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Rec. zool. Surv. India : **108**(Part–1) : 1-8, 2008

A POPULATION SURVEY OF HANUMAN LANGURS IN THE BALASORE DISTRICT, ORISSA

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INTRODUCTION

Among all other leaf monkeys in India, Hanuman langur (*Semnopithecus entellus*) is the most common langur. Out of five species of langurs, the Hanuman langurs are distributed in India almost in all habitats except northeastern states and in some parts of South-India where it is replaced by Nilgiri langur. Field studies on the non-human primates of Orissa had been done by Behura *et al.* (1969) along with Wildlife of Orissa; Tiwari and Mukherjee (1992) reported primates of Puri, Bolangir and Sundargarh districts; Tiwary *et al.* (1997) published the sightings of monkeys and langurs at Chandaka Wildlife Sanctuary; Chaudhuri *et al.* (in press) reported primates of Nayagarh district of Orissa. This report deals with the information regarding distribution, abundance, social composition and status of Hanuman langurs of Balasore district, Orissa.

The other common monkey, the rhesus macaque (*Macaca mulatta*) had been reported in the hill forest by few local inhabitants. The survey team failed to locate this monkey at repeated attempts. Considerable time was spent to locate the rhesus monkeys in the Nilgiri, the hill range, which follows the south-westernly direction, nearly 50 km. Stretch in Balasore district, as far as Mayurbhanj district boundary in a horseshoe pattern. So it is now appeared from the present study that the rhesus monkey population is almost disappeared from this district.

STUDY AREAS

The Balasore district is an interesting place; in ancient time it was a part of Kalinga. During Mughal Rule, the English Merchants established the first settlement in Bengal, presidency at Balasore. It came under Maratha Rule in the 18th century. Balasore district lies between 21°04'–21°59' N latitude and between 86°22' and 87°29' E longitude. The total area of the district is about 3705 sq. km. with a human population density of 532 sq. km. The entire

district is well connected with metalloid and non-metalloid motorable roads. Physiographically, the district is composed of three district regions, *viz.* the coastal belt, inner alluvial plain and the northwestern hills. The majority area of the district is flat plain which is predominantly agriculture based rural.

There are three distinct seasons-summer, rainy season and winter. The atmospheric temperature varies from 15°C to 40°C with a mean of 26°C. Due to its proximity to the sea, the intensity of heat is mitigated in the areas having sea-breeze during March-April.

The winter is very short and is not severe even at Nilgiri hills. The annual average rainfall is about 1600 mm. The main river are Subarnarekha and Baitarini. The forested area occupied in the district is in the Nilgiri sub-division, which are moist peninsular high level Sal forests. This type occurs in the hill tops and characterized by pure stand of Sal which is of poor quality, associated with other trees in the hill and valley like *Terminalia alata, Terminalia chebulia, Callicarpa* sp., *Dillenia pentagyna, Pterocarpus marsupium, Cedrella toona, Ficus bengalensis, Terminatia tomentosa, Gmetina arborea, Madhuca indica, Angeisus latfolia, Largerstromia parviflora, Sterculia villosa* etc. The type of forests that are found crystalline and metamorphic rocks wherever the soil mixture conditions are unfavourable for development of moist Sal even in the areas with much higher rainfall. This type of areas is also common in the western parts.

METHODS

The district is well connected with motorable roads and the survey techniques used here involved slow driving vehicle along roads at an average speed of 20 km/hour. The observations were carried out in the villages, towns, temples, roadsides and forests were surveyed during period under study. The forest survey was made during April-May 2006 in some parts of the districts and remaining parts surveyed in December 2006. This report is based December 2006 survey. Total counts method was used to the estimate the population. The point method was adopted for locating monkeys in the hills. A total of 130 hours were spent in the census work. About 1800 km^2 area was surveyed which comprises 48% of the total area of the district. The survey was carried out from 0700 to 1200 hours and from 1500 to 1800 hours with three observers.

The visual and auditory signals were utilized for locating langur groups particularly in the Nilgiri whereas the other areas are mostly agricultural lands and villages. The villagers and tribal people in the forests were also inquired about the presence of monkey groups. On locating the group, notes on then social composition, habitat and interaction with human were recorded. Individuals were classified broadly into four categories based on the morphological differences and age. They are adult males, adult females, juveniles and infants. The sub-adults of the group were placed in the juveniles and adult population depending upon their age and size.

RESULTS

A total of about 1800 km^2 areas was surveyed which comprised about 48% of the area of the Balasore district and 50 groups of Hanuman langur groups were recorded. Out of these 46 groups were bisexual and 4 were all male groups. The 50 groups contained 742 langurs of which 100 adult males, 393 adult females, 131 juveniles and 118 infants. The group size varied from 4 to 31 langurs. The distribution of Hanuman langur is shown in Fig. 1. This provides a population estimate of 0.027 groups per sq. km. and 0.41 individuals per sq. km. respectively.

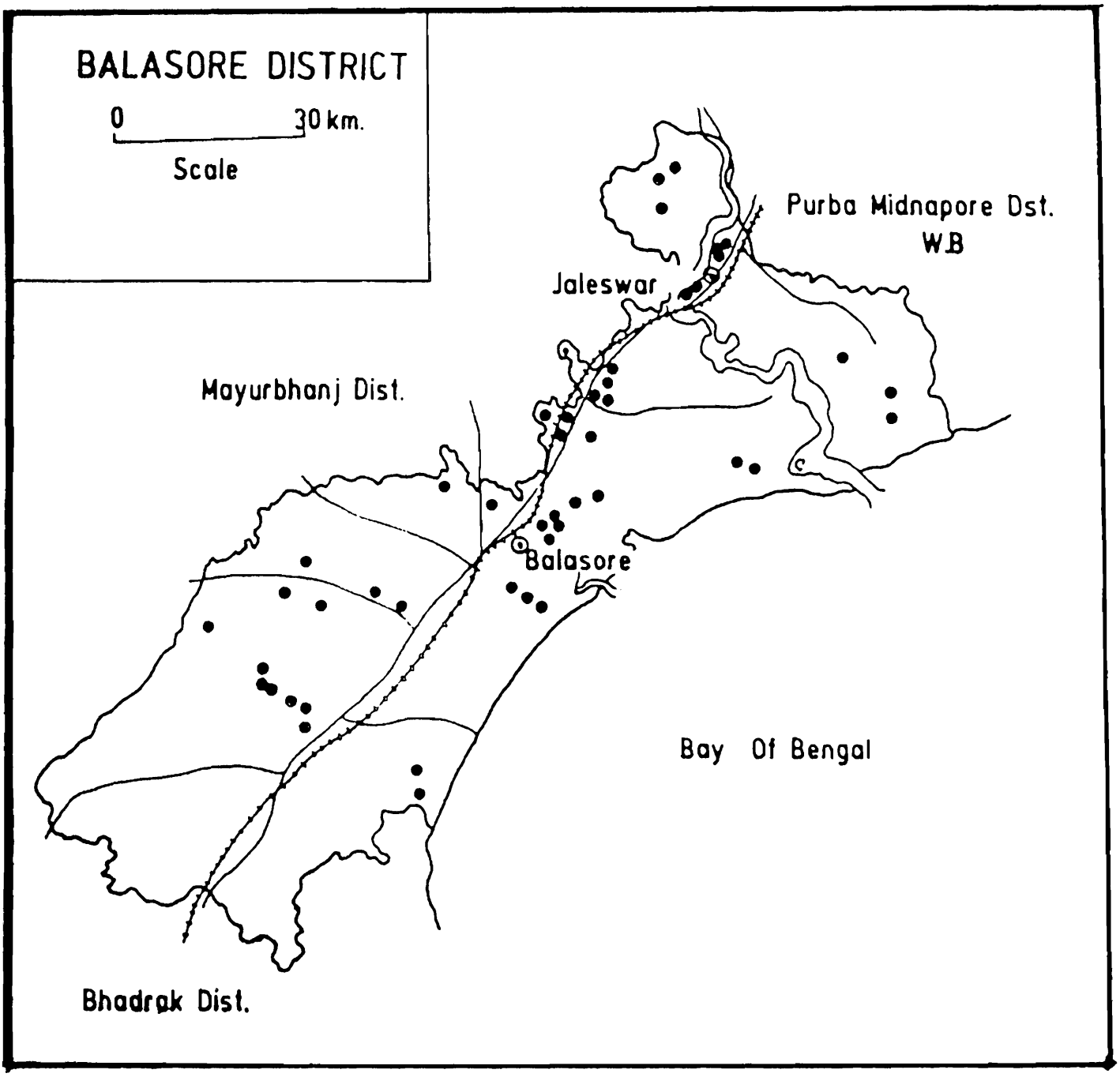

Fig. 1 : Distribution of Hanuman langur.

The 4 all male groups contained 16 langurs of the 4 all male groups one group with 5 langurs inhabited in the forest and other 3 groups with 11 langurs were village groups.

The 46 social groups contained 726 langurs (Fig. 2) consisting of 84 adult males, 393 adult females, 131 juveniles and 118 infants with a mean group size of 15.78 individuals (Table 1).

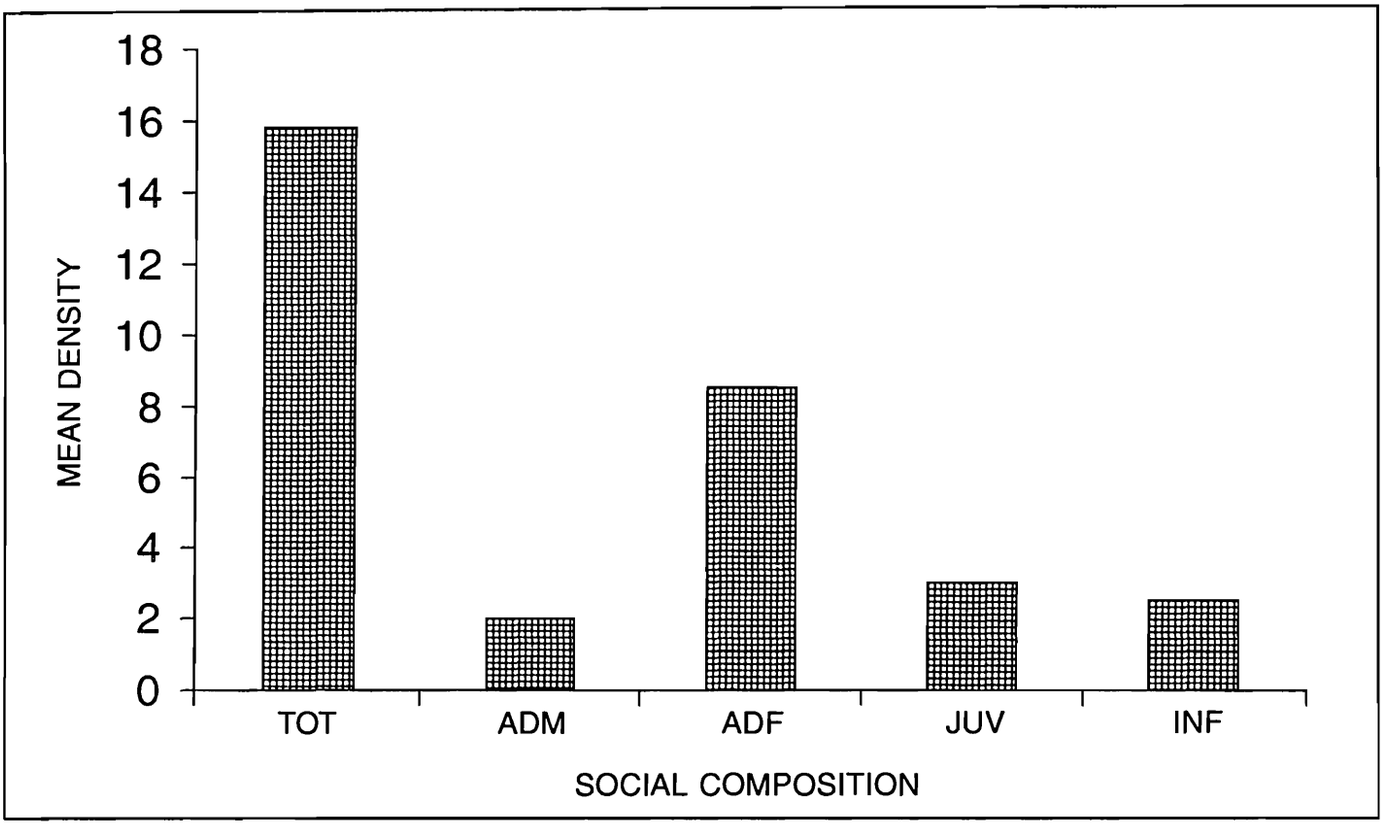

Fig. 2 : Hanuman Langur population of Balasore district.

A total of 48 newborn infants were observed in 30 groups. In 11 groups there were no infants and 3 groups there was only one infant each. The percentage composition consisted of 11.6% adult males, 54.1% adult females, 18.0% juveniles and 16.3% infants. 30% females were having infants. The adult male to adult female ratio was 1 : 4.6 and adult female to infant and juvenile ratios were 1 : 0.30 and 1 : 0.33 respectively.

The Hanuman langurs of Balasore district harbour mainly in the villages and few groups in the forests. 43 groups were recorded in villages and only 3 groups in forests (Table 2). The 43 villages groups contained 683 langurs with a mean of 15.88 individuals per group. The social composition of consisted of 80 adult males, 369 adult females, 125 jeveniles and 109 infants (Fig. 3). The group size varied from 4 to 31 langurs. The sex ratio of adult males to adult females was 1 : 4.6. The ratio of adult females to infants and juveniles were 1 : 0.29 and 1 : 0.33 respectively. The three-forest group consisted of 43 langurs of which 4 were adult males, 24 were adult females, 6 juveniles and 9 infants (Fig. 3). The male-female ratio was 1 : 6.0 and ratio of the adult females to sub-adult was 1 : 0.62.

Table 1 : Group size and distribution of bisexual Hanuman langurs in Balasore.

Sl. No.	Locality	Habitat	Total	Adult Male	Adult Female	Juvenile	Infant
1.	Fuladi	V	24	2	13	3	6
2.	Fuladi	V	13	1	7	2	3
3.	Mundapara	V	15	2	7	3	3
4.	Padabangan	V	24	2	12	4	6
5.	Harar	V	24	2	14	3	5
6.	Kantabari	V	29	3	15	7	4
7.	Kans	V	12	1	5	2	4
8.	Haldipada	V	31	4	17	6	4
9.	Pundal	V	16	2	9	2	3
10.	Sangrampur	V	14	1	8	2	3
11.	Bharatpur	V	9	2	5	2	0
12.	Bharampur	V	26	3	16	4	3
13.	Kuldiha	F	12	1	7	2	2
14.	Chatarpahar	F	11	1	6	2	2
15.	Dhobagadia	F	20	2	11	2	5
16.	Nahag	V	15	2	9	2	2
17.	Kurunda	V	18	2	10	2	4
18.	Khajuridiha	V	22	3	12	2	5
19.	Goaldih	V	15	2	9	2	2
20.	Maitapur	V	20	2	10	2	6
21.	Pakar	V	12	1	7	2	2
22.	Durgapur	V	27	3	16	4	4
23.	Ainni	V	4	1	3	0	0
24.	Kharida	V	14	1	6	3	4
25.	Joynagar	V	6	1	4	1	0
26.	Kosipota	V	13	2	8	2	1
27.	Pudaria	V	14	2	7	5	0
28.	Anko	V	18	2	9	4	3
29.	Mathani	V	11	1	7	3	0
30.	Darada	V	15	2	7	4	2

Table 1 : *(Cont'd.)*

Sl. No.	Locality	Habitat	Total	Adult Male	Adult Female	Juvenile	Infant
31.	Dandi	V	13	2	6	5	0
32.	Debagram	V	20	3	11	4	2
33.	Khaprapoda	V	13	2	7	4	0
34.	Khuard	V	12	1	8	3	0
35.	Hatigarh	V	6	1	5	0	0
36.	Rajnagar	V	8	2	6	0	0
37.	Sekhbagh	V	9	2	7	0	0
38.	Gobarghata	V	24	3	10	7	4
39.	Gobarghata	V	16	1	10	2	3
40.	Gobarghata	V	4	1	2	0	1
41.	Laxmannath	V	17	2	10	2	3
42.	Amliatha	V	19	2	7	5	5
43.	Banida	V	13	1	7	3	2
44.	Nahara	V	20	2	9	4	5
45.	Khurumthapatna	V	19	2	8	5	4
46.	Balim	V	9	1	4	3	1
	Total		**726**	**84**	**393**	**131**	**118**
	Mean		**15.78**	**1.82**	**8.54**	**2.84**	**2.56**

Table 2 : Habitat wise distribution of Hanuman langur in Balasore.

