sloping from front to middle along with a small tubercle and a short longitudinal carina on each side of it.

Distribution : India : Rajasthan : Sawai madhopur and also recorded from Gujarat and Uttar Pradesh.

Elsewhere : Myanmar.

Genus 8 *Oniticellus* Serville 1825

1825. *Oniticellus* Serville, *Encycl. Meth.*, **10** : 356.

1856. *Oniticellus* Lacordaire, *Gen. Col.*, **3** : 110.

1893. *Oniticellus* Reitter, *Verh. Ver. Brunn.*, **31** : 165.

1901. *Tiniocellus* Peringuey, *Trans. S. Afr. Phil. Soc.*, **12** : 116.

1931. *Oniticellus* Arrow, *Fauna of British India including Ceylon and Burma* (Coleoptera : Lamellicornia : Coprinae), **3** : 375.

1963. *Oniticellus* Balthasar, *Monographie der Scarabaeidae und Aphodiidae der Palaearktischen und Orientalischen Region* (Coleoptera : Lamellicornia), **2** : 70-71.

Diagnostic Characters : Body elongate in shape and scutellum is present. The antennae are eight jointed. The elytra are rather flat and not completely covering the abdomen and having the fringe of stiff hairs at the hind margin. The head is short and broad and the metasternum is very long. The abdomen is crenate at the sides. The middle and hind tibiae are moderately broad at the extremity and the basal joint of tarsi is much longer than the second. The male and female are alike.

The two species of the genus *Oniticellus* have been found from Ranthambhore National Park.

Key to the species of the Genus *Oniticellus*

1. Head with carina and prothorax sparingly punctured *pallipes* Fabricius
- Dorsal surface very smooth and shining *cinctus* Fabricius

20. *Oniticellus pallipes* Fabricius

1781. *Scarabaeus pallipes* Fabricius, *Spec. Ins.*, 1 : 33.
1908. *Oniticellus pallipes* Arrow, *Ann. Mag. Nat. Hist.*, 8(1) : 179.
1931. *Oniticellus pallipes* Arrow, *Fauna of British India including Ceylon and Burma* (Coleoptera : Lamellicornia: Coprinae), 3 : 375-376, Fig. 52.
1963. *Oniticellus (Euoniticellus) pallipes* Balthasar, *Monographie der Scarabaeidae und Aphodiidae der Palaearktischen und Orientalischen Region* (Coleoptera : Lamellicornia), 2 : 74, Pl. X. Fig. 3.

Material examined : Kachida Forest Chowki, 3 exs., 4.xii.1999, coll. R. Sewak.

Diagnostic Characters : Narrowly elongate. The head is short and broad, clypeal margin is straight in front and the vertex is hollowed. The prothorax is having slight posterior median groove and with almost rectangular front angle, sides strongly rounded and the base is angulated in the middle. The prothorax is also having a spot a little behind the front margin in the middle, a similar one on each side of the last, one on each side of the middle and another one in the same line near the outer margin, a pair near the middle of the base and one on middle of the pygidium. The male is having a strongly curved carina between the clypeus and frons, another carina just behind it. The front tibia is less broad with sharp and short four external teeth.

Distribution : India : Rajasthan : Sawai madhopur and also recorded from Gujarat, Haryana, Himachal Pradesh, Jammu & Kashmir, Maharashtra, Tamilnadu and West Bengal.

Elsewhere : Bangladesh.

21. *Oniticellus cinctus* Fabricius

1775. *Scarabaeus cinctus* Fabricius, *Syst. Ent.*, 30.
1931. *Oniticellus cinctus* Arrow, *Fauna of British India including Ceylon and Burma* (Coleoptera : Lamellicornia : Coprinae), 3 : 379-380.
1963. *Oniticellus (s. str.) cinctus* Balthasar, *Monographie der Scarabaeidae und Aphodiidae der Palaearktischen und Orientalischen Region* (Coleoptera : Lamellicornia), 2 : 77.

Material examined : Rambheet Village, 3 exs., 6.xii.1999, coll. R. Sewak.

Diagnostic Characters : Smooth, shining black and with a slight greenish luster. Oblong-oval and not very convex. The head is without carina or elevations. The clypeus is short, with a slight depression just behind the middle of the front margin, which is rounded and gently excised in the middle. The prothorax is very smooth and unpunctured, with deeply impressed median longitudinal line; sides are nearly

straight in front and rounded behind. The front angles are rounded and hind angles almost obsolete. The elytra are deeply striate, striae feebly and closely punctured, intervals convex, very minutely and sparingly punctured. The pygidium is finely rugose and opaque. The front tibia of the male is produced at the extremity into a broad, blunt and slightly hooked process but the front tibia of the female is not produced at the extremity and the external teeth are longer and stouter and terminal one distinctly oblique.

Distribution : India : Rajasthan : Sawai madhopur and also recorded from Arunachal Pradesh, Assam, Gujarat, Haryana, Himachal Pradesh, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Uttranchal, Uttar Pradesh and West Bengal.

Elsewhere : Annam, Bangladesh, Malaya Peninsula, Myanmar, Siam and South China.

Genus 9 *Drepanocerus* Kirby, 1828

1828. *Drepanocerus* Kirby, *Zool. Journ.*, **3** : 521.

1856. *Drepanocerus* Lacordaire, *Gen. Col.*, **3** : 111.

1881. *Ixodina* Roth, *Arch. Nat.*, **17**(1) : 128.

1931. *Drepanocerus* Arrow, *Fauna of British India including Ceylon and Burma* (Coleoptera : Lamellicornia : Coprinae), **3** : 380-381.

1963. *Drepanocerus* Balthasar, *Monographie der Scarabaeidae und Aphodiidae der Palaearktischen und Orientalischen Region* (Coleoptera : Lamellicornia), **2** : 61.

Diagnostic Characters : Elongate, flattened and clothed with erect scale like hairs. The clypeus is bidentate. The prothorax is very uneven and scutellum is distinct. The elytra are flat and not covering the sides of the abdomen. The legs are long and slendered. The male generally bears horn.

The single species *Drepanocerus exsul* Sharp has been found from Ranthambhore National Park.

22. *Drepanocerus exsul* Sharp

1875. *Oniticellus exsul* Sharp, *Col. Hefte*, **13** : 53.

1931. *Drepanocerus exsul* Arrow, *Fauna of British India including Ceylon and Burma* (Coleoptera : Lamellicornia : Coprinae), **3** : 385-386, Fig. 55.

Material examined : Indala Village, 2 exs., 14.x.2003, coll. N.S. Rathore & S. Kumar.

Diagnostic Characters : Elongate, sub-rectangular and very flat above. The head is flat and very broad; sides bidentate and the teeth are feeble not far apart. The prothorax is having slightly broad elevation in front and with transverse depression in the middle. The lateral margins are converging towards the base, which is strongly rounded in front, nearly straight behind and obtusely angular in the middle. The scutellum is long and narrow. The elytra are striate, outer stria and the sides are

sinuous and the sternites are abruptly reflected, bearing three prominent sutural intervals and with stiff bristles. The middle and hind tibiae are slendered, bearing minute bristles at their outer edge and with three very blunt teeth. The front tibia of the male is strongly curved at the inner edge.

Distribution : India : Rajasthan : Sawai madhopur and also recorded from Arunachal Pradesh, Assam, Gujarat, Meghalaya and Rajasthan.

Elsewhere : Siam.

Genus 10 *Onitis* Fabricius

1798. *Onitis* Fabricius, *Ent. Syst. Suppl.*, 2.

1856. *Onitis* Lacordaire, *Gen. Col.*, 3 : 103.

1857. *Onitis* Lansberge, *Ann. Soc. Ent. Belg.*, 18 : 49.

1931. *Onitis* Arrow, *Fauna of British India including Ceylon and Burma* (Coleoptera : Lamellicornia : Coprinae), 3 : 386-387.

1963. *Onitis* Balthasar, *Monographie der Scarabaeidae und Aphodiidae der Palaearktischen und Orientalischen Region* (Coleoptera : Lamellicornia), 2 : 26-28.

Diagnostic Characters : Oblong, with stout legs and without front tarsi. The head is not broad and the prothorax is without process or excavation but having a pit on each lateral side near the middle. The scutellum is visible but minute. The front tibia is armed with four external teeth. The abdomen is completely covered by elytra. The front legs are more or less elongate, tibia generally slendered, strongly curved towards the end and without articulated terminal spur but the tip is produced into a finger like process in the male and the female front tibia is always broad, with strong teeth and provided with an articulated terminal spur.

The author recorded five species of the genus *Onitis* from Ranthambhore National Park.

Key to the Species of Genus *Onitis*

1. Clypeus without a carina, clypeo-frontal carina simple and entire *siva* Gillet
- Clypeus with a carina 2
2. Prothorax very lightly punctured *lama* Lansberge
- Clypeo-frontal carina interrupted 3
4. Prothorax strongly and closely punctured clypeo-frontal carina interrupted ...
..... *philemon* Fabricius
- Prothorax not strongly and not closely punctured and clypeo-frontal carina not
interruptly curved 4

4. Prothorax unevenly punctured and its basal impression tuberculated, clypeo-frontal carina strongly elevated and acuminate in the middle *castaneus* Redtenbacher
- Prothorax rugose in front and punctured behind, clypeo-frontal carina interrupted and having another sharp carina in front of it *brahma* Lansberge

23. *Onitis siva* Gillet

1911. *Onitis siva* Gillet, *Ann. Soc. Ent. Belg.*, **4** : 313.

1931. *Onitis siva* Arrow, *Fauna of British India including Ceylon and Burma* (Coleoptera : Lamellicornia : Coprinae), **3** : 388-389.

1963. *Onitis siva* Balthasar, *Monographie der Scarabaeidae und Aphodiidae der Palaearktischen und Orientalischen Region* (Coleoptera : Lamellicornia), **2** : 53-54.

Material examined : Gilai Sagar, 4 exs., 7.xii.1999, coll. R. Sewak.

Diagnostic Characters : Elongate-oval and moderately convex. The clypeal margin is strongly rounded and the clypeus is separated from the frons by a strongly elevated curved carina. The prothorax is having a trace of a longitudinal median groove posteriorly in the middle, uniting with close and narrow basal foveae. The front angles are acutely rectangular and the hind angles obsolete. The front legs of the male are elongate, femur having a very strong spine at the middle of the anterior edge, tibiae slendered, strongly curved anteriorly, armed with four sharp external teeth. The hind femur is little hollowed on its lower surface and has a hooked tooth just beyond the middle on its anterior edge and the female is without teeth.

Distribution : India : Rajasthan : Sawai madhopur and also recorded from Arunachal Pradesh, Gujarat, Kerala, Tamilnadu and Uttar Pradesh.

24. *Onitis lama* Lansberge

1875. *Onitis lama* Lansberge, *Ann. Soc. Ent. Belgium*, **18** : 123.

1931. *Onitis lama* Arrow, *Fauna of British India including Ceylon and Burma* (Coleoptera : Lamellicornia : Coprinae), **3** : 389-390, Pl. XI, Fig. 11 & 12.

1963. *Onitis lama* Balthasar, *Monographie der Scarabaeidae und Aphodiidae der Palaearktischen und Orientalischen Region* (Coleoptera : Lamellicornia), **2** : 44-45.

Material examined : Gaudwar Forest Chowki; Indala village, 2 exs., 14.xii.1999, coll. R. Sewak.

Diagnostic Characters : Rather narrowly oval and very convex. The head is having a strongly elevated, slightly acute frontal carina, a short straight another transverse carina and a trisinate vertex carina extended from eye to eye. The front angles of the prothorax are rather blunt, sides strongly rounded and the base is almost completely rounded. The front femur of the male is having a very sharp oblique tooth beyond the middle of its lower edge and hind femur with a tooth near the end of its

lower edge. The front tibia is broad and armed with four external teeth and a small articulated terminal spur.

Distribution : India : Rajasthan : Sawai madhopur and also recorded from Gujarat, Haryana, Punjab, Uttaranchal and Uttar Pradesh.

25. *Onitis philemon* Fabricius

1801. *Onitis philemon* Fabricius, *Syst. Eleut.*, 1 : 30.

1875. *Onitis distinctus* Lansberge, *Ann. Soc. Ent. Belg.*, 18 : 138.

1931. *Onitis philemon* Arrow, *Fauna of British India including Ceylon and Burma* (Coleoptera : Lamellicornia : Coprinae), 3 : 393-394, pl. XI, figs. 3, 4.

1963. *Onitis philemon* Balthasar, *Monographie der Scarabaeidae und Aphodiidae der Palaearktischen und Orientalischen Region* (Coleoptera : Lamellicornia), 2 : 41, pl. V, fig. 2.

Material examined : Anantpura village; Mansarovar, 18 exs., 31.xi.1999, 4th, 6th & 8th xii.1999, Coll. R. Sewak.

Diagnostic Characters : Oval, not very elongate and not very convex. The clypeus is parabolic, with a feeble emargination in the middle. The clypeus is separated from the frons by an interrupted carina, with a short transverse carina just before it and a conical tubercle just behind it. The prothorax is without well marked median line and the front angles are rectangular and the hind angles obsolete, sides straight in front and strongly rounded in the middle, and the base is obtusely angulated in the middle. The middle femur of the male has a sharp tooth near the end of lower edge and the hind trochanter has a little tooth beneath. The front tibia of the female is broad, armed with four strong external teeth and an articulated terminal spur.

Distribution : India : Rajasthan : Sawai madhopur and also recorded from Arunachal Pradesh, Assam, Bihar, Gujarat, Haryana, Himachal Pradesh, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Tamilnadu, Uttranchal, Uttar Pradesh and West Bengal.

Elsewhere : Sri Lanka.

26. *Onitis castaneus* Redtenbacher

1848. *Onitis castaneus* Redtenbacher, *Hugel's Kaschmir*, 4(2) : 517.

1875. *Onitis castaneus* Lansberge, *Ann. Soc. Ent. Belg.*, 38 : 144.

1931. *Onitis castaneus* Arrow, *Fauna of British India including Ceylon and Burma* (Coleoptera : Lamellicornia : Coprinae), 3 : 398-399, pl. XI, figs. 7, 8.

1963. *Onitis castaneus* Balthasar, *Monographie der Scarabaeidae und Aphodiidae der Palaearktischen und Orientalischen Region* (Coleoptera : Lamellicornia), 2 : 46.

Material examined : Rambheet, 3 exs., 6.xii.1999, coll. R. Sewak.

Diagnostic Characters : Short, compact and convex. The outer margin of the clypeus is strongly reflexed, straight in the middle and has a long transverse acute

carina. The frons has a strongly elevated entire carina and the vertex is strongly excavated. The front angles of the prothorax are rather blunt, sides bisinuate and the base is distinctly lobed in the middle. The front femur of the male has a strong oblique spine near the middle of its anterior edge and the middle tibia has two strong processes at its outer edge. The front tibia of the female is broad and bears four strong external teeth.

Distribution : India : Rajasthan : Sawai madhopur and also recorded from Arunachal Pradesh, Assam, Bihar, Gujarat, Uttranchal, Uttar Pradesh and West Bengal.

Elsewhere : Pakistan.

27. *Onitis brahma* Lansberge

1875. *Chironitis indicus* Lansberge, *Ann. Soc. Ent. Belgium*, **18** : 45.

1931. *Chironitis indicus* Arrow, *Fauna of British India including Ceylon and Burma* (Coleoptera : Lamellicornia : Coprinae), **3** : 402-403, Pl. XII, Fig. 15 & 16.

Material examined : Anantpura Village; Gilai Sagar, 17 exs., 6th to 8th xii.1999, coll. R. Sewak.

Diagnostic Characters : Rather elongate and parallel sided. The clypeal margin is strongly reflexed and a little excised in the middle, forming two obtuse angles. The clypeus is separated from the frons by an interrupted carina, having a sharply elevated transverse carina a little in front of it and a truncated tubercle a little behind of it. The prothorax is with a posterior median groove, uniting behind and with a basal foveae. The front angles are at right angles and hind angles almost obsolete. The front leg of the male is elongate, femur with a blunt process a little before the extremity; tibia is slendered, strongly curved in its interior half and armed with four sharp external teeth. The middle femur has a sharp tooth near the middle of its lower edge and hind femur also having a sharp outwardly directed tooth at its upper edge near the base. The front tibia of the male is armed with four strong external teeth and an articulated terminal spur.

Distribution : India : Rajasthan : Sawai madhopur and also recorded from Gujarat, Karnataka, Maharashtra and Tamilnadu.

Elsewhere : Pakistan.

Genus 11 *Chironitis* Lansberge, 1875

1875. *Chironitis* Lansberge, *Ann. Soc. Ent. Belgium*, **18** : 19.

1894. *Chironitis* Reitter, *Verh. Ver. Brunn.*, **31** : 98.

1931. *Chironitis* Arrow, *Fauna of British India including Ceylon and Burma* (Coleoptera : Lamellicornia : Coprinae), **3** : 401-402.

1963. *Chironitis* Balthasar, *Monographie der Scarabaeidae und Aphodiidae der Palaearktischen und Orientalischen Region* (Coleoptera : Lamellicornia), **2** : 9-10.

Diagnostic Characters : Oblong and rather depressed. The head is not long and the front margin of the clypeus is reflexed. The prothorax is having a small foveae on

each side of the middle. The scutellum is very small and sharply pointed. The front tibia is armed with four external teeth, middle and hind tibiae are strongly dilated at the extremity. The male is without frontal tarsi but present in female.

The single species *Chironitis indicus* has been found from Ranthambhore National Park.

28. *Chironitis indicus* Lansberge

1875. *Chironitis indicus* Lansberge, *Ann. Soc. Ent. Belgium*, **18** : 45.

1931. *Chironitis indicus* Arrow, *Fauna of British India including Ceylon and Burma* (Coleoptera : Lamellicornia : Coprinae), **3** : 402-403, Pl. XII, Fig. 15 & 16.

Material examined : Indala Village, 2 exs., 4.xii.1999, coll. R. Sewak.

Diagnostic Characters : Oblong and rather depressed. The front margin of the clypeus is strongly depressed and having a short transverse posterior carina and separated from the frons by another carina which bears short erect setae. The prothorax is broader than elytra, lateral margin strongly dilated in the middle, convergent and nearly straight from there to the front. The front angles are slightly and hind angles strongly obtuse and the basal foveae are narrow. The front femur is having a sharp, strong tooth near the end of its anterior edge, tibia is long, slender, strongly curved and armed with four external teeth. The clypeo-frontal carina of the female is having a sharp tubercle in the middle.

Distribution : India : Rajasthan : Sawai madhopur and also recorded from Gujarat, Karnataka, Maharashtra and Tamil Nadu.

Elsewhere : Pakistan.

SUMMARY

Altogether twenty eight species belonging to eleven genera of sub-family Coprinae under the family Scarabaeidae were recorded from Ranthambhore National Park, Sawai madhopur, Rajasthan. All the twenty eight species namely *Gymnopleurus cyaneus* Fabricius, *Gymnopleurus miliaris* Fabricius, *Heliocopris gigas* Linnaeus, *Catharsius molossus* Linnaeus, *Copris repertus* Walker, *Copris numa* Lansberge, *Copris cribratus* Gillet, *Copris furciceps* Felsche, *Disphysema candezei* Harold, *Onthophagus troglodyta* Wiedemann, *Onthophagus catta* Fabricius, *Onthophagus seniculus* Fabricius, *Onthophagus kuluensis* Bates, *Onthophagus semicinctus* D'orbigny, *Onthophagus angus* Gillet, *Onthophagus tragus* Fabricius, *Onthophagus ensifer* Boucomont, *Onthophagus cervus* Fabricius, *Liatongus martialis* Harold, *Oniticellus pallipes* Fabricius, *Oniticellus cinctus* Fabricius, *Drepanocerus exsul* Sharp, *Onitis siva* Gillet, *Onitis lama* Lansberge, *Onitis philemon* Fabricius, *Onitis castaneus* Redtenbacher, *Onitis brahma* Lansberge and *Chironitis indicus* Lansberge have been recorded for the first time from "Ranthambhore National Park" All these species belonging to tribes Scarabaeini and Coprini and the representative of the tribes Sisyphini and Panelini were not found.

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INSECTA : DIPTERA

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INTRODUCTION

The dipteran fauna of Rajasthan has been documented by Kumar and Kumar (1996), Joseph and Parui (1998), Nandi (2002), and Kumar (2004, 2005 & 2007). The distributional range in India and oriental region have been documented by Delfando & Hardy (1973, 1975 a & b). The present study records eight species belonging to eight genera under six families from Ranthambhore National Park, Rajasthan. The Diptera species belonging to many families were collected from diverse habitats *i.e.* many sub-localities as mentioned in material examined along with their systematic account below :

SYSTEMATIC ACCOUNT

Order DIPTERA

Suborder NEMATOCERA

Family PSYCHODIDAE

1. *Psychoda alternata* Say

1824. *Psychoda alternata* Say, in Keating, *Major long's second expedition* (Appendix) 2 : 358. Type-loc : Philadelphia. Pennsylvania, U.S.A.

1908. *Psychoda bengalensis* Brunetti, *Rec. Indian Mus.*, 2 : 371 (Male, Female). Type-locs: Calcutta [W. Bengal] and Simla, India.

1973. *Psychoda alternata* Say. Duckhouse, *A catalog of the Diptera of the Oriental region*. 1 : 238.

Material examined : 4 Male, 1 Female, 24.xi.2002, Dhudhal Mal Ka Darra, coll. S. Kumar.

Distribution : Cosmopolitan.

Remarks : New record from Ranthambhore National Park.

2. *Clogmia albipunctata* (Williston)

1893. *Psychoda albipunctatus* (Williston). *Ent. News*, 5 : 113 (Male; *Psychoda*). Type-loc : Havana, Cuba.

1908. *Psychoda albonigra* Brunetti, *Rec. Indian Mus.* **2** : 374 (Female, *Psychoda*). Type-loc : Museum, Calcutta, [W. Bengal] India.

1975. *Clogmia albipunctatus* (Williston). Duckhouse, *A catalog of the Diptera of the Oriental region.* **1** : 231.

Material examined : 5 Male, 2 Female, 22.xi.2002, Padam Talab, coll. S. Kumar.

Distribution : Tropicopolitan.

Remarks : New record from Ranthambhore National Park.

Suborder BRACHYCERA

Family STRATIOMYIDAE

Subfamily CLITDLARINAE

3. *Adoxomyia heminopla* (Wiedemann)

1891. *Adoxomyia heminopla* (Wiedemann). *Zool. Mag.* (Wied.) **1**(3) : 30 (Male, Female : *Clitellaria*) Type-loc : Tranquebar, India.

1975. *Adoxomyia heminopla* (Wiedemann). James, *A catalog of Diptera of the Oriental Region,* **2** : 25.

Material examined : 2 Male, 1 Female, 26.xi.2003, Raj Bagh Talab, coll. S. Kumar.

Distribution : India : Andaman Islands, Bihar, Tamil Nadu and Rajasthan.

Elsewhere : Burma, Ceylon, W. Pakistan (Bangladesh).

Remarks : New record from this protected area.

Subfamily SARGINAE

4. *Sargus metallinus* (Fabricius)

1805. *Sargus metallinus* Fabricius, *Syst Antt.* : 258.

1975. *Sargus metallinus* (Fabricius). James, *A catalog of the Diptera of the Oriental region.* **2** : 21

Material examined : 1 Male, 2 Female, 23.xi.2002, Baghda (Water point), coll. S. Kumar.

Distribution : India : Bihar, A & N Islands, Assam, Bengal, Uttar Pradesh, Rajasthan.

Elsewhere : Widespread in oriental region, Singapore, Borneo, Java, Ambonina, Aru Islands and Shanghai in China.

Remarks : New record from the National Park.

Family TABANIDAE

5. *Tabanus (Tabanus) striatus* (Fabricius)

1787. *Tabanus striatus* Fabricius, *Mantissa insect,* **2** : 356 (sex?). Type-loc : China.

1975. *Tabanus (Tabanus) striatus* (Fabricius), Stone, *A catalog of the Diptera of the Oriental region*, 2 : 70.

Material examined : 2 Male, 25.xi.2002, Galai sagar, coll. S. Kumar.

Distribution : India : A & N Islands, Rajasthan, throughout India.

Elsewhere : Ceylon, China [Kwangtung], N. Thailand, North Vietnam, W. Pakistan, Africa.

Remarks : New record from Ranthambhore National Park.

Family ASILIDAE

Tribe Stichopogonini

6. *Stichopogon indicus* Joseph and Parui

1984. *Stichopogon indicus* Joseph and Parui, *Bull. Zool. Surv. India*, 6 : 249. Type locality : Ratnagiri, Maharashtra.

Material examined : 1 Male, 14.x.2003, Indala, coll. S. Kumar.

Distribution : India : Maharashtra, Rajasthan.

Remarks : New record from Ranthambhore National Park.

Family BOMBYLIIDAE

Subfamily ANTHRACINAE

7. *Anthrax distigma* Weidemann

1828. *Anthrax distigma* Weidemann, *Aussereurop. Zweifl. Insekt.* 309.

Material examined : 1 Male, 8.x.2003, Kachida chowki, coll. S. Kumar.

Distribution : India : West Bengal, Bihar, Uttar Pradesh, & Sikkim.

Elsewhere : Burma, Celebes, Ceylon, Java, Philippines and Sumatra.

Remarks : New record from Ranthambhore National Park.

Suborder CYCLORRAPHA

Family SYRPHIDAE

Tribe ERISTALINI

8. *Eristalinus arvorum* (Fabricius)

1787. *Syrphus arvorum* Fabricius, *Mantissa Insect*, 2 : 335.

1975. *Eristalinus arvorum* (Fabricius), Knutson *et al.* *A catalog of the Diptera of the Oriental region*. 2 : 347.

Material examined : 1 Male, 2 Male, 24.xi.2002, Dhudhal Mal Ka Darra, coll. S. Kumar.

Distribution : India : Throughout India.

Elsewhere : S.E. Asia, Australia, Hawaii Islands, Japan and Micronesia.

Remarks : New record from Ranthambhore National Park.

SUMMARY

Eight species of Diptera belonging to eight genera under six families are reported here. Distributional ranges in India and elsewhere have also been given. All the species of Diptera are new record from the Ranthambhore National Park.

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INSECTA : LEPIDOPTERA : HETEROCERA

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INTRODUCTION

The moth diversity of Ranthambhore National Park (RNP), Rajasthan has been studied for the first time by the Zoological Survey of India. A total 30 species of moths pertaining to 26 genera and five families are identified. All the species are new records to the moth fauna of RNP.

SYSTEMATIC ACCOUNT

Order LEPIDOPTERA

Suborder HETEROCERA

I. Family SPHINGIDAE

1. *Herse convolvuli convolvuli* (Linnaeus)

1758. *Sphinx convolvuli* Linnaeus, *Syst. Nat. Ed.*, **10** : 490.

1937. *Herse convolvuli convolvuli*, Bell & Scott, *Fauna Brit. India*, Moths, **5** : 61.

Material examined : Raj Bagh, RNP, 15.x.2003, 1 ex., Coll. S. Kumar.

Wing expanse : 90-120 mm.

Distribution : India : Rajasthan (RNP), Madhya Pradesh, West Bengal, Darjiling and Medinipur), throughout the rest of mainland.

Elsewhere : Eastern hemisphere except the higher latitudes, rare in Siberia and Europe.

2. *Hippotion boerhaviae* (Fabricius)

1775. *Sphinx boerhaviae* Fabricius, *Syst. Ent. P.* : 542.

1937. *Hippotion boerhaviae*, Bell & Scott, *Fauna Brit. India*, Moths, **5** : 424.

1997. *Hippotion boerhaviae*, Mandal & Maulik, *Fauna of West Bengal, Zool Surv. India*, **7** : 637.

Material examined : Raj Bagh, RNP, 15.x.2003, 2 exs., Coll. S. Kumar.

Wing expanse : 50-58 mm.

Distribution : India : Rajasthan (RNP), Madhya Pradesh, West Bengal, Andhra Pradesh, Gujarat, Orissa, Sikkim, Southern Peninsula, West Himalaya, and Maharashtra.

Elsewhere : Pakistan, Sri Lanka, Bhutan, South China, Malaya and Philippines.

3. *Hippotion celerio* (Linnaeus)

1758. *Sphinx celerio* Linnaeus, *Syst. Ent. P.* : 491.

1937. *Hippotion celerio*, Bell & Scott, *Fauna Brit. India*, Moths, 5 : 417.

Material examined : Raj Bagh, RNP, 15.x.2003, 1 ex., Coll. S. Kumar.

Wing expanse : 60-80 mm.

Distribution : India : Rajasthan (RNP), W. and E. Himalayas and S. India.

Elsewhere : Throughout the world except in the far North and New Zealand, England.

4. *Nephele didyma* (Fabricius)

1777. *Sphinx didyma* Fabricius, *Syst. Ent.* : 543.

1937. *Nephele didyma*, Bell & Scott, *Fauna Brit. India*, Moths, 5 : 325.

Material examined : Raj Bagh, RNP, 15.x.2003, 1 ex., Coll. S. Kumar.

Wing expanse : Male : 70-78 mm. Female : 72-86 mm.

Distribution : India : Throughout India including Rajasthan (RNP), Madhya Pradesh, Western and Eastern Himalayas, South India, Andaman Islands.

Elsewhere : Sri Lanka, Myanmar, extending to Malaya.

5. *Polyptychus dentatus* (Cramer)

1777. *Sphinx dentatus* Cramer, *Pap. Exot.* 2 : 42.

1937. *Polyptychus dentatus*, Bell & Scott, *Fauna Brit. India*, Moths, 5 : 169.

Material examined : Raj Bagh, RNP, 15.x.2003, 3 exs., Coll. S. Kumar.