Habitat	Total	Adult Male	Adult Female	Juvenile	Infant
Forest	43	4	24	6	9
Village	683 + All male 16	80	369	125	109
Total	**742**	**84**	**393**	**131**	**118**

There is a Wildlife Sanctuary called Kuldiha at Balasore district an area of 272 sq. km. The Sanctuary is declared mainly for elephant protection with other fauna. The entire area is undulating and hilly terrain with two motorable approach roads. There are few foot trails in side the forests. The sanctuary was visited twice and only 3 groups of langurs were sighted. Only one group consisted of 12 langurs were recorded, the other 2 groups could not be counted due to rapid disappearance.

Inquiry from the forest personnel inside the forests revealed that the langur population is less in the Sanctuary.

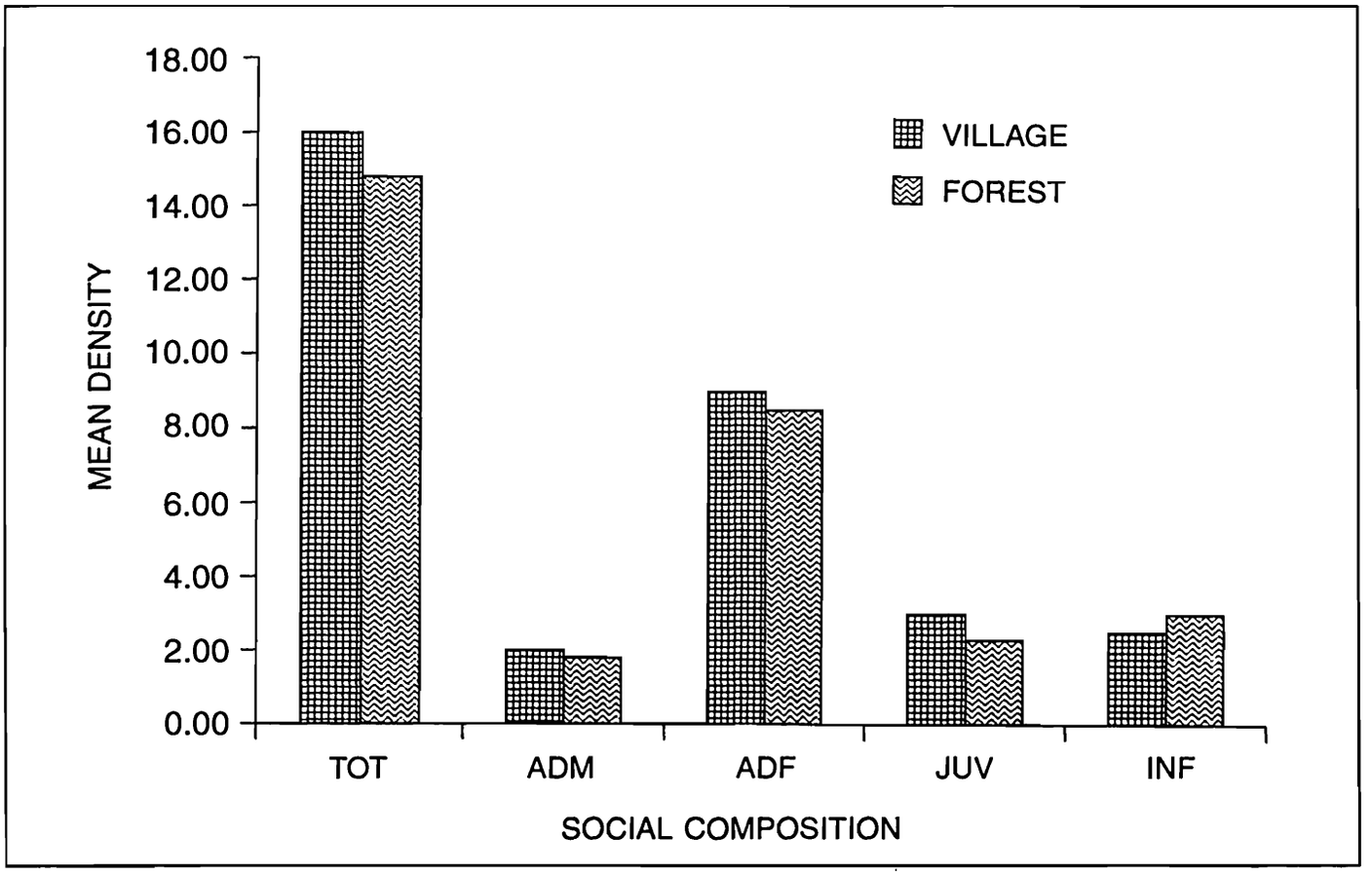

Fig. 3 : Mean density of Hanuman langur of Balasore district.

DISCUSSION

The present survey indicates that the Hanuman langurs inhabit in the villages even in the forests their presence is negligible. 92% of Hanuman langur groups are recorded in villages and these villages represented the most favourable habitat category at Balasore district. In this district the villages afford ideal physical habitat of langurs as big roosting tree, agriculture fields, vegetable gardens and orchards with abundant food and shelter for the langurs which in turn lead to direct competition with human population around the villages and agricultural lands. Due to extensive crop depredations and damage of property caused by the langurs, the villagers repeatedly requested the survey team for removal of langurs.

The monkeys in India for centuries enjoyed sacred status due to religious and philosophical belief. The villagers have become increasingly intolerant of langurs and interested for their translocation to other areas. The changing social mores were eroding the sacred image of the monkeys, once they were enjoying leads to decrease of population of langurs in the district in recent times.

Field Survey of Balasore district revealed that villages contained the majority population of Hanuman langurs. The forested areas of district exist in Nilgiri and Kuldiha on the western part; and a small partly forests in the eastern fringe near Bay of Bengal and sporadic plantations in the north. The Hanuman langurs however, not encountered in the eastern and northern fringe forests. The choice food is the main reason for their harbour in the villages.

Nayagarh (19°54'–21°34' N, 84°30'–85°19' E), another district of Orissa, where 1580 km^2, was surveyed that was about 40% of the total area of the district and 30 groups of Hanuman langur were counted (Chaudhuri *et al.* in 2007). In Balasore district (21°04'–21°59' N, 86°22'–87°29' E) 50 groups of Hanuman langur were sighted with a total of 742 langurs. In Nayagarh, the 30 groups contained 748 langurs. Habitable area for the langurs in Nayagarh are mostly hill forests that provide variety of food items and good shelter but the langurs inhabiting Balasore district solely dependent upon agricultural produce. The group size of Nayagarh langurs was larger than Balasore Population. The findings of these two districts of Orissa revealed that the forest habitat can support larger langur group size than that of village groups, where the competition were more amongst the groups for food and shelter in the villages. So, the groups in the villages were split into smaller unit to avoid conflicts and survival.

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The authors are thankful to the Director, Zoological Survey of India, for his keen interest and providing all facilities for the work.

REFERENCES

Behura, B.K. and Guru, G.B. 1969. Wildlife of Orissa. *Prakruti (Utkal Univ. J. Sc.)*, **6** : 95-126.

Chaudhri, S., Murmu, A. and Mazumdar, P.C. 2007. Survey of Non-human Primates of Nayagarh District, Orissa, India. *Rec. zool. Surv. India*, **107**(Part-2) : 35-43.

Chaudhuri, S. Murmu, A., Talukdar, B. and Alfred, J.R.B. 2004. A population survey of Hanuman langur in the district of Purulia, West Bengal. *Rec. zool. Surv. India*, **103**(3-4) : 47-54.

Ramakrishna, Siddiqui, S.Z., Sethy, P. and Dash, S. 2006. Faunal Resource of Simlipal Biosphere Reserve, Mayurbhanj, Orissa. Z.S.I., *Conservation Area Series*, **28**.

Tiwari, K.K. and Mukherjee, R.P. 1992. Population census of Rhesus macaque and Hanuman langur in India—a status survey report. *Rec. zool. Surv. India*, **92**(1-4) : 349-369.

Tiwari, S.K., Alfred, J.R.B. and Patnaik, S.K. 1977. An account of the mammalian fauna of Chandaka Wildlife Sanctuary, India. *Rec. zool. Surv. India*, **96**(1-4) : 25-38.

Rec. zool. Surv. India : **108**(Part–1) : 9-12, 2008

NEW SITE RECORDS OF THE MALABAR TREE TOAD, *PEDOSTIBES TUBERCULOSUS* GUNTHER (AMPHIBIA : ANURA : BUFONIDAE), IN WESTERN GHATS, INDIA

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INTRODUCTION

The Tree Toad, *Pedostibes tuberculosus* (Amphibia : Anura : Bufonidae), was described by Gunther (1875) from "Malabar", Kerala, India. However, its distribution within the Malabar zone remained ill defined for a long time. After a span of 105 years since its original description, a single specimen of the species was collected by S. K. Bhattacharya on 15-i-1980 from the Silent Valley National Park (lat. 11° 05' N and long. 76° 26' E), Palakkad district, Kerala (Pillai, 1986). This critically endangered toad was subsequently recorded from Ponmudi (lat. 8° 45' N and long. 77° 8' E), Thiruvananthapuram district (Inger *et al.*, 1984) in Kerala; Cotegao Wildlife Sanctuary (lat. 15° 30' N and long. 73° 55' E), in Goa (Das and Whitaker, 1998); Kalakkad (lat. 8° 30' N and long. 77° 33' E), Tirunelveli district in Tamil Nadu (Biju, 2001); Mollem (lat 15° 22' N and long. 74° 12' E), Goa (Dahanukar, *et al.*, 2004); and at Jakkanagadde (lat. 13° 51' N and long. 75° 04' E), Sharavathi River basin, Shimoga district in Karnataka (Gururaja and Ramachandra, 2006). Biju (2001) quoting Das and Whitaker (1990), states that *Pedostibes tuberculosus* has also been reported from Vanjikadavu in Kerala. However, the paper of Das and Whitaker (1990) does not deal with that species at all.

On 10th May 2005, during a faunistic survey tour to the Wayanad district in Kerala, we could collect a specimen of the toad, well known for its phytotelmatic mode of life, from a tree hole at a height of about 12 feet from the ground level in a Shola forest at Vannathimala (lat. 11° 34' N and long. 75° 59' E) (V/A 577). Again on 24th October 2005, we were able to collect a juvenile specimen of the species from a fallen tree in an evergreen forest at Bhagavathi forest range (lat. 13° 19' N and long. 75° 09' E) of Kudremukh National Park, in Karnataka (V/A 578). Subsequently on

24th April 2007 we could collect a specimen from Aralam Wildlife Sanctuary (lat. 11° 57' N and long. 75° 46' E), Kannur, Kerala (V/A 629).

We could determine the specific identity of these three specimens (Fig. 1) as *Pedostibes tuberculosus* Gunther based on the following diagnostic features assigned to the taxon (Daniel, 1963) in scientific literature : A slender, small toad with the tips of fingers and toes dilated into truncated discs; tympanum distinct, 1/3 diameter of eye; parotoids present; fingers webbed at base, first finger half the length of the second; toes almost fully webbed; skin of back tubercular with the largest tubercles in two rows on the sides of back; colour brownish grey above with darker sides; a white band from below the eye to the shoulder and another on the flank; below whitish spotted with black.

The species is being reported here for the first time from Vannathimala, Wayanad; Aralam Wildlife Sanctuary, Kannur in Kerala and the Kudremukh National Park in Karnataka. The specimens studied are deposited in the faunal depository of the Western Ghats Field Research Station, Zoological Survey of India, Calicut and their morphometric data is provided in Table 1.

Table 1 : Morphometric data of *Pedostibes tuberculosus* Gunther.

ZSI/WGRFS/V/A	577	578	629
Snout-vent length	47.0	18.0	35.0
Width of body behind shoulder	13.0	5.0	9.0
Head length	11.0	4.2	11.0
Head width	14.0	5.2	13.0
Head depth	6.0	3.0	5.6
Eye diameter	4.5	2.5	4.2
Interorbital distance	8.2	4.0	6.5
Internarial distance	3.0	1.4	2.6
Diameter of Tympanum	2.0	1.2	1.6
Eye-snout tip distance	6.0	3.0	5.2
Eye-nostril distance	4.0	1.8	3.8
Hand length	19.0	13.0	18.0
First finger length	4.0	2.0	3.0
Second finger length	5.0	3.0	4.0

Incidentally, the specimen collected by us from Wayanad turned out to be the largest specimen of the species so far known with a snout to vent length of 47 mm, against 39.8 mm recorded earlier (Dahanukar *et al.*, 2004).

Daniels (2005) stated that *Pedostibes tuberculosus* is patchily distributed from Maharashtra to Kerala. However, its distribution in Maharashtra is yet to be ascertained as Dhanukumar *et al.*, (2004) states that a very similar tree toad inhabits the forests at Koyna (Maharashtra state) but may in fact represent another, as yet undescribed species of *Pedostibes*. Based on our present collection, and the earlier records, it appears that the species may occur in all the wet forest stretches of Western Ghats from 8° 30'–15° 30' N latitudes Table 2 (Fig. 2).

Table 2 : Collection localities for *P. tuberculosus* in Western Ghats.

Sl. No.	Collection localities	Latitude (N)	Longitude (E)	Year of report
1	Cotegao Wildlife Sanctuary	15°30'	73°55'	Das and Whitaker, 1998
2	Mollem	15°22'	74°12'	Dahanukar, *et al.*, 2004
3	Jakkanagadde	13°51'	75°04'	Gururaja and Ramachandra, 2006
4	Kudremukh National Park	13°19'	75°09'	Present report
5	Aralam Wildlife Sanctuary	11°57'	75°46'	Present report
6	Vannathimala	11°34'	75°59'	Present report
7	Silent Valley National Park	11°05'	76°26'	Pillai, 1986
8	Ponmudi	8°45'	77°08'	Inger *et al.*, 1984
9	Kalakkad	8°30'	77°33'	Biju, 2001

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The authors are grateful to, The Director, Zoological Survey of India, Kolkata for facilities and encouragement. We are thankful to Dr. K.V. Gururaja, Indian Institute of Sciences, Bangalore for his support during the field work.

REFERENCES

Biju, S.D. 2001. *A synopsis to the frog fauna of the Western Ghats, India.* Occasional Publication of the Indian Society for Conservation Biology (ISCB), Tropical Botanic Garden and Research Institute, Thiruvananthapuram, India. 24p.

Dahanukar, N., Padhye, A.D., Salelkar, G.P. and Ghate, H.V. 2004. Aktueller Beleg fur die Malabar-Baumkrote, *Pedostibes tuberculosus* Gunther, 1876, in Indien. *Sauria.*, **26**(3) : 17-20.

Daniel, J.C. 1963. Field guide to the amphibians of Western India. *J. Bombay nat. Hist. Soc.*, **60**(2) : 415-438.

Daniels, R.J. 2005. Amphibians of Peninsular India. University Press (India) Private Limited, Hyderabad-500 029. 268p.

Das, I. and Whitaker, R. 1990. Herpetological investigations in the Western Ghats, South India. Part I. The Vanjikadavu and Nadukani forests, Kerala state. *Hamadryad*, **15**(1) : 6-9.

Das, I. and Whitaker, R. 1998. *Pedostibes tuberculosus* (Malabar tree toad) at Cotegao wildlife Sanctuary, Goa. *Herpetological Review,* **29**(3) : 173.

Gunther, A. 1875. Third report on collection of Indian reptiles obtained by the British Museum. *Proc. Zool. Soc.* London : 567-577.

Gururaja, K.V. and Ramachandra, T.V. 2006. *Pedostibes tuberculosus*, advertisement call and distribution. *Herpetological Review,* **37**(1) : 75-76.

Inger, R.F., Shaffer, H.B., Koshy, M. and Bakde, R. 1984. A report on a collection of amphibians and reptiles from Ponmudi, Kerala, South India. *J. Bombay nat. Hist. Soc.*, **81**(2) : 406-427.

Pillai, R.S. 1986. Amphibian fauna of Silent Valley, Kerala, S. India. *Rec. Zool. Sur. India*, **84**(1-4) : 229-242.