Wing expanse : Male : 92-108 mm., Female : 116-120 mm.

Distribution : India : Rajasthan (RNP), Madhya Pradesh, South India and Uttar Pradesh.

Elsewhere : China, Sri Lanka, and Pakistan.

6. *Psilogramma menephron menephron* (Cramer)

1780. *Sphinx menephron* Cramer, *Pap. Exot.* 3 : 164.

1937. *Psilogramma menephron menephron*, Bell & Scott, *Fauna Brit. India, Moths*, 5 : 169.

Material examined : Bagdha, RNP, 12.x.2003, 1 ex., Coll. S. Kumar.

Wing expanse : Male : 82-122 mm. Female : 108-138 mm.

Distribution : India : Throughout India including Rajasthan (RNP) and Madhya Pradesh.

Elsewhere : China and eastwards to the Solomon Islands.

II. Family PYRALIDAE

7. *Diaphania stolalis* (Guen'ee)

1854. *Glyphodes stolalis*, Guen'ee, *Delt. Et. Pyral.*, : 293.

1896. *Glyphodes stolalis*, Hampson, *Fauna Brit. India, Moths*, 4 : 354.

Material examined : Indala, RNP, 14.x.2003, 1 ex., Coll. S. Kumar.

Wing expanse : Male : 34 mm.

Distribution : India : Rajasthan (RNP), Sikkim.

Elsewhere : Nepal, Sri Lanka, Pulo, Borneo, Australia, Fiji.

III. Family ARCTIIDAE

8. *Cretonotus gangis* (Linnaeus)

1764. *Phalaena gangis* Linnaeus, *Amoen. Acad.*, 6 : 410.

1991. *Cretonotus gangis*, Mandal & Ghosh, *Fauna of Tripura, Rec. Zool. Surv. India* 88(3 & 4) : 313-314.

Material examined : Raj Bagh, RNP, 15.x.2003, 1 ex., Coll. S. Kumar.

Wing expanse : 39 mm.

Distribution : India : Rajasthan (RNP), Madhya Pradesh, West Bengal, Maharashtra, Gujarat, Andhra Pradesh, Kerala, Tamil Nadu, Assam, Meghalaya, Arunachal Pradesh and Tripura.

Elsewhere : Myanmar, Sri Lanka, Western Malaysia, Java, Australia, China, Pakistan and Nepal.

9. *Utetheisa pulchelloides* Hampson

1907. *Utetheisa pulchelloides* Hampson, *Ann. Mag. nat. Hist.* (7)19 : 239.

1939. *Utetheisa pulchelloides* Hampson, Jordan, *Novit. Zool.*, 41 : 281-3.

1988. *Utetheisa pulchelloides* Holloway, *The Moth of Borneo*, 6 : 56.

Material examined : Indala, RNP, 14.x.2003, 1 ex., Coll. S. Kumar.

Wing expanse : Male : 40-46 mm. Female : 45 mm.

Distribution : India : Throughout India including Rajasthan (RNP), Madhya Pradesh and West Bengal.

Elsewhere : Europe, Africa, Sri Lanka, Philippines, Malay Archipeloge, New Guinea and Australia.

IV. Family HYPSIIDAE

10. *Asota caricae* (Fabricius)

1792. *Noctua caricae* Fabricius, *Syst. Ent.*, 3, 2 : 27.

1892. *Hypsa alciphron*, Hampson, *Fauna Brit. India*, Moths, 1 : 502.

1982. *Asota caricae*, Barlow, *An introduction to the Moths of South East Asia* : 77.

Material examined : Kachida, RNP, 08.x.2003, 3 exs., Raj Bagh, RNP, 15.x.2003, 1 ex., Dhudhal Mal Ka Darra, RNP, 11.x.2003, 7 exs., Indala, RNP, 14.x.2003, 12 exs., Coll. S. Kumar.

Wing expanse : Male : 62-67 mm. Female : 72-76 mm.

Distribution : India : Throughout India including Rajasthan (RNP), and Madhya Pradesh.

Elsewhere : Myanmar, Sri Lanka, Penang, Java, Amboina, Ceram, New Guinea, New Hebrides, Solomons, and New Ireland.

V. Family NOCTUIDAE

11. *Achaea janata* Linnaeus

1758. *Achaea janata* Linnaeus, *Syst. Nat.* 10 : 527.

1985. *Achaea janata*, Kobes, *Heterocera Sumatrana*, Band 4 : 39.

Material examined : Kachida, RNP, 08.x.2003, 2 exs., Bagdha, RNP, 12.x.2003, 2 exs., Raj Bagh, RNP, 15.x.2003, 1 ex., Dhudhal Mal Ka Darra, RNP, 11.x.2003, 1 ex., Gilai sagar, RNP, 13.x.2003, 1 ex., Coll. S. Kumar.

Wing expanse : 42-46 mm.

Distribution : India : Rajasthan (RNP), Madhya Pradesh.

Elsewhere : Europe, Africa, Mauritis, Japan, China, Myanmar, and Sri Lanka.

12. *Agrotis* sp.

1816. *Agrotis*, Ochs. *Eur. Schmett.* IV, : 66.

1894. *Agrotis*, Hampson, *Fauna Brit. India*, Moths, 2 : 503.

Material examined : Indala, RNP, 14.x.2003, 1 ex., Coll. S. Kumar.

Distribution : Universally distributed including Madhya Pradesh, Rajasthan (RNP).

13. *Anua tirhaca* (Cramer)

1780. *Noctua tirhaca* Cramer, *Pap. Exot.* **2** : 116.

1894. *Ophiusa tirrhaca*, Hampson, *Fauna Brit. India*, Moths, **2** : 503.

1991. *Anua tirhaca*, Mandal and Maulik, *Fauna of Orissa, Zool. Surv. India*, **3** : 218.

Material examined : Bagdha, RNP, 12.x.2003, 1 ex., Dhudhal Mal Ka Darra, RNP, 11.x.2003, 1 ex., Coll. S. Kumar.

Wing expanse : 64-80 mm.

Distribution : India : Rajasthan (RNP), Madhya Pradesh, West Bengal, Orissa, Sikkim, Meghalaya, Assam, Himachal Pradesh, Uttar Pradesh, Punjab, Maharashtra and Tamil Nadu.

Elsewhere : Sri Lanka and Phillippines.

14. *Calyptra minuticomis* (Guen'ee)

1852. *Calpe minuticomis* Guen'ee, *Noct.* **2** : 374.

1894. *Calpe minuticomis*, Hampson, *Fauna Brit. India*, Moths, **2** : 565.

Material examined : Bagdha, RNP, 12.x.2003, 1 ex., Coll. S. Kumar.

Wing expanse : 50 mm.

Distribution : India : Throughout India.

Elsewhere : Java and Sri Lanka.

15. *Chrysodeixis eriosoma* (Doubleday)

1843. *Plusia eriosoma* Doubleday, *Dieffenbach's New Zealand*, **2** : 285.

1894. *Plusia eriosoma*, Hampson, *Fauna Brit. India*, Moths, **2** : 569-570.

1976. *Chrysodeixis eriosoma* Doubleday, Holloway : 32.

1985. *Chrysodeixis eriosoma* Holloway, *The Moths of Borneo, The Malayan Nature Journal*, **38**(3&4) : 289.

Material examined : Rajasthan (RNP), Bagdha, RNP, 12.x.2003, 2 exs., Dhudhal Mal Ka Darra, RNP, 11.x.2003, 1 ex., Coll. S. Kumar

Wing expanse : 42 mm.

Distribution : India : Throughout India including Madhya Pradesh.

Elsewhere : North and South America, Japan, China, and Australasian regions.

16. *Entomogramma tortum* Guen'ee

1852. *Entomogramma tortum* Guen'ee, *Noct.* **3** : 204.

1894. *Entomogramma tortum*, Hampson, *Fauna Brit. India*, Moths, **2** : 533.

Material examined : Raj Bagh, RNP, 15.x.2003, 1 ex., Coll. S. Kumar.

Wing expanse : 54 mm.

Distribution : India : Rajasthan (RNP), Madhya Pradesh, Western and Southern India.

Elsewhere : Java and Sri Lanka.

17. *Episparis varialis* Walker

1858. *Episparis varialis* Walker, *Cat. hep. Het. B. M.* xvi : 7.

1888. *Episparis varialis*, Cotes & Swinhoe, *Cat. Moths of India* : 435.

1894. *Episparis varialis*, Hampson, *Fauna Brit. India*, Moths, **2** : 543.

Material examined : Bagdha, RNP, 12.x.2003, 2 ex., Coll. S. Kumar.

Wing expanse : 60 mm.

Distribution : India : Peninsular India including Rajasthan (RNP), Madhya Pradesh and Andamans.

Elsewhere : Sri Lanka.

18. *Ercheia* sp.

1857. *Ercheia* Walker, *Cat.* Xiii : 1107.

1894. *Ercheia*, Hampson, *Fauna Brit. India*, Moths, **2** : 451.

Material examined : Raj Bagh, RNP, 15.x.2003, 1 ex., Coll. S. Kumar.

Distribution : Ethiopian, Oriental and Australasian regions.

19. *Grammodes geometrica* (Fabricius)

1775. *Noctua geometrica* Fabricius, *Syst. Ent.* : 599.

1991. *Grammodes geometrica*, Mandal and Maulik, *Fauna of Orissa, Zool. Surv. India* **3** : 219.

Material examined : Raj Bagh, RNP, 15.x.2003, 1 ex., Coll. S. Kumar.

Wing expanse : 26-38. mm.

Distribution : India : Rajasthan (RNP), Madhya Pradesh, Orissa, West Bengal, Sikkim, Assam, Uttar Pradesh, Maharashtra, Andaman & Nicobar Islands, Punjab, Karnataka and Tamil Nadu.

Elsewhere : Bangladesh, Southern Myanmar, Sri Lanka, Singapore, Java, Pulo Lant and Taiwan.

20. *Hypocala* sp.

1852. *Hypocala* Guen'ee, *Noct.* ii : 73.

1894. *Hypocala*, Hampson, *Fauna Brit. India*, Moths, **2** : 452.

Material examined : Bagdha, RNP, 12.x.2003, 1 ex., Indala, RNP, 14.x.2003, 1 ex., Coll. S. Kumar.

Distribution : India : Throughout India including Madhya Pradesh.

Elsewhere : Myanmar, Borneo, China, Malacca, Australia, and Sri Lanka.

21. *Mocis undata* (Fabricius)

1775. *Noctua undata* Fabricius, *Syst. Ent.* : 600.

1991. *Mocis undata*, Mandal and Maulik, *Fauna of Orissa, Zool. Surv. India* **3** : 220.

Material examined : Bagdha, RNP, 12.x.2003, 1 ex., Kachida, RNP, 08.x.2003, 1 ex., Raj Bagh, RNP, 15.x.2003, 1 ex., Dhudhal Mal Ka Darra, RNP, 11.x.2003, 1 ex., Coll. S. Kumar.

Wing expanse : 50 mm.

Distribution : India : Rajasthan (RNP), Madhya Pradesh, Orissa, West Bengal, Bihar, Meghalaya, Tripura, Punjab, Uttar Pradesh, Assam, Meghalaya, Himachal Pradesh, Maharashtra, Kerala, Tamil Nadu and Andaman & Nicobar Islands.

Elsewhere : Bangladesh, Malaysia, Philippines, Sundaland, Myanmar, Sri Lanka, Taiwan and Hainan of oriental and also Ethiopio-Malagassic and Palaearctic Regions.

22. *Ophideres ancilla* Cramer

1777. *Phalaena (Noctua) ancilla*, Cramer, *Pap. Exot.* ii : 149.

1894. *Ophideres ancilla*, Hampson, *Fauna Brit. India*, Moths, **2** : 559.

Material examined : Kachida, RNP, 08.x.2003, 1 ex., Coll. S. Kumar.

Wing expanse : 80 mm.

Distribution : India : Throughout India including Rajasthan (RNP) and Madhya Pradesh.

Elsewhere : Sri Lanka, Myanmar.

23. *Ophideres fullonica* Linnaeus

1767. *Ophideres fullonica* Linnaeus, *Syst. Nat.* I, **2** : 812.

1888. *Othreis fullonica*, Cotes & Swinhoe, *Cat. Moths of India* : 311.

1894. *Ophideres fullonica*, Hampson, *Fauna Brit. India*, Moths, **2** : 560.

Material examined : Bagdha, RNP, 12.x.2003, 1 ex., Coll. S. Kumar.

Wing expanse : Male : 80-94 mm., Female : 90-110 mm.

Distribution : India : Rajasthan (RNP), Madhya Pradesh, Maharashtra (Mumbai), Himachal Pradesh (Kulu), Sikkim, Meghalaya (Shillong) and Sikkim.

Elsewhere : Pakistan (Karachi), Africa and Australia.

24. *Ophiusa coronata* (Fabricius)

1775. *Noctua coronata* Fabricius, *Syst. Ent.* 1 : 596.

1894. *Ophiusa coronata*, Hampson, *Fauna Brit. India*, Moths, 2 : 502.

Material examined : Bagdha, RNP, 12.x.2003, 1 ex., Dhudhal Mal Ka Darra, RNP, 11.x.2003, 1 ex., Coll. S. Kumar.

Wing expanse : 82-96 mm.

Distribution : India : Throughout India including Rajasthan (RNP), Madhya Pradesh, Andaman & Nicobar Islands.

Elsewhere : Myanmar, Sri Lanka, Java and Australia.

25. *Ophiusa dotata* (Fabricius)

1794. *Noctua dotata* Fabricius, *Ent. Syst.*, 3 : 153.

1894. *Ophiusa dotata*, Hampson, *Fauna Brit. India*, Moths, 2 : 496.

Material examined : Bagdha, RNP, 12.x.2003, 2 exs., Dhudhal Mal Ka Darra, RNP, 11.x.2003, 1 ex., Gilai sagar, RNP, 13.x.2003, 1 ex., Coll. S. Kumar.

Wing expanse : 82 mm.

Distribution : India : Throughout India including Rajasthan (RNP).

Elsewhere : Myanmar, Sri Lanka.

26. *Ophiusa triphaenoides* (Walker)

1858. *Ophiodes triphaenoides* Walker, *Cat. hep. Het. B.M.* xiv : 1358.

1888. *Minucia triphaenoides*, Cotes & Swinhoe, *Cat. Moths of India* : 400.

1894. *Ophiusa triphaenoides*, Hampson, *Fauna Brit. India*, Moths, 2 : 505.

Material examined : Kachida, RNP, 08.x.2003, 1 ex., Raj Bagh, RNP, 15.x.2003, 1 ex., Dhudhal Mal Ka Darra, RNP, 11.x.2003, 1 ex., Gilai sagar, RNP, 13.x.2003, 2 exs., Coll. S. Kumar.

Wing expanse : 60 mm.

Distribution : India : Rajasthan (RNP), Madhya Pradesh, Jharkhand, Maharashtra and Sikkim.

27. *Sphingomorpha chlorea* (Cramer)

1777. *Phalaena (Noctua) chlorea* Cramer, *Pap. Exot.*, ii : 104.

1894. *Sphingomorpha chlorea*, Hampson, *Fauna Brit. India*, Moths, **2** : 490-491.

Material examined : Kachida, RNP, 08.x.2003, 1 ex., Bagdha, RNP, 12.x.2003, 1 ex., Coll. S. Kumar.

Wing expanse : 60-84 mm.

Distribution : India : Throughout India including Rajasthan (RNP) and Madhya Pradesh.

Elsewhere : Sri Lanka, Myanmar, and Africa.

28. *Spodoptera litura* (Fabricius)

1775. *Noctua litura* Fabricius, *Syst. Ent.* : 601.

1991. *Prodenia litura*, Mandal and Maulik, *Fauna of Orissa, Zool. Surv. India* **3** : 212.

1989. *Spodoptera litura*, Holloway, *The Malayan Nature journal, Malayan Nature Society, Malaysia*, **42**(2 & 3) : 136.

Material examined : Bagdha, RNP, 12.x.2003, 1 ex., Coll. S. Kumar.

Wing expanse : 36-40 mm.

Distribution : India : Rajasthan (RNP), Madhya Pradesh, West Bengal, Sikkim, Orissa, Tripura, Himachal Pradesh, Uttar Pradesh, Punjab, Maharashtra, Karnataka, Tamil Nadu and Kerala.

Elsewhere : Nepal, Southern Myanmar, Sri Lanka, Singapore, Borneo Java and Taiwan of oriental and also Australo-Papuan, Ethiopian, Palaearctic and Hawaiian Regions.

29. *Spirama retorta* Cramer

1779-83. *Spirama retorta* Cramer, *Pap. Exot.*, **2** : 116.

1894. *Spirama retorta*, Hampson, *Fauna Brit. India*, Moths, **2** : 553.

Material examined : Bagdha, RNP, 12.x.2003, 1 ex., Indala, RNP, 14.x.2003, 1 ex., Coll. S. Kumar.

Wing expanse : Male : 64-76 mm., Female : 66-88 mm.

Distribution : India : Throughout India including Rajasthan (RNP) and Madhya Pradesh.

Elsewhere : Sri Lanka, Myanmar, China, Japan, and Java.

30. *Trigonodes hyppasia* Cramer

1770-83. *Trigonodes hyppasia* Cramer, *Pap. Exot.*, **3** : 250.

1894. *Trigonodes hyppasia*, Hampson, *Fauna Brit. India*, Moths, **2** : 527.

Material examined : Indala, RNP, 08.x.2003, 4 exs., Raj Bagh, RNP, 15.x.2003, 2 exs., Dhudhal Mal Ka Darra, RNP, 11.x.2003, 1 ex., Gilai sagar, RNP, 13.x.2003, 1 ex., Coll. S. Kumar.

Wing expanse : 46 mm.

Distribution : India : Throughout India including Rajasthan (RNP) and Madhya Pradesh.

SUMMARY

The paper deals with systematic account 30 species of moths belonging to 26 genera and 5 families from the area of Ranthambhore National Park, Rajasthan. All the species are reported for the first time from this park. The study will help in management activities of the National Park.

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INSECTA : HYMENOPTERA : FORMICIDAE

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INTRODUCTION

Ants (Formicidae: Hymenoptera: Insecta) have the most highly organized social life among all the insects. The major factor responsible for their ecological success is division of labour. They live in highly organized and well-established community with hundred and thousands of individuals of distinct forms. Bingham's (1903) fauna is the main source of knowledge on ant fauna of British India. Later Rothneyi (1889) published extensive notes on ants of Bengal whereas Wronghton (1892) provided a good account on Formicidae mainly from Maharashtra. Chapman and Capco (1951) published a checklist of the ants of Asia. Chhotani and Maiti (1977) worked on ants of Andaman Islands. Pajni and Suri (1978) reported the Formicidae Fauna of Chandigarh.

Mathew (2000) and Mathew and Tiwari (2002) dealt with the ants of Tripura and Meghalaya. Ali (1991 & 1992) reported the ant fauna of Karnataka. Bharti (2001 & 2002) has given the checklist of Northwest India. Tiwari (1997) has worked out the ants of Delhi. Tiwari, *et al.* (1998, 2002, and 2003) has published the ant fauna of West Bengal, Orissa and Sikkim.

Hymenoptera fauna of Rajasthan was described by Chhotani and Ray (1976). Tak (1995, 2000 a & b, 2008) has dealt the ants of Rajasthan. Tak and Rathore (1996) has reported the ant fauna of the Thar Desert. Ant (Formicidae) fauna of Desert National Park, Rajasthan has been reported by Tak and Rathore (2004); Tak, *et al.* (2007) has worked the ants of adjacent areas of Pichhola Lake, Udaipur.

The present studies are based on the material collected from Ranthambhore National Park of Rajasthan by the survey parties of Desert Regional Station, Zoological Survey of India. The manuscript deals with sixteen ant species distributed under eight genera and six subfamilies *viz.* Ponerinae, Dorylinae, Dolichoderinae, Formicinae, Pseudomyrmecinae and Myrmicinae of Family Formicidae of Order Hymenoptera. All the sixteen species are new records from Ranthambhore National Park.

Abbreviation used :

N. S. Rathore	-	N. S. R.
R. Sewak	-	R. S.
S. Kumar	-	S. K.

*New Record from Ranthambhore National Park.

**New Record from Rajasthan.

SYSTEMATICS**Class INSECTS****Order HYMENOPTERA****Family FORMICIDAE****1. Subfamily DORYLINAE Leach**

1. *Dorylus (Typhlopone) labiatus* Shuckard*

2. Subfamily PONERINAE Lepeletier

2. ***Anochetus taylori* Forel*

3. ***Anochetus yerburyi* Forel*

3. Subfamily PSEUDOMYRMECINAE Emery

4. *Tetraponera (Tetraponera) rufonigra* Jerdon*

4. Subfamily MYRMECINAE Lepeletier

5. ***Cremastogaster (Orthocrema) walshi* Forel*

6. ***Cremastogaster (Acrocoelia) rothneyi* Mayr*

7. *Monomorium (Xeromyrmex) salomonics indicum* Forel*

8. *Monomorium (Parholcomymex) gracillimum* Jerdon var. *mayri* Forel*

5. Subfamily DOLICHODERINAE Forel

9. *Tapinoma (Micromyrma) melanocephalum* Fabricius*

6. Subfamily FORMICINAE Latreille

10. *Camponotus (Tanaemyrmex) compressus* Fabricius*

11. *Camponotus (Tanaemyrmex) invidus* Forel*

12. *Camponotus (Tanaemyrmex) taylori* Forel*

13. ***Camponotus (Tanaemyrmex) variegatus* Smith*

14. ***Camponotus (Tanaemyrmex) carin* Emery*

15. ***Camponotus dichrous* Forel*

16. *Polyrhachis (Myrmhopla) simplex* Mayr*

Subfamily DORYLINAE Leach

Tribe **Dorylini** ForelGenus **Dorylus** Fabricius1. **Dorylus (Tyhlopone) labiatus** Shuckard

1940. *Dorylus (Tyhlopone) labiatus* Shuckard *Ann. Mag. Nat. Hist.*, **5** : 319.

Material examined : Anantpura, 9 exs., 4.xi.2000; (under moist log), Lahpur Dam, 30 exs., 6.xi.2000 (tree trunk), Coll. N.S.R.

Diagnostic characters : Length Worker maj. 6-8 mm. Worker min. 3.5 mm. Worker: Castaneous yellow, polished, smooth, shining and blind. Head rectangular, longer than its breadth; broader in front than posteriorly. No longitudinally impressed line on the head. Mandibles with two teeth. Antennae – Worker maj. 11 and worker min. 10 jointed. Alitrunk rectangular, depressed, slightly constricted at the promesonotal suture. Petiole one jointed and the node longer than its breadth.

Distribution : India : Rajasthan, Gujarat, Maharashtra, Chandigarh, Karnataka, Punjab, Delhi, West Bengal, Orissa, Sikkim, Manipur, Uttar Pradesh and Himachal Pradesh. Elsewhere: Myanmar, Countries East of Bay of Bengal.

Subfamily PONERINAE Lepeletier

Tribe ODONTOMACHINI Mayr

Genus **Anochetus** Mayr2. **Anochetus taylori** Forel

1900. *Anochetus taylori* Forel, *J. Bombay nat. Hist. Soc.*, **xiii** : 60 & 63.

Material examined : Ranthambhore, 3 exs., 30.xi.1999 (understone), Coll. R.S.

Diagnostic characters : Length-Worker - 4.8 mm., Head, alitrunk and abdomen covered with scattered erect pale hairs. Head irregularly rectangular, posteriorly constricted, mandibles placed very close together in the middle of the front of the head. Mandibles tridentate at apex, the intermediate tooth very small. Antennal carinae short, wide apart covering the base of the antennae. Antenna 12 - jointed, filiform. Alitrunk broad and convex in front, rounded and slightly compressed posteriorly, the pronotum constricted into neck anteriorly. Petiole one jointed and the node smooth, thick, convex in front, flat almost concave posteriorly. Abdomen elongate, massive.

Distribution : Rajasthan, Gujarat, Maharashtra, Western India, Karnataka, Tamil Nadu, Orissa.

Tribe **Odontomachini** MayrGenus **Anochetus** Mayr3. **Anochetus yerburyi** Forel

1900. *Anochetus yerburyi* Forel, *J. Bombay nat. Hist. Soc.*, **xiii** : 59-62.

Material examined : Malik Talab, 2 exs., 3.xi.2000 (Under moist log), Coll. N.S.R.

Diagnostic characters : Length Worker 4-4.5 mm. Worker : Head with mandibles, antennae and legs testaceous yellow, alitrunk and abdomen light shining castaneous red. Head smooth convex in front the front fan shaped area faintly longitudinally striate, posteriorly not so deeply emarginate. Mandibles placed very close together in the middle of the front of the head. Mandibles tridentate at apex, the intermediate tooth very small. Antennae 12 jointed. Alitrunk somewhat coarsely longitudinally rugose in front, the meso and metanotum punctate. Petiole one jointed and flat, only slightly convex in front, above the margin is subacute and rounded. Abdomen smooth and shining with the base punctured.

Distribution : Rajasthan and Karnataka.

Elsewhere : Sri Lanka.

Subfamily PSEUDOMYRMECINAE Emery

Tribe PSEUDOMYRMECINI Forel

Genus *Tetraponera* Smith

4. *Tetraponera (Tetraponera) rufonigra* Jerdon

1852. *Tetraponera (Tetraponera) rufonigra* Jerdon, (*Eciton rufonigrum*), *Madr. Jour. Lit. Sc.*, 12 : 111.

Material examined : Fakiri Talab, 3 exs., 30.viii.2001. (Under stone), Coll. N.S.R. and R.S.

Diagnostic Characters : Length Worker-12 m.m. Worker : Head, 2nd joint of petiole black, the mandibles, antennae, thorax and 1st joint of the petiole more or less red. Head rectangular, a little longer than broad and slightly narrow in front than posteriorly. Mandibles with six teeth. Clypeus transverse narrow, raised in the middle which is slightly produced giving the anterior margin a bisinuate appearance. Antennae short and stout, 12 segmented. Ocelli present. Alitrunk elongate, the pronotum broad its anterior lateral angles dentate, a medial small longitudinal tubercle at its posterior margin, promesonotal suture arched to the front, mesonotum small flat, a deep emargination at the meso-metanotal suture. Metanotum longer than the pro and meso together. Petiole two jointed elongate, the 1st node oval with a long petiole, 2nd node conical with a short petiole. Abdomen small, oval, acute at apex, sting exerted.

Distribution : Rajasthan, Gujarat, Tripura, Chandigarh, Karnataka, Tamil Nadu, Kerala, Punjab, Haryana, Uttar Pradesh, Himachal Pradesh, Meghalaya, West Bengal, Orissa and Manipur.

Elsewhere : Myanmar, Sri Lanka, China, Singapore, Indonesia, Cambodia, Java and Sumatra.

Subfamily MYRMICINAE Lepeletier

Tribe CREMASTOGASTERINI Emery

Genus *Cremastogaster* Lund

5. *Cremastogaster (Orthocrema) walshi* Forel

1902. *Cremastogaster (Orthocrema) walshi* Forel, *Rev. Suisse Zool.* **10** : 15.

Material examined : Galai sagar Dam, 8 exs., 7.xii.1999 (under stone), Coll. R.S. Malik Talab, 23 exs., 8.xi.2000 (under stone) Coll. N.S.R.

Diagnostic Characters : Length Worker : 3-3.5 m.m. Worker : Dark piceous, smooth and shining, the basal portion of the metanotum longitudinally striate pilosity fairly abundant and pale yellowish in colour. Head rectangular, slightly longer than broad. Mandibles longitudinally striate with 4 teeth. Antennae short and thick, the scape not extending to the posterior margin of the head, the club formed of the apical three joints, but somewhat indistinct. Alitrunk raised in front and a little compressed pro-mesonotal suture obsolete, meso-mesonotal suture deep. Basal portion of metanotum sculptured, metanotal spines very short, triangular, not divergent. Petiole two jointed 1st joint slightly broadened, flat anteriorly and narrowed posteriorly, 2nd joint with a rounded, slightly raised node divided longitudinally by a broad groove. Abdomen short and broad.

Distribution : India : Rajasthan, Chandigarh, Punjab, Haryana, Uttar Pradesh, Meghalaya, Orissa, Sikim, Himachal Pradesh and West Bengal.

Tribe *Cremastogasterini* Emery

Genus *Cremastogaster* Lund

6. *Cremastogaster (Acrocoelia) rothneyi* Mayr

1878. *Cremastogaster (Acrocoelia) rothneyi* Mayr, *Verh. zool.-bot. Ges. Wein*, **28** : 681.

Material examined : Raj Bagh Talab, 10 exs., 8.xi.2000 (under log), Coll. N.S.R. Fakiri Talab, 6 exs., 30.iii.2001 (under log), Atal sagar, 15 exs., 31.iii.2001 (under stone), Coll. N.S.R. and R.S.

Diagnostic Characters : Length Worker : 3-3.5 m.m. Worker : Rufo-feruginous, abdomen fuscous brown to black, pilosity fairly abundant. Head longitudinally striate a little longer than broad. Mandibles finely striate with 4 teeth. Antennae slender but short, the scape not quite reaching the top of the head, the club of the flagellum formed of apical three joints. Alitrunk pronotum flat above, rounded anteriorly, mesonotum slightly, concave meso-metanotal suture very distinct, basal portion of the metanotum transversely rectangular, longitudinally striate, metanotal spines very thick at base, apex directed backwards and inwards. Petiole two-jointed 1st joint broad, flat above; broader in front than posteriorly, the sides rounded, 2nd joint seen from above trituberculate on upper side, the tubercles rounded, the anterior one small, the other two larger side by side, subequal, abdomen broadly cordate.