PLATE I

Fig. 1. : Photograph showing the adult and juvenile specimens of *Pedostibes tuberculosus*.

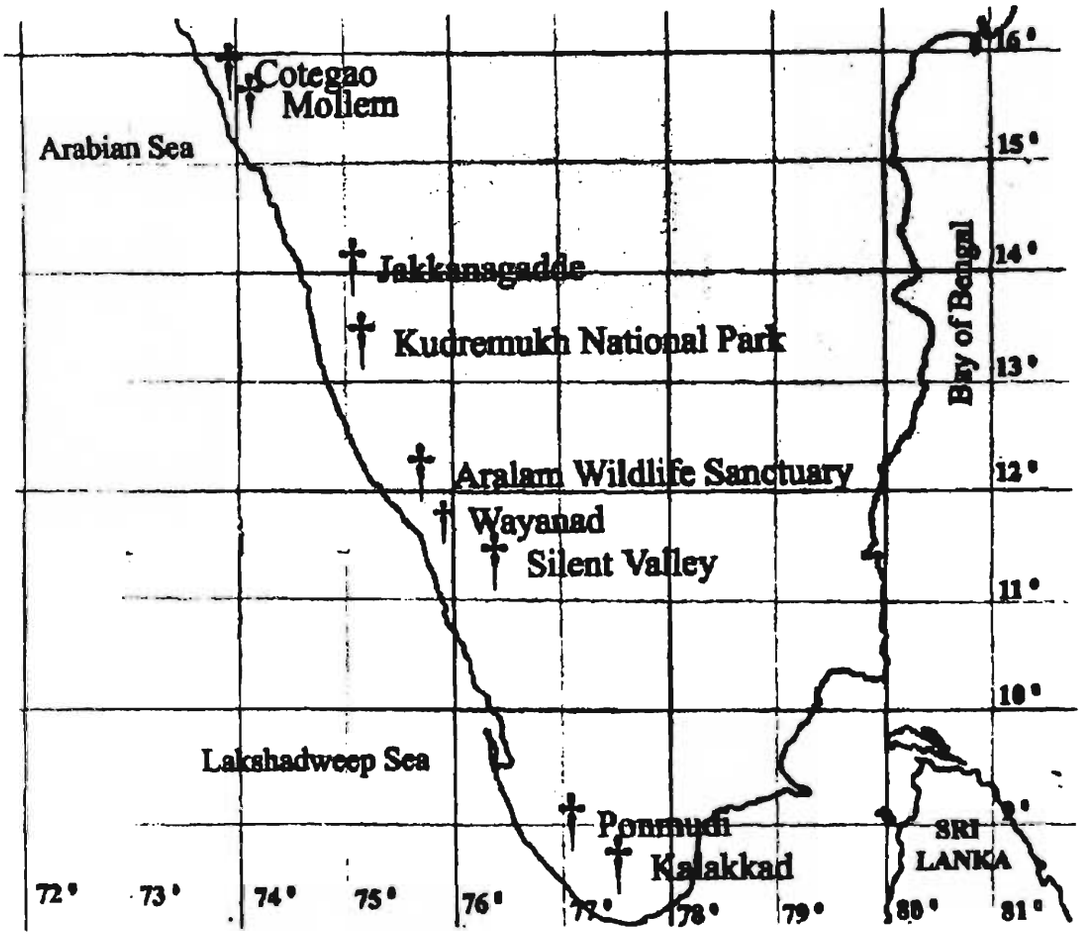

Fig. 2. : Map showing the distribution of *Pedostibes tuberculosus* (map not to scale).

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NEW SITE RECORD OF *MINERVARYA SAHYADRIS* DUBOIS, OHLER & BIJU (AMPHIBIA : ANURA : RANIDAE), IN WESTERN GHATS, INDIA

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INTRODUCTION

A new genus *Minervarya* and a species *Minervarya sahyadris* was described under the family Ranidae by Dubois, Ohler and Biju (2001) from Kerala and Karnataka. They collected the frog from Gundia (lat. 13° 05' N and long. 76° 07' E), Hassan district, Karnataka on 25 July 1984 and Mukkam (lat. 11° 15' N and long. 75° 43' E), Kozhikode district, Kerala on 20 July 2001. No reports were available after the description.

On 12 December 2006, during a faunistic survey tour, we could collect seven specimens of the species from a small ditch along the sides of a slow flowing stream amidst a thick forest near Hipla (lat. 13° 30' N and long. 75° 36' E), Bhadra Wildlife Sanctuary, Chickmagalur district, Karnataka.

We could determine their specific identity (Fig. 1) as *Minervarya sahyadris* Dubois *et al.*, based on the following diagnostic features assigned to the taxon : A small frog with fejerveryan lines on both sides of the belly in life; possessing a rictal gland at the mouth commissure, prominent in life; distinct canthus rostralis; nostrils near to snout tip than to eye; a white horizontal band along the upper lip in life; vomerine teeth present; median lingual process absent; digital extremities rounded, not dilated; webbing rudimentary; inner metatarsal tubercle short, conical; outer metatarsal tubercle present, minute; tarsal ridge present; heels strongly overlapping when folded at right angles to each other; tibiotarsal articulation reaching up to posterior corner of eye. Dorsal skin with longitudinal folds; pupil horizontal and oval, iris golden yellow; sides of head brownish, darker in tympanic region; mid dorsum brown to brick red; upper arm brick red; upper lip white colored; venter yellowish white.

The specimens studied are deposited in the faunal depository of the Western Ghats Field Research Station, Zoological Survey of India, Calicut (Reg. No : VA/609) and their morphometric data is provided in Table 1. Biju (2001) stated that *Minervarya sahyadris* is apparently common and it might have escaped the attention of previous collectors presumably because of its small size which makes it superficially look like a young *Fejervarya*. Varun (Personal communication), on 11th March 2006 sighted these frogs at Parippathodu, Aralam Wildlife Sanctuary, Kannur, Kerala. All the described characters can be very well studied in life than in the preserved specimens as members of this frog show variations in dorsum color which vary from sandy brown to dark brick red.

Table 1 Morphometric data of *Minervarya sahyadris* from Bhadra Wildlife Sanctuary. Measurements are given in mm [values given in last column mean ± standard deviation (range)].

(Reg.No : ZSI/WGFRS/V/A 609)	1	2	3	4	5	6	7	Total of seven specimens
Snout-vent length	17.1	17.0	17.8	17.0	15.6	14.8	16.6	16.6 ± 1.02 (14.8–17.8)
Width of body behind shoulder	6.2	6.4	5.8	6.4	5.2	5.0	6.0	5.9 ± 0.56 (5.2–6.4)
Head length	6.2	5.8	5.8	5.6	5.4	5.2	5.6	5.7 ± 0.32 (5.2–6.2)
Head width	5.0	5.0	5.0	4.8	4.8	4.6	5.0	4.9 ± 0.16 (4.6–5.0)
Head depth	3.4	3.0	3.2	3.2	3.0	2.8	3.0	3.1 ± 0.20 (2.8–3.4)
Eye diameter	2.2	2.6	2.4	2.2	2.0	2.0	2.2	2.2 ± 0.21 (2.0–2.6)
Interorbital distance	2.2	2.0	2.2	2.2	1.8	1.8	2.0	2.0 ± 0.18 (1.8–2.2)
Internarial distance	2.0	2.0	2.0	2.0	1.8	1.6	2.0	1.9 ± 0.16 (1.6–2.0)
Diameter of Tympanum	1.4	1.2	1.4	1.2	1.2	1.2	1.4	1.3 ± 0.11 (1.2–1.4)
Eye-snout tip distance	3.2	3.0	3.2	3.2	2.8	2.8	3.0	3.0 ± 0.18 (2.8–3.2)
Eye-nostril distance	1.8	1.8	1.8	1.8	1.6	1.6	1.8	1.7 ± 0.10 (1.6–1.8)
Tibia length	8.4	9.0	9.0	7.0	9.0	7.0	8.0	8.2 ± 0.90 (7.0–9.0)

In all the specimens studied a faint light lateral black stripe starting from the point of nostril to the thigh end is present, getting darker at the region of tympanum and back of fore arm. In the specimens with dark brick red mid dorsum, space between the mid dorsum and the lateral stripe appears ashy brown.

Our present collection from Hipla extends the range of the species by about 100 km north of the type locality. It appears that the species may occur in the forest stretches of Western Ghats from 11° 15' N to 13° 30' N latitude and 76° 07' E to 75° 36' E longitude (Fig. 2).

ACKNOWLEDGEMENT

The authors are grateful to the Director, Zoological Survey of India, Kolkata for facilities and encouragement.

REFERENCES

Biju, S.D. 2001. *A synopsis to the frog fauna of the Western Ghats, India.* Occasional Publication of the Indian Society for Conservation Biology (ISCB), Tropical Botanic Garden and Research Institute, Thiruvananthapuram, India. 24p.

Dubois, A., Ohler, A. and Biju, S.D. 2001. A new genus and species of Ranidae (Amphibia : Anura) from southwestern India. *Alytes*, **19** : 53-79.

PLATE I

Fig. 1. : Photograph of *Minervarya sahyadris*.

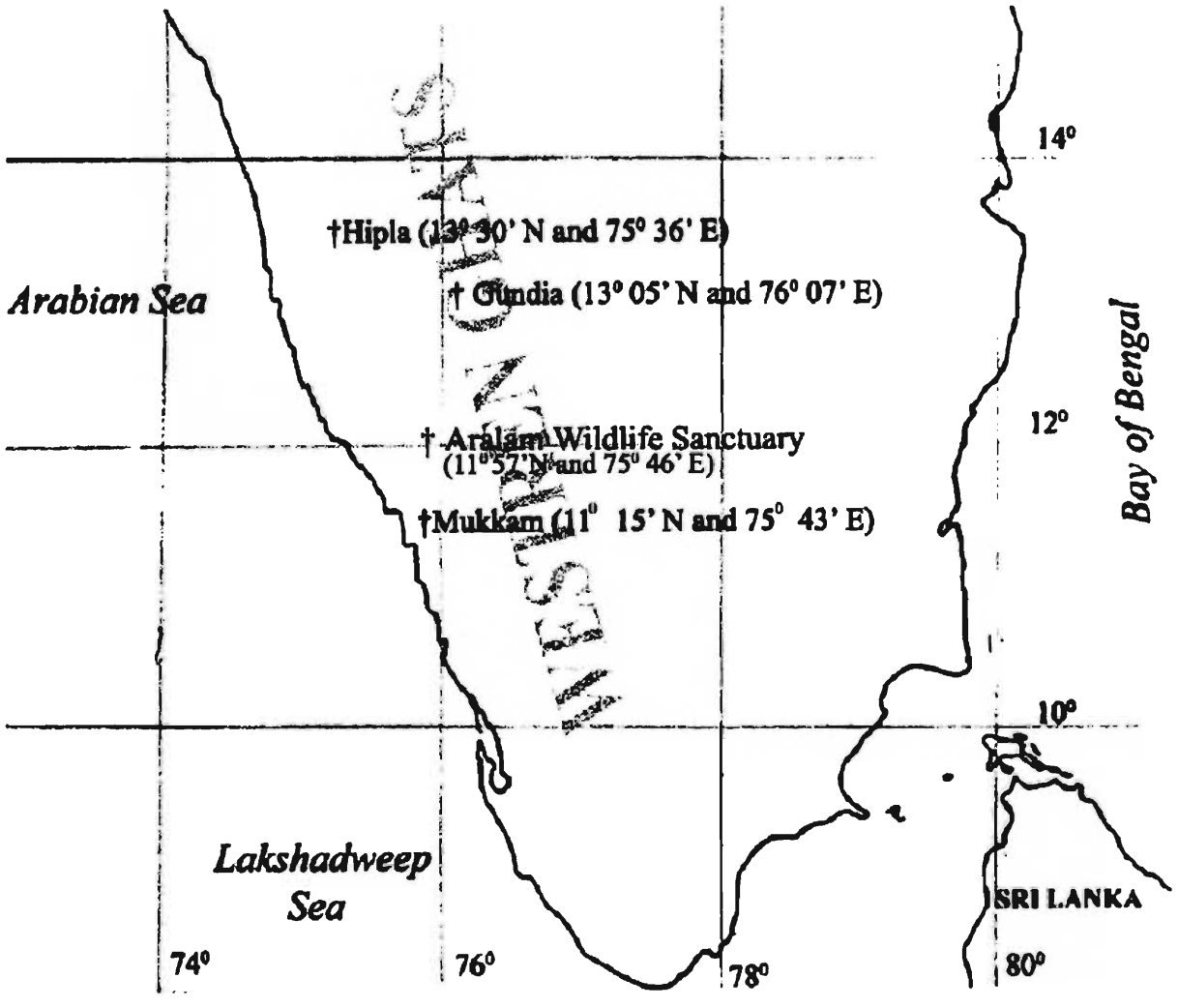

Fig. 2. : Map showing the distribution status of *Minervarya sahyadris* (map not to scale).

Rec. zool. Surv. India : **108**(Part–1) : 17-24, 2008

FIRST EVER RECORD OF AN ENDANGERED FISH, *CHACA CHACA* (HAM.–BUCH.) FROM ARUNACHAL PRADESH : A BIODIVERSITY HOT SPOT

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INTRODUCTION

Arunachal Pradesh – the land of the down lit mountains, is the bit of paradise that remained on earth at the top of the North-Eastern part of India. The geography of the state is so varied with variation of mountainous ranges. Elewin (1999) has pointed out that it is so mountainous, so cut about chopped up and divided by countless streams.

The East Siang District with its headquarter at Pasighat is located between 27° 43' and 29° 20' N latitude, 94° 40' to 95° 35' E longitude. It is bounded by West Siang District in the west, Upper Siang District in the north and Lower Dibang Valley and Dibang Valley Districts in the east of Arunachal Pradesh and south to Dhemaji District of Assam. Down the middle of East Siang District the mighty Siang River flows from Tibet and thereby gives its name to the District. The altitude of the District varies from 13 mts to 273 mts from the sea level.

As regards the information of Ichthyofauna of Arunachal Pradesh, works of Jayaram (1963), Jayaram and Sen (1977), Dutta Choudhary and Sen (1977), Dutta Choudhary (1978, 1980, 1981 and 1994), Jhingran and Sehgal (1978), Sinha (1994), Nath and Dey (1985 and 2000), Sarkar and Ponniah (2000), Sen (2000), Sen (2006) and Tamang *et al.* (2006) are with mentioning. A perusal of the available literature suggests that *Chaca chaca* (Hamilton-Buchanan) has not been reported earlier from the aquatic habitat of Arunachal Pradesh.

In the present paper the fish species *Chaca chaca* collected from Tango Epong stream in the village Motum. On the basis of its different characteristics the fish has been identified as

Chaca chaca (Hamilton-Buchanan) and is commonly known as *Chaca*. The fish is locally known as Hitaduke by Adi Tribals. The specimens were further confirmed as *Chaca chaca* (Hamilton-Buchanan) by the Zoological Survey of India (ZSI), Kolkata.

MATERIALS AND METHODS

The fish were collected from Tango Epong stream in Motum village under Mebo Block of East Siang District of Arunachal Pradesh (Map-1). The collected specimens were fixed in 6% formalin. In order to avoid damage to the caudal fin, the fixed specimens were kept in cylindrical transparent container in an upside down position. Some of specimens have been kept in the Fish Germplasm Explorations Laboratory, Department of Zoology, Jawaharlal Nehru College, Pasighat, Arunachal Pradesh and few in Ichthyology Research Laboratory, University Department of Zoology, T.M. Bhagalpur University, Bhagalpur. The identification has been made with the help of meristic, morphometric characteristics and X-Ray studies of the specimens using the available literatures and further confirmed as *Chaca chaca* (Hamilton-Buchanan) by the Freshwater Section, Zoological Survey of India (ZSI), Kolkata.

KEY TO THE SPECIES

A robust large size ugly fish with head and body ahead of anal fin depressed, Barbels six, feebly developed. Gill opening mainly some/what contracted, lateral line complete, marked by a prominent papillated and tuberculated ridge. Caudal fin rounded with a large procurrent dorsal and a shorter ventral part at the end of the tail only.

SYSTEMATIC ACCOUNT

Order SILURIFORMES

Family CHACIDAE

Chaca chaca (Hamilton-Buchanan)

1822. *Platystacus chaca* (Hamilton), *Fish Ganges*, pp. 140, 374, Pl.-XXVIII, fig. 43.

1831. *Chaca gray, Zool. Mise.*, p. 9, 138.

1878. *Chaca lophioides* (Day), *Fish India*, p. 481, Pl. CXII, fig. 2.

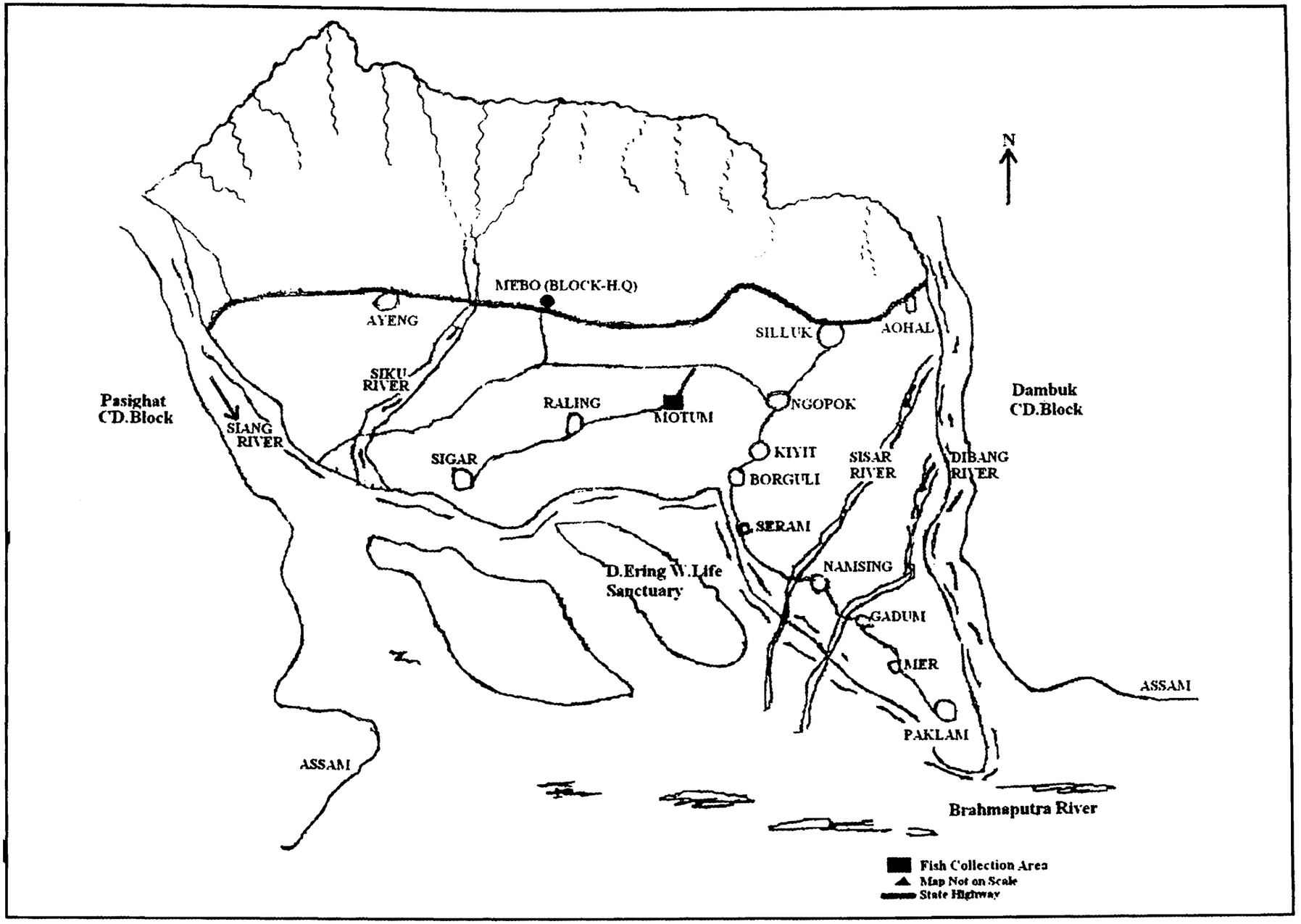
1889. *Chaca lophioides* (Day), *Fish Brit. India*, pp. 111-112; fig. 46.

1937. *Chaca chaca* (Shaw and Shebbeare), *J. Roy Asiat. Soc. Bengal Sci.*, III, p. 85, fig. 82.

1964. *Chaca chaca* (Jayram and Majumdar), *Proc. Zool. Soc. Calcutta*, **17**(2), p.178.

1968. *Chaca chaca* (Srivastava), *Fishes of U.P and Bihar*, p. 122, fig. 77.

1980. *Chaca chaca* (Jayram), *Occ. Papers*, ZSI, No. 23, p. 15.



Map 1 : Mebo Block of East Siang district.

1981. *Chaca chaca* (Jayram), *Hand book : Freshwater fishes of India*, pp. 274-275.

1988. *Chaca chaca* (Datta Munshi and Srivastava), *Nat. Hist. Fish. Syst. Freshwater fishes.* pp. *275-276, Pl.XXXIII,* fig. 4.

1991. *Chaca chaca* (Jhingran), *Fish and Fisheries of India*, pp. 15-16, Pl.1.IV, fig. 14.

2002. *Chaca chaca* (Vishwanath), *Fishes of North-East India.* A field guide to species identification. Pub. Dept.of Life Sci. Manipur University, pp. 160-161.

2006. *Chaca chaca* (Gupta and Gupta), *General and applied Ichthyology* : Hill-stream fishes, pp. 288-321, fig. 14.8(d).

MATERIALS EXAMINED

D.1/3; P.1/9; V.9; A.9; Barbels, 3 pairs 2/1. Pre-orbital distance 12 to 13 mm, length of head 42 to 44 mm, standard length of the body 132 to 157 mm, total length of the body 147 to 170 mm, width of the body 48 to 53 mm and anal opening 1.5 to 2 mm.

In the fresh condition the colour appears dark brown, the tip of lower jaw was dark red on its inner margin which disappeared after preservation.

Body stout, depressed ahead of anal fin, but strongly compressed, slightly tapering behind abdomen. The whole upper surface is covered with tubercles and soft spines which are found along the edge of lower lip also. Head flat, very large and strongly depressed dorsoventrally, gape of mouth very wide, lower jaw prominent, eye minute, barbels-minute 3 pairs, one pair maxillary and 2 pairs mandibular, teeth on both the jaws, chin is provided with an adhesive apparatus. Dorsal and pectoral fins provided with strong spines. Rayed dorsal fin short with three rays and a strong spine. It is slightly serrated on both sides but the pectoral fin with short and strong spines and are serrated internally. Pelvic fin with six rays, Anal fin short with nine rays. Caudal fin rounded along procurrent dorsal and a shorter ventral part which is recognized as second dorsal and second anal fin by Srivastava (1968), confluent with caudal fin. Lateral line long, some what cardiform in shape, concave anteriorly lying across the bodies of the anterior vertebrae and enclosed in bone. The colour and black and white Photographs have been shown in Plate : I, Fig. a & b and Plate : II, Fig. a & b respectively.

DISCUSSION

The earlier workers such as Dutta Choudhary (1978, 1980a & b, 1994) Dutta Choudhary and Sen (1977), Jhingran and Sehgal (1978) during their investigation did not report *Chaca chaca* from Arunachal Pradesh. Srivastava (1968) reported that it is distributed in the rivers of North India. Datta Munshi and Srivastava (1988) reported that *Chaca chaca* is distributed in the rivers of Nothern India, Bihar, West Bengal and Assam in India. Sinha (1994) recorded 230 fish species

from seven North-East states of region. Out of this 139 fish species were recorded from Arunachal Pradesh. With regards to the family *Chacidae* of species *Chaca chaca*, out of seven states only three of North-East states of India showed its presence namely Assam, Meghalaya and Tripura whereas it has not been reported from Arunachal Pradesh, Manipur, Mizoram and Nagaland. Sinha (1992a) has listed thirteen threatened coldwater fish species from this region but it is not listed in it.

Nath and Dey (2000) reported 131 ichthyospecies from the river systems of Arunachal Pradesh but they have not reported *Chaca chaca* from any type of water from Arunachal Pradesh. Sarkar and Ponniah (2000) reported 172 fish species in the water system of seven North-Eastern states but they have not reported *Chaca chaca* in any states of this region and cited it in an endangered codition. Sen (2000) reported that out of seven states of North-Eastern region *Chaca chaca* is present in Meghalaya, Assam and Tripura only. Vishwanath (2002) reported that it is found in the Northern part of India, Manipur and Assam and the maximum standard length is 13.5 cm. Nautiyal (2005) reported that *Chaca chaca* is only found in Central-Nepal Himalaya (CNH) and Himalaya (H) whereas it is absent in Western Himalaya (WH) Eastern Himalaya (EH) and Western Ghats (WG). The richness of the family *Chacidae* and species *Chaca chaca* are located only in Central Nepal Himalaya (CNH) and Himalaya (H). Gupta and Gupta (2006) reported that the distribution of *Chaca chaca* is in North Bengal and Assam. Sen (2006) reported 143 ichthyospecies from the water system of different districts of Arunachal Pradesh, but he has not reported *Chaca chaca* from any districts of Arunachal Pradesh. Silas (2006) reported that the family *Chacidae* and species *Chaca chaca* is reported in Assam and North Bengal in North-Estern region of India.

SUMMARY

Arunachal Pradesh once described as the "Hidden Land" by virtue of its geographical position, climatic conditions and altitudinal variations is a Biodiversity rich region in the top of the North-Eastern part of India. The entire state is almost wholly a rugged mountainous terrain, with beautiful green vallies drained by innumerable streams, rivulets descending down from upper elevation to the plains of Assam to meet the mighty river Brahmputra. Arunachal Pradesh is the 18th hot spot of biological and habitat diversity (Baishya *et al.*, 2001). Till date limited work has been done in relation to Ichthyofaunal diversity in the state. Sarkar and Ponniah (2000) reported that the fish *Chaca chaca* is in endangered condition. The present finding of *Chaca chaca* require its conservation in its natural habitat and more investigation should be done in the field of ichthyofaunal diversity so that real Gene Pool, Germplasm exploration, Cataloguing and conservation can be done in future.

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REFERENCES

Baishya, A.K., Haque, S., Bora, P.J and Kalita, N. 2001. Flora of Arunachal Pradesh : an over view. *Arunachal Forest News,* **19**(1 & 2) : 1-25.

Datta Munshi, J.S. and Srivastava, M.P. 1988. *Natural History of fishes and systematics of freshwater fishes of India.* Narendra Publishing House, Delhi, P, 403.

Dutta, A.K. and Barman, R.P. 1984a. On a new species of *Noemachelius (Pisces : Cobitidae)* from Arunachal Pradesh, India. *Bull. Zool. Surv. India,* **6**(1-3) : 275-277.

Dutta, A.K. and Barman, R.P. 1984b. On a new species of the genus *Garra* Hamilton (*Pisces cyprinidae)* from Nandapha Wild Life sanctuary, Arunachal Pradesh, India. *Bull. Zool. Surv. India,* **6**(1-3) : 283-287.

Dutta, A.K. and Barman, R.P. 1985. Fauna of Namdapha, Arunachal Pradesh (*Pisces*). *Res. Zool. Surv. India,* **6**(1-3) : 275-277.

Dutta, A.K. and Sen, T.K. 1977. *Schizopygopsis stolickzae* Steindachner recorded from Arunachal Pradesh, India with observation on the extension in the geographical range. *Ibid.* **3**(4) : 143-144.

Dutta Choudhary, S. 1978. General fauna, freshwater fish. *Arunachal Pradesh District Gazetteers, Lohit District.* Pub. Director of Information and Public Relation, Government of Arunachal Pradesh, pp 16-22.

Dutta Choudhary, S. 1980. Invertebrates and fish fauna, *Arunachal Pradesh District Gazetteers, Tirap District.* Pub. Director of Information and Public Relation, Government of Arunachal Pradesh, pp 17-19.

Dutta Choudhary, S. 1981. General fauna, freshwater fish. *Arunachal Pradesh District Gazetteers, Subansiri District.* Pub. Director of Information and Public Relation, Government of Arunachal Pradesh, pp 41-42.

Dutta Choudhary, S. 1994. General fauna, fishes. *Arunachal Pradesh District Gazetteers East Siang and West Siang District.* Pub. Director of Information and Public Relation, Government of Arunachal Pradesh, pp. 15-21.

Dutta Choudhary, S. and Sen, N. 1977. On a collection of fish from Arunachal Pradesh with some new records. *News Let. Zool. Surv. India,* **3**(4) : 217-223.

Elewin, V. 1999. *A Philosphy for NEFA (Arunachal Pradesh).* Directorate of Research, Government of Arunachal Pradesh, Itanager P. 296.

Gupta, S.K. and Gupta, P.C. 2006. *General and applied Ichthyology.* S. Chand & Co. Ltd, New Delhi, P. 1130.

Jayaram, K.C. 1963. A new species of *sisoried* from the Kaming Frontier Division (NEFA). *J. Zool. Soc. India,* **15**(1) : 85-87.

Jayaram, K.C. and Mazumdar, N. 1964. On a collection of fish from the Kaming Frontier Division, NEFA. *J. Bombay Nat. Hist. Soc.,* **61**(2) : 264-280.

Jhingran, V.G. and Sehgal, K.L. 1978. *Coldwater Fisheries of India.* Pub. Inland Fish. Soc. India, Barrackpore, P. 239.

Nath, P. and Dey, S.C. 1985. Capture fisheries, an unfocused treasure of Arunachal Pradesh. *Fishing Chimes,* **5**(4) : 22-25.

Nath, P. and Dey, S.C. 2000. *Fish and Fisheries of North-East India (Arunachal Pradesh).* Narendra Publishing House, Delhi, P. 217.

Nautiyal, P. 2005. Taxonomic richness in the fauna of the Himalaya, Central Highlands and Western Ghats (Indian Sub continent). *Int. J. Eco. Environ. Sci.,* **31**(2) : 73-92.

Sarkar, U.K. and Ponniah, A.G. 2000. Evaluation of North-East Indian fishes for their potential as cultivable, sport and ornamental fishes alongwith their conservation and endemic status, p. 11-30. In A.G. Ponniah and U.K. Sarkar (eds.). *Fish Biodiversity of North-East India.* NBFGR. NATP Publ. **2**, 228 p.

Sen, N. 2000. Occurrence, distribution and status of diversified fish fauna of North East India, p. 31-48. In A.G. Ponniah and U.K. Sarkar (eds.). *Fish Biodiversity of North-East India.* NBFGR. NATP Publ. **2**, 228 p.

Sen, T.K. 2006. *Fauna of Arunachal Pradesh, State Fauna Series (Pisces).* Zoological Survey of India, Kolkata, **13**(Part-I) : pp. 317-396.

Silas, E.G. 2006. Checklist of finfish species endemic to the North-Eastern India. A Workshop on fish germplasm exploration, cataloguing and conservation for North-Eastern region : New Initiatives, ICAR Complex, Shillong, May 5th–6th, Organised by NBFGR, Lucknow, p. 1-4.

Sinha, M. 1992a. Fisheries development of the North-Eastern states. North-Eastern Council, Shillong. pp 62-76.

Sinha, M. 1992b. Coldwater fishes of North-Eastern region of India. National Seminar on Endangered Fishes of India. Allahabad, April 25th–26th.

Sinha, M. 1994. Fish Genetic Resources of the North-Eastern region of India. *J. Inland Fish. Soc. India,* **26**(1) : 1-19.

Srivastava, C.B. 1966. On a collection of fishes from Tirap Frontier Division (NEFA), India. *J. Zool. Soc. India,* **18** : 122-128.

Srivastava, G.J. 1968. Fishes of Eastern Uttar Pradesh, Vishwavidyalaya Prakashan, Varanasi, pp. xxii + 163.

Tamang, L., Chaudhry, S. and Choudhory, D. 2006. On New record of freshwater fish *Pseudolaguvia shawi* (Hora) from Arunachal Pradesh, India (Teleostomi : Erethistidae). *Zoos' Print. J.*, **21**(11) : 2443-2446.

Vishwanath, W. 2002. *Fishes of North-Eastern India*, NATP, NBFGR, Lucknow. Pub. Department of Life Sciences, Manipur University, India, pp. 160-161.

PLATE I

Fig. a. : Colour photograph of *Chaca chaca* (Dorsal view).

Fig. b. : Colour photograph of *Chaca chaca* (Ventral view).