Distribution: India: Maharashtra, Gujarat, Tamil Nadu, Sikkim, West Bengal, Punjab, Haryana, Himachal Pradesh, Meghalaya, Uttar Pradesh and Orissa.

Tribe **Solenopsidini** Forel

Genus **Monomorium** Mayr

7. **Monomorium (Xeromyrmex) salomonis indicum** Forel

1902. *Monomorium salomonis* Linn. race *indicum* Forel, *Rev. Suisse Zool.*, **10** : 213.

Material examined : Atal sagar, 8 exs., 31.iii.2001 (under stone), Fakiri Talab, 2 exs., 30.viii.2001 (under stone), Katholi Chowki, Many exs., 2.iv.2001 (under dry dung), Coll. N.S.R. & R.S.

Diagnostic Characters : Length Worker : 3-3.5 m.m. Worker : Ferruginous red with abdomen dark brown. Head opaque almost as broad as long, broader anteriorly than posteriorly. Mandibles narrow with three or four teeth, when closed partially concealed under the projecting margin of the clypeus. Antennae moderately long, the scape not quite reaching the posterior margin of the clypeus. Alitrunk anteriorly rounded, moderately broad, the meso-metanotal suture distinct, the basal portion of the metanotum broadening posteriorly. Petiole two jointed the nodes seen from above equal, rounded and petiolate anteriorly. Abdomen oval.

Distribution : India : Rajasthan, Maharashtra, Gujarat, Chandigarh, Karnataka, Punjab, West Bengal, Andhra Pradesh and Tamil Nadu.

Elsewhere : Myanmar.

Tribe **Solenopsidini** Forel

Genus **Monomorium** Mayr

8. **Monomorium (Parholcomymex) gracillimum var. mayri** Forel

1902. *Monomorium (Parholcomymex) gracillimum* var. *mayri* Forel, *Rev. Suisse Zool.*, **10** : 209.

Material examined : Dhudhal Mal Ka Darra. 20 exs., 1.iv.2001 (ground), Coll. N.S.R. & R.S.

Diagnostic Characters : Worker : Length 2.5-3m.m. Worker : Dark brown with the mandibles, antennae and legs pale yellow in colour. Abdomen with a patch of yellow at the base. Head convex smooth and shining, a little longer than broad, the posterior lateral angle rounded. Mandibles with the masticatory margin very oblique armed with four teeth. Antennae short, slender the scape falling short of the top by one fourth of its length. Alitrunk narrower than the head, emarginate at the meso-metanotal suture, the mesonotum convex, narrower anteriorly slightly convex, apical portion, obliquely truncate. Petiole two jointed 1st node conical rounded above, higher than the 2nd and anteriorly petiolate, 2nd node subglobose not broader than the 1st node. Abdomen oval.

Distribution : Rajasthan, Gujarat, Tamil Nadu, Kerala.

Elsewhere : Sri Lanka, North Africa, Arabia, Myanmar.

Subfamily DOLICHODERINAE Forel

Tribe **Tapinomini** Emery

Genus **Tapinoma** Forster

9. *Tapinoma (Micromyrma) melanocephalum* Fabricius

1793. *Tapinoma (Micromyrma) melanocephalum* Fabricius, *Ent. Syst.*, **2** : 353. (*Formica melanocephala*).

Material examined : Anatpura, 1 ex. 4.xi.2000 (under moist log), Coll. N.S.R. Dhudhal Mal Ka Darra, 15 exs., 1.iv.2001 (ground), Coll. N.S.R. & R.S.

Diagnostic Characters : Length Worker : 1.5-2.0 m.m. Worker : Head and alitrunk dark brown in colour, abdomen yellowish white. Head longer than broad, oval, not emarginate, rounded posteriorly. Mandibles triangular broad with the masticatory margin equal to the other margin and armed with minute teeth. Clypeus evenly convex, broader than high, its anterior margin slightly arched. Antennae thick, the scape extending beyond the top of the head. The joints of the flagellum longer than broad. Alitrunk viewed from the side not emarginate, the pro-meso and meso-metanotal sutures distinct slightly constricted at the latter suture. Petiole one jointed with a distinct node. Base of the abdomen overhanging the pedicel.

Distribution : India : Rajasthan, Gujarat, Maharashtra, Chandigarh, Karnataka, Tamil Nadu, Meghalaya, Tripura, West Bengal and Orissa.

Elsewhere : Spread through tropics of both the hemispheres, South America.

Subfamily FORMICINAE Latreille

Tribe **Camponotini** Forel

Genus **Camponotus** Mayr

10. *Camponotus (Tanaemyrmex) compressus* Fabricius

1892. *Camponotus maculatus* Fabricius race *compressus*, Forel, *J. Bombay nat. Hist. Soc.*, **7** : 239 & 240.

1925. *Camponotus (Tanaemyrmex) compressus* Emery, *C. Gen. Insect. Fasc.* **183** : 98.

Material examined : Lahpur dam, 3 exs., 6.xi.2000 (tree turnk), Coll. R.S., Mansarovar, 1 ex., 31.iii.2001 (ground), Coll. N.S.R. & R.S.

Diagnostic Characters : Length Worker : maj. 11-13 m.m. Worker : Black, opaque, Head sub-triangular, very broad posteriorly. Mandibles triangular with seven teeth. Clypeus medially vertically carinate. Alitrunk narrower than head, anteriorly produced into a collar viewed from side forming a arch, petiole one jointed, node of the petiole oval, transverse convex in front, flat posteriorly. Tibia of the legs prismatic. Abdomen broad and massive.

Distribution : India : Rajasthan, Gujarat, Maharashtra, Shillong, Andamans, Chandigarh, Karnataka, Tamil Nadu, Assam, West Bengal, Meghalaya, Punjab, Orissa, Tripura, Sikkim, and Manipur.

Elsewhere : Sri Lanka, Myanmar, Russia, Arabia, Africa, Borneo, Phillipines, Malayan subregion and Nepal.

Tribe **Camponotini** Forel

Genus **Camponotus** Mayr

11. **Camponotus (Tanaemyrmex) invidus** Forel

1892. *Camponotus (Tanaemyrmex) invidus* Forel *J. Bombay nat. Hist. Soc.*, 7 : 235, fig. 2, Worker, Soldier.

Material examined : Lahpur Dam, 1 ex., 6.xi.2000 (tree trunk), Coll. N.S.R., Mansarovar, 10 exs., 8.xii.1999 (under stone), Coll. R.S.

Diagnostic Characters : Length worker : 5-6 m.m. Worker : Head, alitrunk and abdomen entirely pale yellow with sparse erect yellowish pubescent. Head more or less elongate, sides of the head straight not convex. Mandibles with 6 teeth; clypeus comparatively broad. Antennae 12 segmented, comparatively long and thick. Alitrunk convex anteriorly, strongly laterally compressed posteriorly, with the pro-meso and metanotum more strongly curved. Legs stout, tibia cylindrical. Petiole one jointed, node low, convex in front, flat posteriorly, abdomen comparatively long and massive.

Distribution : India : Rajasthan, Orissa, Sikkim, West Bengal, Himachal Pradesh, Uttaranchal, Delhi, Andaman and Nicobar Islands.

Tribe **Camponotini** Forel

Genus **Camponotus** Mayr

12. **Camponotus (Tanaemyrmex) taylori** Forel

1892. *Camponotus maculatus*, Fabricius race *taylori* Forel, *J. Bombay nat. Hist. Soc.*, 7 : 229 & 241, Worker.

Material examined : Raj Bagh Talab, 4 exs., 8.xi.2000 (Under log), Coll. N.S.R.

Diagnostic Characters : Length : Worker maj. 7-8 m.m. Worker : Castaneous brown in colour. Head subtriangular, mandibles with 7 teeth. Antennae 12 jointed scape of antennae cylindrical. Median lobe of clypeus with its anterior margin transverse. Alitrunk very broad and short viewed from side forming a regular arch. Tibia cylindrical and without spines. Abdomen short and broad. Petiole one jointed, node of petiole oval, transverse, convex in front, flat posteriorly.

Distribution : India : Rajasthan, Maharashtra, Western India, Kerala, Tamil Nadu, Orissa, Sikkim, N.W. Himalayas and West Bengal.

Elsewhere : Sri Lanka, Myanmar and China.

Tribe **Camponotini** ForelGenus **Camponotus** Mayr13. **Camponotus (Tanaemyrmex) variegatus** Smith

1858. *Camponotus variegatus* Smith (*Formica*) Cat., VI : 19 Worker, Female.

Material examined : Malik Talab, 3 exs., 3.xi.2000 (Under stone), Coll. N.S.R.

Diagnostic Characters : Length : Worker maj. 9-10 m.m. Worker : Yellowish red without lusture. Head subtriangular, rather elongate, the posterior lateral angles not prominent, mandibles with 6 teeth. Scape of antennae cylindrical. Median lobe of clypeus with its anterior margin transverse. Alitrunk narrow rather compressed, seen from side forming a regular arch. Tibia cylindrical and without spines beneath. Petiole one jointed, the node of petiole small but remarkably thick, very convex in front, flat posteriorly, abdomen broadly oval.

Distribution : India : Rajasthan and Tamil Nadu.

Elsewhere : Sri Lanka, Java, Myanmar and Singapore.

Tribe **Camponotini** ForelGenus **Camponotus** Mayr14. **Camponotus dichrous** Forel

1897. *Camponotus dichrous* Fore, Bull. Soc. Vaud. Sc. Nat., 16 : 63, Worker.

Material examined : Lahpur Dam, 4 exs., 8.xi.2000 (ground), Coll. N.S.R.

Diagnostic Characters : Worker : 9-11 m.m. Worker : Head and 3rd and following segments of the abdomen pitch black, basal two segments yellow, the alitrunk brown. Head triangular much broader posteriorly than in front, the lateral occipital angles very prominent, mandibles with teeth, clypeus carinate with a median anteriorly produced rectangular lobe. Scape of antennae cylindrical. Tibia compressed and spined beneath. Alitrunk anteriorly narrowed into a collar, seen from side forming a regular arch. Petiole one jointed and node of petiole convex in front, flat posteriorly. Abdomen oval not broader than the head.

Distribution : India : Rajasthan, Punjab, Uttar Pradesh, Himalaya and West Bengal.

Tribe **Camponotini** ForelGenus **Camponotus** Mayr15. **Camponotus (Tanaemyrmex) carin** Emery

1889. *Camponotus (Tanaemyrmex) carin* Emery, Ann. Mus. Civ. Stor. Nat. Genova, 3(7) : 512, Worker.

Material examined : Bagdha, 2 exs., 12.x.2003; Sawai madhopur, 2 exs., 14.x.2003, Coll. S.K.

Diagnostic Characters : Length Worker maj. : 11-12 m.m. Worker : Head and scape of antennae black, alitrunk and abdomen dark fuscous brown. Head elongate, broader in front narrower oval, the posterior occiput transverse but the occipital angles not prominent, mandibles with six teeth. Clypeus rather narrow, vertically carinate down the middle, median lobe slightly produced. Alitrunk seen from side forming a regular arch. Pronotum remarkable long, narrowed anteriorly forming a neck, about twice as long as broad. Petiole one jointed and the node of the petiole very thick at base, low and conical. Abdomen narrow, oval.

Distribution : India : Rajasthan, Maharashtra and Mumbai.

Elsewhere : Myanmar, Tennasserim and China.

Tribe **Camponotini** Forel

Genus **Polyrhachis** Smith

16. **Polyrhachis (Myrmhopla) simplex** Mayr

1862. *Polyrhachis (Myrmhopla) simplex* Mayr, *Verh. Zool. -bot., Ges. Wien*, **13** : 682, Worker.

Material examined : Lahpur Dam, 2 exs., 1.xii.1999 (Under stone), Coll. R.S.; Bagdha, 1 ex, 12.x.2003, Coll. S.K.

Diagnostic Characters : Length Worker : 4.5-7 m.m. Worker : Black head and thorax punctured, granulate, abdomen opaque, pubescence almost entirely absent. Head broadly oval clypeus with a distinct medial vertical carina, the anterior margin incised in the middle, antennal carinae wide apart. Alitrunk narrower than the head, compressed posteriorly, pronotum and mesonotum longer than broad pronotal spines very short and thick, directed obliquely outwards, metanotal spines erect, slightly divergent, the apex slightly bent outwards, legs stout tibia without hairs. Petiole one jointed and the node of the petiole broader than long, biconvex, with two spines on the upper lateral angles and two obtuse teeth in the middle between them, abdomen short, very convex above, globose.

Distribution : India : Rajasthan, Gujarat, Chandigarh and Tamil Nadu.

SUMMARY

The manuscript deals with sixteen ant species distributed under eight genera and six subfamilies viz. Ponerinae, Dorylinae, Dolichoderinae, Formicinae, Pseudomyrmecinae and Myrmicinae of Family Formicidae of Order Hymenoptera. All the sixteen species are new records from Ranthambhore National Park.

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ICHTHYOFAUNA

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INTRODUCTION

Fish fauna of Rajasthan wetlands have been extensively studied by Anonymous ?, Jayaram (1949), Hora and Mathur (1952), Mathur (1952), Krishna and Menon (1958), Datta *et al.* (1961), Dubey and Mehra (1962), Moona (1963), Dhawan (1967), Tiwari (1968), Datta and Majumdar (1970), Mathur and Yazdani (1973), Durve and Rajbanshi (1975), Durve (1976), Durve and Kakkar (1977, 1979), Mathur (1977), Chaudhary (1978), Johal and Dhillon (1981), Johal (1982), Sharma and Johal (1982), Saxena (1984), Sharma *et al.* (1984), Gupta and Kulshreshta (1985), Sharma and Durve (1985), Johal and Sharma (1986), Vyas (1986), Nama (1987), Jhingran (1989), Ajithkumar (1990, 1991, 1993), Sharma (1991), Sharma and Kulshreshta (1991), Ajithkumar and Asthana (1993), Ajithkumar and Mittal (1993), Ajithkumar and Sankar (1993), Johal *et al.* (1993), Kumar and Asthana (1993), Ajithkumar *et al.* (1995), Saxena and Rathore (1995), Yazdani (1996), Kohli *et al.* (1998) and Kumar and Rathore (1999 & 2007). Very little is known about the fish fauna of Ranthambhore National Park. Chaudhary (2000) have listed seven species from RNP.

The present account is based on collection made by many survey parties of Desert Regional Station, Jodhpur to various sub-localities of Ranthambhore National Park (RNP). Many species were identified from fisherman's catch and photographs were taken to avoid collection of specimens due to their large size, weight and numbers. The ichthyofauna here in is also represented by hill stream fishes like *Noemacheilus* species, *Garra* sp., primary freshwater fishes like *Rasbora* sp., bottom dwellers like, *Channa* sp., spiny eel *Mastacembelus* sp., and other food and game fishes in habit water bodies of RNP.

Under each species, citation for original description and other accompanying work necessary to undertake the taxon is given. The classification of fishes adopted in this paper is that of Day (1876-78), Jayaram (1999), Talwar and Jhingran (1991) and Menon (1999).

SYSTEMATIC ACCOUNT

Class OSTEICHTHYES

Order CYPRINIFORMES

Family CYPRINIDAE

Subfamily CYPRININAE

1. *Catla catla* (Hamilton-Buchanan)
2. *Cirrhinus mrigala mrigala* (Hamilton-Buchanan)
3. *Labeo rohita* (Hamilton-Buchanan)
4. *Puntius sophore* (Hamilton-Buchanan)*

Subfamily RASBORINAE

5. *Rasbora daniconius* (Hamilton-Buchanan)*
6. *Rasbora rasbora* (Hamilton-Buchanan)*

Subfamily GARRINAE

7. *Garra lamta* (Hamilton)*

Family BALITORIDAE

Subfamily NEMACHEILINAE

8. *Nemachelius botia* (Hamilton-Buchanan)*
9. *Nemachelius denisoni* (Day)*

Order SILURIFORMES

Family BAGRIDAE

10. *Aorichthys seenghala* (Sykes)

Family SILURIDAE

11. *Wallago attu* (Schneider)

Order PERCIFORMES

Suborder CHANNOIDAE

Family CHANNIDAE

12. *Channa marulius* (Ham.)
13. *Channa orientalis* (Bloch and Schneider)*
14. *Channa punctatus* (Bloch)

Family MASTACEMBELIDAE

15. *Macrognathus pancalus* (Hamilton-Buchanan)*
16. *Mastacembelus armatus* (Lacepede)*

Class OSTEICHTHYES
Order CYPRINIFORMES
Family CYPRINIDAE
Subfamily CYPRININAE
Genus *Catla* Valenciennes

1. *Catla catla* (Hamilton-Buchanan)

1822. *Cyprinus catla* Hamilton-Buchanan, *Fishes of Ganges* : 287, 318, pl. 13, fig. 81.
(Type-locality : Rivers and tanks of Bengal).
1878. *Catla b Buchanan* Valenciennes : Day, *Fishes of India* : 553, pl. 134, fig. 5; Day, 1889,
Fauna Br. India, Fishes, 1 : 287, fig. 99.
1966. *Catla catla* Jhingran, *FAO World Symposium on Warm-water Pond Fish Culture* : 18.

Common Name : Catla.

Material Identified : Fishermen's catch at Mansarovar Lake.

Diagnostic characters : Body deep, head enormously large with wide upturned mouth and big eyes, lower jaw prominent and protruding. Pectoral fins long, reaching up to pelvic fins. Caudal fin deeply forked. Scales large, silvery with dark grey above and silvery-white below.

Distribution : India : Northern India, transplanted into some rivers of peninsular India (Cauvery).

Elsewhere : Pakistan, Bangladesh, Nepal, Myanmar, Sri Lanka and China.

Remarks : Non-predatory, surface and mid water feeder. Hardy fish, successfully introduced for commercial purpose into almost all parts of India. Important food fish (carp).

Genus *Cirrhinus* Cuv

2. *Cirrhinus mrigala mrigala* (Hamilton-Buchanan)

1822. *Cyprinus mrigala* Hamilton-Buchanan, *Fishes of Ganges* : 279, 386, pl. 6, fig. 79.
(Type-locality : Ponds and freshwater rivers of Gangetic provinces).
1968. *Cirrhinus chaudhuryi* Srivastava, *Fishes of Eastern Uttar Pradesh* : 30. fig. 17. (Type-locality : Gorakhpur, Uttar Pradesh); Dutt and Murthy, 1976, *Mem. Soc. Zool. Guntur*, 1 : 17.

Common Name : Mrigal.

Material Identified : Fishermen's catch at Mansarovar Lake.

Diagnostic characters : Body streamlined, with blunt snout. Mouth broad with upper lip entire and lower lip indistinct. A single pair of short rostral barbels present. Dorsal fin as high as body. Pectorals shorter than head. Caudal fin deeply forked.

Distribution : India : Northern India from Punjab to West Bengal and Assam.

Elsewhere : Pakistan : Indus plain and adjacent hilly areas and Bangladesh.

Remarks : Elegant fine fish. It is an important major carp of India and a game fish. It has been successfully transplanted into water of peninsular India for aquaculture.

Genus *Labeo* Cuvier

3. *Labeo rohita* (Hamilton-Buchanan)

1822. *Cyprinus rohita* Hamilton-Buchanan, *Fishes of Ganges* : 301, 388, pl. 36, fig. 85. (Type-locality : Freshwater rivers of gangetic provinces).

1877. *Labeo rohita* Day, *Fishes of India* : 538. pl. 127, fig. 4; Day, 1889, *Fauna Br. India*, *Fishes*, 1 : 262; Macdonald, 1948, *J. Bombay nat. Hist. Soc.*, 44 : 527, fig. 9.

1924. *Labeo horai* Fowler, *Proc. Acad. nat. Sci. Philad.*, 76 : 95, fig 8 (type-locality: Sutlej river nr. Ludhiana, Punjab).

Common Name : Rohu.

Material Identified : Fishermen's catch at Galai sagar and Mansarovar Lake.

Diagnostic characters : Body moderately elongate, snout obtuse, depressed, without labial lobe. Eyes large, mouth small, lips thick and fringed with thin very short maxillary pair of barbels. Dorsal fin present in between tip of snout and base of deeply forked caudal fin. Scales moderate, reddish blue on the back, silvery sides.

Distribution : India : North and central India.

Elsewhere : Pakistan, Bangladesh, Terai region of Nepal and Myanmar.

Remarks : Graceful riverine fish. A bottom feeder and prefers to feed on plant matter including decaying vegetation. An excellent game fish.

Genus *Puntius* Hamilton-Buchan

4. *Puntius sophore* (Hamilton-Buchanan)

1822. *Cyprinus sophore* Hamilton-Buchanan, *Fishes of Ganges* : 310, 389. (nec pl. 19, fig. 86). (Type-locality : rivers in Gangetic provinces); Chaudhuri, 1916, *Mem. Indian Mus.*, 5 : 436.

1878. *Barbus sophore* Day, *Fishes of India* : 566, pl. 143, fig. 4; Day, 1889, *Fauna Br. India*, *Fishes*, 1 : 309; Murthy, 1977, *Proc. Indian Acad. Sci.*, 85(B) (3) : 126.

1924. *Barbus annandalei* Fowler, *Proc. Acad. Nat. Sci. Philad.*, 76 : 87, fig. 6. (Type-locality : Sutlej river at Ludhiana); Chaudhuri, 1916, *Mem. Indian Mus.*, 5 : 436.

1970. *Puntius carletoni* Tilak, *Sci and Cult.*, 36(11) : 613, fig. 1.

Common Name : Spotfin swamp barb.

Material Identified : Fishermen's catch at Mansarovar Lake.

Diagnostic characters : Body relatively deep, dorsal more convex than ventral, lateral line incomplete. Head short with terminal mouth, barbels absent. Dorsal fin present equidistant between tip of snout and base of caudal fin, its last un-branched ray osseous and smooth. Scales moderate, dark greenish back, lower half silvery, a deep black round block at base of caudal fin.

Distribution : India, Pakistan, Nepal, Bangladesh, Myanmar and Yuanan (China).

Remarks : Shoal fish and of medicinal value.

Subfamily RASBORINAE

Genus *Rasbora* Bleeker

5. *Rasbora daniconius* (Hamilton-Buchanan)

1822. *Cyprinus daniconius* Hamilton, *Fish Ganges*, P. 327, pl. 15, Fig. 89 (Type-locality : Rivers of Southern Bengal).

1999. *Parlusiosoma daniconius*, Menon, *Rec. zool. Surv. India, Occ. Paper No.*, **175** : 366

Common Name : Blackline rasbora.

Material examined : 4 exs., Sultanpur Ki Kui; 5.xii.1999, coll. R. Sewak; 3 exs., Baghda, 9.x.2003; 35 exs., Kalighati (Water point), 11.x.2003, coll. S. Kumar.

Diagnostic characters : Body oblong and compressed. Pectoral fins shorter than head. Lateral line complete with 31-34 scales. Barbels absent. Origin of dorsal fin nearer to caudal fin base. Anal fin with 7-8 rays. Thick black median band present from eye to caudal fin.

Distribution : Widely distributed in India.

Remarks : It is a surface feeder, grows to 10.5 cm in length; popularly known as 'Rasbora'

6. *Rasbora rasbora* (Hamilton-Buchanan)

1822. *Cyprinus rasbora* Hamilton-Buchanan, *Fishess of Ganges* : 329, 391, pl. 2, fig. 90. (Type-locality : ponds of Bengal).

1878. *Rasbora buchanani* Bleeker: Day, *Fishes of India* : 584, pl. 145, fig. 10; Day, 1889, *Fauna Br. India, Fishes*, **1** : 337, fig. 107.

1913. *Rasbora rasbora* var. *kobonensis* Chaudhuri, *Rec. Indian Mus.*, **8**(3) : 251, pl. 8, figs. 1, 1a, 1b (Type-locality : Brahmaputra, river at Kabo, Abor Hills, Assam).

Common Name : Gangetic scissortail rasbora.

Material Identified : Fishermen's catch at Gilai sagar Dam.

Diagnostic characters : Body elongate. Mouth moderate, obliquely directed upwards. Dorsal fin inserted behind origin of pelvic fins. Caudal fin deeply emarginated. Lateral line complete. Colour in life olive-brown. Caudal fin with sharply defined black hind margin.

Distribution : India : Gangetic provinces and Assam.

Elsewhere : Pakistan, Bangladesh, Myanmar and Thailand.

Remarks : A popular aquaria fish especially for small aquarium.

Subfamily GARRINAE

Genus **Garra** Hamilton-Buchanan

7. **Garra lamta** (Hamilton-Buchanan).

1822. *Cyprinus (Garra) lamta* Hamilton (in part), *Fish Ganges* : 343, 393, Type-locality : Tinaur river at Butwal, Nepal).

1999. *Garra lamta*, Menon, *Rec. zool. Surv. India, Occ. Paper No.*, 175 : 366.

Common Name : Lamta garra.

Material examined : 6 exs., Kalighati, 11.x.2003, coll. S. Kumar.

Diagnostic characters : Body cylindrical, some what flattened on under surface. Head short and bluntly pointed. Snout rounded and smooth. Its tip marked off by a deep transverse groove, transverse lobe at tip and sides of snout in front of nostrils covered with horny tubercles. Two pairs pf barbells. Dorsal fin inserted near to tip of snout than to caudal fin. Pectoral fins longer than head. Caudal fin deeply emarginate. Lateral line with 31-34 scales. A black spot behind angle of operculum and a short obscure black bar near base of caudal fin.

Distribution : India. Darjeeling and Kamaon Himalaya, Assam, Sikkim and Gujarat.

Remarks : It inhabits streams and torrential waters. Commercially important due to its oily taste.

Family NEMACHEILINAE

Subfamily NEMACHEILINAE

Genus **Nemacheilus** Bleeker

8. **Nemachelius botia** (Hamilton-Buchanan)

1822. *Cobitis botia* Hamilton-Buchanan, *Fishes of Ganges* : 350, 394. (Type-locality : rivers of north-eastern Bengal).

1878. *Nemacheilus botia* Day (Partim), 1878, *Fishes of India* : 614, pl. 156, fig. 5.

1910. *Nemachilus mackenziei* Chaudhuri, *Rec. Indian Mus.*, 5(3) : 183 (Type-locality : Cheriadhang and Toulasal in Nainital dist., U.P.; nr. Siripur in Bengal and Purnahia in Champaran Dist., Bihar).

1987. *Nemacheilus botia* Menon, *Fauna of India, Pisces*, 4 : 141, pl. 5, fig. 5. Indus Basin.

Common Name : Not Known.

Material Identified : Fishermen's catch at Mansarovar Lake.

Diagnostic characters : Body slender, eyes moderate, nostrils close together, anterior not tubular. Mouth semi-circular lips fleshy with well developed barbels. Dorsal fin present near snout tip than base of caudal fin. Caudal fin slightly emarginate. Scales conspicuous and imbricate, lateral line casually complete, ending beyond base of anal fin, olivaceous to yellowish orange colour with 12-16 blackish crossbands.

Distribution : India : Northern India-Brahmaputra and Ganga basin.

Elsewhere : Pakistan.

Remarks : Not of any interest to fisheries.

9. *Nemacheilus denisoni* (Day)

1867. *Nemacheilus denisoni* Day, *Proc. Zool. Soc. Lond.*, 287, (Type-locality : Bhawany River; Base of Nilgiris).

1987. *Neomacheilus d. denisoni*, Menon, *Fauna of India. Pisces*, (4)1 : 93, pl. 10, figs. 3 & 4, (Peninsular India).

Common Name : Not Known.

Material examined : 1 ex., Malik Talab, 3.xi.2000, coll. N.S. Rathore; 2 exs., Dhudhal Mal Ka Darra, 1.iv.2001, coll. N.S. Rathore & R. Sewak.

Diagnostic characters : Body of uniform depth, its depth 4.7-6.9 times in standard length. Mouth semi-circular, lips moderately fleshy, lower lip furrowed and interrupted in middle. Barbels well developed and thread like. Dorsal fin inserted midway between snout-tip and base of caudal fin. Caudal fin deeply emarginated, with rounded lobes. Lateral line incomplete. A blackish band at the base of dorsal fin origin and number of brownish black bands from dorsal to ventral surface of body.

Distribution : Peninsular India, Bihar and Madhya Pradesh.

Remarks : This species attains a length of about 5 cm SL.

Order SILURIFORMES

Family BAGRIDAE

Genus *Aorichthys* Wu

10. *Aorichthys seenghala* (Sykes)

1841. *Platystoma seenghala* Sykes, *Trans. Zool. Soc. Lond.*, 2 : 371, pl. 65, fig. 2 (Type-locality : Mulla Motha river at Poona).

1877. *Macrones seenghala* Day, *Fishes of India* : 444, pl. 99, fig. 1; Day, 1889, *Fauna Br. India*, fishes, 1 : 150.

1976. *Mystus (Aorichthys) seenghala* Mirsa, *Fauna of India, Pisces* (2nd ed.), 3 : 79, fig. 16.

Common Name : Giant river-catfish.

Material Identified : Fishermen's catch at Mansarovar Lake.

Diagnostic characters : Body graceful, elongate and compressed. Snout broad and spatulate. Mouth subterminal, barbels four pairs. Dorsal spine weakly serrated on its posterior margin, adipose fin base short, about as long as rayed dorsal fin.

Distribution : India : Ganga, Yamuna, Krishna, Godavari and Cauvery river systems.

Elsewhere : Afghanistan, Pakistan, Nepal and Bangladesh.

Remarks : A good sports fish.

Family SILURIDAE

Genus *Wallago* Bleeker

11. *Wallago attu* (Schneider)

1801. *Silurus attu* Schneider, *Syst. Ichth.*, : 378, pl. 75 (Type-locality : Malabar).