PLATE II

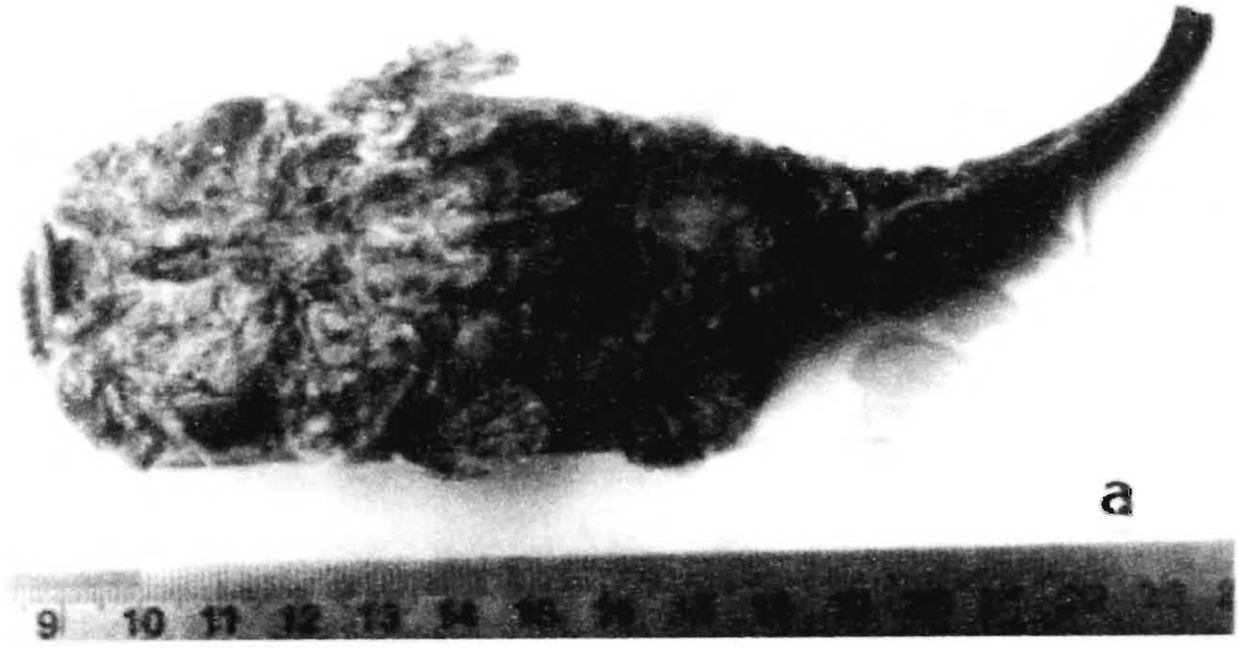

Fig. a. : B/W photograph of *Chaca chaca* (Dorsal view)

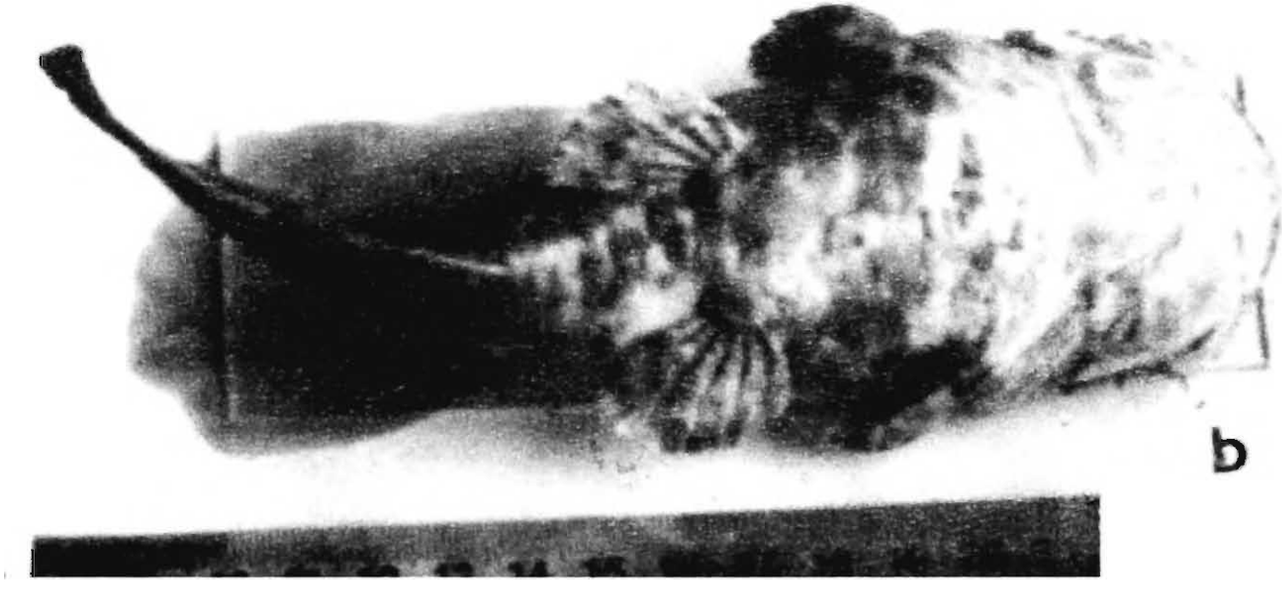

Fig. b. : B/W photograph of *Chaca chaca* (Ventral view)

Rec. zool. Surv. India : **108**(Part–1) : 25-31, 2008

A NEW SPECIES *MYLONCHULUS WASIMI* (MONONCHIDA : NEMATODA) FROM SOUTH 24-PARGANAS, W.B., INDIA

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INTRODUCTION

A new species *Mylonchulus wasimi* n. sp. under the genus *Mylonchulus* Cobb (1916) from South 24-Parganas, West Bengal, India, has been described and illustrated. No male, but eight female representatives are found under this proposed new species. The genus *Mylonchulus* is under the family Mylonchulidae Jairajpuri (1969) and subfamily Mylonchulinae Jairajpuri (1969). The present species was collected during July, 2004. Jairajpuri and Khan (1981) mentioned 34 species under the genus *Mylonchulus* and Andrassy (1992) provided the key of 56 species under this genus.

MATERIALS AND METHODS

Nematodes were extracted from soil samples using 'Baermann's Funnel Method' (Christie and Perry, 1951), fixed in hot, diluted 4% FA (formalin-acetic acid mixture) (Seinhorst, 1966), mounted in anhydrous glycerin and sealed properly. Preserved specimens were observed under different magnifications with an Olympus BX-51 trinocular light microscope (Olympus Inc., Japan). Figures were drawn with the aid of a Camera Lucida attached to the microscope. Images were captured with a CCD digital camera system (CoolSnapPro) integrated with the microscope.

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DESCRIPTION OF SPECIES

Mylonchulus wasimi n. sp.
(Fig. 1, 2; Table 1)

Measurements : See Table 1.

Female : Body length medium, cuticle thin. Dorsal tooth large, opposed by nine regular transverse rows of denticles and a clear sub-ventral tooth (length of which is 1/3rd of the dorsal tooth length); amphid aperture cup-shaped and its opening 13.8% of the adjacent body width, buccal capsule mylonchuloid type. Nerve ring situated at about 22% of oesophageal length from anterior end. Oesophagus long, slender; oesophago-intestinal junction non-tuberculate. Gonad didelphic-amphidelphic, anterior gonad shorter than the posterior gonad mostly; ovary reflexed at both the side, *pars proximalis*, *pars refringes* and *pars distalis* vagina are prominent. A distinct lip-like protuberance at the opening of vulval region; one pre- and one post-advulval papillae present, though variations in their number (pre-advulval papillae: 0-2 and post-advulval papillae: 0-2) were found. Tail one anal diameter long. Shape of the tail is digit-like and dorsally bent. Caudal glands three in number, large and much developed; clear spinneret with sub-terminal opening.

Male : Not found.

Juveniles : Ten juveniles were collected. General morphology is similar to that of female specimens. Amphid, nerve ring and caudal glands indistinct but spinneret conspicuous.

Type Locality and Type habitat : Soil samples associated with guava (*Psidium guajava* L.) tree were collected during July, 2004 from district South 24-Parganas (22°22.64' N, 88°25.7' E), West Bengal, India.

Type specimens : Slides containing holotype and paratypes of *M. wasimi* n. sp. have been deposited at National Zoological Collection of Zoological Survey of India with following registration numbers: WN950 (Holotype with two female paratypes), WN951 (three female paratypes), WN952 (one female paratype) and WN953 (one female paratype).

Differential Diagnosis and Relationships : The proposed new species is close to *M. vulvapapillatus* Altherr in Altherr and Delamare Deboutteville (1972). It is also comparable to *M. neocontractus* Patil and Khan (1982), *M. parabrachyurus* (Thorne, 1924), Schneider, 1939, *M. dentatus* Jairajpuri (1970) and *M. sigmaturus* Cobb (1917).

M. wasimi n. sp. is larger than *M. neocontractus* (L = 1.5-1.85 mm vs 0.8-1.0mm), and has nine regular transverse rows of denticles (vs four), other measurements are also different, 'c' higher (35.61-46.07 vs 25-30), 'c′' lower (0.72-1.55 vs 2) and 'V' higher (60.95-74.4% vs 52-57%).

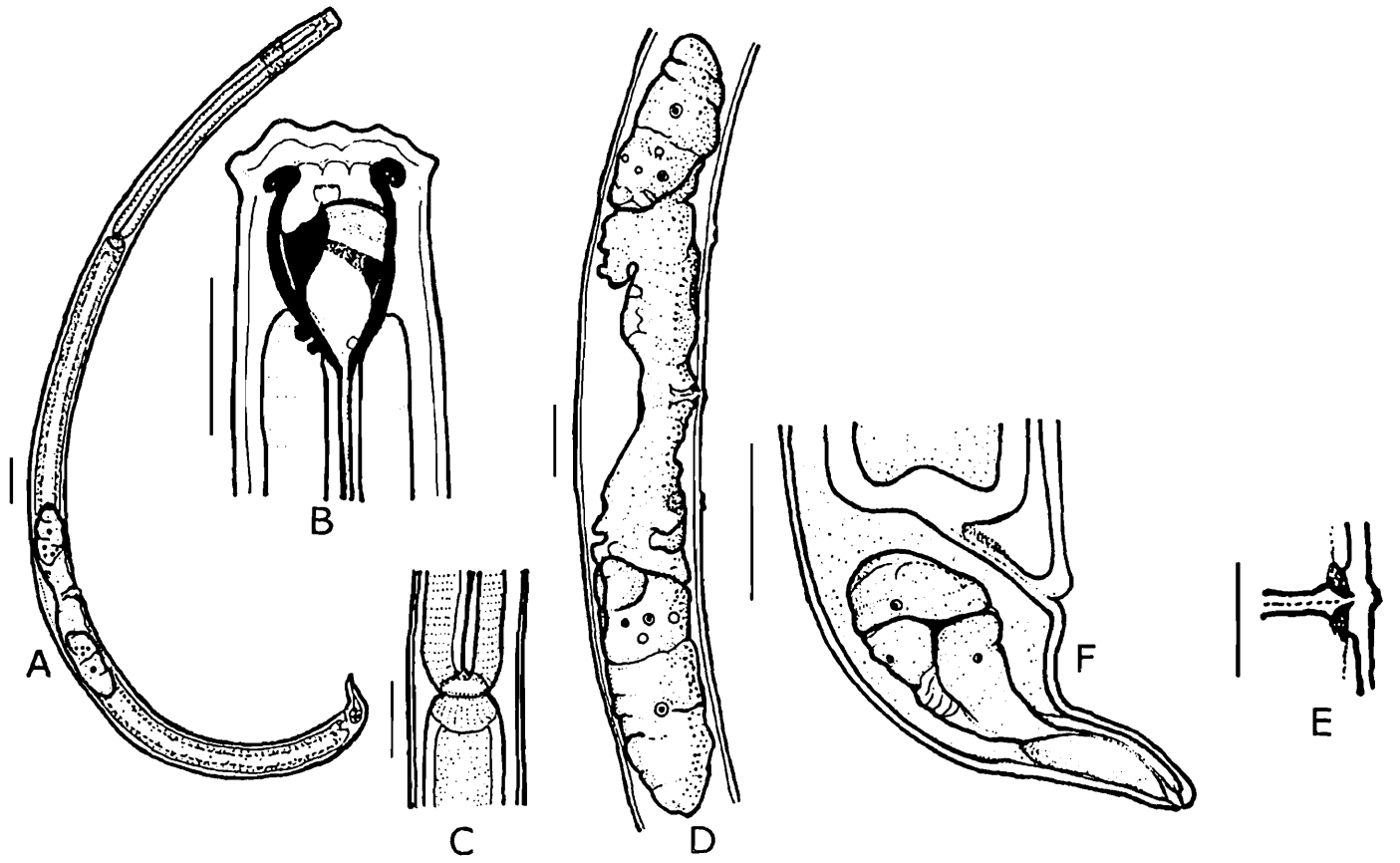

Fig. 1 : *Mylonchulus wasimi* n. sp. (Camera Lucida drawings)

A. Entire body of female, B. Head region, C. Nontuberculate oesophago-intestinal junction, D. Gonad (didelphic-amphidelphic), E. Vulval region, F. Tail region. (Scale bars : A= 50 µm; B, F = 12.5 µm; C, D = 25 µm; E = 6.25 µm)

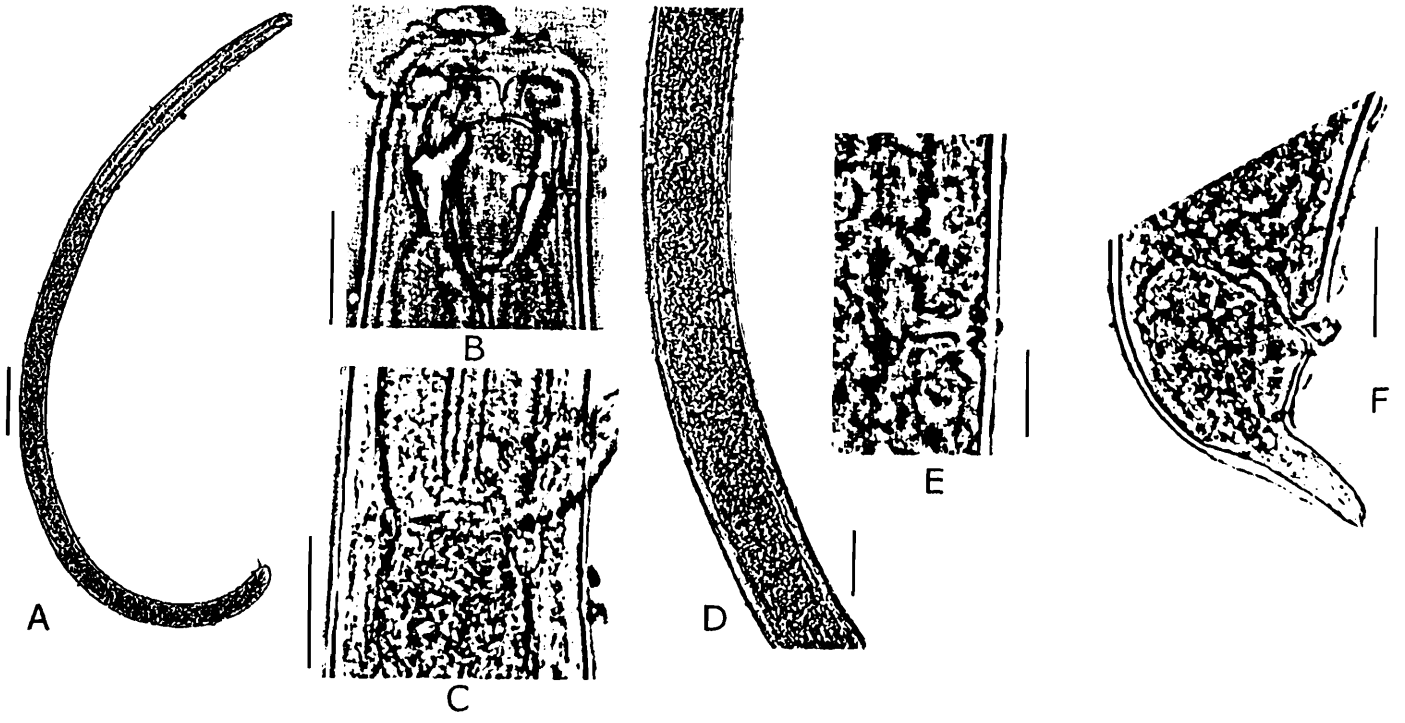

Fig. 2 : *Mylonchulus wasimi* n. sp. (Photomicrographs)

A. Entire body of female, B. Head region, C. Oesophago-intestinal junction, D. Gonad (didelphic-amphidelphic), E. Vulval region, F. Tail region. (Scale bars : A= 100 µm; B = 12.5 µm; C, D, E, F = 25 µm.

Table 1. : Measurements of *Mylonchulus wasimi* n. sp. (n = numbers, all measurements are in µm, only 'L is in mm).

	Holotype ♀	Paratype ♀♀ ranges (7)	Mean ± SD
L	1.75	1.50–1.85	1.66 ± 0.13
a	32.88	26.94–36.50	31.83 ± 3.34
b	3.53	3.53–3.79	3.63 ± 0.10
c	40.46	35.23–46.07	40.10 ± 3.76
c'	1	0.72–1.38	1.12 ± 0.21
V	62.74	60.95–67.32	64.20 ± 1.99
G1	12.12	11.93–17.41	14.44 ± 2.21
G2	15.1	13.51–19.33	15.78 ± 2.03
Cuticle thickness at head region	16.45	15.11–16.65	16.11 ± 0.60
Cuticle thickness at mid-body	16.25	15.13–16.25	15.63 ± 0.43
Cuticle thickness at tail region	16.4	15.89–16.72	16.34 ± 0.27
Lip hight	7.89	7.84–8.32	8.03 ± 0.18
Lip diameter	29.97	28.20–33.30	29.95 ± 1.57
Mid-body diameter	53.28	42.30–60.00	52.67 ± 6.30
Anal diameter	40.48	40.21–44.41	42.05 ± 1.58
Length of buccal cavity	29.97	28.20–33.30	30.36 ± 1.97
Diameter of buccal cavity	19.98	16.45–20.00	18.68 ± 1.80
Position of dorsal tooth from the base of buccal cavity	21.15	21.14–21.15	21.15 ± 0.00
% of dorsal tooth of total buccal cavity length	70.57	63.51–75.00	69.90 ± 4.40
Position of sub-ventral tooth from the base of buccal cavity	13.81	13.81–14.21	13.93 ± 0.13
Position of amphid from the anterior end	9.21	8.88–9.22	9.11 ± 0.12
Diameter of amphidial aperture	3.95	3.68–3.95	3.75 ± 0.09
Position of excretory pore from anterior end	115.36	101.32–178.66	124.7 ± 22.93
Length of oesophagus	496.17	415.95–506.16	458.04 ± 36.43
Length of cardia	12.5	11.88–13.33	12.62 ± 0.42
Diameter of cardia	25	25.00–26.98	26.07 ± 0.68
Position of nerve ring from anterior end	109.89	70.00–117.50	105.51 ± 14.67

Table 1. : *(Cont'd.)*

	Holotype ♀	Paratype ♀♀ ranges (7)	Mean ± SD
D	41.24	35.37–44.34	39.33 ± 3.90
AS1	30.98	25.64–34.80	30.49 ± 3.48
AS2	32.62	25.98–35.65	31.49 ± 3.74
PS1	65.41	42.35–65.41	58.98 ± 10.29
PS2	66.24	43.01–66.24	60.27 ± 10.66
Glandularium	291.55	236.56–297.36	272.31 ± 25.43
Anterior gonad	212.83	208.84–264.65	237.67 ± 23.35
Uterus	68.92	64.89–97.55	81.96 ± 12.60
Oviduct	70.93	70.64–102.25	88.15 ± 13.90
Ovary	72.98	54.36–73.85	67.56 ± 6.22
Posterior gonad	264.33	240.81–289.98	259.90 ± 17.53
Uterus	72.28	68.21–111.13	84.76 ± 14.65
Oviduct	88.8	74.98–102.62	92.08 ± 9.06
Ovary	103.25	66.44–103.25	83.04 ± 12.39
Position of vulva from anterior end	1098.9	972.90–1215.45	1066.73 ± 87.47
Total length of vagina	12.82	11.96–12.82	12.34 ± 0.31
Pars proximalis vagina	7.89	6.66–7.89	7.27 ± 0.45
Pars refringes vagina	2.96	2.88–3.54	3.12 ± 0.22
Pars distalis vagina	1.97	1.79–2.16	1.95 ± 0.14
cw	14.47	14.46–15.30	14.94 ± 0.34
Rectum length	27.38	25.52–28.00	27.18 ± 0.80
Tail length	43.29	32.90–45.00	41.67 ± 3.81
% of tail of total body length	2.47	2.16–2.89	2.52 ± 0.25

The proposed new species is also different from *M. parabrachyurus*. Though body size resembles, the overall measurements are different, 'c' higher (*vs* 24-25), 'c′' lower (*vs* 2) and transverse rows of denticles more in number (*vs* 6), shape of the tail is also different.

M. dentatus has 10-15 rows of transverse denticles, short body size. In this species spinneret opening is sub-terminal (*vs* terminal) and the other measurements are also different from the newly described species.

Transverse rows of denticles more in number (*vs* 7-8) in *M. wasimi* n. sp. than *M. sigmaturus*, shape of the tail is also different.

The proposed new species seems close to *M. vulvapapillatus* but differs in longer body (*vs* 1.4 mm), shorter tail length, thus a higher 'c' value (*vs* 30). The value of 'a' also higher (26.94-36.5 *vs* 23).

Taken together, the proposed new species has some unique features: (i) Nine regular transverse rows of denticles and a sub-ventral tooth (length of which is 1/3rd of the length of dorsal tooth), (ii) didelphic-amphidelphic gonad, (iii) vulva with vulval papillae and a small protuberance at the vulval opening, and (iv) three caudal glands highly developed with a sub-terminal spinneret opening.

Etymology : The name *Mylonchulus wasimi* n. sp. has been chosen after the name of eminent nematologist, Wasim Ahmad, Aligarh Muslim University, UP, India.

SUMMARY

The new species *Mylonchulus wasimi* n. sp. from South 24-Parganas, West Bengal, India, is described and illustrated along with affinities with closely related species under the genus *Mylonchulus*. Body medium sized (1.5-1.85 mm) with thin cuticle. Buccal cavity mylonchuloid type, consisting nine regular transeverse rows of denticles and a sub-ventral tooth. Gonad didelphic-amphidelphic, vulval papillae present, a distinct lip-like protuberance at the opening of vulval region; vagina with three distinct parts : *pars proximalis, pars refringes* and *pars distalis*. Tail about one anal diameter long, dorsally bent, digitate with three developed glands and sub-terminal spinneret opening.

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REFERENCES

Altherr, E. and Delamare Deboutteville, C. 1972. Nematodes interstitiels des eaux douces des Etats-Unis d'Amérique (états de Washington, du Colorado et du Massachusetts) récoltés par C1. Delamare Deboutteville.- *Ann. Spéléol.*, **27**: 683-760.

Andrassy, I. 1992. A taxonomic survey of the family Mylonchulidae (Nematoda). *Opuscula Zoologica Budapest*, **XXI** : 11-35.

Christie, J.R. and Perry, V.G. 1951. Removing nematodes from soil. *Proceedings of Helminthological Society of Washington*, **17** : 106-108.

Cobb, N.A. 1916. Subdivisions of Mononchs. *Journal of Parasitology*, **2** : 195-196.

Cobb, N.A. 1917. The mononch (*Mononchus* Bastian, 1866), a genus of predatory nematodes. Contributions to a science of Nematology, VI. *Soil Science*, **3** : 431-486.

Jairajpuri, M.S. 1969. Studies on Mononchida of India. I. The genera *Hadronchus, Iotonchus* and *Miconchus* and a revised classification of Mononchida, new order. *Nematologica*, **15** : 557-581.

Jairajpuri, M.S. 1970. Studies on Mononchida of India. III. The genus *Mylonchulus* (family Mylonchulidae Jairajpuri, 1969). *Nematologica*, **16** : 434-456.

Jairajpuri, M.S. and Khan, W.U. 1981. *Predatory nematodes* (Mononchida) *with special reference to India.* Associated Publishing Company, New Delhi, 1-131pp.

Patil, K.J. and Khan, E. 1982. Taxonomic studies on nematodes of Vidarbha region of Maharashtra, India. III. One new and two known species of *Mylonchulus* (Nematoda: Mononchoidea). *Indian Journal of Nematology*, **12** : 158-160.

Schneider, W. 1939. Würmer oder Vermes. II. Fadenwürmer oder Nematoden. 1.Freilebende und pflanzenparasitische Nematoden. *Die Tierwelt Deutschlands*, **36** : 1-260.

Seinhorst, J.W. 1966. Killing nematodes for taxonomic study with hot f.a.4:1. *Nematologica*, **1** : 178.

Rec. zool. Surv. India : **108**(Part–1) : 33-40, 2008

FIRST REPORT OF FIVE OXYUROID NEMATODES OF COCKROACH (*PERIPLANETA AMERICANA* L.) FROM ANDHRA PRADESH, INDIA

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INTRODUCTION

Cockroaches are the principal and intermediate hosts of a variety of animal parasites specially nematodes and protozoa (Khairul & Paran, 1977). In India, many authors had reported different species of nematodes of cockroach (*Periplaneta americana* L.) from different corners of the country at different times. Major contributions were made by Basir (1940, 1956), Singh and Singh (1955), Farooqui (1967), Parveen and Jairajpuri, (1980,1981 and 1983), Duggal and Aulakh (1988, 1989), Singh and Kaur (1988), Sing and Sing (1989), Mathur and Khera (1989), Mojumder and Khan (1992), Rizvi and Jairajpuri (1995, 2002) and many others. Rao (1958) and Rao (1970) had also made some contribution on the nematode parasites of cockroaches from Andhra Pradesh.

During faunal survey tour to Andhra Pradesh from Nemathelminthes section of Zoological Survey of India, Kolkata between the period of April 1998 to December 2002, the first author had collected five nematode species from *Periplaneta americana* L. from different localities of the state. All the species belong to the family Thelastomatidae under the order Oxyurida, and are described hereunder. These are being recorded for the first time from Andhra Pradesh.

MATERIALS AND METHODS

The cockroach hosts, after their collection, were dissected and the guts were separated. The alimentary canal was opened into a petri dish with normal saline and observed under a binocular in low magnification. The parasites were collected into cavity block by a pipette, then fixed in hot (about 60°C) 70% alcohol. The nematodes were dehydrated by slow dehydration process i.e. by

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keeping the materials into dessicator for two weeks. After that the specimens were mounted on glass slides in anhydrous glycerol; then examined under microscope. Measurements were taken by an ocular micrometer. De Man's Formula (1884) was used for dimensions.

DISCUSSION

1. ***Schwenkiella periplaneticola*** Parveen and Jairajpuri, 1981

Measurements : FEMALE (n = 4) : L = 2.5–3.2 mm; a = 14.7–16.0; b = 5.9–6.3; c = 2.9–3.4; V = 49.6–50.31. MALE : Not found.

Description : FEMALE : Cylindrical body, tapering at both the ends; measures 2.5–3.2 mm in length and 0.17–0.20 mm in maximum width. Cuticle annulated. Mouth surrounded by eight labio-papillae. Buccal cavity small, measures 0.011–0.014 mm long and 0.004–0.006 mm wide. Oesophagus long (0.42–0.51 mm) with a cylindrical corpus (0.31–0.35 mm × 0.03–0.04 mm), a short isthmas (0.03–0.04 mm × 0.04 mm) and an end valbular bulb (0.08–0.10 mm × 0.07–0.09 mm). Nerve ring 0.17–0.21 mm from anterior end of the body. Excretory pore post-oesophageal, 0.48–0.55 mm from anterior extremity. Vulva equatorial in position. Ovaries divergent. Tail long, filiform, about one-third of body length, measures 0.85–0.93 mm. Eggs oval in shape, measuring 0.051–0.084 mm × 0.049–0.058 mm in diameter.

Habitat : Posterior intestine.

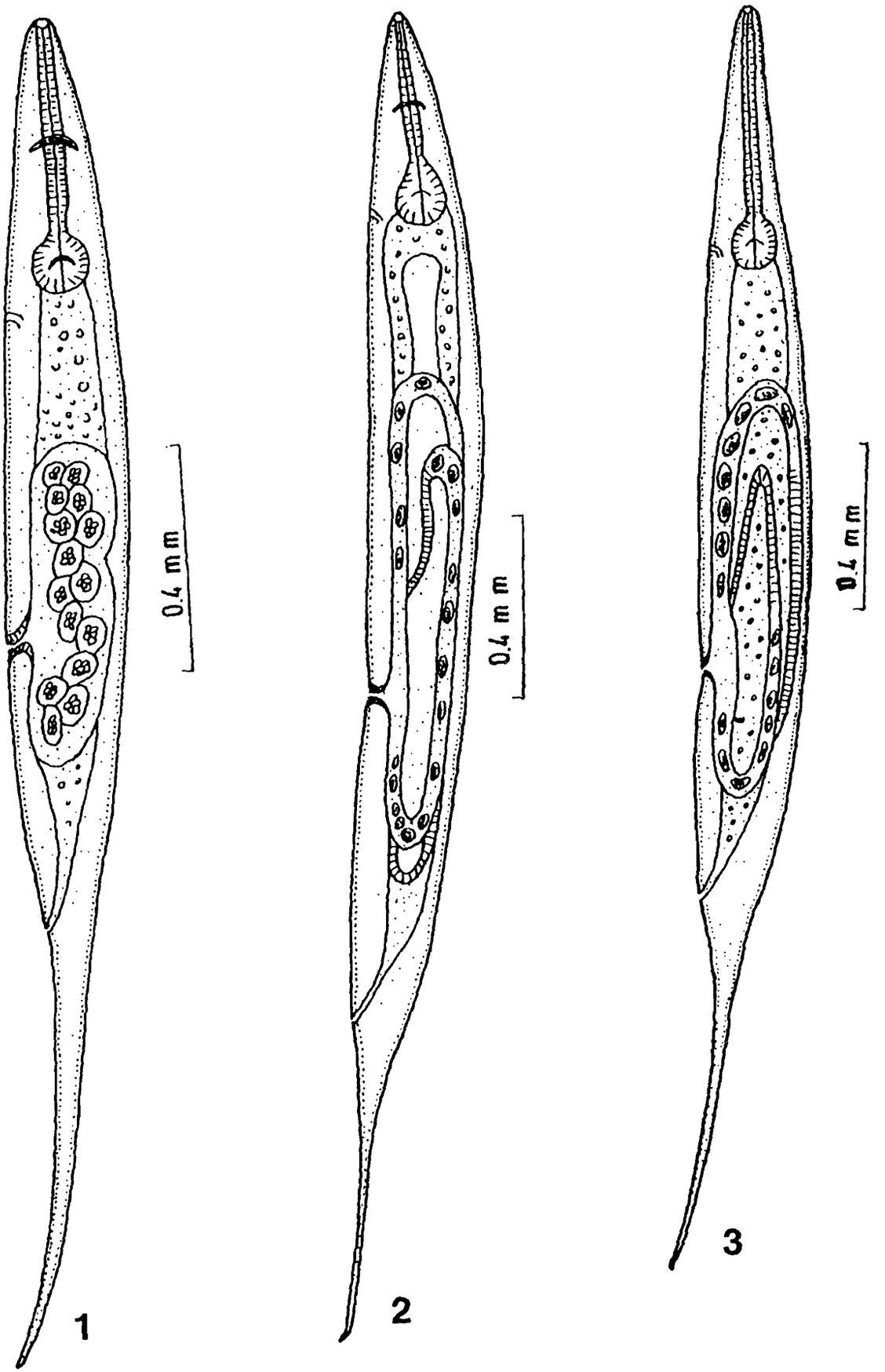
Locality : Rajamundry, Dist. East Godavari.

Remarks : The present specimens show close resemblances with measurements and description, made by original author, Parveen and Jairajpuri, 1981. The species was described from Aligarh, Uttar Pradesh.

2. ***Schwenkiella basiri*** Parveen and Jairajpuri, 1980

Measurements : FEMALE : (n = 12) : L = 2.56–3.24 mm; a = 12.2–13.5; b = 5.8–6.6; c = 3.7–4.5; V = 47.3–49.6. MALE : Not found.