1877. *Wallago attu* Day, *Fishes of India* : 479, pl. III, fig. 4; Day, 1889, *Fauna Br. India*, *Fishes*, 1 : 11126, fig. 54; Misra, 1976. *Fauna of India*, *Pisces* (2nd ed.), 3 : 206, fig. 41.

1939. *Wallagonia attu* Hora, *J. Bombay nat. Hist. Soc.*, 41(1) : 64, pl.

1953. *Wallagu attu valeya* Deraniyagala, *Spolia zeylan.*, 27 : 15 (Type-locality : Yakvala, Ceylon); Roberts, 1982, *Coperia*, (4) : 891.

Common Name : Boal.

Material Identified : Fishermen's catch at Gilai sagar Dam.

Diagnostic characters : Body elongate and compressed, eyes small. Mouth wide barbels, two pairs, maxillary pair long dorsal fin short, inserted usually slightly in advance of pelvic fins. Caudal fin deeply forked, its upper lobe longer uniform silvery, dorsally greyish green with a wash of gold and cream.

Distribution : India, Pakistan, Sri Lanka, Nepal, Bangladesh, Myanmar, Thailand, Vietnam, Kampuchea, Sumatra and Java.

Remarks : One of the largest, voracious and predatory catfishes. Esteemed food of poorer classes. It is also a good sport fish. It is sluggish in nature and stays at bottom of water in search of food. Due to its rich oil content many like it. The Hindus also offer it to Goddess Kali.

Order PERCIFORMES

Suborder CHANNOIDAE

Family CHANNIDAE

Genus *Channa* Scopoli

12. *Channa marulius* (Ham.)

1822. *Ophiocephalus marulius* Hamilton, *Fish Ganges* : 65, 367, pl. 17, fig. 9 (Type locality : River Ganges).

1999. *Channa marulius*, Menon, *Rec. zool. Surv. India*, Occ, Paper No., 175 : 366.

Common Name : Giant snakehead.

Material examined : 22 exs., Guda: Mansarovar, 11.x.2003, coll. S. Kumar.

Diagnostic Characters : Body elongate, pectoral fins about half head length. Pelvic fin about 75% of pectoral fin length. Caudal fin rounded. Pre-dorsal scales 16, scales 60-70 in lateral series. Dorsal and anal fins with white spots, more distinct towards posterior end of fins. A distinct pale edged ocellus at base of caudal fin towards upper side. Young ones conspicuous with a brilliant orange colored lateral band.

Distribution : Widely distributed in India.

Remarks : A favorite sporting fish. The fish is cultured in irrigation wells in parts of South India. This giant sneak head is common in rivers and Duars in West Bengal. It is avoided in cultured waters because of its carnivorous habit.

13. *Channa orientalis* (Bloch and Schneider).

1800. *Channa orientalis* Bloch. and Schneider, *Syst. Ichth. P.* 496, pl. 90, fig. 2. (Type-locality : India).

1999. *Channa orientalis*, Menon, *Rec. zool. Surv. India*, Occ. Paper No., 175 : 366.

Common Name : Asiatic snakehead.

Material examined : 2 exs., Dhudhal Mal Ka Darra, 24.xi.002; 1 ex., Kalighati, 26.xi.2002, coll. S. Kumar.

Diagnostic Characters : Body elongate and fairly rounded in cross section. Pectoral fins extend to anal fins, pelvic fin less than 50% of pectoral fin length. Caudal fin rounded. Scales on summit of head large rosette of head-scale situated behind orbit so that it touches frontal head-scale in front and basal head-scale behind. Pre-dorsal scales 12. Base of pectoral fin with transverse black bands.

Distribution : Widely distributed in India.

Remarks : This species is smallest member of genus attains 20-21 cm in length. This species includes forms with and without pelvic fins, the later being known from Srilanka, Myanmar and Java. *Channa gachua* is synonym of this species (Menon, 1999).

14. *Channa punctatus* (Bloch)

1793. *Ophiocephalus punctatus* Bloch. *Naturges. ausland, Fische*, (7) : 139, pl. 358. (Type-locality : rivers and lakes of Coromandel coast); Day, 1876, *Fishes of India* : 367, pl. 78, fig. 1 : Day, 1889, *Fauna Br. India*, Fishes, 2 : 364; Deraniyagala; 1929, *Spolia Zeyl.*, 15(2) : 90, pl. 26.

Common Name : Spotted snakehead.

Material Identified : Fishermen's catch at Mansarovar Lake and Gilai sagar Dam.

Diagnostic characters : Body elongate and fairly rounded, eyes moderate, mouth large, lower jaw longer, maxillary reaching to below on behind hind border of eyes. Pectoral fins extend to anal fin, pelvic fin about 75% of pectoral fin length. Caudal fin rounded. Dorsal, anal and caudal fins dark grey, sometimes with a reddish tinge, paired fins pale orange.

Distribution : India. Throughout India.

Elsewhere : Afghanistan, Pakistan, Sri Lanka, Nepal, Bangladesh, Myanmar and Yunnan (China).

Remarks : Prolific breeder.

Family MASTACEMBELIDAE

Genus *Macrognathus* Laceped

15. *Macrognathus pancalus* (Hamilton-Buchanan)

1822. *Macrognathus puncalus* Hamilton, *Fish Ganges*, 30, 364, pl. 223, fig. 7. (Type-locality : Bengal).

1990. *Mastacembelus pancalus*, Yazdani, *Rec. zool. Surv. India, Occ. Paper No.*, **124** : 1-26.

Common Name : Spiny eel.

Material examined : 1 ex., Mansarovar, 31.iii.2001, coll. N.S. Rathore & R. Sewak.

Diagnostic Characters : Body eel like. Pre-opercle with 3-5 spines, pre-orbital spine strong and pierces skin. Dorsal fin inserted above middle of pectoral fins, dorsal and anal fins separated from caudal fin. Round white spots of brown, vertical stripes present on body.

Distribution : Widely distributed in India.

Remarks : This species inhabits slow and shallow waters. It is of little commercial importance.

Genus *Mastacembelus* Scopoli

16. *Mastacembelus armatus* (Lacepede)

1801. *Macrognathus armatus* Lacepede, *Hist. Nat. Poiss.*, **2** : 286.

1990. *Matacembelus armatus*, Yazdani, *Rec. zool. Surv. India, Occ. Paper No.*, **124** : 1-6. (*Fauna India*, Fish).

Material examined : 1 ex., Mansarovar, 31.iii.2001, coll. N.S. Rathore and R. Sewak.

Common Name : Tire-track spinyeel.

Diagnostic characters : Body relatively slender, snout long, conical without any prolongation of upper jaw. Pre-orbital spine present. Spinous dorsal fin inserted above, middle or posterior-third of pectoral fins, last dorsal spine small and hidden beneath the skin. Dorsal and anal fins broadly joined to caudal fin band and reticulated pattern present on body.

Distribution : Widely distributed in India.

Remarks : It is the largest spiny eel. It is reported to be a very good food-fish. It is common during summer months. Thus is also found commonly at quite high altitude in river Tawi (Jammu) and its tributaries.

SUMMARY

The inventory comprises of 16 species accommodated under 12 genera 3 orders and 6 families. Nine species marked with asterik* are new records from Ranthambhore National Park.

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AMPHIBIA

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INTRODUCTION

The earliest history of the amphibian study comprises a number of workers. Boulenger (1882 and 1890) was considered to be pioneer in the taxonomy of the amphibians. Different aspects of Indian amphibians were studied by Anandale (1907) and taxonomy of the amphibians was also studied by Smith (1940). Murthy (1967-68) and Myers (1968) studied the amphibians of the south India. Sarkar (1993) studied the amphibians of Orissa state.

The species diversity of amphibians is poorly represented in Rajasthan. Out of 206 species known in India, ten species viz. *Occidozyga cyanophlyctis*, *Occidozyga hexadactyla*, *Limnonectes limnocharis*, *Tomopterna breviceps*, *Halobatrachus tigrinus*, *Bufo melanostictus*, *Bufo andersoni*, *Microhyla ornata*, *Uperodon systema* and *Polypedates maculatus* have been recorded so far from this state by Mansukhani and Murthy (1964), Bohra *et al.* (1983), Sharma (1995) and Rathore and Kumar (2007).

Amphibian fauna of Ranthambhore National Park has been recorded so far by Chaudhary (2000) with an account of only two species. The present paper describes total five species of frogs and toads. Classification followed are that of Boulenger (1920), Parker (1934), Daniel (1963) and Chanda (2002).

SYSTEMATIC ACCOUNT

Class AMPHIBIA

Order ANURA

Family RANIDAE

1. *Haplobatrachus tigrinus* (Daudin)

1802. *Rana tigrina* Daudin, *Hist. Nat.*, : 42.

2002. *Haplobatrachus tigrinus* (Daudin) Chanda, *Hand Book- Indian Amphibians* : i-viii, pp. 136.

Material examined : 1 ex., Bagdha, 23.xi.2002; 1 ex., Dhudhal Mal Ka Darra, 25.xi.2002; 1 ex., Raj Bagh, 15.x.2003 ; 2 exs., Kachida, 8.x.2003 ; 1 ex., Gilai Sagar, coll. S. Kumar.

Diagnostic characters : Largest of all Indian frogs. Normally it is olive brown above but may be greenish marked with characteristic dark spots. One light yellow vertebral stripe from snout to vent which may be rarely absent in some specimens. A strong glandular fold extending eye to the shoulder. Snout more or less pointed. First finger is longer than the second.

Distribution : All over India except Meghalaya.

Elsewhere : Nepal, Pakistan and Bangladesh.

Remarks : Commonly available in Indian region.

2. *Euphlyctis cyanophlyctis* (Schneider)*

2002. *Euphlyctis cyanophlyctis* (Schneider) Chanda, *Hand Book-Indian Amphibians* : i-viii, 98.

Material examined : 4 exs., (juveniles), Malik Talab, 3.xi.2000, coll. N.S. Rathore; 1 ex., Fakiri Talab, 30.iii.2001, coll : N.S. Rathore & R. Sewak; 10 exs., (juveniles), Mansarovar, 11.x.2003, coll : S. Kumar.

Diagnostic characters : It is a medium sized frog with a length of around 65 cm. from snout to vent. Upper dorsum is olive brown with dark markings and rows of pores but ventral side is almost smooth. A more or less distinct, dark, light edged band present above each flank even on the upper and lower margins of thigh. Proportionally longer thigh, two blackish streaks on the hind side of the thighs are always present. Dark spots on the limbs.

Distribution : All over India except Meghalaya.

Elsewhere : Nepal, Sri Lanka, Pakistan, Bangladesh and Thailand.

Remarks : Commonly available in Indian region. New record from RNP.

Family BUFONIDAE

3. *Bufo stomaticus* Lutken Smith*

2002. *Bufo stomaticus* Lutken Smith, Chanda, *Hand Book- Indian Amphibians* : i-viii, 28.

Material examined : 1 ex., Mansarovar, 30.iii.2000, coll : N.S. Rathore & R. Sewak; 1 ex., Bagdha, 9.x.2003, coll : S. Kumar.

Diagnostic characters : Large sized toad, Dorsal surface of the body tuberculated and ventral surface coarsely granulated. Tympanum distinct.

Distribution : India : Rajasthan, Andhra Pradesh, Madhya Pradesh, Uttar Pradesh, Maharastra, West Bengal.

Elsewhere : Sri Lanka, Pakistan.

Remarks : Species is common in desert and semi desert areas. New record from RNP.

4. *Bufo malenostictus* Schneider

1962. *Bufo malenostictus* Schneider, *Hist. Amph.* 1 : 216.

2002. *Bufo malenostictus* Schneider, Chanda, *Hand Book-Indian Amphibians* : i-viii, pp. 25.

Material examined : 2 exs., Malik Talab, 6.xi.2000, coll : N.S. Rathore; 1 ex., Malik Talab, 13.x.2003, coll : S. Kumar.

Diagnostic characters : The dorsal surface of the body brown to yellowish brown with prominent and spiny warts on the dorsal side of the body are. Tympanum very distinct and close to the eyes. Tips of fingers and toes are blunt.

Distribution : All over India.

Elsewhere : Myanmar, Sri Lanka, Sumatra, Java, Borneo, Bali, Malaysia, Indonesia, Philippines.

Remarks : Species is common in desert and semi desert areas.

Family MICROHYLIDAE

5. *Microhylata ornata* (Dum. and Bibr.)*

1890. *Microhylata ornata* Boulenger, *Fauna, British. India Including Ceylon and Burma, Reptilia & Batrachia* : 165.

2002. Chanda, *Hand Book-Indian Amphibians* : i-viii, 41.

Material examined : 1 ex., Mansarovar, 30.iii.2001, coll : N.S. Rathore & R. Sewak; 3 exs., Gilai Sagar, 13.x.2003, coll S. Kumar.

Diagnostic characters : Small sized frog, fingers and toads are slender with their tips dilated into small discs. Dorsal surface with a dark marking on back extending posteriorly between the eyes. A dark streak extending from behind the eyes up to the shoulder. The pupil is erect and the tongue is elliptical.

Distribution : All over India.

Elsewhere : Myanmar, Sri Lanka, Southern China and Indo-China.

Remarks : Species is rare in western India but abundant in rainy season. New record from RNP.

SUMMARY

Five species under four genera and three families have been recorded from Ranthambhore National Park. Three species marked with asterisk* are new records from RNP.

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REPTILIA

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INTRODUCTION

Detailed account of the Reptiles of Indian region is provided by Smith (1943). Significant contribution towards the knowledge of Herpetofauna is by Blanford (1879) who has provided elaborate account of Reptiles. Krishna and Dave (1960) and Krishna (1975) have worked on many other aspects of reptiles of the Thar Desert, Rajasthan. Minton (1966) gave the elaborate study on Reptiles of Pakistan and the Thar. Roonwal (1963) had also given valuable information on reptiles of Rajasthan. Ecological studies on reptiles of Rajasthan were made by Prakash (1973). Study on the food and feeding habitats of the reptiles was done by Sharma and Vazirani (1977). Later, Biswas and Sanyal (1977) published the Rajasthan fauna of reptiles. Reptiles associated with wetland of Rajasthan have been worked out by Kumar and Rathore (2007). Significant contributions on Indian reptiles are in the form of Fauna volume and hand book on reptiles by Sharma (1998, 2002, 2003 & 2007).

The Reptile fauna of Ranthambhore National Park is so far represented by only fourteen species from its habitat. Twelve species of reptiles have been documented by Chaudhry (1997 and 2000) and thirteen species by Sippy and Kapoor (2001). Snakes of Ranthambhore are being worked out by Rathore and Khandal (2005). The present study accounts for a total of 38 species belonging to 3 species of Testudines, 11 species of Lizards and 23 species of Snakes and 1 species of Crocodile. Seven species of lizards and sixteen species of snakes marked with asterik * are new records from RNP. One species of snake marked with ** is reported for the first time from Rajasthan.

SYSTEMATIC ACCOUNT

Class REPTILIA

Order TESTUDINES

Suborder CRYPTODIRA

Family TRIONYCHIDAE

1. *Lissemys punctata punctata* (Lacepede, 1788)

North Indian Flap-Shelled Turtle

1931. *Lissemys punctata punctata*, Smith, *Fauna Brit. Ind.*, 1 : 157.

Material examined : 1ex., Kachida, 8.x.2003; 1ex., Dhudhal Mal Ka Darra, 25.xi.2002; 2 exs., Gilai sagar, 13.x.2003 by S. Kumar.

Diagnostic characters : Small flat turtle, length hardly exceeds more than 24 cm. Plastron with semicircular flaps. First marginal bone is very large in adults. Front portion is very flexible in adults.

Distribution : India : Ganga river system, Sikkim, Kutch and Andaman Islands.

Elsewhere : Bangladesh, Burma, Nepal, Pakistan and Sri Lanka.

Remarks : Suspected to be threatened.

2. *Trionyx gangeticus* (Cuvier, 1825)

Indian Soft-Shelled Turtle

1931. *Trionyx gangeticus*, Smith, *Fauna Brit. Ind.*, 1 : 167.

Material examined : 2 exs., Mansarovar, 11.x.2003; 1 ex., Gilai sagar, 13.x.2003 by S. Kumar.

Diagnostic characters : Paddle shaped feet, Black coloured, slow moving, sluggish. Very large, soft shelled turtle with an oval shell and reaches up to 45 cm. Snout is equal to the diameter of the orbit. Head is comparatively large and dorso-laterally situated eyes.

Distribution : India : Ganga, Sind and Mahanadi river system.

Elsewhere : N.W. Pakistan, Bangladesh and Nepal foothills.

Remarks : Protected by legislation but measures are not followed strictly.

Family EMYDIDAE

3. *Kachuga tentoria circumdata* (Mertens, 1969)

Indian Roofed Turtle, Hard Shelled Turtle

1998. *Kachuga tentoria circumdata* Sharma, *Fauna of India-Reptilia* (Testudines and Crocodilians) Vol. I. 104 pp.

Material examined : 7 exs., Bagdha, 23.xi.2002; 1 ex., Kachida, 8.x.2003 by S. Kumar.

Diagnostic characters : Length 23 cm. A pink ring over the margins of the shell. The carapace is olive brown in colour, dorsal keel is deep red. Plastron is yellow with only one black spot on each plastral shield. Middle of the head having two curved bands.

Distribution : India : Madhya Pradesh, Rajasthan and Uttar Pradesh.

Elsewhere : Data Deficient.

Remarks : Species has become vulnerable on account of its habitat destruction.

Order SQUAMATA

Suborder SAURIA

Family GEKKONIDAE

4. *Hemidactylus brooki* Gray, 1845

Spotted House Gecko*

1935. *Hemidactylus brooki* Smith, *Fauna Brit. Ind.*, 2 : 89.

Material examined : 1 ex., Fakiri Talab, 30.iii.2001, coll. N.S. Rathore & R. Sewak.

Diagnostic characters : A light brown and dark black spots due to powdery scales. Head large, ovate and prominent. Eyes are with vertical pupil.

Distribution : India : Widely distributed in whole of the India.

Elsewhere : Sri Lanka, Borneo, Pakistan, Burma, South China, West Indies, Tropical Asia and northern half of Africa.

Remarks : Species is very common.

5. *Hemidactylus leschenaulti* Dum. and Bibr., 1836

Common Bark Gecko*

1935. *Hemidactylus leschenaulti* Smith, *Fauna Brit. Ind.*, 2 : 97.

Material examined : 1ex., Indala, 28.xi.2002, coll. S. Kumar.

Diagnostic characters : Ashy grey gecko with cross bars or undulating cross bars on the dorsal part of the body. Head is large with a broad snout, covered with small granular scales. Nostril is situated between rostral.

Distribution : India : Widely distributed in Peninsular India, Rajasthan and West Bengal.

Elsewhere : Sri Lanka and Pakistan.

Remarks : Species is abundant.

6. *Hemidactylus flaviviridis* Ruppell, 1835

Yellow-bellied House Gecko*

1935. *Hemidactylus flaviviridis* Smith, *Fauna Brit. Ind.*, 2 : 98.

Material examined : 2 exs., 22.xi.2002, Ranthambhore Fort Gate; 3 exs., 25.xi.2002, Jogi Mahal; 2 exs., 9.x.2003, Anantpura Chowki by S. Kumar.

Diagnostic characters : Head large swollen at the corners near tympanum and jaws, covered with minute granules. Ear opening is sub-circular. Nostril is situated between nasals.

Distribution : India : Whole of India.

Elsewhere : Arabia, Pakistan, Iran and shores of the Red Sea.

Remarks : Species is most common throughout its range.

Family AGAMIDAE

7. *Calotes versicolor* (Daudin, 1802)

Indian Garden Lizard

1935. *Calotes versicolor* Smith, *Fauna Brit. Ind.*, **2** : 189.

Material examined : 1 ex., Bagdha, 23.xi.2002, coll. S. Kumar.

Diagnostic characters : A large and robust gecko with pale bars on dorsum and yellowish belly. Head is large with a broad snout. Eyes are large, digits long strong slightly curved at angles.

Distribution : India : Whole of India but widely distributed in north India.

Elsewhere : Sumatra to South China, Sri Lanka, Pakistan, Afghanistan.

Remarks : Species is most common.

Family CHAMAELEONIDAE

8. *Chamaeleo zeylanicus* Laurenti, 1768

Indian Chamaeleon

1935. *Chamaeleo zeylanicus* Smith, *Fauna Brit. Ind.*, **2** : 251.

Material examined : 1 ex., Indala, 28.xi.2002. coll. S. Kumar.

Diagnostic characters : A large anterior dorsal crest is most prominent which bends posteriorly forming an army cap like structure. Tongue is long and elastic. Eyes are large, opening of the eyes are just like slit. Eyes have a power of independent movement.

Distribution : India : Peninsular India, Gujarat.

Elsewhere : Sri Lanka.

Remarks : Species is endangered in India.

Family SCINCIDAE

9. *Mabuya macularia* (Blyth, 1853)

Bronzy Grass Skink*

1935. *Mabuya macularia* Smith, *Fauna Brit. Ind.*, **2** : 264.

Material examined : 2 exs., Bagdha, 23.xi.2002; 3 exs., Raj Bagh 26.xi.2002; 1 ex., Indala, 28.xi.2002, 1 ex., Kachida, 8.x.2003; 2 exs., Kalighati, 11.x.2003 by S. Kumar.

Diagnostic characters : Brown olive and bronzy with a dorso-lateral stripe which is always present. Tongue is long and elastic.

Distribution : India : Whole of India.

Elsewhere : Burma, Pakistan, Vietnam, Thailand and Malaysia.

Remarks : Species is common every where.

10. ***Riopa punctata*** (Linnaeus, 1766)

Dotted Garden Skink*

1935. *Riopa punctata* Smith, *Fauna Brit. Ind.*, **2** : 318.

Material examined: 1 ex., Malik Talab, 3.xi.2000, coll. N.S. Rathore.

Diagnostic characters : Brown, each scale is with a dark basal spot which form a longitudinal stripe. A pair of nuchal is always present. Belly is yellowish white. Snout is obtusely pointed. Lower eyelid is divided.

Distribution : India : Almost whole of India.

Elsewhere : Sri Lanka, Man-son mountains, Tonking.

Remarks : Species is very common every where.

Family LACERTIDAE

11. ***Ophisops jerdoni*** Blyth, 1853*

Punjab Snake-eyed Lacerta

1935. *Ophisops jerdoni* Smith, *Fauna Brit. Ind.*, **2** : 377.

Material examined : 1 ex., Indala, 28.xi.2002, coll. S. Kumar.

Diagnostic characters : Dorsum olive brown with a golden tinge, with 2 golden lateral stripes. Upper head shields strongly keeled, nostril is in a large nasal shield. Pre frontals in contact with each other. Temporal scales are strongly keeled.

Distribution : India : Rajasthan, Tamil Nadu, Andhra Pradesh, Maharashtra, Madhya Pradesh, Kutch.

Elsewhere : Pakistan.

Remarks : Species is commonly available in different sublocalities of Ranthambhore National Park.

12. *Ophisops microlepis* Blanford, 1870*

1935. *Ophisops microlepis* Smith, *Fauna Brit. Ind.*, **2** : 380.

Material examined : 4 exs., Padam Talab area, 22.xi.2002; 1 ex., Indala, 28.x.2003 by S. Kumar.

Diagnostic characters : Dorsum is olive greenish or brownish with golden stripes and sides of neck and flanks are densely spotted.

Distribution : India : Rajasthan, Bihar, Gujarat, Madhya Pradesh.

Remarks : Species is very common.

Family VARANIDAE

13. *Varanus griseus koniecznyi* Mertens, 1954

Indian Desert Monitor

2002. *Varanus griseus* Sharma, *Fauna of India and adjacent countries-Reptilia (Sauria)* Vol. II. 399 pp.

Material examined : 1 ex., Katholi-padra area, 24.xi.2002, species was closely observed and identified by S. Kumar and S. K. Das.

Diagnostic characters : Sandy brown with cylindrical tail. Narrow cross bands on dorsum. Devoid of any light spots. Prominent streaks on head and eyes and ears. size is comparatively larger.

Distribution : India : In drier parts of Rajasthan, Madhya Pradesh, Punjab and Maharashtra.

Elsewhere : Pakistan, Afghanistan, Iran and North Africa.

Remarks : Population of this species has become exceedingly low.

14. *Varanus bengalensis* (Linnaeus, 1758)

Indian Monitor Lizard

2002. *Varanus bengalensis* Sharma, *Fauna of India and adjacent countries-Reptilia (Sauria)* Vol. II. 402 pp.

Material examined: 1 ex., Jogi Mahal Ki Mori, 22.xi.2002; 2 exs., Dhudhal Mal Ka Darra, 24.xi.2002; 1 ex., Bagdha, 9.x.2003 ; 1 ex., Indala, 14.x.2003 ; 1 ex., Ranthambhore Fort Gate, 16.x.2003 by S. Kumar and S. K. Das.

Diagnostic characters : Sandy brown with cylindrical tail. A prominent dark streak is present on the eye; ventrum is whitish with thin dark transverse bars.

Distribution : Throughout India.

Elsewhere : Burma, Sri Lanka, Pakistan, Nepal and Uzbekistan.

Remarks : Population of this species has become exceedingly low.

Suborder SERPENTES

Family TYPHLOPIDAE

15. *Typhlops braminus* (Daudin, 1803)**Common Blind Snake***

2007. Sharma, *Fauna of India : Reptilia (Serpentes)* Vol. III. pp. 37.

Material examined : 5 exs., Kachida, 8.x.2003, under the soil near termite mount recorded by S. Kumar; 6 exs., under soil Jhoomar Bawadi reported by Rathore and Khandal.

Diagnostic characters : Cylindrical worm like body with strongly projecting rounded snout. Dorsal colouration brownish or paler. Snout anal portion and tail end somewhat whitish.

Distribution : Throughout India including Andaman & Nicobar Islands.

Elsewhere : Sri Lanka, Southern China, Burma, East Indies, Vietnam, Malaysia, Mexico, Pakistan, Bangladesh, Iran, Islands of Indian Ocean, Hawaii and other islands of Pacific Ocean, South Africa, Persia and Arabia.

Remarks : This species is very common.

Family BOIDAE

16. *Python molurus molurus* (Linnaeus, 1758)**Indian Python or Rock Python**

2007. Sharma, *Fauna of India : Reptilia (Serpentes)* Vol. III. pp. 91.

Material examined : 2 exs., on way from Raj Bagh Talab to Jogi Mahal Ki Mori, 9.x.2003; 1ex., near Malik Talab, 10.x.2003 by S. Kumar; 5 exs., Bodal, reported by Rathore and Khandal.

Diagnostic characters : Light yellowish and brownish above with a dorsal series of large walnut coloured crown saddles alternate with pink laterals.

Distribution : Whole of India.

Elsewhere : Pakistan and Sri Lanka.

Remarks : Species is vulnerable.

17. *Eryx conicus* (Schneider, 1801)**Common Sand Boa***

2007. Sharma, *Fauna of India : Reptilia (Serpentes)* Vol. III. pp. 95.

Material examined : 1 ex., near Dhudhal Mal Ka Darra, Forest Chowki, 11.x.2003, by S. Kumar; 1 ex., near the main entrance road reported by Rathore and Khandal.

Diagnostic characters : Robust snake, cylindrical body which tapers abruptly. Dark stripe behind the eye, ventrum is yellowish-white, eyes are small but distinct, surrounded by 10-15 minutes scales.

Distribution : India : Whole of India.

Elsewhere : Sri Lanka, Afghanistan and Pakistan.

Remarks : This species is fairly common.

18. *Eryx johni johni* (Russell, 1801)

Indian Sand Boa/John's Sand Boa*

2007. Sharma, *Fauna of India : Reptilia (Serpentes)* Vol. III. pp. 97.

Material examined : 6 exs., live & 4 exs., road kill in the Ranthambhore area reported by Rathore and Khandal.

Diagnostic characters : Body cylindrical, dorsal colouration is greyish bronze, slight pale mottling on the flanks with indistinct and light coloured tail rings. Snake is docile and sluggish.

Distribution : India : Rajasthan, Gujarat Andhra Pradesh, Uttar Pradesh, Maharashtra, Tamil Nadu and Punjab.

Elsewhere : Sri Lanka, Pakistan, Afghanistan and Iran.

Remarks : Commonly observed in its range.

19. *Elaphe helena* (Daudin, 1803)

Common Trinket Snake*

2007. Sharma, *Fauna of India : Reptilia (Serpentes)* Vol. III. pp. 117.

Material examined : 1exs., Ranthambhore Road, reported by Rathore and Khandal.

Diagnostic characters : Dorsal colour is dark-brown with blackish crossbars housing white ocelli on the anterior portion along with two broad dark stripes on the lateral aspects, body scales are keeled on the posterior portion and tail.

Distribution : Rajasthan, Gujarat, Assam, and Nagaland.

Elsewhere : Sri Lanka and Pakistan.

Remarks : This species is fairly common.

20. *Ptyas mucosus* (Linnaeus, 1758)

Indian Rat Snake

2007. Sharma, *Fauna of India : Reptilia (Serpentes)* Vol. III. pp. 124.

Material examined : 1 ex., Nalghat area, by S. Kumar in 2003; 25 exs., Semli area, reported by Rathore and Khandal.

Diagnostic characters : Head quite distinct from the neck. Top of the head is devoid of spots. Ventrums are creamish or turbid white, free edges of the ventrals and sub-caudals are blackish.

Distribution : Whole of India and Andaman Islands.

Elsewhere : South China, Vietnam, Southern Afghanistan to Transcaspia, Sri Lanka, Java, Sumatra, Malaysia, Taiwan and Pakistan.

Remarks : This species is fairly common but subject to the commercial exploitation on account of its large scale killing.