Description : FEMALE : Cylindrical body measuring 2.56–3.24 mm in length and 0.21–0.24 mm in width. Cuticle transversely annulated. Mouth opening surrounded by eight labio-papillae. Buccal cavity small, 0.015–0.016 mm deep and 0.014–0.015 mm wide. Oesophagus 0.44–0.49 mm long; divided into anterior corpus (0.32–0.37 mm × 0.03–0.06 mm), middle isthmus (0.03–0.04 mm × 0.033–0.036 mm) and posterior bulb (0.11–0.13 mm × 0.11–0.12 mm). Nerve ring at 0.23–0.26 mm from anterior end of the body. Excretory pore post-oesophageal, 0.54–0.58 mm from head end. Reproductive system didelphic; vulva more or less equatorial in position, vagina directed slightly anterior to the body. Eggs ellipsoidal, 0.07–0.09 mm × 0.05–0.06 mm in diameter. Anus at about 0.68–0.72 mm from posterior extremity. Tail long, filiform, about one-fourth of the body length.



Figs. 1-3. 1. *Schwenkiella periplaneticola* : Entire female. 2. *Schwenkiella basiri* : Entire female. 3. *Thelastoma guptai* : Entire female.

Habitat : Intestine.

Locality : Guntur, Dist. Guntur.

Remarks : The present specimens conform well with the description and measurements given by Parveen and Jairajpuri, 1980. The species was described and illustrated as new to science by them from North India.

3. ***Thelastoma guptai*** Duggal and Aulakh, 1989

Measurements : FEMALE : (n = 11) : L = 3.52–3.67 mm; a = 12.2–12.6; b = 6.4–6.6; c = 4.1–4.2; V = 43.1–48.5. MALE : Not found.

Description : FEMALE : Body long, cylindrical, tapering at both the ends; 3.52–3.67 mm in length and 0.28–0.32 mm in maximum width. Cuticle uniformly striated up to anal region. Oesophagus long (0.54–0.56 mm), cylindrical; divided into anterior long corpus (0.41–0.42 mm), middle short isthmus (0.025 × 0.036 mm–0.028 × 0.037 mm) and end valvular bulb (0.102 × 0.105 mm–0.108 × 0.112 mm). Cardia distinct. Excretory pore at bulbal region, about 0.53–0.54 mm from anterior end of the body. Genital system amphidelphic. Vulva equatorial, 1.52–1.78 mm from head end. Eggs oval in shape, measures 0.07 × 0.04 mm–0.08 × 0.05 mm. Tail long, filiform, 0.86–0.90 mm in length.

Habitat : Rectum.

Locality : Medak, Dist. Medak.

Remarks : The present specimens are in agreement with the description and range of measurements, made by Duggal and Aulakh, 1989, who described and illustrated the species as new to science from Delhi.

4. ***Thelastoma atheri*** (Parveen and Jairajpuri, 1983) Rizvi and Jairajpuri, 1995

Measurements : FEMALE : (n = 8) : L = 2.52–3.02 mm; a = 15.7–15.9; b = 6.2–7.0; c = 3.5–3.6; V = 48.4–49.1. MALE : (n = 2) : L = 1.20–1.24 mm; a = 14.8–14.9; b = 6.6–6.7; c = 3.3–3.4.

Description : FEMALE : Body long, filiform, 2.52–3.02 mm in length and 0.16–0.20 mm in maximum width. Body becomes tapering towards both the extremities. Cuticle transversly annulated. Mouth surrounded by eight labio-papillae. Buccal cavity small, 0.013–0.014 mm long and 0.004 mm wide. Oesophagus long, cylindrical, measures 0.41–0.42 mm in length. It consists of anterior long corpus (0.311–0.315 mm long and 0.034–0.35 mm wide), middle short isthmus (0.031–0.034 mm long, 0.032 mm wide) and posterior bulb (0.82–0.087 mm × 0.085–0.088 mm). Cardia distinct. Nerve ring encircles corpus, 0.17–0.19 mm from anterior end. Excretory pore 0.47–0.51 mm from anterior extremity. Genital system didelphic, vulva slightly anterior to middle of the body. Eggs oval in shape, measures 0.073–0.075 mm × 0.051–0.052 mm in diameter. Tail long, filiform, 0.72–0.91 mm in length.

MALE : Body short, cylindrical, 1.20–1.24 mm in length and 0.081–0.083 mm in maximum width. Cuticle transversely annulated. Mouth surrounded by eight labio-papillae. Buccal cavity small, 0.012–0.013 mm long and 0.003 mm wide. Oesophagus 0.181–0.186 mm long, divided into anterior corpus (0.121–0.124 mm x 0.014–0.018 mm), middle short isthmus (0.014–0.016 mm x 0.011–0.012 mm) and end bulb (0.034–0.39 mm x 0.031–0.036 mm). Nerve ring and excretory pore 0.092–0.098 mm and 0.27–0.29 mm from anterior end of the body respectively. Testes single. Spicule not so distinct. Caudal papillae four pairs. Tail long, filiform, measuring 0.35–0.38 mm in length.

Habitat : Posterior intestine.

Locality : Tirupati-Tirumala, Dist. Chittoor.

Remarks : The present specimens show close similarities with the diagnosis and description of Thalastoma atheri Rizvi and Jairajpuri, 1995. T. atheri was a new combination, proposed for Schwenkiella atheri Parveen and Jairajpuri, 1983; and was described from Aligarh of Uttar Pradesh State.

5. ***Thelastoma kherai*** Duggal and Aulakh, 1989

Measurements : FEMALE : (n = 7) : L = 2.81–2.93 mm; a = 14.7–15.4; b = 5.5–5.6; c = 3.4–3.6; V = 49.8–49.9. MALE : (n = 1): L = 1.06 mm; a = 12.7; b = 4.6; c = 3.3.

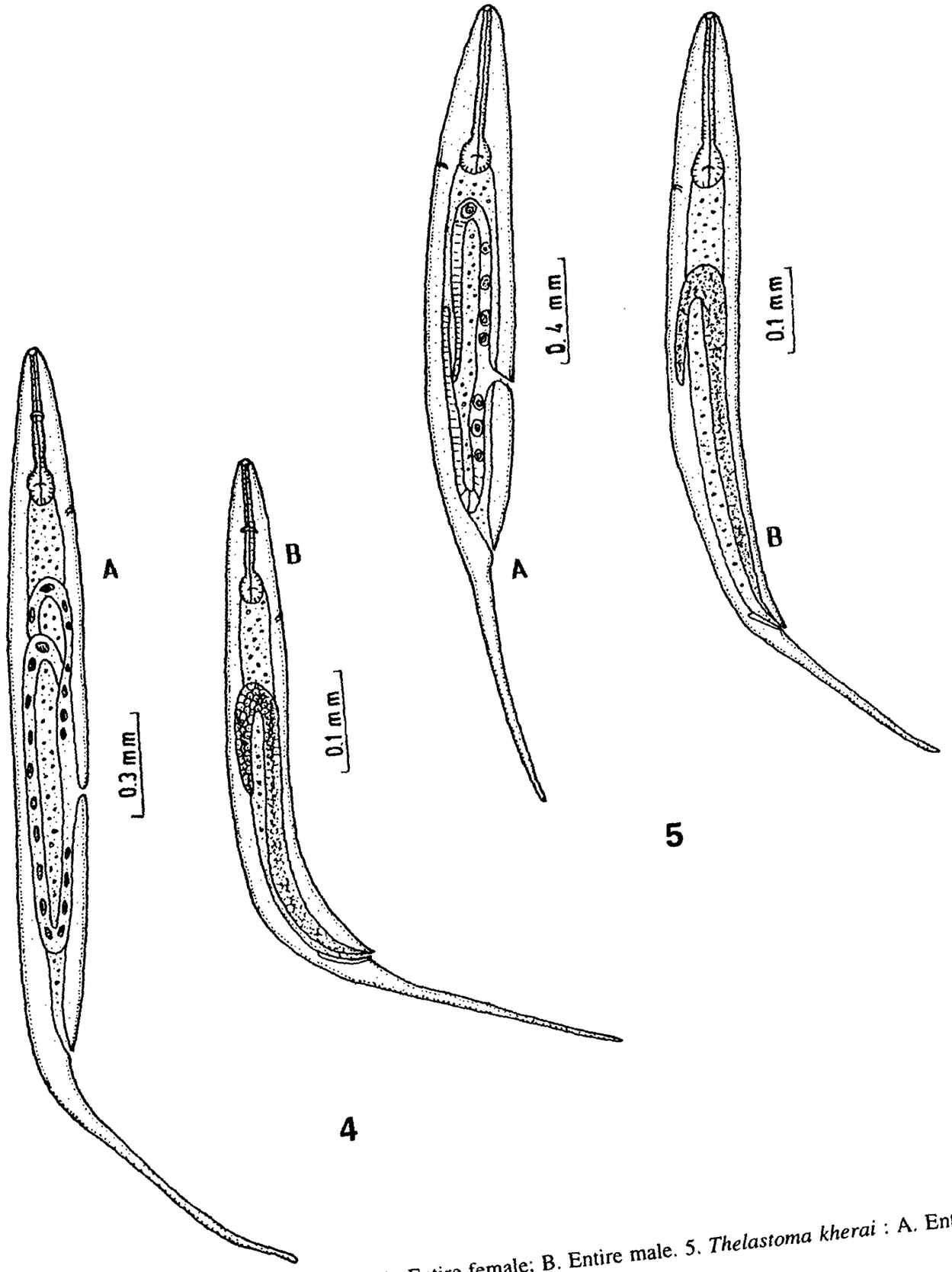
Description : FEMALE : Body long, more or less straight, cylindrical, measuring 2.81–2.03 mm long and 0.190–0.192 mm wide. Cuticle striated uniformly up to anus. Oesophagus long, cylindrical, measures 0.51–0.53 mm; divided into anterior long corpus (0.39–0.42 mm x 0.03–0.04 mm), middle short isthmus (0.027–0.029 mm x 0.031–0.032 mm) and end rounded bulb (0.093–0.095 mm x 0.093–0.094 mm). Excretory pore at bulbal region, measures 0.517–0.519 mm from anterior extremity. Reproductive system didelphic. Vulva at about middle of the body, 1.40–1.46 mm from head end. Eggs oval in shape, 0.075 x 0.052 mm–0.080 x 0.053 mm in diameter. Tail long filiform, measuring 0.83–0.85 mm in length.

MALE : Body short, straight, 1.06 mm in length and 0.082 mm in width. Striation present up to anal region. Oesophagus 0.23 mm long with spindle-shaped corpus (0.018 x 0.024 mm) and rounded end bulb (0.047 x 0.048 mm). Cardia present. Testis single and reflexed. Spicule single, 0.062 mm long. Tail long, filiform, 0.32 mm in length.

Habitat : Rectum.

Locality : Nandyal, Dist. Karnool.

Remarks : Present specimens closely conform well to the original species, described as new form by Duggal and Aulakh, 1989, in all measurements and diagnosis. The new species was described from Delhi.



Figs. 4-5 : 4. *Thelastoma atheri* : A. Entire female; B. Entire male. 5. *Thelastoma kherai* : A. Entire female; B. Entire male.

SUMMARY

Five species of parasitic nematodes of cockroach (*Periplaneta americana* L.) under the order Oxyurida namely, *Schwenkiella periplaneticola* Parveen and Jairajpuri, 1981, *S. basiri* Parveen and Jairajpuri, 1980, *Thelastoma guptai* Duggal and Aulakh, 1989, *T. atheri* (Parveen and Jairajpuri, 1983) Rizvi and Jairajpuri, 1995 and *T. kherai* Duggal and Aulakh, 1989 have been described herein. These species are being recorded for the first time from Andhra Pradesh.

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REFERENCES

Basir, M.A. 1940. Nematodes parasitic in Indian cockroaches. *Proc. Indian Acad. Sci.*, **12**, Sec. B : 8-16.

..... 1956. Oxyuroid parasites of Arthropods. A monographic study, 1. Thelastomatidae. 2. Oxyuridae. *Zoologica* (Stuttgart) : 79 pp., 13 plates.

De Man, J.G. 1884. Die frei in der reinen Erde und in sussen Wasser lebenden nematoden niederlandischen fauna. Eine *Systematische Faunistische Monographie. Leiden* : 206 pp.

Duggal, C.L. and Aulakh, A. 1988. On some nematode parasites infecting household insects in northwest India. *Research Bulletin (Science) of the Punjab University*, **39** : 21-25.

..... 1989. *Thelastoma kherai* sp. nov. and *T. guptai* sp. nov. (Nematoda : Thelastamatidae) from Periplaneta americana in Delhi, India. *Research Bulletin (Science) of the Punjab University*, **40**(1-11) : 95-98.

Farooqui, M.N. 1967. On a known and some new species of insect nematodes. *Zool. Anz.*, **176** : 276-296.

Khairul, A.A. and Paran, T.P. 1977. Parasites of Periplaneta americana in Penang, Malaysia. Malayan Nature Journal, **30**(1) : 69-77.

Mathur, N. and Khera, S. 1989. The influence of host stage and sex upon the size and composition of the nematode parasitic in *Periplaneta americana. Res. Bull. Punjab Univ. Sci.* **40** : 275-280.

Majumder, V. and Khan, E. 1992. Thelastomatid nematode parasitism in the hind gut of *Periplaneta americana. Current Nematlogy*, **3** : 111-117.

Parveen, R. and Jairajpuri, D.S. 1980. A new species of the genus *Schwenkiella* Basir, 1956 from the cockroach, Periplaneta americana, from Aligarh. *Indian J. Parasitol.*, **4**(1) : 41-43.

..... 1981. Two new species of insect nematodes of the family Thelastomatidae. *Rivista Di. Parassitologia*, **43**(2) : 261-266.

..... 1983. Schwenkiella atheri sp. nov. (Nematoda: Thelastomatidae), a new nematiode parasite of the common cockroach, *Periplaneta americana. Indian J. Nematol.*, **13**(2) : 209-212.

Rao, P.N. 1958. Studies on the Nematode parasites of insects and other arthropods. *Arq. Mus. Nac. Rio. de Janerio.*, **46** : 33-84.

Rao, V.J. 1970. Studies on the nematode parasites of Arthropods. Ph.D. Thesis (unpublished), Osmania University, Hyderabad, Andhra Pradesh. 125 pp.

Rizvi, A.N. and Jairajpuri, D.S. 1995. Scanning electron microscopy of *Thelastoma atheri* n.comb. (Nematoda : Thelastomatidae) from the cockroach, *Perilaneta americana. J. Parasit. Appl. Anim. Biol.*, **4**(1) : 9-13.

..... 2002. Studies on a new and some known species of insect oxyurid nematodes. *Riv. Iber. de. Parasitol.*, **6**(1-2) : 1-7.

Singh, K.S. and Singh, K.P. 1955. On some nematodes from invertebrates. *Rec. Indian Mus.*, **53** : 37-51.

Singh, H.S. and Kaur, H. 1988. On a new nematode, *Hammerschmidtiella basiri* n.sp. from *Periplaneta americana. Indian J. Parassitol.*, **12**(1) : 187-189.

Singh, H.S. and Singh, K. !989. On two new nematodes from Periplaneta americana from India. *Dr. B. S .Chouhan Comm. Vol., Zoological Survey of India, Calcutta* : 149-153.

Rec. zool. Surv. India : **108**(Part–1) : 41-42, 2008

REDISCOVERY OF *RHACOPHORUS NASO* ANNANDALE, 1912 (AMPHIBIA : ANURA : RHACOPHORIDAE) FROM MIZORAM, NORTH EAST INDIA

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INTRODUCTION

"Mr. Kemp's collections of Batrachia from the Abor Country and the Frontiers of Assam comprises 57 specimens of frogs and toads and a considerable number of tadpoles. With those obtained on the expedition of 1911-1912 I have included two interesting specimens taken by Mr. Kemp on a previous visit to the Frontier of eastern Bhutan. In all at least 25 species are represented of which about one third are new to science, while several have only been recorded hitherto from Burma or from Assam south of Brahmaputra. The collection, therefore, affords the opportunity of making important additions to the fauna of the Himalayas, the animals of extreme eastern region of which have up to the present been almost unknown" wrote Annandale in 1912.

Annandale described eight new species, from this collection including *Rhacophorus naso*. This he found to be a 'peculiar' species easily distinguishable from other members of the genus that occurred in Assam and Burma by the presence of a dermal appendage at its snout.