21. *Argyrogena ventromaculatus* (Gray and Hardwicke, 1834)

Glossy Bellied Racer*

2007. Sharma, *Fauna of India : Reptilia (Serpentes)* Vol. III. pp. 129.

Material examined : 1 exs., Chiroli, recorded by S. Kumar in 2002; 1 ex., live & 1 ex., dead, Ranthambhore Fort reported by Rathore and Khandal.

Diagnostic characters : A dorsal series of black cross bars or rhomboidal spots. Head is grayish with regular markings of dark brown colour on the top. In some individuals short vertebral stripe is present which is distinct on neck.

Distribution : India: Rajasthan, Gujarat, Maharashtra and Uttar Pradesh.

Elsewhere : Afghanistan, Persia, Israel, Iran and Uzbekistan.

Remarks : This species is fairly common.

22. *Argyrogena faciolutus* (Shaw, 1802)

Banded Racer*

2007. Sharma, *Fauna of India : Reptilia (Serpentes)* Vol. III. pp. 132.

Material examined : 1 ex., live, Ranthambhore main road reported by Rathore and Khandal.

Diagnostic characters : Body colour is brownish to grayish, base of scales are darker. Body is elongate with faint cross bars or spots which gradually disappear on the posterior end.

Distribution : India : Rajasthan, Gujarat, Maharashtra, West Bengal, Peninsular India, Karnataka and Bihar.

Elsewhere : Sri Lanka, Nepal and Pakistan.

Remarks : This species is fairly common. New record from Rajasthan** (Rathore and Khandal, 2005).

23. *Oligodon taeniolatus* (Jerdon, 1853)
Streaked Kukri Snake*

2007. Sharma, *Fauna of India : Reptilia (Serpentes)* Vol. III. pp. 165.

Material examined : 1 ex., live, Ranthambhore main road reported by Rathore and Khandal.

Diagnostic characters : Body with uniform diameter. Nape with W-shaped collar. A dark band across the head at level of eyes is present in most of the individuals.

Remarks : This species is fairly common.

Distribution : India : Rajasthan, Gujarat, Peninsular India and Bihar.

Elsewhere : Sri Lanka and Pakistan.

Remarks : This species is fairly common.

24. *Dendrelaphis tristis* (Daudin, 1803)
Common Bronze Back Tree Snake*

2007. Sharma, *Fauna of India : Reptilia (Serpentes)* Vol. III. pp. 182.

Material examined : 3 exs., road kill, Ranthambhore road reported by Rathore and Khandal.

Diagnostic characters : Eyes are large with round pupil, head with feeble black temporal stripe which extends on the neck and breaks up into vertical bars. Upper lip is yellow anterior dorsum are having yellowish tinge.

Distribution : India : Rajasthan, Gujarat, Peninsular India and West Bengal.

Elsewhere : Sri Lanka and Pakistan.

Remarks : This species has become vulnerable on account of habitat destruction.

25. *Lycodon striatus* (Shaw, 1802)
Barred Wolf Snake*

2007. Sharma, *Fauna of India : Reptilia (Serpentes)* Vol. III. pp. 191.

Material examined : 1 exs., dead, Ranthambhore Lodge hotel road reported by Rathore and Khandal.

Diagnostic characters : Body is slender and tapering, head is slightly differentiated from neck. Snout is blunt almost two times wider than its height. Body colour is dark brown or blackish, with white or yellow cross bars. Upper lips and ventral parts are white.

Distribution : India : Rajasthan, Gujarat, Whole of India as far as east as Chota Nagpur and Northward to Punjab.

Elsewhere : Sri Lanka, Pakistan Transcaspia and eastern Iran.

Remarks : No where common but not endangered.

26. ***Lycodon aulicus*** (Linnaeus, 1758)

Common Wolf Snake*

2007. Sharma, *Fauna of India : Reptilia (Serpentes)* Vol. III. pp. 192.

Material examined : 2 exs., Live, near Maa farm Vanyavilas hotel reported by Rathore and Khandal.

Diagnostic characters : Snout is spatulate, upper lip with brown or white spots. Body scales are smooth, anal shield is divided in most of the individuals.

Distribution : India : Whole of India including Andaman and Nicobar islands.

Elsewhere : Sri Lanka, Hong Kong, Laos, Malaysia, Mauritius, Nepal, North and South Vietnam, Pakistan, Bangladesh, Philippines, Celebes, Maldives Islands. Myanmar, Indonesia and South China.

Remarks : This species is fairly common.

27. ***Sibynophis subpunctatus*** (Dumeril, Bibron & Dumeril, 1854)

Light-Brown Black-Headed Snake*

2007. Sharma, *Fauna of India : Reptilia (Serpentes)* Vol. III. pp. 204.

Material examined : 1 ex., road kill, near ticket booking office reported by Rathore and Khandal.

Diagnostic characters : A yellow transverse bar is present between the eyes and two broad yellow bars form a border to the dark areas of the nape. Ventral shields are 151-215, sub-caudal shields are 42-76. Ventrums are yellowish, each ventral shield is with a black dot near its outer border.

Distribution : India : Rajasthan, Gujarat, Peninsular India and West Bengal.

Elsewhere : Sri Lanka.

Remarks : This species has become vulnerable on account of habitat destruction.

28. ***Xenochrophis piscator*** (Schneider, 1799)

Checkered Keelback Water Snake*

2007. Sharma, *Fauna of India : Reptilia (Serpentes)* Vol. III. pp. 214.

Material examined : 2 exs., 11.x.2003, Dhudhal Mal Ka Darra, recorded by S. Kumar; 20 exs, Live & 3 Road kill, all perennial water bodies in the Ranthambhore National Park reported by Rathore and Khandal.

Diagnostic characters : Body cylindrical with bluntly pointed snout, dorsal black markings are arranged in five series and form a chess-board like pattern. Body with five rows of small light black spots, bars which are generally narrow than inter spaces separating them. Eyes are large with round pupil.

Distribution : India : Whole of India.

Elsewhere : Malayan region, Taiwan, Borneo, Burma, Bangladesh, Pakistan, Sri Lanka, Indo-Chinese sub-region and South China.

Remarks : This species is fairly common.

29. *Boiga trigonata* (Schneider, 1802)

Indian Gamma Snake*

2007. Sharma, *Fauna of India : Reptilia (Serpentes)* Vol. III. pp. 250.

Material examined : 3 exs., Live & 3 Road kill, Bodal-Lasora Road, Ranthambhore road reported by Rathore and Khandal.

Diagnostic characters : Body is long and slender with a distinct triangular head. Dorsal coloration is grayish brown. Two alternating series of large rounded or oval generally light edged spots. Two other series of much smaller spots is also present on the sides of the body. A dark stripe emerges from the eye and reaches up to the angle of mouth.

Distribution : India : Rajasthan, Gujarat, Peninsular India, Sikkim and North Bengal.

Elsewhere : Sri Lanka, Pakistan, Eastern Iran, Saudi Arabia and Southern Uzbekistan.

Remarks : This species is fairly common.

30. *Psammophis leithi* (Gunther, 1869)

Leith's Sand Snake/Ribbon Snake*

2007. Sharma, *Fauna of India : Reptilia (Serpentes)* Vol. III. pp. 262.

Material examined : 2 exs., road kill on Ranthambhore Road reported by Rathore and Khandal.

Diagnostic characters : A pair of black to deep brown stripes arises on internasal which continue along the whole length of the body gradually becoming wider on the posterior side and ultimately fuse at the tail.

Distribution : India : Rajasthan, Gujarat, Uttar Pradesh, Maharashtra and Kashmir.

Elsewhere : Pakistan.

Remarks : This species is fairly common.

31. *Ahaetulla nasutus* (Lacepede, 1789)**Common Green Whip Snake***

2007. Sharma, *Fauna of India : Reptilia (Serpentes)* Vol. III. pp. 270.

Material examined : 2 exs., live near Jogi Mahal area reported by Rathore and Khandal.

Diagnostic characters : Thin bodied laterally compressed, belly may be greyish or rosy, body scales are smooth, vertebral row is larger than the other dorsal rows. Snout bears a median groove.

Distribution : India : Rajasthan, Gujarat, Peninsular India excluding the Ganga valley west to Patna and Bengal.

Elsewhere : Complete Indo-Chinese region, Vietnam, Thailand, Cambodia, Cochinchina, Sri Lanka, Burma.

Remarks : This species has become vulnerable on account of habitat loss and skin trade.

32. *Enhydryis sieboldi* (Schlegel, 1837)*

2007. Sharma, *Fauna of India : Reptilia (Serpentes)* Vol. III. pp. 276.

Material examined : 1 ex., Dhudhal Mal Ka Dara, 1.iv.2001, coll. N.S. Rathore & R. Sewak.

Diagnostic characters : Head with three dark brown stripes between the eyes, body with dark brown elliptical transverse blotches separated by interspaces. Nasal cleft extending from nostril to first supralabial. Scales in 27 or 29 rows in mid-body.

Distribution : India : Rajasthan, Gujarat, West Bengal, Uttar Pradesh, Bihar, Madhya Pradesh, Maharashtra, Assam, Kerala and Karnataka.

Remarks : This snake is a rare species.

Family ELAPIDAE**33. *Bungarus fasciatus* (Schneider, 1801)****Banded Krait**

2007. Sharma, *Fauna of India : Reptilia (Serpentes)* Vol. III. pp. 292.

Material examined : 1 ex., on way to high point recorded by S. Kumar in 2003.

Diagnostic characters : Snake is banded with black or purplish black bands which are broad and submerged. Body lengths upto 1800 mm and tail 150 mm. Scales in 15 rows throughout.

Distribution : India : Rajasthan, Andhra Pradesh, Uttar Pradesh, Orissa, South of Himalayas, Bihar, North-east India and West Bengal.

Elsewhere : Complete Indo-Chinese subregion, Malaya Peninsula & Archipelago, Southern China, Myanmar and Thailand.

Remarks : This snake is a common snake throughout its range.

34. *Bungarus caeruleus* (Schneider, 1801)

Common Indian Krait

2007. Sharma, *Fauna of India : Reptilia (Serpentes)* Vol. III. pp. 292.

Material examined : 2 exs., live & 2 dead, Bodal, Maa farm and Tiger Moon reported by Rathore and Khandal.

Diagnostic characters : Head is not distinct from the neck with blunt and flat snout. Ventrums are whitish, scales round the body are in 15 or 17 rows.

Distribution : India : Rajasthan, Gujarat, Andhra Pradesh, Uttar Pradesh, Punjab, Haryana, Orissa, Maharashtra, Karnataka, Peninsular India, Madhya Pradesh, Tamil Nadu, and Kerala.

Elsewhere : Sri Lanka and Pakistan.

Remarks : This snake is becoming rare on account of habitat loss.

35. *Naja naja naja* (Linnaeus, 1758)

Binoocellate Cobra/Indian Cobra

2007. Sharma, *Fauna of India : Reptilia (Serpentes)* Vol. III. pp. 302.

Material examined : 2 exs., live near Raj Bagh Talab recorded by S. Kumar in 2002; 2 live in RNP and Maa Farm reported by Rathore and Khandal.

Diagnostic characters : Head is quite wide, spectacle mark on dorsal aspect of hood. Ventral side of hood is with 2 to 4 irregular, dark, transverse bars in many individuals it is uniformly dark. It is sub-cylindrical posteriorly dorsoventrally flattened.

Distribution : India : Rajasthan, Gujarat, Andhra Pradesh, Madhya Pradesh, Goa, Punjab, Haryana, Orissa, Maharashtra, Karnataka, Peninsular India, Tamil Nadu, West Bengal, Kashmir, Bihar and Kerala.

Elsewhere : Sri Lanka.

Remarks : Species is common throughout its range.

Family VIPERIDAE

36. *Vipera russelli* (Shaw, 1797)

Russell's Viper

2007. Sharma, *Fauna of India : Reptilia (Serpentes)* Vol. III. pp. 341.

Material examined : 1 ex., road kill by vehicle, Lahpur Chowki, RNP reported by Rathore and Khandal.

Diagnostic characters : Head distinct from the neck with blunt and flat obtuse snout with prominent *canthus rostralis*. A series of vertebral scales which are oval in shape.

Distribution : India : Whole of India.

Elsewhere : Sri Lanka, Pakistan, Eastern Himalayas, Burma, Thailand and many parts of Indo-Chinese region.

Remarks : Though the snake is available every where in its range, but no where common, the species is abundant in certain areas but missing from other areas.

37. *Echis carinatus* (Schneider 1801)

Saw-Scaled Viper

2007. Sharma, *Fauna of India : Reptilia (Serpentes)* Vol. III. pp. 343.

Material examined : 1 ex., live, 11.x.2003, Lakarda area; 1 ex., live, 14.x.2003, Bakaula, recorded by S. Kumar; 7 exs., live & 5 exs., road kill RNP, Ranthambhore Road and Bodal-Lasora road reported by Rathore and Khandal.

Diagnostic characters : Dorsal aspect of head with a light arrow mark, eyes are large. A distinct stripe emerges from the zone of eye and reaches up to the angle of the mouth. Its diameter is greater than its distance from the mouth, surrounded by 13-21 small scales. The outermost row of scales is largest.

Distribution : India: India: Rajasthan, Gujarat, Andhra Pradesh, Goa, Maharashtra, Karnataka, Tamil Nadu, Jammu and Kashmir.

Elsewhere : Arabia, Ghana, Kenya, Nigeria, Sri Lanka, Iran, whole of middle east, southern portion of Eurasia, Pakistan and Iraq.

Remarks : Most common throughout its range.

Order CROCODILIA

Family CROCODYLIDAE

38. *Crocodylus palustris* Lesson 1834

Crocodile

1931. *Crocodylus palustris*, Smith, *Fauna Brit. Ind.* 47.

1998. Sharma, *Fauna of India : Reptilia (Testudines and Crocodilians)* Vol. I. pp. 150.

Material examined : Padam Talab, Raj Bagh Talab, Kachida, Lahpur Dam, Dhudhal Mal Ka Darra, Gilai sagar, Mansarovar, Fort Gate river system and almost all the water points of the protected area observed and sighted by S. Kumar.

Diagnostic characters : Short and broad snouted, Body strongly armoured, 3-5 meters in length, all the fingers are webbed at the base, in the two middle toes the webbing is not up to the end of the digit, inner toes are half webbed.

Distribution : India: Gujarat, Rajasthan, Kerala, Tamil Nadu, Karnataka, Maharashtra, Orissa, Bihar, Andhra Pradesh, Madhya Pradesh, Uttar Pradesh, Haryana and West Bengal.

Elsewhere : Bangladesh, Iran, Nepal, Pakistan and Sri Lanka.

Remarks : The population of this species has been depleted considerably throughout the range. Species has become vulnerable on account of the of its habitat destruction.

Remarks : Most commonly seen in almost all wetlands within the National park area. A fight between tiger and the crocodile was observed on 26th November, 2002 near Jogi Mahal area. The fight continued for more than two hours and tiger badly injured the crocodile on its forehead. The adult crocodile of the age of more than 20 years succumbed due to injuries later.

SUMMARY

Thirty eight species belonging to 30 genera under 14 families and 3 orders have been recorded so far from the Ranthambhore National Park. Twenty three species of reptiles are being reported for the first time from RNP.

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AVES

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INTRODUCTION

Base line information on avifauna of an area is a prerequisite to assess the status of birds and the habitat quality with special reference to the indicator species including the rare and endemic species of the region. The community studies have been largely expressed in terms of species richness, abundance, density and diversity. All these components have been used as an indicator of habitat quality, because an increase in the value of the components is generally thought to reflect larger amounts of the necessary resources to sustain larger population within a given area. Quantitative information on bird species abundance in different habitats is necessary for solving many fascinating ecological problems. Ali (1979) reported that the studies on the ecology as well as ethology of birds in different habitats would give valuable input for forest management. Review of literature reveals that only few studies were carried out on avifauna of the Ranthambhore National Park (Chaudhary, 1997, 2000; Ranjitsinh, 1999; Reddy, 1999; Sippy and Kapoor, 2001; Andheria, 2000, 2002; Srinivas, 2002 and Kumar and Sivaperuman, 2005). The present study was made to describe the bird community structure of Ranthambhore National Park.

The study was conducted during month of November 2002 and October 2003. Bird species were estimated by line transect and point count method (Burnham *et al.*, 1980). Birds were identified based on physical features with the help of field guides and reference books (Ali and Ripley, 1983; Grimmett *et al.*, 1998). Richness Indices like R1 and R2, Hill's number N1 and N2, Diversity Indices like Shannon-Weiner (H') and Simpson's (I), Evenness measures like E1 and E2 were calculated using the computer program SPDIVERS.BAS (Ludwig and Reynolds, 1988). Density of birds was calculated using the programme DISTANCE.

SYSTEMATIC ACCOUNT

During the present study, a total of 149 species of birds belong to 17 Orders and 53 Families were recorded from Ranthambhore National Park, Rajasthan. Out of these, 116 were resident and 33 migrants (Table 1).

Table 1. Systematic account of birds recorded from the Ranthambhore National Park, Rajasthan

Sl. No.	Common name	Scientific name	Status*
	PODICIPEDIFORMES		
	PODICIPEDIDAE		
1.	Little Grebe	<i>Tachybaptus ruficollis</i> (Pallas)	R
	PELECANIFORMES		
	PELECANIDAE		
2.	Spot-billed Pelican	<i>Pelecanus philippensis</i> Gmelin	R
	PHALACROCORACIDAE		
3.	Little Cormorant	<i>Phalacrocorax niger</i> (Vieillot)	R
	ANHINGIDAE		
4.	Darter	<i>Anhinga melanogaster</i> Pennant	LM
	CICONIIFORMES		
	ARDEIDAE		
5.	Little Egret	<i>Egretta garzetta</i> (Linnaeus)	R
6.	Grey Heron	<i>Ardea cinerea</i> Linnaeus	R
7.	Purple Heron	<i>Ardea purpurea</i> Linnaeus	R
8.	Large Egret	<i>Casmerodius albus</i> (Linnaeus)	R
9.	Cattle Egret	<i>Bubulcus ibis</i> (Linnaeus)	R
10.	Indian Pond-Heron	<i>Ardeola grayii</i> (Sykes)	R
11.	Little Green Heron	<i>Butorides striatus</i> (Linnaeus)	R
12.	Black-crowned Night-Heron	<i>Nycticorax nycticorax</i> (Linnaeus)	R
13.	Black Bittern	<i>Dupetor flavicollis</i> (Latham)	R
	CICONIIDAE		
14.	Painted Stork	<i>Mycteria leucocephala</i> (Pennant)	LM
15.	Asian Openbill-Stork	<i>Anastomus oscitans</i> (Boddaert)	R
16.	White-necked Stork	<i>Ciconia episcopus</i> (Boddaert)	R
17.	Black-necked Stork	<i>Ephippiorhynchus asiaticus</i> (Latham)	M
	THRESKIORNITHIDAE		
18.	Oriental White Ibis	<i>Threskiornis melanocephalus</i> (Latham)	LM

Sl. No.	Common name	Scientific name	Status*
19.	Eurasian Spoonbill ANSERIFORMES ANATIDAE	<i>Platalea leucorodia</i> Linnaeus	LM
20.	Lesser Whistling-Duck	<i>Dendrocygna javanica</i> (Horsfield)	R
21.	Gadwall	<i>Anas strepera</i> Linnaeus	M
22.	Spot-billed Duck	<i>Anas poecilorhyncha</i> J.R. Forester	LM
23.	Northern Shoveller	<i>Anas clypeata</i> Linnaeus	M
24.	Northern Pintail	<i>Anas acuta</i> Linnaeus	M
25.	Garganey	<i>Anas querquedula</i> Linnaeus	M
26.	Common Teal FALCONIFORMES ACCIPITRIDAE	<i>Anas crecca</i> Linnaeus	M
27.	Oriental Honey-Buzzard	<i>Pernis ptilorhynus</i> (Temminck)	LM
28.	Black-shouldered Kite	<i>Elanus caeruleus</i> (Desfontaines)	R
29.	Black Kite	<i>Milvus migrans</i> (Boddaert)	R
30.	Brahminy Kite	<i>Haliastur indus</i> (Boddaert)	R
31.	Western Marsh-Harrier	<i>Circus aeruginosus</i> (Linnaeus)	M
32.	Pallid Harrier	<i>Circus macrourus</i> (S.G. Gmelin)	M
33.	Pied Harrier	<i>Circus melanoleucos</i> (Pennant)	M
34.	Shikra	<i>Accipiter badius</i> (Gmelin)	R
35.	Eurasian Sparrowhawk PANDIONIDAE	<i>Accipiter nisus</i> (Linnaeus)	M
36.	Osprey GALLIFORMES PHASIANIDAE	<i>Pandion haliaetus</i> (Linnaeus)	M
37.	Grey Francolin	<i>Francolinus pondicerianus</i> (Gmelin)	R
38.	Painted Spurfowl	<i>Galloperdix lunulata</i> (Valenciennes)	R
39.	Indian Peafowl GRUIFORMES TURNICIDAE	<i>Pavo cristatus</i> (Linnaeus)	R
40.	Yellow-legged Button quail	<i>Turnix tanki</i> Blyth	R
41.	Common Buttonquail	<i>Turnix suscitator</i> (Gmelin)	R

Sl. No.	Common name	Scientific name	Status*
RALLIDAE			
42.	Slaty-legged Crake	<i>Rallina eurizonoides</i> (Lafresnaye)	R
43.	White-breasted Waterhen	<i>Amaurornis phoenicurus</i> (Pennant)	R
44.	Ruddy-breasted Crake	<i>Porzana fusca</i> (Linnaeus)	R
45.	Watercock	<i>Gallicrex cinerea</i> (Gmelin)	M
46.	Common Moorhen	<i>Gallinula chloropus</i> (Linnaeus)	R
47.	Common Coot	<i>Fulica atra</i> Linnaeus	LM
CHARADRIIFORMES			
JACANIDAE			
48.	Pheasant-tailed Jacana	<i>Hydrophasianus chirurgus</i> (Scopoli)	LM
49.	Bronze-winged Jacana	<i>Metopidius indicus</i> (Latham)	R
CHARADRIIDAE			
50.	Little Ringed Plover	<i>Charadrius dubius</i> Scopoli	M
51.	Lesser Sand Plover	<i>Charadrius mongolus</i> Pallas	M
52.	Red-wattled Lapwing	<i>Vanellus indicus</i> (Boddaert)	R
SCOLOPACIDAE			
53.	Eurasian Woodcock	<i>Scolopax rusticola</i> Linnaeus	M
54.	Common Snipe	<i>Gallinago gallinago</i> (Linnaeus)	M
55.	Common Redshank	<i>Tringa totanus</i> (Linnaeus)	M
56.	Marsh Sandpiper	<i>Tringa stagnatilis</i> (Bechstein)	M
57.	Common Greenshank	<i>Tringa nebularia</i> (Gunner)	M
58.	Green Sandpiper	<i>Tringa ochropus</i> Linnaeus	M
59.	Wood Sandpiper	<i>Tringa glareola</i> Linnaeus	M
60.	Common Sandpiper	<i>Actitis hypoleucos</i> Linnaeus	M
61.	Ruddy Turnstone	<i>Arenaria interpres</i> (Linnaeus)	M
62.	Little Stint	<i>Calidris minuta</i> (Leisler)	M
63.	Temminck's Stint	<i>Calidris temminckii</i> (Leisler)	M
RECURVIROSTRIDAE			
64.	Black-winged Stilt	<i>Himantopus himantopus</i> (Linnaeus)	LM
65.	Pied Avocet	<i>Recurvirostra avosetta</i> Linnaeus	M

Sl. No.	Common name	Scientific name	Status*
	BURHINIDAE		
66.	Stone-Curlew	<i>Burhinus oediconemus</i> (Linnaeus)	R
	GLAREOLIDAE		
67.	Indian Courser	<i>Cursorius coromandelicus</i> (Gmelin)	R
68.	Small Pratincole	<i>Glareola lactea</i> Temminck	LM
	LARIDAE		
69.	River Tern	<i>Sterna aurantia</i> J.E. Gray	M
70.	Black-bellied Tern	<i>Sterna acuticauda</i> J.E. Gray	LM
71.	Whiskered Tern	<i>Chlidonias hybridus</i> (Pallas)	LM
	COLUMBIFORMES		
	PTEROCLIDAE		
72.	Painted Sandgrouse	<i>Pterocles indicus</i> (Gmelin)	R
	COLUMBIDAE		
73.	Blue Rock Pigeon	<i>Columba livia</i> Gmelin	R
74.	Spotted Dove	<i>Streptopelia chinensis</i> (Scopoli)	R
75.	Red Collared-Dove	<i>Streptopelia tranquebarica</i> (Hermann)	R
76.	Eurasian Collared-Dove	<i>Streptopelia decaocta</i> (Frivaldszky)	R
77.	Yellow-legged Green Pigeon	<i>Treron phoenicoptera</i> (Latham)	R
	PSITTACIFORMES		
	PSITTACIDAE		
78.	Rose-ringed Parakeet	<i>Psittacula krameri</i> (Scopoli)	R
79.	Plum-headed Parakeet	<i>Psittacula cyanocephala</i> (Linnaeus)	LM
	CUCULIFORMES		
	CUCULIDAE		
80.	Pied Crested Cuckoo	<i>Clamator jacobinus</i> (Boddaert)	LM
81.	Brainfever Bird	<i>Hierococcyx varius</i> (Vahl)	LM
82.	Indian Cuckoo	<i>Cuculus micropterus</i> Gould	R
83.	Asian Koel	<i>Eudynamys scolopacea</i> (Linnaeus)	R
84.	Greater Coucal	<i>Centropus sinensis</i> (Stephens)	R
	STRIGIFORMES		
	STRIGIDAE		
85.	Collared Scops-Owl	<i>Otus bakkamoena</i> Pennant	R

Sl. No.	Common name	Scientific name	Status*
86.	Brown Fish-Owl	<i>Ketupa zeylonensis</i> Gmelin	R
87.	Spotted Owlet	<i>Athene brama</i> (Temminck)	R
	CAPRIMULGIFORMES		
	CAPRIMULGIDAE		
88.	Indian Jungle Nightjar	<i>Caprimulgus indicus</i> Latham	R
	APODIFORMES		
	APODIDAE		
89.	Alpine Swift	<i>Tachymarptis melba</i> (Linnaeus)	R
90.	House Swift	<i>Apus affinis</i> (J.E. Gray)	R
	CORACIIFORMES		
	ALCEDINIDAE		
91.	Small Blue Kingfisher	<i>Alcedo atthis</i> (Linnaeus)	R
92.	White-breasted Kingfisher	<i>Halcyon smyrnensis</i> (Linnaeus)	R
93.	Lesser Pied Kingfisher	<i>Ceryle rudis</i> (Linnaeus)	R
	MEROPIDAE		
94.	Small Bee-eater	<i>Merops orientalis</i> Latham	R
	CORACIIDAE		
95.	Indian Roller	<i>Coracias benghalensis</i> (Linnaeus)	R
	UPUPIDAE		
96.	Common Hoopoe	<i>Upupa epops</i> Linnaeus	R
	PICIFORMES		
	CAPITONIDAE		
97.	Coppersmith Barbet	<i>Megalaima haemacephala</i> (P.L.S. Muller)	R
	PICIDAE		
98.	Yellow-fronted Pied Woodpecker	<i>Dendrocopos mahrattensis</i> (Latham)	R
99.	Lesser Golden-backed Woodpecker	<i>Dinopium benghalense</i> (Linnaeus)	R
	PASSERIFORMES		
100.	Indian Pitta	<i>Pitta brachyura</i> Linnaeus	R
	HIRUNDINIDAE		
101.	Common Swallow	<i>Hirundo rustica</i> Linnaeus	LM

Sl. No.	Common name	Scientific name	Status*
102.	Red-rumped Swallow	<i>Hirundo daurica</i> Linnaeus	LM
	MOTACILLIDAE		
103.	Large Pied Wagtail	<i>Motacilla maderaspatensis</i> Gmelin	R
104.	Yellow Wagtail	<i>Motacilla flava</i> Linnaeus	M
105.	Grey Wagtail	<i>Motacilla cinerea</i> Tunstall	M
106.	Paddyfield Pipit	<i>Anthus rufulus</i> Vieillot	LM
107.	Eurasian Tree Pipit	<i>Anthus trivialis</i> (Linnaeus)	M
	PYCNONOTIDAE		
108.	Red-whiskered Bulbul	<i>Pycnonotus jocosus</i> (Linnaeus)	LM
109.	Red-vented Bulbul	<i>Pycnonotus cafer</i> (Linnaeus)	R
	IRENIDAE		
110.	Common Iora	<i>Aegithina tiphia</i> (Linnaeus)	R
111.	Jerdon's Chloropsis	<i>Chloropsis cochinchinensis</i> (Gmelin)	R
112.	Gold-fronted Chloropsis	<i>Chloropsis aurifrons</i> (Temminck)	R
	LANIIDAE		
113.	Brown Shrike	<i>Lanius cristatus</i> Linnaeus	M
	TURDINAE		
114.	Oriental Magpie-Robin	<i>Copsychus saularis</i> (Linnaeus)	R
115.	Indian Robin	<i>Saxicoloides fulicata</i> (Linnaeus)	R
116.	Black Redstart	<i>Phoenicurus ochruros</i> (Gmelin)	LM
117.	Pied Bushchat	<i>Saxicola caprata</i> (Linnaeus)	R
118.	Desert Wheatear	<i>Oenanthe deserti</i> (Temminck)	M
	TIMALIINAE		
119.	Common Babbler	<i>Turdoides caudatus</i> (Dumont)	R
120.	Jungle Babbler	<i>Turdoides striatus</i> (Dumont)	R
	SYLVIINAE		
121.	Streaked Fantail-Warbler	<i>Cisticola juncidis</i> (Rafinesque)	R
122.	Ashy Prinia	<i>Prinia socialis</i> Sykes	R
123.	Plain Prinia	<i>Prinia inornata</i> Sykes	R
124.	Blyth's Reed-Warbler	<i>Acrocephalus dumetorum</i> Blyth	M

Sl. No.	Common name	Scientific name	Status*
125.	Indian Great Reed-Warbler	<i>Acrocephalus stentoreus</i> (Hemprich & Ehrenberg)	R
126.	Common Tailor Bird MONARCHINAE	<i>Orthotomus sutorius</i> (Pennant)	R
127.	Asian Paradise-Flycatcher PARIDAE	<i>Terpsiphone paradisi</i> (Linnaeus)	LM
128.	Great Tit DICAEDIDAE	<i>Parus major</i> Linnaeus	R
129.	Tickell's Flowerpecker NECTARINIIDAE	<i>Dicaeum erythrorhynchos</i> (Latham)	R
130.	Purple-rumped Sunbird	<i>Nectarinia zeylonica</i> (Linnaeus)	R
131.	Purple Sunbird ESTRILDIDAE	<i>Nectarinia asiatica</i> (Latham)	R
132.	White-throated Munia	<i>Lonchura malabarica</i> (Linnaeus)	R
133.	Black-throated Munia	<i>Lonchura kelaarti</i> (Jerdon)	R
134.	Spotted Munia	<i>Lonchura punctulata</i> (Linnaeus)	R
135.	Black-headed Munia PASSERIDAE PLOCEINAE	<i>Lonchura malacca</i> (Linnaeus)	R
136.	Baya Weaver STURNIDAE	<i>Ploceus philippinus</i> (Linnaeus)	R
137.	Common Myna	<i>Acridotheres tristis</i> (Linnaeus)	R
138.	Jungle Myna	<i>Acridotheres fuscus</i> (Wagler)	R
139.	Grey-headed Starling ORIOLIDAE	<i>Sturnus malabaricus</i> (Gmelin)	R
140.	Eurasian Golden Oriole	<i>Oriolus oriolus</i> (Linnaeus)	LM
141.	Black-headed Oriole DICRURIDAE	<i>Oriolus xanthornus</i> (Linnaeus)	R
142.	Black Drongo	<i>Dicrurus macrocercus</i> Vieillot	LM
143.	Ashy Drongo	<i>Dicrurus leucophaeus</i> Vieillot	M
144.	White-bellied Drongo ARTAMIDAE	<i>Dicrurus caerulescens</i> (Linnaeus)	R
145.	Ashy Woodswallow	<i>Artamus fuscus</i> Vieillot	R

Sl. No.	Common name	Scientific name	Status*
CORVIDAE			
146.	Indian Treepie	<i>Dendrocitta vagabunda</i> (Latham)	R
147.	House Crow	<i>Corvus splendens</i> Vieillot	R
148.	Jungle Crow	<i>Corvus macrorhynchos</i> Wagler	R
149.	Common Raven	<i>Corvus corax</i> Linnaeus	R

*R = Resident, M = Migrant, LM = Local Migrant

Highest number of birds was recorded in insectivores (50) followed by aquatic feeders (20), omnivores (29), granivores (18), carnivores (13), frugivores (9) and nectar-frugivores (3) (Table 2).

Table 2. Order and status of birds recorded from RNP

Sl. No.	Order	Status			Feeding guilds						
		R/LM	M	Total	A	I	G	N/F	C	F	O
1.	Podicipediformes	01	-	01	1				-		
2.	Pelecaniformes	03	-	03	3	-		-			
3.	Ciconiiformes	14	01	15	15						
4.	Anseriformes	02	05	07	7	-	-	-	-		
5.	Falconiformes	05	05	10		-		-	10	-	
6.	Galliformes	03	-	03		3	-				
7.	Gruiformes	07	01	08		-	8		-	-	
8.	Charadriiformes	09	15	24	-		-	-	-	-	24
9.	Columbiformes	06	-	06	-	-	6		-	-	-
10.	Psittaciformes	02	-	02	-		-			2	
11.	Cuculiformes	05	-	05	-	-			-	5	
12.	Strigiformes	03	-	03					3	-	-
13.	Caprimulgiformes	01	-	01	-	1		-			-
14.	Apodiformes	02	-	02		2	-		-		
15.	Coraciiformes	06	-	06	3	3	-	-	-		
16.	Piciformes	03		03	-	3		-		-	
17.	Passeriformes	44	06	50	-	38	4	3	-	2	3
	Total	116	33	149	29	50	18	3	13	9	27

R = Resident, M = Migrants, A = Aquatic feeders, I = Insectivores, C = Carnivores, G = Granivores, F = Frugivores, N/F = Nectar-frugivores, O = Omnivores

Abundance of birds : Out of 149 species of birds, Rose-ringed Parakeet was highest in dominance followed by Ashy Wood Swallow, Red-wattled Lapwing, Garganey, etc. (Table 3).

Table 3. Abundance and dominance of birds in RNP

(+ = dominance less than 0.05)

Sl. No.	Common Name	Abundance	Dominance Index
1.	Rose-ringed Parakeet	518	9.40
2.	Ashy Wood Swallow	391	7.09
3.	Red-wattled Lapwing	391	7.09
4.	Garganey	335	6.08
5.	Gadwall	250	4.54
6.	Yellow-legged Green-Pigeon	242	4.39
7.	Indian Peafowl	190	3.45
8.	Plum-headed Parakeet	157	2.85
9.	Red-vented Bulbul	150	2.72
10.	Indian Treepie	147	2.67
11.	White-bellied Drongo	124	2.25
12.	Large Pied Wagtail	116	2.10
13.	Black Drongo	98	1.78
14.	House Swift	84	1.52
15.	Common Iora	83	1.51
16.	Indian Cuckoo	76	1.38
17.	Grey Nightjar	72	1.31
18.	Little Egret	67	1.22
19.	Marsh Sandpiper	65	1.28
20.	Lesser Sand Plover	64	1.16
21.	Oriental White Ibis	59	1.07
22.	Alpine Swift	56	1.02
23.	Large Egret	56	1.02
24.	Little Green Heron	55	1.00
25.	Yellow Wagtail	53	0.95

Sl. No.	Common Name	Abundance	Dominance Index
26.	Red-whiskered Bulbul	53	0.06
27.	Northern Pintail	51	0.93
28.	Small Pratincole	46	0.83
29.	Asian Paradise-Flycatcher	45	0.82
30.	Spotted Dove	45	0.82
31.	Indian Roller	45	0.82
32.	Little Stint	45	0.82
33.	Temminck's Stint	45	0.82
34.	Little Ringed Plover	44	0.80
35.	Small Bee-eater	43	0.78
36.	Asian Koel	38	0.69
37.	Common Hoopoe	37	0.67
38.	Jerdon's Chloropsis	34	0.62
39.	Ruddy Turnstone	33	0.60
40.	Little Cormorant	32	0.58
41.	Common Coot	32	0.58
42.	Grey Francolin	32	0.58
43.	Spot-billed Duck	31	0.56
44.	Indian Pond-Heron	30	0.54
45.	Tickell's Flowerpecker	30	0.54
46.	Lesser Golden-backed Woodpecker	28	0.51
47.	Green Sandpiper	28	0.51
48.	Wood Sandpiper	27	0.49
49.	Jungle Babbler	24	0.44
50.	Common Moorhen	23	0.42
51.	Jungle Myna	23	0.41
52.	Spotted Munia	23	0.42
53.	Great tit	22	0.40
54.	Black-headed Munia	22	0.40
55.	Common Babbler	22	0.40
56.	Baya Weaver	21	0.38

Sl. No.	Common Name	Abundance	Dominance Index
57.	Common Sandpiper	21	0.38
58.	Bronze-winged Jacana	19	0.34
59.	Blue Rock Pigeon	18	0.33
60.	Black-headed Oriole	17	0.31
61.	Grey-headed Starling	16	0.29
62.	Little Grebe	16	0.29
63.	Lesser Whistling-Duck	15	0.29
64.	Grey Wagtail	15	0.27
65.	Indian Great Reed-Warbler	14	0.25
66.	Northern Shoveller	14	0.25
67.	Eurasian Tree Pipit	12	0.22
68.	White-breasted Kingfisher	12	0.22
69.	Black-crowned Night-Heron	12	0.22
70.	Cattle Egret	12	0.22
71.	Common Swallow	12	0.22
72.	Pheasant-tailed Jacana	12	0.22
73.	Common Greenshank	10	0.18
74.	Black Bittern	9	0.16
75.	Common Teal	8	0.15
76.	Asian Openbill-Stork	8	0.15
77.	Black-bellied Tern	8	0.15
78.	Black-throated Munia	8	0.15
79.	Common Redshank	8	0.15
80.	Common Snipe	8	0.15
81.	Common Tailor Bird	8	0.15
82.	Grey Heron	8	0.15
83.	Painted Stork	8	0.15
84.	Oriental Honey-Buzzard	7	0.13
85.	Pied Avocet	7	0.13
86.	Watercock	7	0.13
87.	Black-winged Stilt	6	0.11

Sl. No.	Common Name	Abundance	Dominance Index
88.	Common Myna	6	0.11
89.	Shikra	6	0.11
90.	Black Redstart	6	0.11
91.	Stone-Curlew	6	0.11
92.	Blyth's Reed-Warbler	6	0.11
93.	Desert Wheatear	6	0.11
94.	Purple-rumped Sunbird	6	0.11
95.	Streaked Fantail-Warbler	6	0.11
96.	Whiskered Tern	6	0.11
97.	House Crow	5	0.09
98.	Eurasian Woodcock	5	0.09
99.	Painted Sandgrouse	5	0.09
100.	Painted Spurfowl	5	0.09
101.	Pied Harrier	5	0.09
102.	Red-rumped Swallow	5	0.09
103.	River Tern	4	0.07
104.	Ruddy-breasted Crake	4	0.07
105.	Yellow-fronted pied Woodpecker	4	0.07
106.	Black Kite	4	0.07
107.	Indian Courser	4	0.07
108.	Indian Pitta	4	0.07
109.	Pallid Harrier	4	0.07
110.	Pied Crested Cuckoo	4	0.07
111.	Plain Prinia	4	0.07
112.	White-throated Munia	4	0.07
113.	Western Marsh-Harrier	4	0.07
114.	Eurasian Collared-Dove	3	0.05
115.	Greater Coucal	3	0.05
116.	Lesser Pied Kingfisher	3	0.05
117.	Small Blue Kingfisher	3	0.05
118.	Common Raven	3	0.05

Sl. No.	Common Name	Abundance	Dominance Index
119.	Black-necked Stork	3	0.05
120.	Indian Robin	3	0.05
121.	Pied Bushchat	3	0.05
122.	Ashy Drongo	2	+
123.	Ashy Prinia	2	+
124.	Darter	2	+
125.	Jungle Crow	2	+
126.	Oriental Magpie-Robin	2	+
127.	Paddyfield Pipit	2	+
128.	Purple Sunbird	2	+
129.	Red Collared Dove	2	+
130.	White-breasted Waterhen	2	+
131.	White-necked Stork	2	+
132.	Barred Buttonquail	2	+
133.	Brahminy Kite	2	+
134.	Brainfever Bird	2	+
135.	Brown Fish Owl	2	+
136.	Brown Shrike	2	+
137.	Collared Scops Owl	2	+
138.	Coppersmith Barbet	2	+
139.	Eurasian Sparrowhawk	2	+
140.	Eurasian Spoonbill	2	+
141.	Osprey	2	+
142.	Slaty-legged Crake	2	+
143.	Spot-billed Pelican	2	+
144.	Yellow-legged Button quail	2	+
145.	Black-shouldered Kite	1	+
146.	Eurasian Golden Oriole	1	+
147.	Gold-fronted Chloropsis	1	+
148.	Purple Heron	1	+
149.	Spotted Owlet	1	+

Diversity Indices and density of birds : Most widely used diversity indices like Shannon-Weiner Index, Simpson's Index and Hill's numbers were estimated for the birds of Ranthambhore National Park. Richness Index (R1 and R2) showed the richness of birds. Shannon Index (H') showed high values of diversity, similarly Hill's number also showed high values (Table 4).

Table 4. Diversity indices of birds in the RNP

Richness Index		Simpson's Index	Shannon Index	Hill's numbers		Evenness Index	
R1	R2			N1	N2	E1	E2
17.16	1.99	0.03	3.94	51.64	28.76	0.79	0.35

Diversity index (H') was highest in Rose-ringed Parakeet followed by Red-wattled lapwing and Indian Peafowl. Rose-ringed Parakeet was showed highest density followed by Blossm-headed Parakeet (Table 5).

Table 5. Diversity indices and density of selected bird species in Ranthambhore National Park

Sl.	Species Name	Simpson	Shannon	Density/km ²
1.	Black Drongo	0.06	2.99	623
2.	Plum-headed Parakeet	0.05	3.14	855
3.	Lesser Golden-backed Woodpecker	0.02	2.94	763
4.	Yellow-legged Green-Pigeon	0.06	3.06	806
5.	Asian Koel	0.02	3.24	497
6.	Large Pied Wagtail	0.06	3.05	551
7.	Little Green Heron	0.05	2.85	506
8.	Asian Paradise-Flycatcher	0.02	3.13	691
9.	Indian Peafowl	0.03	3.58	748
10.	Rose-ringed Parakeet	0.03	3.90	951
11.	Red-vented Bulbul	0.03	3.52	599
12.	Red-wattled Lapwing	0.02	3.82	817
13.	Small Bee-eater	0.02	3.31	144
14.	Spotted Dove	0.01	3.44	699
15.	Indian Treepie	0.03	3.74	642
16.	White-bellied Drongo	0.02	3.77	423

During the period of study 5511 individuals were sighted. Out of the recorded species 33 were migrants. Species like Rose-ringed Parakeet, Ashy Wood Swallow, Red-wattled Lapwing, Garganey, Yellow-footed Wood Pigeon and Indian Peafowl were most common species in this area. The less dominance species are Black-shouldered Kite, Eurasian Golden Oriole, Gold-fronted Chloropsis, Purple Heron and Spotted Owllet. The present study showed the high species diversity (H') was 3.94, which is comparable with other areas (Johnsingh *et al.* 1987; Daniels, 1989; Johnsingh and Josha, 1994; Gokula, 1998; Jayson and Mathew, 2000 & 2002). The insectivores and omnivores were highest in species richness and dominance. The bird species diversity is influenced by the patchiness (Wiens and Rottenberry, 1981). The availability of different types of microhabitat in the study area may be persuading the bird species diversity of Ranthambhore National Park.

SUMMARY

A total of 331 species have been reported so far from Ranthambhore National Park whereas 149 avian species have been recorded in the present study during the years 1999-2003 from the protected area. 17 avian species have been reported for the first time from Ranthambhore National Park.

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MAMMALIA

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INTRODUCTION

The present knowledge on mammals of Rajasthan is available from the studies made by Alfred and Agrawal (1996), Agrawal (1967), Bahadur (1925), Bate and Harrison (1997), Biswas and Ghosh (1968), Ghosh (1976), Prakash (1959, 1974, 1975 and 1995) and Roberts (1977). About 397 species of mammals have been reported from India Alfred, *et al.* (2006 a). Sharma (1995 and 1999) has documented 87 species of mammals belonging to 55 genera under 27 families from the state of Rajasthan along with their district and region-wise distribution within the state. Mammals associated with wetlands of Rajasthan have been reported by Haque and Vijayan (1988), Kumar (2005) and Kumar and Rathore (2007). From Ranthambhore National Park thirty nine species of mammals have been documented by Chaudhary (1997 & 2000), Jain (2001) and Sippy and Kapoor (2001). Ungulates density and grazing pressures on RNP have been studied by Berkmuller, *et al.* (1989) and Kumar (2000). Under the supervision of the Empowered Committee on Forests and Wildlife Management constituted by the Hon'ble Chief Minister of Rajasthan, census operations were carried out in Ranthambhore Tiger Reserve during May-June, (Singh, 2005).

The present account enlists 31 mammalian species from the Ranthambhore National Park. The species were mainly observed during 1999-2003 while undertaking the faunal survey of the National Park. The classification and conservation status is followed after Ellerman and Morrison-Scott (1951), Honaki *et al.* (1982), Alfred, *et al.* (2002 and 2006 b). Abbreviations used in the text : Lrnt = Lower Risk Near Threatened; LRlc = Lower Risk Least Concern; VU = Vulnerable, EN = Endangered; CR = Critically Endangered; DD = Data Deficient; IWPA = Indian Wildlife (Protection) Act, 1972; CITES = Convention on International Trade in Endangered Species of Wild Fauna and Flora; CAMP= Conservation Assessment and Management Plan of Biodiversity Conservation Prioritization Project; IUCN = International Union for Conservation of Nature and Natural Resources.

SYSTEMATIC ACCOUNT

Order INSECTIVORA

Family SORICIDAE

Subfamily CROCIDURINAE

Genus **Suncus** Ehrenberg, 1832

1. ***Suncus murinus*** (Linnaeus, 1766)

House Shrew, Chhuchhundar

1766. *Sorex murinus* Linnaeus, *Syst. Nat.* 12th ed. 1 : 74, Type locality : Java, Indonesia.

Species Observed : 2 exs., 22-23.xi.2002, Forest Chowki near Jogi Mahal; 2 exs., 9.x.2003, Anantpura Forest Chowki.

Diagnostic characters : Greyish dark brown, emits strong musk odour, make squeaking sound, nocturnal in habit.

Distribution : India : Throughout the country.

Elsewhere : S. E. Asia, Continental & peninsular Indo-malayan region, Introduced in Guam, Maldiv islands, Coastal Africa, Madagascar, Comores, Mauritius and into coastal Arabia.

Remarks : The species was mostly found near the forest chowki's within the core and buffer areas of the National Park.

Status : CAMP : LRlc (Nationally); DD (Globally).

Order CHIROPTERA

Suborder MEGACHIROPTERA

Family PTEROPODIDAE

Subfamily PTEROPODINAE

Genus **Cynopterus** Cuvier, 1824

2. ***Cynopterus sphinx*** (Vahl, 1797)

Short-nosed Fruit Bat, Chota Badur

1797. *Vespertilio sphinx* Vahl, *Skr. Nat. Selsk, Copenhagen*, 4(1) : 123. Type locality : Travancore, Kerala, India.

Species Observed : 23 exs., 26.xi.2002, Raj Bagh Talab old building; 15 exs., 9.x.2003, Anantpura Forest Chowki.

Diagnostic characters : Medium in size, ears large, brownish in colour, roosts in groups.

Distribution : India : Throughout.

Elsewhere : Bangladesh, Bhutan, Campuchia, China, Indonesia, Malaysia, Myanmar, Pakistan, Sri Lanka, Thailand, Vietnam and many south east Asian Islands.

Remarks : Congregation of bats was sighted in old buildings at Raj Bagh Talab and near Anantpura chowki.

Status : CAMP : LRlc (Nationally); DD (Globally).

Genus *Pteropus* Erxleben, 1777

3. *Pteropus giganteus* (Brünnich, 1782)

Indian Flying Fox, Badur

1782. *Vespertilio gigantea* Brünnich, *Dyrenes Historie*, 1 : 45 (Bengal = West Bengal, India).

Species Observed : 23 exs., 22.xi.2002, Padam Talab; 15 exs., 25.xi.2002, Dhudhal Mal Ka Darra; 25 exs., 25.xi.2002, Gilai Sagar; 12 exs., 8.x.2003, Kachida; 21 exs., 9.x.2003, Sultanpur Ki Kui.

Diagnostic characters : Very large size, brown with ears black, head long with dog like muzzle, extremely gregarious, tail absent, roosts on tree forming a colony of few hundred individuals.

Distribution : Widely distributed throughout India including Andamans.

Elsewhere : China, Thailand, Sri Lanka, Nepal, Maldives Islands and Myanmar.

Remarks : Five roosting colonies were seen at Padam Talab area, Sultanpur Ki Kui, Dhudhal Mal Ka Darra, Kachida and Gilai Sagar area in Ranthambhore National Park.

Status : CAMP : LRnt, CITES : Appendix II.

Family MEGADERMATIDAE

Genus *Megaderma* Geoffroy, 1810

4. *Megaderma lyra* Geoffroy, 1810

Indian False Vampire, Great False Vampire

1810. *Megaderma lyra* Geoffroy. *Ann. Mus. Hist. Nat. Paris*, 15 : 190.

Species Observed : 21 exs., 26.xi.2002, Dhudhal Mal Ka Darra; 15 exs., 27.xi.2002 & 6 exs., 15.x.2003, Raj Bagh Talab old building; 13 exs., 9.x.2003, Sultanpur Ki Kui.

Diagnostic characters : Body grey with light brown tinge, belly white, large oval ears joined over forehead, tail absent. Roosts in caves or old dilapidated structures.

Distribution : India : Throughout the Indian mainland.

Elsewhere : Afghanistan, Bangladesh, China, Malaysia, Myanmar, Nepal, Pakistan, Sri Lanka, Thailand and Vietnam.

Remarks : Large population was found roosting in Raj Bagh Talab area, Sultanpur Ki Kui and in the wall of Dhudhal Mal Ka Darra.

Status : CAMP : LRlc (Nationally); DD (Globally).

Order PRIMATES

Family CERCOPITHECIDAE

Subfamily CERCOPITHECINAE

Genus *Macaca* Lacepede, 1799

5. *Macaca mulatta* (Zimmermann, 1780)

Rhesus Macaque, Bandar

1780. *Cercopithecus mulatto* Zimmermann, *Geogr Gesch. Mensch. Vierf. Thiere*, **2** : 195.

Species Observed : 5 exs., 11.x.2003, Shyampura; 6 exs., 11.x.2003, Badlav & Basso, Kundera Forest Range; 4 exs., 12.x.2003, Mor Dongri.

Diagnostic characters : Red faced, orange fur on loin and rump, diurnal, terrestrial and also arboreal in nature.

Distribution : India : Whole of North and Northeast India to south up to 15°46' N Latitude near Bay of Bengal.

Elsewhere : Afghanistan, Nepal, Pakistan, Bhutan to Thailand including China.

Remarks : Few were seen in the adjoining areas of Shyampura, Badlav and Basso, in the Kundera Forest Range, also seen migrating to and from human habitation in the buffer zone.

Status : IWPA : Schedule II; CAMP : LRlc (Nationally); DD (Globally); CITES : Appendix II.

Subfamily COLOBINAE

Genus *Semnopithecus* Desmarest, 1822

6. *Semnopithecus entellus* (Dufresne, 1797)

Langur, Hanuman Langur

1797. *Simia entellus* Dufresne, *Bull. Soc. Philom Paris, ser. 1* : 7 : 49 (W. Bengal).

Species Observed : 4 exs., 22.xi.2002 & 2 exs., 16.x.2003, Ranthambhore Fort Gate; 2 exs., 22.xi.2002, Padam Talab; 2 exs., 23.xi.2002 & 2 exs., 9.x.2003, Jogi Mahal; 6 exs., 23.xi.2002, Bagdha; 3 exs., 24.xi.2002, Katholi-padra Area; 5 exs., 24.xi.2002, Dhudhal Mal Ka Darra; 1 ex., 24.xi.2002, Chiroli; 2 exs., 25.xi.2002, Gilai Sagar; 1 ex., 28.xi.2002 & 1 ex., 11.x.2003, Mansarovar; 4 exs., 28.xi.2002, Indala;

4 exs., 9.x.2003, Sultanpur Ki Kui; 1 exs., 10.x.2003, Malik Talab; 2 exs., 11.x.2003, Bodal Bawadi; 4 exs., 11.x.2003, Badlav & Basso, Kundera Forest Range; 2 exs., 11.x.2003, Kalighati; 5 exs., 11.x.2003, Shyampura; 3 exs., 9.x.2003 & 2 exs., 12.x.2003, Anantpura Forest Chowki; 1 ex., 13.x.2003, Nalghati area; 1 ex., 13.x.2003, Maa Farm Area; 4 exs., 13.x.2003, Kachida; 3 exs., 14.x.2003, Raj Bagh Talab old building.

Diagnostic characters : Black face monkey with long limbs and tail, diurnal, terrestrial and arboreal.

Distribution : India : Throughout the country except NE India and Western part of Gujarat.

Elsewhere : China, Nepal, Pakistan, Bangladesh and Sri Lanka.

Remarks : Large in population, commonly seen throughout the forested area of the National Park and vigilant to mark the presence of tiger. Their call is sure for an approaching predator.

Status : IOWPA : Schedule II; CAMP : LRlc (Nationally); DD (Globally); CITES : Appendix I.

Order CARNIVORA

Family CANIDAE

Genus *Canis* Linnaeus, 1758

7. *Canis aureus* Linnaeus, 1758

Asiatic Jackal, Gidar

1758. *Canis aureus* Linnaeus. *Syst., Nat.*, 10th ed., 1 : 40.

Species Observed : 2 ex., 22.xi.2002, Padam Talab; 1 ex., 22.xi.2002, Ranthambhore Fort Gate; 1 ex., 23.xi.2002, Bagdha; 1 ex., 24.xi.2002, Katholi-padra Area; 1 ex., 24.xi.2002, Dhudhal Mal Ka Darra; 1 ex., 25.xi.2002, Jogi Mahal; 1 ex., 28.xi.2002, Indala; 1 ex., 28.xi.2002, Mansarovar; 2 ex., 9.x.2003, Anantpura Forest Chowki; 1 ex., 9.x.2003, Sultanpur Ki Kui; 2 ex., 10.x.2003, Malik Talab; 1 ex., 11.x.2003, Kalighati; 1 ex., 11.x.2003, Bodal Bawadi; 1 ex., 11.x.2003, Shyampura; 1 ex., 11.x.2003, Badlav & Basso, Kundera Forest Range; 1 ex., 13.x.2003, Gilai Sagar; 2 ex., 13.x.2003, Nalghati area; 1 ex., 14.x.2003, Raj Bagh Talab old building.

Diagnostic characters : Smaller than wolf, without elevated forehead and arching brows; coat colour variable with mixture of black and white, buff around the shoulder, ears and legs. Mainly nocturnal in habit.

Distribution : India : Almost throughout the country.

Elsewhere : Afghanistan, Central South western and South Asia, North and East Africa, Southeastern Europe, Iran, Nigeria, Tanzania, Thailand, Transcaucasus, Sri Lanka.

Remarks : Often seen across the National Park especially at dawn and dusk.

Status : IWPA : Schedule II, Part II; CAMP : LRlc (Nationally); CITES : Appendix III.

8. *Canis lupus* Linnaeus, 1758

Wolf, Bheria

1758. *Canis lupus* Linnaeus, *Syst. Nat.*, 10th. ed., 1 : 39.

Species Observed : 4 exs., 25.xi.2002, Dhudhal Mal Ka Darra; 4 exs., 10.x.2003, Lahpur valley; 5 exs., 10.x.2003, Bakaula.

Diagnostic characters : Larger than Asiatic Jackal and looks like Alsatian dog distinguished by powerful jaws, arching brows and elevated forehead; coat colour variable from sandy fawn to stippled with black. Mainly nocturnal in habit.

Distribution : India : Throughout India except extreme south.

Elsewhere : Throughout the northern hemisphere, North America south to 20° N in Oaxaca (Mexico), Europe, Asia including the Arabian peninsula and Japan excluding Indo-China.

Remarks : Sighted mostly in the Lahpur valley area, Bakaula and Dhudhal Mal Ka Darra.

Status : IWPA : Schedule I, Part I; RDB; VU; CITES : Appendix I.; CAMP : LRnt (Nationally); DD (Globally).

Genus *Vulpes* Frisch, 1775

9. *Vulpes bengalensis* (Shaw, 1800)

Indian Fox, Lumri

1800. *Canis bengalensis* Shaw, *Gen. Zool. Syst. Nat. Hist.*, Mammalia 1(2), p. 330.

Species Observed : 2 exs., 22.xi.2002, Padam Talab; 1 ex., 22.xi.2002, Jogi Mahal; 1 ex., 22.xi.2002, Ranthambhore Fort Gate; 1 ex., 23.xi.2002, Bagdha; 1 ex., 24.xi.2002, Chiroli; 1 ex., 24.xi.2002, Katholi-padra Area; 1 ex., 25.xi.2002, Gilai Sagar; 1 ex., 25.xi.2002, Dhudhal Mal Ka Darra; 1 ex., 28.xi.2002, Indala; 4 exs., 9.x.2003, Jakiri Talab; 2 exs., 9.x.2003, Sultanpur Ki Kui; 1 ex., 9.x.2003, Malik Talab; 3 exs., 9.x.2003, Anantpura Chowki; 1 ex., 11.x.2003, Kalighati; 1 ex., 11.x.2003, Badlav & Basso, Kundera Forest Range; 3 exs., 11.x.2003, Bodal Bawadi; 1 ex., 11.x.2003, Shyampura; 1 ex., 11.x.2003, Mansarovar; 1 ex., 13.x.2003, Jhoomar; 3 exs., 13.x.2003, Kachida; 1 ex., 13.x.2003, Nalghati area; 3 exs., 13.x.2003, Semli Area; 1 ex., 13.x.2003, Maa Farm Area; 1 ex., 14.x.2003, Raj Bagh Talab old building.

Diagnostic characters : Slender limped grey coloured species with back of ears grey and tail tip black.

Distribution : India : Throughout.

Elsewhere : Nepal and Pakistan.

Remarks : Commonly seen.

Status : IWPA : Schedule II, Part II; CITES : Appendix III; CAMP : LRnt (Nationally); DD (Globally).

Family HYAENIDAE

Subfamily HYAENINAE

Genus *Hyaena* Brunnich, 1771

10. *Hyaena hyaena* (Linnaeus, 1758)

Striped Hyaena, Lakkar Bagha

1758. *Canis hyaena* Linnaeus, *Syst. Nat.*, 10th. ed., 1 : 40.

Species Observed : 1 ex., 22.xi.2002, Padam Talab; 4 exs., 23.xi.2002, Bagdha; 2 exs., 24.xi.2002, Chiroli; 1 ex., 25.xi.2002, Jogi Mahal; 2 exs., 25.xi.2002, Gilai Sagar; 1 ex., 25.xi.2002, Dhudhal Mal Ka Darra; 3 exs., 28.xi.2002, Indala; 1 ex., 8.x.2003, Kachida; 1 ex., 9.x.2003, Anantpura Chowki; 3 exs., 9.x.2003, Malik Talab; 1 ex., 10.x.2003, Lahpur valley; 2 exs., 10.x.2003, Bakaula; 2 exs., 11.x.2003, Basso, Kundera Forest Range; 1 ex., 11.x.2003, Kalighati; 1 ex., 13.x.2003, Nalghati area.

Diagnostic characters : Coat dark greyish to creamish buff in colour with blackish transverse stripes on body and limbs.

Distribution : India : South to the Nilgiri Hills, west to Gujarat, north to lowland of Jammu and Kashmir and Kumaon, East to West Bengal.

Elsewhere : Afghanistan, Algeria, CIS Countries, Egypt, Ethiopia, Iran, Iraq, Israel, Kenya, Libya, Mali, Morocco, Nepal, Nigeria, Pakistan, Saudi Arabia, Sierra Leone, Somalia, South Africa, Sudan and Tanzania.

Remarks : Commonly seen during night survey especially when light trap collection was made by the survey party at different localities of the National Park.

Status : IWPA : Schedule III; CAMP : LRnt (Nationally); DD (Globally).

Family FELIDAE

Subfamily FELINAE

Genus *Felis* Linnaeus, 1758

11. *Felis chaus* Schreber, 1777

Jungle Cat, Khatas

1777. *Felis chaus* Schreber, *Die Säugethiere*, 2(13) : pl. 1101 B, text, 3(24) : 414.

1832. *Felis kutas* Pearson, *J. Asiat. Soc. Bengl.*, 1 : 75 (Medinapur, West Bengal, India).

Species Observed : 1 ex., 22.xi.2002, Padam Talab; 4 exs., 22.xi.2002, Ranthambhore Fort Gate; 4 exs., 23.xi.2002, Bakaula; 4 exs., 23.xi.2002, Bagdha; 3 exs., 24.xi.2002, Chiroli; 1 ex., 24.xi.2002, Katholi-padra Area; 3 exs., 25.xi.2002, Gilai Sagar; 3 exs., 25.xi.2002, Dhudhal Mal Ka Darra; 2 exs., 27.xi.2002, Jogi Mahal; 1 ex., 28.xi.2002, Indala; 3 exs., 8.x.2003, Kachida; 2 exs., 9.x.2003, Malik Talab; 1 ex., 9.x.2003, Semli Area; 1 ex., 9.x.2003, Sultanpur Ki Kui; 3 exs., 10.x.2003, Lahpur valley; 1 ex., 11.x.2003, Kalighati; 1 ex., 11.x.2003, Shyampura; 2 exs., 11.x.2003, Basso, Kundera Forest Range; 1 ex., 11.x.2003, Man-sarovar; 1 ex., 12.x.2003, near Anantpura Chowki; 1 ex., 13.x.2003, Maa Farm Area; 2 exs., 15.x.2003, Raj Bagh Talab old building.

Diagnostic characters : Unspotted dorsal coat varying in colour from yellowish grey to tawny rufous; black horizontal stripes present on the inner side of fore legs; tail short with black tip. Mainly nocturnal in habit.

Distribution : India : South of Krishna river in South India, Gujarat, Madhya Pradesh, Rajasthan, Jammu & Kashmir, Sikkim, Uttar Pradesh and West Bengal.

Elsewhere : Afghanistan, Algeria, Arabia, Benin, China, Egypt, Iran, Iraq, Israel, Kenya, Malawi, Morocco, Mozambique, Myanmar, Nepal, Pakistan, Sri Lanka, Syria, Thailand, Vietnam, Yemen, Zambia, Zimbabwe and CIS countries.

Remarks : Occasionally seen.

Status : IOWA : Schedule II, Part II; CITES : Appendix II; CAMP : LRnt (Nationally); DD (Globally).

Subfamily PANTHERINAE

Genus *Panthera* Oken, 1816

12. *Panthera pardus* (Linnaeus, 1758)

Leopard, Tenduwa

1758. *Felis pardus* Linnaeus, *Syst. Nat.* 10th ed., 1 : 41.

Species Observed : 1 ex., 22.xi.2002, Padam Talab; 4 exs., 22.xi.2002, Ranthambhore Fort Gate; 1 ex., 23.xi.2002, Bakaula; 4 exs., 23.xi.2003, Bagdha; 1 ex., 24.xi.2002, Chiroli; 3 exs., 24.xi.2002, Katholi-padra Area; 1 ex., 25.xi.2002, Dhudhal Mal Ka Darra; 2 exs., 26.xi.2002, Raj Bagh Talab old building; 5 exs., 27.xi.2002, Jogi Mahal; 1 ex., 8.x.2003, Kachida; 3 exs., 9.x.2003, Malik Talab; 1 ex., 9.x.2003, Semli Area; 1 ex., 10.x.2003, Lahpur valley; 2 exs., 11.x.2003, Basso, Kundera Forest Range; 6 exs., 11.x.2003, Kalighati; 2 exs., 12.x.2003, near Anantpura Chowki; 1 ex., 13.x.2003, Nalghati Area.

Diagnostic characters : Comparatively smaller than tiger; coat sleek and short-haired with colour varying from pale yellow to warm grey, rich tawny to rufous fawn and marked with close set black rosettes, all over the sides of body and tail except ringed tail tip. Spots down the middle of the back and on head, limbs and belly solid black (not rosettes). Mainly nocturnal in habit.

Distribution : India : Throughout.

Elsewhere : Afghanistan, Algeria, Angola, Arabia, Botswana, Cameroon, Central African Republic, Congo, Chad, China, Egypt, Ethiopia, Gabon, Guinea-bissau, Indonesia, Iran, Iraq, Kenya, Korea, Liberia, Laos, Malawi, Malaysia, Mauritania, Morocco, Mozambique, Myanmar, Namibia, Nepal, Niger, Nigeria, Pakistan, Senegal, Sierra Leone, Somalia, South Africa, Sri Lanka, Sudan, Tanzania, Thailand, Tunisia, Turkey, Uganda, CIS Countries, Vietnam, Zaire, Zambia, Zimbabwe.

Remarks : Rarely seen. Sighted at Ranthambhore fort area and Highpoint repeatedly within same period.

Status : IWPA : Schedule I, Part I; RDB; VU; CITES : Appendix I; CAMP : VU (Nationally); DD (Globally).

13. *Panthera tigris* (Linnaeus, 1758)

Tiger, Bagh

1758. *Felis tigris* Linnaeus, *Syst. Nat.*, 10th ed., 1 : 41.

Species Observed : 4 exs., 22.xi.2002, Padam Talab; 5 exs., 23.xi.2002, Bakaula; 7 exs., 23.xi.2002, Bagdha; 3 exs., 24.xi.2002, Katholi-padra Area; 2 exs., 24.xi.2002, Chiroli; 3 exs., 25.xi.2002, Gilai sagar; 3 exs., 25.xi.2002, Dhudhal Mal Ka Darra; 7 exs., 27.xi.2002, Raj Bagh Talab old building, 1 ex., 28.xi.2002, Mansarovar; 6 exs., 28.xi.2002, Indala; 5 exs., 8.x.2003, Kachida; 8 exs., 8.x.2003, Jogi Mahal; 4 exs., 9.x.2003, Anantpura Forest Chowki; 4 exs., 9.x.2003, Malik Talab; 2 exs., 10.x.2003, Lohpur valley; 4 exs., 11.x.2003, Basso, Kundera Forest Range; 6 exs., 11.x.2003, Kalighati; 2 exs., 11.x.2003, Bodal; 2 exs., 13.x.2003, Nalghati Area; 8 exs., 16.x.2003, Ranthambhore Fort Gate.

Diagnostic characters : Coat rich reddish yellow to orange marked with black stripes; tail black ringed and ears black on outside with prominent white spot.

Distribution : India : Throughout in suitable pockets except desert region.

Elsewhere : Bangladesh, Bhutan, China, Laos, Indonesia, Korea, Malaysia, Myanmar, Nepal, Thailand, Vietnam, CIS Countries.

Remarks : Tiger was sighted almost every year during the survey. A total of 28 sightings were recorded and in a single survey a maximum of 12 individuals were sighted. A female with two cubs was observed near Jogi Mahal in the year 2003. A maximum of four individuals both adult and cubs have been recorded at a time near Kalighati, Jogi Mahal Ki Mori and Kachida. Other places of sighting were Indala, Thumka, Lakarda, Padam Talab and Gilaisagar. Tiger and crocodile conflict was observed at Jogi Mahal wetland, resulting in mortality of crocodile in the year 2002.

Status : IWPA : Schedule I, Part I; RDB; VU; CITES : Appendix I; CAMP : EN (Nationally); DD (Globally).

Family HERPESTIDAE

Subfamily HERPESTINAE

Genus *Herpestes* Illiger, 181114. *Herpestes edwardsii* (E. Geoffroy Saint-Hilaire, 1818)

Indian Grey Mongoose, Newla

1818. *Ichneumon edwardsii* E. Geoffroy Saint-Hilaire. *Descrip de L'Egypte*. 2 : 139.

1874. *Herpestes ferrugineus* Blanford, *Proc. zool. Soc. Lond.*, pp. 661 (Larkhana, Sind, Pakistan).

Species Observed : 4 exs., 22.xi.2002, Ranthambhore Fort Gate; 1 ex., 22.xi.2002, Padam Talab; 3 exs., 23.xi.2002, Jogi Mahal; 4 exs., 23.xi.2002, Bagdha; 4 exs., 24.xi.2002, Chiroli; 5 exs., 24.xi.2002, Katholi-padra Area; 1 ex., 25.xi.2002, Gilai Sagar; 5 exs., 25.xi.2002, Dhudhal Mal Ka Darra; 5 exs., 27.xi.2002, Raj Bagh Talab old building; 4 exs., 28.xi.2002, Indala; 1 ex., 28.xi.2002, Mansarovar; 4 exs., 8.x.2003, Kachida; 4 exs., 9.x.2003, Malik Talab; 4 exs., 9.x.2003, Sultanpur Ki Kui; 3 exs., 9.x.2003 & 5 exs., 12.x.2003, Anantpura Forest Chowki; 4 exs., 10.x.2003, Lahpur valley; 2 exs., 10.x.2003, Bakaula; 2 exs., 11.x.2003, Kalighati; 2 exs., 11.x.2003, Bodal Bawadi; 4 exs., 11.x.2003, Shyampura; 1 ex., 11.x.2003, Badlav & Basso, Kundera Forest Range; 1 ex., 13.x.2003, Nalghati area; 2 exs., 13.x.2003, Maa Farm Area.

Diagnostic characters : Pale grey grizzled body with reddish brown speckling, face sharply conical with small ears concealed beneath the body, hind foot distinctly reddish.

Distribution : India : Throughout.

Elsewhere : Afghanistan, Bahrain, Indonesia, Pakistan, Iraq, Iran, Japan, Kuwait, Malaysia, Nepal, Saudi Arabia and Sri Lanka.

Remarks : Commonly seen throughout the Park.

Status : IUPA : Schedule IV; CITES : Appendix III; CAMP : LRlc (Nationally); DD (Globally).

15. *Herpestes javanicus* (E. Geoffroy Saint-Hilaire, 1818) *auropunctatus*

Small Indian Mongoose, Newla

1818. *Ichneumon javanicus* E. Geoffroy Saint-Hilaire, *Descrip. de L'Egypte*, 2 : 138.

Species Observed : 2 exs., 22.xi.2002, Padam Talab; 1 ex., 22.xi.2002, Ranthambhore Fort Gate; 2 exs., 23.xi.2002, Bakaula; 2 exs., 23.xi.2002, Bagdha; 1 ex., 24.xi.2002, Chiroli; 3 exs., 27.xi.2002, Raj Bagh Talab old building; 1 ex., 28.xi.2002, Indala; 1 ex., 9.x.2003, Anantpur Chowki; 2 exs., 9.x.2003, Malik Talab; 2 exs., 10.x.2003, Lahpur valley; 2 exs., 11.x.2003, Dhudhal Mal Ka Darra.

Diagnostic characters : Small in size, tail shorter than body, fur brownish soft and silky.

Distribution : India : Jammu and Kashmir in the north, Gujarat in the west, Andhra Pradesh in the south to north eastern states in the east.

Elsewhere : Afghanistan, Bangladesh, Bhutan, Cambodia, China, Indonesia, Malaysia, Myanmar, Nepal, Pakistan, Thailand, Vietnam, Introduced to Cuba, Dominican Republic, Fiji Isls., Hawaiian Isls., Jamaica, Japan, Puerto Rico, Surinam, West Indies and many other tropical regions.

Remarks : It was observed regularly at various places in the Park.

Status : IWPA : Schedule IV; CAMP : LRlc (Nationally); DD (Globally).

Family URSIDAE

Subfamily URSINAE

Genus *Melursus* Meyer, 1793

16. *Melursus ursinus* (Shaw, 1791)

Sloth Bear, Bhalu

1791. *Bradypus ursinus* Shaw, *Nat. Misc.*, 2 (unpaged), pl. 18.

Species Observed : 2 exs., 22.xi.2002, Ranthambhore Fort Gate; 2 exs., 23.xi.2002, Jogi Mahal; 1 ex., 23.xi.2002, Bakaula; 1ex., 23.xi.2002, Bagdha; 1 ex., 24.xi.2002, Chiroli; 2 exs., 24.xi.2002, Katholi-padra Area; 3 exs., 25.xi.2002, Dhudhal Mal Ka Darra; 2 exs., 27.xi.2002, Raj Bagh Talab old building, 1 ex., 28.xi.2002, Indala; 1 ex., 8.x.2003, Kachida; 2 exs., 9.x.2003, Anantpura Chowki; 3 exs., 10.x.2003, Lahpur valley; 4 exs., 11.x.2003, Kalighati; 2 exs., 11.x.2003, Shyampura; 1 ex., 11.x.2003, Bodal; 1 ex., 13.x.2003, Nalghati area; 1 ex., 13.x.2003, Semli Area; 1 ex., 13.x.2003, Maa Farm Area.

Diagnostic characters : Instantly recognized by its long, coarse, shaggy black hair, elongated grey snout; white or cream coloured V-shaped mark over its chest and ivory claw. Both diurnal and nocturnal.

Distribution : India : Throughout.

Elsewhere : Sri Lanka.

Remarks : Regularly seen around Jogi Mahal Ki Mori and from Guda to Bodal. It was also encountered at various places in the core area as it moves from one place to another frequently.

Status : IWPA : Schedule I, Part I; CITES : Appendix I; CAMP : VU (Nationally); DD (Globally).

Family VIVERRIDAE

Subfamily PARADOXURINAE

Genus *Paradoxurus* Cuvier, 182117. *Paradoxurus hermaphroditus* (Pallas, 1777)

Toddy Cat, Lakati

1777. *Viverra hermaphroditus* Pallas, In Schreber, *Die Säugethiere*, 3(25) : 426.

Species Observed : 2 exs., 22.xi.2002, Ranthambhore Fort Gate; 1 ex., 23.xi.2002, Jogi Mahal; 1 ex., 23.xi.2002, Bakaula; 1 ex., 24.xi.2002, Chiroli; 2 exs., 8.x.2003, Kachida; 1 ex., 9.x.2003, Anantpura Forest Chowki; 1 ex., 11.x.2003, Kalighati.

Diagnostic characters : Black or blackish brown in colour with coarse hair, under wool whitish, buff or rich yellow, a white patch below the eye. Nocturnal.

Distribution : India : Almost throughout the country except desert part of Rajasthan and Gujarat.

Elsewhere : Bhutan, Combodia, China, Indonesia, Japan, Laos, Malaysia, Myanmar, Nepal, New Guinea, Philippines, Singapore, Sri Lanka, Thailand, Vietnam, Sulawesi, Moluccas, Aru Islands.

Remarks : Recorded from Ranthambhore Fort Gate, Jogi Mahal area, Bakaula, Chiroli, Kachida, Anantpura Forest Chowki and Kalighati in the night near human activity zone.

Status : IUPA : Schedule II; Part II; CAMP : LRlc (Nationally); DD (Globally).

Order ARTIODACTYLA

Family SUIDAE

Subfamily SUINAE

Genus *Sus* Linnaeus, 175818. *Sus scrofa* Linnaeus, 1758

Indian Wild Boar, Jangli Suar

1758. *Sus scrofa* Linnaeus, *Syst. Nat.* 10th ed., 1 : 49.

Species Observed : 13 exs., 22.xi.2002, Padam Talab; 7 exs., 23.xi.2002, Bakaula; 17 exs., 23.xi.2002, Bagdha; 22 exs., 24.xi.2002, Lahpur valley; 3 exs., 24.xi.2002, Chiroli; 24.xi.2002, Dhudhal Mal Ka Darra; 30 exs., 24.xi.2002, Katholi-padra Area; 23 exs., 25.xi.2002, Jogi Mahal; 29 exs., 27.xi.2002, Raj Bagh Talab old building; 6 exs., 28.xi.2002, Indala; 8 exs., 9.x.2003, Sultanpur Ki Kui; 11 exs., 8.x.2003, Kachida; 5 exs., 9.x.2003, 17 exs., 9.x.2003, Anantpura Chowki; Malik Talab; 12 exs., 11.x.2003, Shyampur; 8 exs., 11.x.2003, Kalighati; 5 exs., 11.x.2003, Bodal Bawadi; 1 ex., 13.x.2003, Nalghati area.

Diagnostic characters : Females smaller than males. Body with short thick neck and slender legs. Head with sloping muzzle, large ears and small eyes. Body colour varies from dark gray to pinkish brown with coarse black and brown bristles. Tusk like canine developed in adult males.

Distribution : Throughout forested or semi-forested tracts of whole of India.

Elsewhere : Australia, China, U.S.A, Central and South America, Europe, Norway, Sweden, South Russia to middle east, South Africa, Sri Lanka, Fiji Islands, Galapagos, Hawain Islands, Indonesia, Lesser Sunda Islands, Solomon Islands, Mauritius, Molucca Islands, West Indies and Numerous oceanic Islands.

Remarks : Large population dwells in the National Park and commonly seen on the margins of the wetlands or swampy portion surrounded by forest. They can be abundantly seen in Padam Talab, Rajbagh Talab and almost all other water bodies having swampy-vegetation margins throughout the protected area.

Status : IWPA : Schedule III; CAMP : LR1c (Nationally); DD (Globally).

Family CERVIDAE

Subfamily CERVINAE

Genus *Axis* H. Smith, 1827

19. *Axis axis* (Erxleben, 1777)

Spotted Deer, Chital

1777. *Cervus axis* Erxleben, *Syst. Regn. Anim.*, 1 : 312.

Species Observed : 6 exs., 22.xi.2002, Padam Talab; 12 exs., 23.xi.2002, Bakaula; 32 exs., 23.xi.2002, Bagdha; 17 exs., 24.xi.2002, Chiroli; 14 exs., 24.xi.2002, Katholi-padra Area; 17 exs., 25.xi.2002, Dhudhal Mal Ka Darra; 4 exs., 25.xi.2002, Gilai Sagar; 20 exs., 25.xi.2002 & 9 exs., 10.x.2003, 23 exs., 27.xi.2002, Raj Bagh Talab old building, 18 exs., 28.xi.2002, Indala; 15 exs., 8.x.2003, Kachida; 17 exs., 9.x.2003, Malik Talab; 23 exs., 9.x.2003, Anantpura Chowki; 34 exs., 10.x.2003, Lahpur Valley; 15 exs., 11.x.2003, Bodal Bawadi; 7 exs., 11.x.2003, Kalighati; 17 exs., 11.x.2003, Semli Area; 4 exs., 13.x.2003, Nalghati area; 27 exs., 14.x.2003, Jogi Mahal.

Diagnostic characters : Easily recognized from far by presence of white spotted bright rufous fawn coat.

Distribution : India : Peninsular India, northwards to Kumaon and Sikkim including West Bengal. Introduced in Andaman at Ross Island.

Elsewhere : Nepal, Sri Lanka. Introduced in many parts of the world.

Remarks : Huge population exists in the National Park.

Status : IWPA : Schedule III; RDB : Schedule IV; CAMP : LR1c (Nationally); DD (Globally).

Genus **Cervus** Linnaeus, 1758

20. **Cervus unicolor** Kerr, 1792

Sambar, Sambhar

1792. *Cervus unicolor* Kerr., In. Linnaeus, *Anim. Kingdom*, p. 300.

Species Observed : 11 exs., 22.xi.2002, Padam Talab; 1 ex., 22.xi.2002, Ranthambhore Fort Gate; 12 exs., 23.xi.2002, Jogi Mahal; 12 exs., 23.xi.2002, Bakaula; 5 exs., 23.xi.2002, Bagdha; 21 exs., 24.xi.2002, Katholi-padra Area; 16 exs., 24.xi.2002, Chiroli; 12 exs., 25.xi.2002, Dhudhal Mal Ka Darra; 3 exs., 25.xi.02 & 14 exs., 26.xi.2002, Raj Bagh Talab old building; 9 exs., 28.xi.2002, Indala; 16 exs., 8.x.2003, & 7 exs., 13.x.2003, Kachida; 4 exs., 9.x.2003, Sultanpur Ki Kari; 4 exs., 9.x.2003, Malik Talab; 20 exs., 9.x.2003, Anantpura Chowki; 11 exs., 10.x.2003, Lohpur Valley; 22 exs., 11.x.2003, Shyampur; 2 exs., 11.x.2003, Badlav & Bassao; 6 exs., 11.x.2003, Mansarovar; 7 exs., 11.x.2003, Kalighati; 14 exs., 11.x.2003, Bodal; 1 ex., 13.x.2003, Nalghati area; 9 exs., 13.x.2003, Gilai Sagar.

Diagnostic characters : Largest of ungulates with elegant horns. Coat colour brown with yellowish or greyish tinge.

Distribution : India : Kerala, Tamil Nadu, northwards to Uttar Pradesh, east to Northeastern States.

Elsewhere : Australia, China, Indonesia, Malaysia, Myanmar, Taiwan and Sri Lanka.

Remarks : Commonly seen throughout the Park, especially exploring wetlands.

Status : IWPA : Schedule III; CAMP : LRlc (Nationally); DD (Globally).

Family BOVIDAE

Subfamily ANTILOPINAE

Genus **Antelope** Pallas, 1766

21. **Antelope cervicapra** (Linnaeus, 1758)

Black Buck, Kala Hiran

1758. *Capra cervicapra* Linnaeus, *Syst. Nat.*, 10th ed., 1 : 69 (Inland of Trivandrum, Kerala, India).

Species Observed : 5 exs., 12.x.2003, Mor Dongri; 2 exs., 28.xi.2002, Indala; 2 exs., 11.x.2003, Bodal; 4 exs., 24.xi.2002, Chiroli; 2 exs., 10.x.2003, Lohpur Valley.

Diagnostic characters : Female distinct with yellowish fawn coat above and white below and without horns. Male bears spirally twisted long, slender horns with rounded transverse ridges and black dorsally with white underparts. Females reddish dorsally and hornless.

Distribution : India : Punjab, Rajasthan, Gujarat, Bihar, Assam in the east and up to Kanyakumari in south.

Elsewhere : Pakistan. Introduced population in Nepal, Texas (U.S.A.) and Argentina.

Remarks : A sizeable population is present in the National Park but occasionally seen. Five individuals were sighted in the Mor Dongri area.

Status : IWPA : Schedule I; Part I; RDB : VU; CITES : Appendix III; CAMP : LRlc (Nationally); DD (Globally).

Genus *Gazella* Blainville, 1816

22. *Gazella bennettii* (Sykes, 1831)

Indian Gazella, Chinkara

1831. *Antilope bennetti* Sykes, *Proc. Zool. Soc. Lond.*, 1830-31 : 104 (Deccan, India).

Species Observed : 2 exs., 23.xi.2002, Bakaula; 7 exs., 24.xi.2002, Chiroli; 2 exs., 10.x.2003, Lohpur Valley; 4 exs., 11.x.2003, Bodal.

Diagnostic characters : Slender, body colour sandy brown to light chestnut with white underparts; horns slightly curved, closely ringed and relatively long in male; in female when horns present are shorter and smooth. Diurnal.

Distribution : India : Andhra Pradesh, Gujarat, Karnataka, Madhya Pradesh, Maharashtra, Punjab, Tamil Nadu, Uttar Pradesh and Rajasthan.

Elsewhere : E. Iran to Pakistan.

Remarks : Occasionally seen near the water points of the Park especially in area of Bakaula, Chiroli, Lohpur and Bodal.

Status : IWPA : Schedule II; Part I; RDB : VU; CAMP : LRlc (Nationally); DD (Globally).

Subfamily BOVINAE

Genus *Boselaphus* Blainville, 1816

23. *Boselaphus tragocamelus* (Pallas 1766)

Blue Bull, Rozra, Neel Gai

1766. *Antilope tragocamelus* Pallas, *Misc. Zool.*, p. 5.

Species Observed : 7 exs., 22.xi.2002, Padam Talab; 4 exs., 23.xi.2002, Bakaula; 5 exs., 23.xi.2002, Bagdha; 7 exs., 24.xi.2002, Chiroli; 12 exs., 24.xi.2002, Katholi-padra Area; 11 exs., 25.xi.2002, Dhudhal Mal Ka Darra; 4 exs., 25.xi.2002, Jogi Mahal; 12 exs., 25.xi.2002 & 14 exs., 13.x.2003, Gilai Sagar; 9 exs., 27.xi.2002, Raj Bagh Talab old building; 4 exs., 28.xi.2002, Bodal Bawadi; 2 exs., 28.xi.2002, Mansarovar; 4 exs., 28.xi.2002, Indala; 11 exs., 9.x.2003, Anantpura Chowki; 6 exs., 9.x.2003, Sultanpur Ki Kui; 2 exs., 10.x.2003, Malik Talab; 8 exs., 10.x.2003, Lohpur; 14 exs., 11.x.2003, Shyampur; 7 exs., 11.x.2003, Badlav & Basso; 3 exs., 11.x.2003, Kalighati; 6 exs., 11.x.2003, Guda; 5 exs., 13.x.2003, Kachida; 5 exs., 13.x.2003, Nalghati area; 5 exs., 13.x.2003, Maa Farm Area.

Diagnostic characters : Male iron-grey with a white ring below and two white spots on its cheek; horns not ringed but distinctly keeled in front; females and young males sandy brown. Both diurnal and nocturnal in habit.

Distribution : India : From base of Himalayas to Andhra Pradesh, Bihar, Gujarat, Haryana, Karnataka, Madhya Pradesh, Maharashtra, Punjab, Rajasthan and Uttar Pradesh.

Elsewhere : Nepal and Pakistan. Introduced into Texas (U.S.A.).

Remarks : Commonly seen throughout the Park. Large population was seen in Gilai Sagar lake area.

Status : IUCN : LRcd; IWPA : Schedule III; CAMP : LRlc (Nationally); DD (Globally).

Order RODENTIA

Suborder SCIUROGNATHI

Family SCIURIDAE

Subfamily SCIURINAE

Genus *Funambulus* Lesson, 1835

24. *Funambulus pennantii* Wroughton, 1905

Northern Palm Squirrel

1905. *Funambulus pennantii* Wroughton, *J. Bombay nat. Hist. Soc.*, **16** : 411 (Mandvi Taluka, Surat, Gujarat, India).

Species Observed : 2 exs., 22.xi.2002, Padam Talab; 10 exs., 22.xi.2002 & 8 exs., 16.x.2003, Ranthambhore Fort Gate; 7 exs., 23.xi.2002, Bakaula; 17 exs., 23.xi.2002, Bagdha; 16 exs., 24.xi.2002, Katholi-padra Area; 4 exs., 24.xi.2002, Chiroli; 12 exs., 24.xi.2002 & 7 exs., 11.x.2003, Dhudhal Mal Ka Darra; 7 exs., 25.xi.2002 & 8 exs., 10.x.2003, Jogi Mahal; 2 exs., 25.xi.2002 & 1 ex., 13.x.2003, Gilai Sagar; 3 exs., 26.xi.2002 & 4 exs., 14.x.2003, Raj Bagh Talab old building; 8 exs., 28.xi.2002 & 4 exs., 11.x.2003, Mansarovar; 4 exs., 28.xi.2002 & 3 exs., 14.x.2003, Indala; 7 exs., 8.x.2003, Kachida; 12 exs., 9.x.2003, Sultanpur Ki Kui; 5 exs., 10.x.2003, Malik Talab; 19 exs., 10.x.2003, Lahpur; 14 exs., 11.x.2003, Shyampura; 18 exs., 11.x.2003, Badlav & Basso; 3 exs., 11.x.2003, Bodal; 2 exs., 11.x.2003, Kalighati; 8 exs., 11.x.2003, Maa Farm Area; 9 exs., 12.x.2003, Anantpura Chowki; 1 exs., 13.x.2003, Nalghati area.

Diagnostic characters : Small in size, ears rounded, and muzzle pointed. Dorsum grey and divided by three cream coloured stripes and distinctly separated from belly by indistinct creamy buff longitudinal strip. Tail bushy with whitish or creamy tip.

Distribution : India : North, north-east, western central India.

Elsewhere : Afghanistan, Pakistan, Iran and Nepal.

Remarks : Most commonly found around abandoned buildings inside forested zone and human habitation in and around the National Park.

Status : IWPA : Schedule IV; CAMP : LRlc (Nationally); DD (Globally).

Family MURIDAE

Subfamily GERBILLINAE

Genus *Meriones* Illiger, 1811

25. *Meriones hurrianae* (Jordon, 1867)

Indian Desert Gerbil

1867. *Gerbillus hurrianae* Jordon, *Mamm. India*, p. 186.

Species Observed : 2 exs., 22.xi.2002, Padam Talab; 1 ex., 23.xi.2002 & 1 ex., 9.x.2003, Jogi Mahal; 1 ex., 23.xi.2002 & 2 exs. 10.x.2003, Bakaula; 1 ex., 26.xi.2002 & 1 ex., 14.x.2003, Raj Bagh Talab old building; 2 exs., 28.xi.2002, Mansarovar; 1 ex., 8.x.2003, Kachida; 2 exs., 9.x.2003, Malik Talab; 1 ex., 15.x.2003, on way to Kukraj, High point.

Diagnostic characters : Sandy grey to brownish grey, under parts pale yellow to dirty white, tail hairy and tufted with a black streak on dorsal surface of tail. Diurnal and fossorial.

Distribution : India : Gujarat, Haryana, Punjab and Rajasthan.

Elsewhere : Afghanistan, Iran and Pakistan.

Remarks : They were mostly sighted in the areas around and on way to Kukraj, High point and Raj Bagh Talab.

Status : IWPA : Schedule V; CAMP : LRlc (Nationally); DD (Globally).

Genus *Tatera* Lataste, 1882

26. *Tatera indica* (Hardwicke, 1807)

Indian Gerbil

1807. *Dipus indicus* Hardwicke, *Trans. Linn. Soc. London*, **8** : 279.

Species Observed : 2 exs., 24.xi.2002, Katholi-padra Area; 1 ex., 24.xi.2002, Chiroli; 1 ex., 28.xi.2002, Indala; 2 exs., 8.x.2003, Kachida; 1 ex., 9.x.2003, Anantpura Chowki; 2 exs., 10.x.2003, Lohpur Valley.

Diagnostic characters : Foot comparatively longer, soles naked to heel, tail clothed with hair and tufted at tip; upper parts sandy brown to reddish brown, under surface white; tail dark above and below and pale on sides; hind foot white. Nocturnal and fossorial.

Distribution : India : Andhra Pradesh, Bihar, Goa, Gujarat, Haryana, Himachal Pradesh, Jammu and Kashmir, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Orissa, Punjab, Rajasthan, Chennai, Uttar Pradesh and West Bengal.

Elsewhere : Data Deficient.

Remarks : It was sighted in Katholi, Chiroli, Indala, Kachida, Anantpura and Lahpur with numerous burrows in the region.

Status : IWPA : Schedule V; CAMP : LRlc (Nationally); DD (Globally).

Subfamily MURINAE

Genus *Bandicota* Gray, 1873

27. *Bandicota bengalensis* (Gray and Hardwicke, 1833)

Lesser Bandicoot Rat, Chuha

1833. *Arvicola bengalensis* Gray and Hardwicke. *Illustr. Indian Zool.*, pl. 21.

Species Observed : 2 exs., 24.xi.2002 & 1 ex., 26.xi.2002, 7 exs., 22.xi.2002, Ranthambhore Fort Gate; Dhudhal Mal Ka Darra; 8 exs., 09.x.2003 & 7 exs., 12.x.2003, Anantpura Forest Chowki; 2 exs., 9.x.2003, Jogi Mahal; 10 exs., 11.x.2003, Bodal; 4 exs., 11.x.2003, Badlav & Basso, Kundera Forest Range; 4 exs., 11.x.2003, Kalighati.

Diagnostic characters : Body greyish brown to blackish dorsal surface, in some with reddish hue, light to dark grey ventral surface. Nocturnal and fossorial.

Distribution : India : Throughout.

Elsewhere : Indo-China, Indonesia, Myanmar, Nepal, Pakistan and Sri Lanka.

Remarks : The species was observed maximum at Anantpura Forest Chowki and Bodal.

Status : IWPA : Schedule V; CAMP : LRlc (Nationally); DD (Globally).

Genus *Mus* Linnaeus, 1758

28. *Mus musculus* Linnaeus, 1758

House Mouse, Musti

1758. *Mus musculus* Linnaeus, *Syst. Nat.* 10th ed., 1 : 62.

Species Observed : 3 exs., 22.xi.2002, Ranthambhore Fort Gate; 1 ex., 26.xi.2002, Raj Bagh Talab old building, 1 ex., 28.xi.2002, Indala; 2 exs., 9.x.2003, Anantpura Forest Chowki; 2 exs., 24.xi.2002, Katholi; 1 ex., 13.x.2003, Kachida.

Diagnostic characters : Body sandy brown to dark brown above and white to ochraceous brown below. Nocturnal.

Distribution : India : Throughout.

Elsewhere : Spread throughout most of world, in close association with human beings.

Remarks : The species was found in good numbers in the National Park and are food of reptiles and predatory birds.

Status : IWPA : Schedule V; CAMP : LRlc (Nationally); DD (Globally).

Genus **Rattus** Fischer, 1803

29. **Rattus rattus** (Linnaeus, 1758)

House Rat, Chuha

1758. *Mus rattus* Linnaeus, *Syst. Nat.*, 10th ed., 1 : 61. From Uppsala, Sweden.

Species Observed : 5 exs., 22.xi.2002, Ranthambhore Fort Gate; 3 exs., 24.xi.2002, 2 exs., 24.xi.2002, Katholi-padra Area; 26.xi.2002, Dhudhal Mal Ka Darra; 5 exs., 27.xi.2002, Raj Bagh Talab old building; 2 exs., 8.x.2003 & 1 ex., 10.x.2003, Kachida; 7 exs., 9.x.2003, 12.x.2003, Anantpura Chowki; 4 exs., 10.x.2003, Jogi Mahal; 3 exs., 10.x.2003, Lahpur Valley; 5 exs., 11.x.2003, Kalighati.

Diagnostic characters : Medium size, belly white in outdoor forms and greyish buff in indoor; tail dark in colour and longer than head and body.

Distribution : India : Throughout.

Elsewhere : Introduced worldwide in the tropics and temperate zones.

Remarks : Frequently encountered in good numbers around abandoned buildings and dwellings in the National Park especially near the forest chowki's.

Status : IWPA : Schedule V; CAMP : LRlc (Nationally); DD (Globally).

Suborder HYSTRICOGNATHI

Family HYSTRICIDAE

Genus **Hystrix** Linnaeus, 1758

30. **Hystrix indica** Kerr, 1792

Indian Crested Porcupine, Shahi

1792. *Hystrix indica* Kerr, In : Linnaeus, *Anim. Kingdom*, p. 213.

Species Observed : 2 exs., 23.xi.2002, Bakaula; 5 exs., 24.xi.2002, Katholi-padra Area; 5 exs., 26.xi.2002, Dhudhal Mal Ka Darra; 1 ex., 27.xi.2002, Raj Bagh Talab old building; 1 ex., 28.xi.2002, Indala; 3 exs., 11.x.2003, Kalighati; Kachida; 4 exs., 12.x.2003, 2 exs., 12.x.2003, Bagdha; 3 exs., 13.x.2003, Anantpura Chowki; 1 ex., 13.x.2003, Nalghati area; 1 ex., 13.x.2003, Thumka Range.

Diagnostic characters : Brown crest of bristles on head and neck; coarse bristles cover shoulder and belly; back with long quills bearing alternative bands of brown and white. Nocturnal and fossorial.

Distribution : India : Throughout.

Elsewhere : Israel, Nepal, Pakistan, Russian Turkestan and Sri Lanka.

Remarks : The RNP holds sizeable population of this species and can be seen in the night mostly on the margins of pathways of Dhudhal Mal Ka Darra, Lakarda, Thumka and Kalighati.

Status : IWP : Schedule IV; CAMP : LRlc (Nationally); DD (Globally).

Order LAGOMORPHA

Family LEPORIDAE Fischer, 1817

Genus *Lepus* Linnaeus, 1758

31. *Lepus nigricollis* Cuvier, 1823

Indian Hare or Black-naped Hare

1823. *Lepus nigricollis* Cuvier, Dict Sci. Nat., 26 : 307. (Malabar, Tamil Nadu, India).

Species Observed : 2 exs., 22.xi.2002 & 4 exs., 16.x.2003, Ranthambhore Fort Gate; 1 ex., 23.xi.2002, Bakaula; 3 exs., 23.xi.2002, Bagdha; 4 exs., 24.xi.2002, Katholi-padra Area; 1 ex., 24.xi.2002, Chiroli; 5 exs., 25.xi.2002, Dhudhal Mal Ka Darra; 2 exs., 25.xi.2002 & 1 ex., 9.x.2003, Jogi Mahal; 1 ex., 27.xi.2002, Raj Bagh Talab old building; 1 ex., 28.xi.2002, Jakiri Talab; 4 exs., 8.x.2003, Kachida; 1 ex., 9.x.2003, Sultanpur Ki Kui; 2 exs., 9.x.2003 & 2 exs., 12.x.2003, Anantpura Chowki; 1 ex., 10.x.2003, Lahpur Valley; 2 exs., 10.x.2003, Jhoomar Bawadi; 2 exs., 11.x.2003, Kalighati; 4 exs., 11.x.2003, Shyampura; 1 ex., 11.x.2003, Bodal; 2 exs., 11.x.2003, Badlav & Basso; 2 exs., 11.x.2003, Man-sarovar; 2 exs., 12.x.2003, Maa Farm Area; 7 exs., 13.x.2003, Thumka Range; 4 exs., 14.x.2003, Indala.

Diagnostic characters : Dark brown or black patch on its neck from ears to shoulders and upper surface of tail black distinguishes it from other species.

Distribution : India : Throughout.

Elsewhere : Bangladesh, Bhutan, Indonesia, Pakistan and Sri Lanka.

Remarks : Commonly found throughout the Park. Variation in their length and shade of the coat was noticed may be due to age and moulting process.

Status : IWP : Schedule IV; CAMP : LRlc (Nationally); DD (Globally).

SUMMARY

The paper records the sighting of thirty one species of mammals belonging to seven orders under seventeen families and twenty eight genera. The mammalian species reported are abundantly found in the core and buffer zone of the National Park. These animals are partially or substantially depended on water bodies within the protected area for various needs and remain closely associated with the wetlands. Due to varying microhabitats and climate the Park is rich in mammalian diversity.

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THREATS AND CONSERVATION

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INTRODUCTION

Ranthambhore National Park is a unique ecological habitat protected for wildlife especially tigers. The tiger once a national pride is becoming the national problem and in order to save the tigers, the problems are worsening over the years for the government to handle such a situation. The people living around the park are considered as the main cause of depleting flora and fauna. Grazing, felling of trees, over exploitation of water resources, use of chemical fertilizers and pesticides, excessive tourism, vehicular interference and many man made ecological blunders including management by inadequately trained manpower are some of the main threats to the national park today. All of them needs to be addressed and tackled both individually and collectively based on global or national experience in the background of site-specific needs. Due to constant pressure of the villagers, the buffer zone of the national park has degraded. Some of the main threats to the park and the ways and means by which they can be solved for long survival of the faunal elements are discussed here.

GRAZING PRESSURE

The periphery of the park is surrounded by villages with high human cattle ratio. The soil cover in the buffer area is initially thin due to natural sandstone sheet rocks of Vindhyan System. The villagers are mainly dependent on cattle wealth as the domestic animals provide substantial surrogatory economy to them but are many a times maintaining poor quality cattle with lesser yields. Excessive grazing, uncontrolled felling and lopping of trees in the periphery and the buffer area have resulted into soil erosion and removal of vegetal cover. The quality of grasses is poor and the regeneration power of the buffer area has deteriorated due to heavy cattle grazing over the years. Hence, the villagers try to invade the core area of the park after a few showers of rain when the new vegetation starts flourishing. This ultimately leads to loss of faunal elements.

FELLING OF TREES FOR FUEL WOOD

There is enough to meet everybody's requirement. It's all based on planning and judicious use. But the overall increase of human population of the surrounding villages

around the park and the felling and lopping without replanting young saplings for next process of succession and growth has resulted in increase of wasteland accentuated by poor soil quality. The fuel wood requirement of the villagers is being met by cutting the trees of the park. Some of the felled trees are also smuggled to nearby industries and towns to earn livelihood. This ill planned cutting of trees has led to poor regeneration, wasteland formation and thereby depletion of existing fauna associated with these forest trees or felled ones.

EXPLOITATION OF WATER RESOURCES

Use of water for human and animal drinking purposes together with irrigation is undoubtedly a pressure on water resources in this area. The impact of lifting out the water for human use is most decisive factor creating scarcity of water in the natural tanks and reservoirs of the sanctuary, which are exclusively used by wildlife for drinking and habitat creation. The ever-increasing population pressure and run-off of chemical fertilizers is causing water pollution and rendering it most unfit for wild animals. Excessive use of water for irrigation is also accentuating the scarcity factor in these areas, thereby causing conflict between the villagers and the management authorities of the park.

USE OF CHEMICAL FERTILIZERS AND PESTICIDES

Harmful effects of chemical fertilizers like urea and di-ammonium are well known. These are extensively used by the villagers especially to grow vegetable and cereal crops. The toxic run-off of the agricultural fields gets mixed with the water of natural reservoirs used by wild animals. These toxic run-offs from agricultural fields are serious threat to plant and animal species. Birds in general and especially raptors are the worst affected victims of pesticide usage in agriculture fields. Use of various medicines for milch animals is also affecting the vulture population dependent on their caracas.

TOURISM

Ranthambhore National Park is one of the largest tourist sites of Rajasthan in India to have a glimpse of Tiger and other animals in the natural free roaming state. The tourist pressure remains high especially during winter and holidays. The rise in tourism encroaches upon the tranquility of existing wildlife, disturbs their habitat and their movements from one point to the other in search of food and water. Although the park authorities have made specified trails for the visitors, but the constant movements of jeeps full of enthusiastic visitors are common and most frequent sources of disturbance to the park animals especially during morning and evening hours of the day, when these animals are in siesta under the tree shades or near water holes. The tourists are becoming a source of sound pollution and also spreading perishable and non-perishable items such as cans, bottles, plastics etc. leading to unhygienic conditions. They sometimes also lure the animals to food items not suitable to them. The in-sanitary atmosphere leads to diseases disquieting the health and

calmness of wild animals.

VEHICULAR PRESSURE

The gypsies and canter auto vans that carry tourists also disturb the tranquility of this sanctuary. The noise of motor engines is unbearable which disturbs the wild animals along with the exhaust smoke creating air pollution. Leakage of diesel, petrol and fuel oil on the ground become a potential threat to wildlife. Fast driving for chasing animals to see them from close proximity enhances the disturbance already caused by their presence. On sighting a wild carnivore species, visitors vehicle do congregate at a place and increases the fear factor of the animals of that area by their presence in large numbers.

ECOLOGICAL THREATS

The buffer area of the park, due to over exploitation of the forest wealth, has resulted into development of wastelands and barren hills. The denudation of hills and valleys is accelerating the large-scale topsoil removal and leaching of nutrient rich soils into the drainage system, causing siltation and filling up of the riverbeds and also decreasing the water holding capacity of the land.

This is further accentuated due to over grazing by the cattle and excessive use of chemical fertilizers and pesticides for raising crops. The beneficial soil micro-organisms and arthropods are severely affected due to use of these harmful chemicals.

INADEQUATE TRAINED MANPOWER

The increase in incidence of illegal poaching and disappearance of wild animals especially carnivores are amounting to colossal loss of natural heritage wealth of the country. There is a meagre manpower employed for surveillance of the national park and inadequate facilities and equipments with which these untrained manpower work, results in the inappropriate management of the park. For monitoring of wild animals in the park, proper equipments and training of the manpower employed for their management is an utmost requirement.

CONSERVATION STRATEGIES

Love and regard for wildlife is a part of India's ancient culture. Man has practically used the wild animals for all the purposes like worship, food, shelter and entertainment. Many animals are symbols of their home states and being adopted as logos. They are worshipped as God or associated in the form of their vehicles. Conservation of wildlife is a part and parcel of India's socio-economic life.

India lies at the confluence of Africa, European and Southeast Asian biological systems and possesses components from each of these realms as well as several peculiar indigenous endemic floral and faunal species. Today the pressure of human activity on land and forests threatens a significant portion of this wealth. What makes

matter worse is that knowledge of our wildlife is still largely incomplete except for a few groups of vertebrates such as aves and mammals. Large amount of floral and faunal wealth has to be unearthed and documented before they disappear without being known for their role in this world. A detailed animal-plant interaction and listing of fauna associated with particular plant species is needed, as the presence of one is indicative of the other in the ecosystem.

The need to preserve our natural and cultural heritage arose not merely to provide evidence of our historic past but in order to have a link between the past and the present for future sustenance. India has the oldest continuous civilization in the world and the evidences of our past evoke not only wonder at the achievements of our ancestors but empathy and emotional involvement of several religious historical antecedents and aspirations all co-existing in discrete natural eco-geographical regions. Unlike the west, India still has such an abundance of our past in our midst that we are referred to as a traditional society. The emerging issue in this milieu is that the old traditional values and our natural cultural heritage will determine our future as the most eco-developed country rather than developing country. The old traditional heritage are to be recreated to regain the rich and bewildering faunal diversity especially the keystone wildlife species and therefore has potential for conservation (Tewari, 1991a & b; Panwar, 1986 & 1991; Anon. 1999-2000). Some of the conservational suggestions are discussed below :

- The encroachments in the already existing village pastures and other revenue lands should be removed and they should be developed into proper “*Gochars*” with regulated grazing. This will stop open grazing. Development of *Gochars* in the buffer area leading to religious *Orans* may solve the problem of poor regeneration of vegetal growth.
- Better and high yielding cattles should be provided through a regional cattle-breeding programme.
- Trees attaining long life, such as *Ficus* species need to be planted in the Aravallis, the Vindhyans, the buffer and the core zone of the park. Tigers prefer their shady hideout. Their leaves provide good fodder, which enhances milk production. *Ficus* species can increase the percentage of green cover and survival of many endangered and threatened wildlife species especially the bigger birds whose favourite food happens to be the berries of *Ficus* trees and nests in their hollows on the thick trunks. They also evoke religious sentiments and are of medicinal and industrial value.
- Plant tree saplings of horticulture importance in the periphery as an alternate means of economy for the villagers so as to minimize their dependency on livestock.
- Trees, shrubs, herbs and climbers with thick succulent stems and fruits should be planted so as to naturally meet the water requirements for many animals especially in the dry conditions. Grasses such as *Khus* should be grown near water bodies and other places as it keeps the ambient temperatures of the environment cool for the wild animals during extreme summers.

- *Prosopis juliflora* which was once raised for meeting out the fuel wood, fodder requirement and increase of green cover of Rajasthan is now causing problem in the park due to fast spread. Instead of uprooting it completely, it should be lopped in such a way so as to make trees out of the bushy form and the lopped parts utilized as fuel and fodder especially during adverse condition. It is observed that flowers of *P. juliflora* are visited by honeybees as a source of nectar. Its pods are good food for goats, birds and smaller mammals. Therefore, it should also be allowed to grow in small bushy intermittent patches as this forms the most suitable habitat for many wildlife species especially chinkaras and many species of reptiles.
- Fodder trees such as *Acacia leucopholea*, *Leucaena leucopholea*, *Ailanthus excelsa*, *Ficus sp.*, *Holoptelea integrifolia*, *Azadirachta indica* and grasses such as *Motia*, *Dhaman*, *Karad*, *Bhurat*, *Neenjna* and *Bamboo* bush which are growing well in degraded lands needs to be planted for fodder supplement to reduce pressure due to over-grazing and also to regenerate the grasslands. The seeds of these plants species also provide good food for wild animals especially mammals and birds.
- Planting of common plant species found in the area such as *Launea coromandelica*, *Anogeissus pendula*, *Syzygium cumini*, *Boswellia serrata*, *Diospyros melanoxylon*, *Butea monosperma*, *Ziziphus mauritiana*, *Tamarindus indica*, *Mitragyna parvifolia*, *Bauhinia sp.*, *Cassia fistula*, *Phoenix sylvestris*, *Flacourtia indica*, *Adhatoda vasica*, *Capparis sp.*, *Grewia flavescens*, *Calligonum sp.*, *Euphorbia sp.*, and other native species can also help in water conservation and prevent soil erosion besides providing good hideout for the wildlife. Other suitable plant species of multipurpose importance which require minimum maintenance, self-perpetuating and have the power to regenerate on their own in all sort of adverse conditions should be planted with the help of State Forest Department.
- Proper lopping menstruation should be used to make trees attain height required for bigger birds especially raptors for nesting.
- Silvicultural practices to be adopted as far as possible in re-greening the Ranthambhore National Park so that the survival of the faunal elements can be regulated.
- Milk Co-operatives should be formed similar to that initiated by Dr. V. Kurien, architect of India's modern dairy industry, who brought successful white revolution named "Operation Flood" in Indian History. Another historical revolution should come from State of the Warriors, the Ranthambhore, and a place testimony to the historical events. Farmers should be convinced to form a co-operative instead of keeping individual cattle. A member of every household should hold an equal share in that co-operative irrespective of caste, colour, creed or wealth.

- The villagers should be trained to use dried and fallen twigs for their fuel wood demand before gradually switching over to alternative means of non-renewal energy sources. Alternate means of energy such as use of biogas, solar and wind energy should be promoted to stop from destruction of natural habitat of the animals. Fuel wood requirements should strictly be met by proper lopping of tree parts without disturbing the faunal niches of the animals.
- Drinking water facilities should be developed in the villages itself so that they do not disturb the water sources of wild animals. The old ruined water harvesting structures built by the Maharajas many of which are still filled with water during raining season needs to be renewed. Few more water harvesting structures on the old traditional designs should be built at the periphery, inside the buffer and core area of the park to meet out the water requirements of the animals and the villagers. For maintaining better health and hygiene of the park water bodies, should not be allowed to become polluted.
- Use of chemical fertilizers and pesticides should be banned in the near vicinity of the national park. The beneficial soil fauna is killed due to the use of chemical fertilizers and pesticides. Villagers should be encouraged to adopt their old traditional way of manuring and use of cow-dung and goat pellets. Properly treated natural farmyard manure should be used for healthy growth of plants and soil organisms, thus ensuring the flourishing of animal species diversity at all levels in the serene environment of Ranthambhore.
- The activities of the tourists spreading perishable and non-perishable items such as cans, bottles, plastics etc. that create nuisance to the wild animals and their habitat inside the Park be banned. Tourist pressure should not be built up and they should not be permitted to approach the habitat of wild animals and disturb them. The villagers and the tourists should be well informed and educated through various audio-visual means about the rules and regulations of the park before entering so that well being of the animals can be maintained at all levels and at all times. A well-informed tourist will prefer to behave in accordance with the laws of the park unlike an ignorant entrant. The representatives of the villagers should form part of the tourism and they should be involved at every stage in the management of the park so that they associate themselves with the growth and activities of the park.
- Battery operated noiseless and smokeless vehicles to be driven on the roads inside the park. Introduction of electric vans, cable cars in between *dangs* and the valley terrain and balloon flights for the nature lovers may further encourage healthy eco-tourism in the area. The number of vehicles and the number of tourists in each vehicle entering inside the park should be strictly observed and reviewed from time to time based on the environmental conditions of the park and also the behaviour of the animals during certain period of time especially when climatic adversity becomes severe in some years. The carrying capacity of the park should be assessed based on opinion of experts for the park.

- Latest Information Technology should be used in building up a data bank of each of the animal species with their habitat preference and dependence on other factors available within the national park. Methodology like Camera trap should be used to study tigers and other important species of the animals sharing this mega niche of the ecosystem.
- Tagging and monitoring of existing wildlife species is the need of the hour and should be implemented at the earliest to save further disappearance or vanishing of these beautiful creatures of nature. The bird's ringing has been successfully practiced and should now be applied on bigger vertebrate species especially on rare and threatened faunal elements. This should slowly be tried on all representative groups of plant and animal diversity. The manpower should be trained accordingly. This will re-evoke strong emotions for conservation and preservation of wildlife.
- The living standards of the employees at the level of forest cleaners and forest guards onwards need to be upgraded making channels for progress of each group separately. They should be made more efficient by providing all the required infrastructure of monitoring and management techniques. When we can think of conserving and working on improving the living conditions of feared and fierce animals like tiger why shouldn't we think of understanding the problems of the employees working in such a natural harsh environmental conditions.
- Basic facilities and amenities are to be provided to the forest employees working in the high-risk zones. Introduction of information technology can help in minimizing the risks faced daily by the forest staff directly involved in the management of the park.
- Working hours of employees to be reviewed and certified on medical grounds. Overburdening and also no work for many are resulting into ill health. Scrutiny of the old manpower and further employment on the basis of job requirement and their capabilities may be ascertained. Many countries have less working hours than that practiced in India especially for those rendering field duties.

It is well understood by the scientists that the animals and plants cannot survive in isolation from the habitat in which they have evolved. The same stands true for the locals of a particular area or habitat who have over the years lived their life in the close proximity and in the vicinity of these plants and animals.

The locals have been the conservationists never born before. Their traditional practices of protecting wildlife have been documented in the folk songs, pictures, paintings which all show that they were more judiciously utilizing wildlife than the modern man who in the name of power and politics have brought destruction in the name of enjoyment, pleasure and courtesy to the foreign guests. Ours is an eco-developed country since ancient days. What cost are we paying for becoming developed? Our traditional practices have to be updated and made more scientifically proven and accepted widely. The villagers are the vital resource of grey matter and their natural ways of collection and use of non-wood forest produce should be

documented. They should be encouraged to practice them. The villagers are well versed with the forest routes and the existing animal and plant life, as they were dependant on them. They will help in developing an indigenous data bank of plants and animals existing there with their common names and the places where they are found. When the villagers were living with the wild before the declaration of protected areas why can't they continue to live thereafter. Villagers can be made the guardians of the natural wealth under the control of the state authorities for better and collective management especially of the wildlife in the area.

Fell the forest and life will dwindle. Let them live with the habitat. Conserve man, their plants and animals for which they care in their own traditional religious conservational style excluding the sacrifices to deities. General awareness about the scientific ways of conserving the natural habitat is required along with the justification not to allow increasing human population of that particular habitat so that simultaneous sustainability is maintained for all the plants, the animals and the man.

Many organizations are working towards the same goal with different aspects or the same objective. There is lot of repetition and wastage of funds as well as difference of opinions due to being government, private and non-government bodies. Responsibilities being shirked from one to another.

Interlinking and co-ordination is required to avoid repetition of work. Revamping the whole set-up and restructuring the already functioning committees for the management of the park is now the call of the hour. Responsibilities to be fixed for proper management of the wildlife and the habitat conservation.

All the wildlife sanctuaries and national park have plants and animals as their main resources hence scientific organizations like ZSI and BSI should be consulted by the state forest authorities in the management of protected areas. All the high-level policy-decision making committies should have a member representative from these organizations so that wholistic approach can be achieved in the managment and conservation of protected areas.

Tagging and monitoring the tiger and other wildlife with the help of latest information technology will help evolve a "Linked network monitoring system" to solve the problems.

The Ranthambhore National Park still holds capacity of rejuvenation if the vast majority of the park resources including wastelands and watersheds are conserved on biologically sustainable sound management strategies. The wasteland rejuvenation in the buffer zone may prove to be a major step in conserving the area for wildlife protection. Even if it is marginally exploited by villagers of the region, it can sustain the interaction without threats to the resources of core area especially animals. People's participation on a proportional benefit-sharing basis can be of significance to overcome the difficulties in bringing together the collective efforts of the people around it.

Ranthambhore National Park has proved to be a land bank of rich germplasm. Faunal elements are far and many but still unexplored.

The Ranthambhore National Park is a unique representative of the glorious cultural, religious, archaeological, geological, biological and natural heritage of the country hence should be further protected under a wider umbrella by designating Ranthambhore National Park and its surrounding historical town as a “heritage site”

SUMMARY

The vast assemblage of faunal species so far recorded from the Ranthambhore National Park, a part of Ranthambhore Tiger Reserve amply suggests that the national park area is rich in faunal resources and supports faunal entities from protozoa to mammalia. The present studies highlights the threats faced by the national park viz. grazing pressure, felling of trees for fuel wood, exploitation of water resources, use of chemical fertilizers and pesticides, tourism, vehicular pressure, ecological threats, inadequate trained manpower along with some suggestions for conservation.

The wasteland rejuvenation in the buffer zone may prove to be a major step in conserving the area for wildlife protection. People's participation on a proportional benefit-sharing basis can be of significance to overcome the difficulties in bringing together the collective efforts of the people in conserving wildlife. The Ranthambhore National Park is still under explored and needs extensive investigations to be undertaken by agencies engaged in systematic studies on fauna. Apart from tiger conservation Ranthambhore National Park needs attention of scientific organizations and State Government of Rajasthan to inventorise the faunal status of this protected area for better health and management. Similar faunal studies should be undertaken for other uncovered areas falling under Ranthambhore Tiger Reserve. Ranthambhore National Park and its surrounding historical town should be declared as a “heritage site” All the wildlife sanctuaries and national park have plants and animals as their main resources hence scientific organizations of Ministry of Environment and Forests, New Dehi viz. ZSI and BSI should be consulted by the state forest authorities in the management of protected areas. All the high-level policy-decision making committies should have a member representative from these organizations so that wholistic approach can be achieved in the managment and conservation of protected areas.

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