He reported the type to be a 'unique specimen' bearing the registration number 16929 in the Indian Museum register of Reptilia and Batrachia. From his description of the specimen it is clear that the specimen he described is a female. *Rhacophorus naso* Annandale, 1912, was since not seen or collected. 'Several surveys made in and around Arunachal Pradesh did not yield any more material' (Chanda, 1994).

There were at least twelve such species of anurans in North-East India which were known only from the original description. Under a study on 'Little known amphibian species of North-East India', serious efforts were made to collect these 'little known' amphibians. In this connection two surveys were conducted in the state of Mizoram. During the first survey in 2005 a single male

specimen of *Rhacophorus naso* was spotted on a tree trunk by a stream side some seven meters above ground in the District Park, Lunglei district of Mizoram. It was then identified to the genus level. During a second survey of the area, additional materials were collected including a single female on 4th June, 2006. Study of this female specimen confirmed its identity as *Rhacophorus naso* as it agreed well with Annandale's description of the 'unique' type specimen. The dermal appendage which distinguishes this species from others is not prominent in the males.

Material examined : 1 ex., SVL 34 mm (male), Regd. No. VA/ERS/ZSI/769, District park, Zebawk, Lunglei district, Mizoram (Alt. 1128 m, N 22°50', E. 92°49'), 22.9.2005, Coll. R. Mathew and party; 13 adults (and 10 juveniles), SVL 30-43 mm (2 females and 11 males), Regd. No. VA/ ERS/ZSI/728, District Park, Lunglei District, Mizoram, 4.6.2006, Coll. R. Mathew and party.

Habitat : Trees by the side of stream. The first specimen in 2005 was collected from the free trunk during day. Thorough search during day time on the second visit yielded one specimen from the hollow of a bamboo. Near about areas yielded juveniles. Towards dusk a female specimen was spotted camouflaged on a tree trunk about a meter above the ground. More males and a female were collected in the rainy night from the park, from children's swings, tree trunks and ground.

Diagnosis : Annandale's description of the female specimen is very accurate. The females are purplish brown whereas the males are lustrous green and brown (Plate I). Preserved specimens do nto retain the original colour.

Remark : Presently *Rhacophorus naso* has been placed under the genus *Aquixalus* (Frost, 2006, online reference).

ACKNOWLEDGEMENTS

The authors are grateful to the Director, Zoological Survey of India, Kolkata for permission to undertake the study and for laboratory facilities. Field assistance by Dr. Dimos Khynriam and Mr. Nirmal Sapkota are gratefully acknowledged.

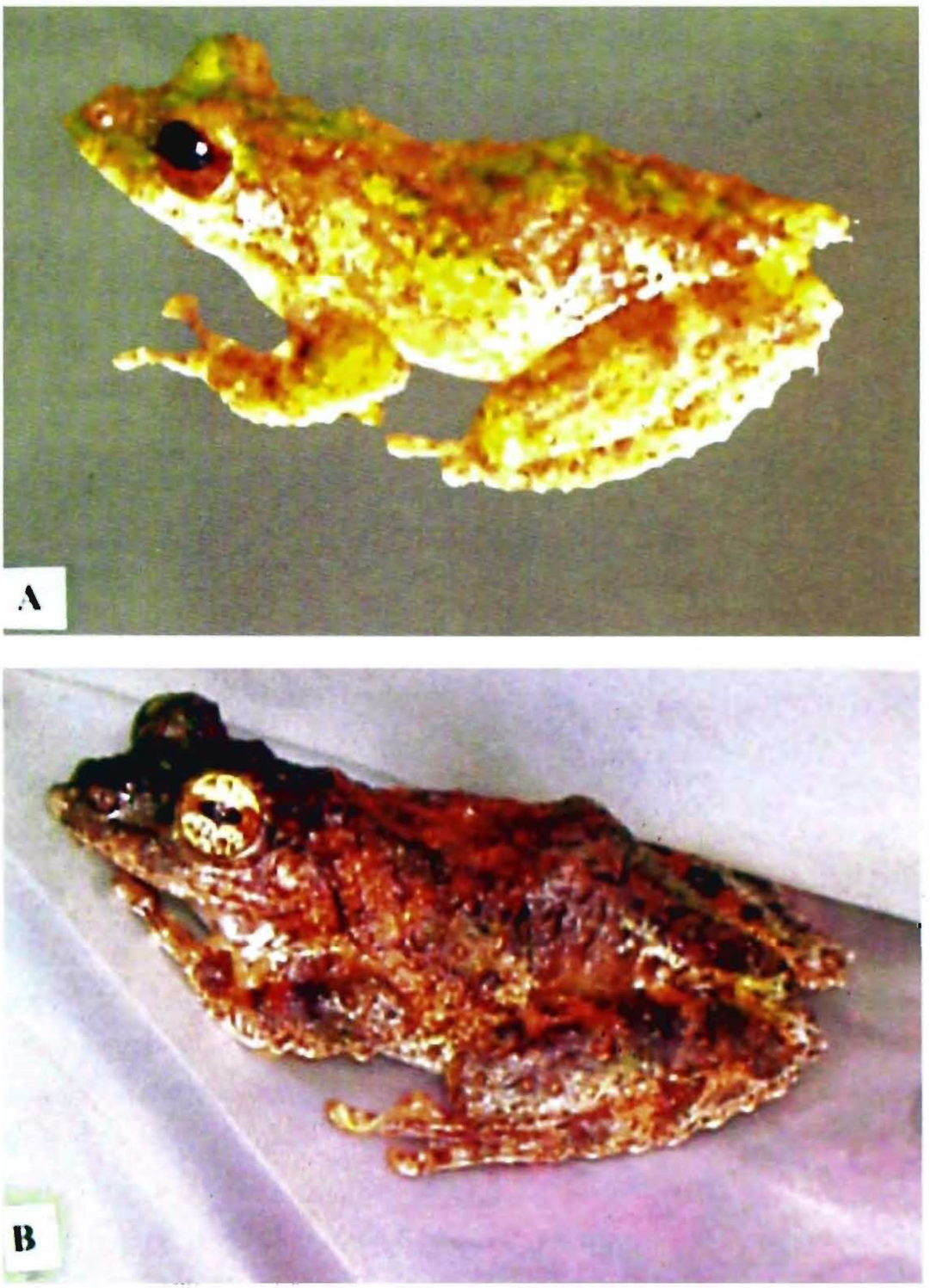
REFERENCES

Annandale, N. 1912. Zoological results of the Abor Expedition Part I Batrachia. *Rec. Indian Mus.* Calcutta, **8** : 7-36 (Plates ii-iv).

Chanda, S.K. 1994. Anuran (Amphibia) Fauna of Northeast India. *Mem. Zool. Surv. India*, **18** : 1-143 (p. 122).

Frost Darrel, R. 2006. Amphibian species of the world : an online reference; version 4 (17 August, 2006)-http://research-amnh.org/herpetology/amphibian/index.php. American Museum of Natural History, New York, USA.

PLATE I



Rhacophorus naso Annandale, A) Male, B) Female

Rec. zool. Surv. India : **108**(Part–1) : 43-57, 2008

DESCRIPTION OF SIX NEW SPECIES OF SPIDERS OF THE GENERA *LATHYS* (FAMILY : DICTYNIDAE), MARPISSA (FAMILY : SALTICIDAE), MISUMENOIDES (FAMILY : THOMISIDAE), AGROECA (FAMILY : CLUBIONIDAE), GNAPHOSA (FAMILY : GNAPHOSIDAE) AND FLANONA (FAMILY : LYCOSIDAE)—FROM INDIA

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INTRODUCTION

Spiders though ubiquitous, have remined a neglected group from India. About 100 years ago, a consolidated volume on the entire class Arachnida was published by Pocock (1900) in the Fauna of British India, which includes 215 species of spiders only. During last 40 years, mainly through the work Tikader (1962-1987), enormous amount of informations on Indian Spiders has been gathered. The work on Indian spiders was initiated by Fabricius (1733), and subsequently followed by Simon (1894), Thorell (1898), Walckenaer (1805), Sundavall (1833), Gravely (1921), Gajbe (1999), besides Tikader as mentioned above. Apart from these, Simon (1884) worked on genus *Lathys* under the family Dictynidae from Canada; Westring (1961) studied on the genus *Agroeca* under the family Clubionidae from New England; Simon (1898) studied on the genus *Flanona* under the family Lycosidae from Sri Lanka. Recently Biswas (present author) has been working on Statewise occurrance and distribution of spider fauna of this country and documenting the same under the State Fauna Series. As a result of these studies a total of 1442 species belonging to 361 genera under 59 families are so far known from the Indian Sub-continent. This is merely 3.58% of the world spider species, since 39,000 species belonging to 3600 genera under 110 families have been reported from the globe.

All the type specimens are deposited in the National Collection of the Zoological Survey of India, Kolkata.

**40/5, Fakir Para Road, Behala, Kolkata.*

Genus *Lathys* Simon

1884. *Lathys* Simon, *Bull. Soc. Zool. France*, **9** : 321

1858. *Lathys* : Chamberlin, R. V. and Gertsch, W. J. *The Spider Family-Dictynidae in America North of Mexico,* : 25.

1972. *Lathys* : Kaston, B. J. *How to know the Spider* "Pictured key nature series : 79.

Diagnosis : This species is much larger in size than the previously recorded species of the genus Lathys, which possesses dark brown cephalothorax and tiger-like ornamentation on their dorsal and ventral side of abdomen.

Type-species : *Lathys varia* Menge

Distribution : New England, Canada, Asia.

1. ***Lathys mussooriensis*** sp. nov.

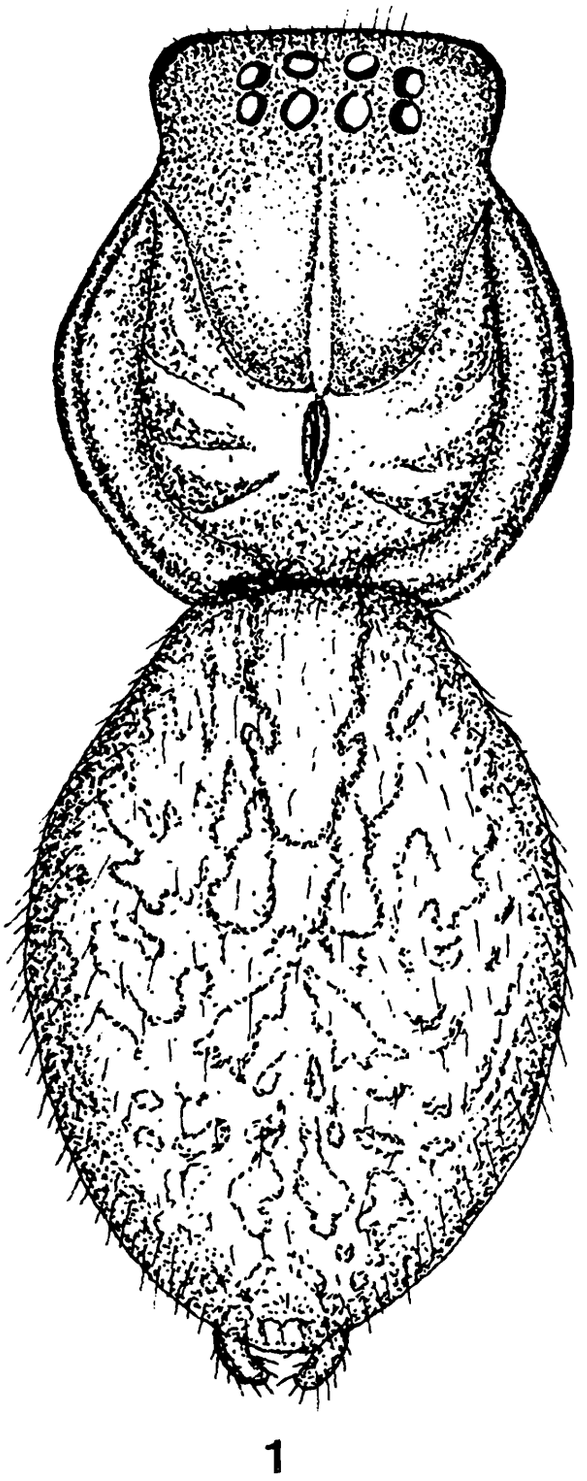
(Figs. 1-3)

General : Cephalothorax dark-brown in colour and larger in-size than the previous recorded species of the genus *Lathys.* Total length 15.00 mm. Carapace 7.00 mm. long, 5.00 mm wide; abdomen 8.00 mm. long, 6.00 mm wide. These spiders are peculier in their body shapes look like as Theridiid, having the elongated abdomen. Detailed study of different morphological features, clearly shows that they are allied to Lycosidae.

Cephalothorax : Cephalothorax is dark-brown in colour with characteristic shade, look like *Hippasa* (Lycosidae) with obscure border and median band longer than wide, convex, cephalic region slightly high and narrowing in front, clothed with fine hair, clypeus is low, centre is provided with a prominent and depressed fovea. Anterior row is slightly procurved and posterior row of eyes are slightly recurved. Out of eight heterogenous eyes, antero-median eyes are smaller than postero-madian eyes. Antero-median eyes are pearly white in appearance, lateral eyes are close and each situated on a brown tubercle. Strong, stout and long chelicerae are provided with two teeth in inner margin and one prominent tooth in outer margin. Strong and stout fang present. Sternum sheiled-shaped, pointed behind and brown in colour. Labium as long as wide, brown, clothed with spine like hair and is provided with prominent scopulae. Legs are long, stout and strong, clothed with hair and spines having uniseriate calaminstrium on IV matatarsi and bear three tarsal claws. Male is not known till.

Abdomen : Elongated, oval clothed with spine-like hair. Dorsum of the abdomen covered with blackish brown tiger-like ornamentation. Ventral side also same as like as dorsal side. Epigyne and internal ganitalia as in text figs. (2 & 3).

Type species : Holotype female, paratype two females immature preserved in rectified spirit (70%). Registration numbers are 5582-83/18.



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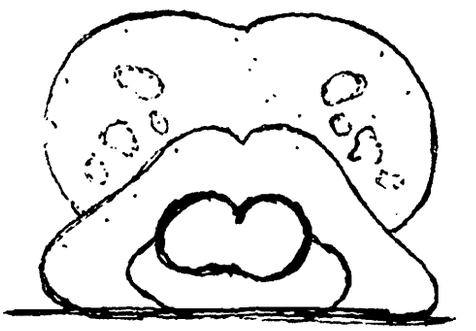

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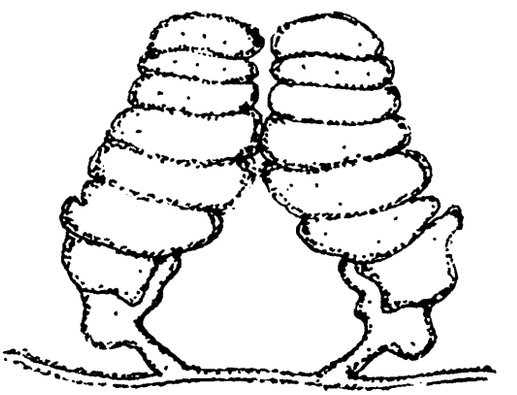

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Figs. 1-3. : (*Lathys mussoriensis*) sp. nov. ♀

1. Dorsal view (legs are omitted)
2. Epigyne
3. Internal genitalia

Type-locality : Mussoorri (Alt. about 8000 ft.), Uttaranchal, India, 21.x.2005, coll. Rakhi Roy from a corner of a wall within a heep of dry leaves.

Distribution : India : Mussoorri, Uttaranchal (New record). Elsewhere : North America, Canada).

Remarks : This species having some similarities with *Lathus foxii* Marx but differs from it in these successive characters (1) Size, length, colour and abdominal ornamentation of *Lathys mussooriensis* Sp. nov. differs from *Lathys foxii* Marx (2) Size and appearance eyes greatly varies from *Lathys foxii* Marx (3) Prominent and depressed fovea is present in *Lathys mussoooriensis* Sp. nov. but no such fovea in *Lathys foxii* Marx (4) Epigyne and internal genitalia are also structurally different.

Comments : *Lathys* is one of the important genus under the family Dictynidae which was only found in America and Europe. Two genus as *Argenna* and *Dictyna* were recorded from India before. *Lathys mussooriensis* new species from Mussoorri is not only remarkable from Indian Sub-continent but also adds a new line to science of spider fauna from South East Asia.

Genus ***Marpissa*** Koch

1845. *Marpissa* Koch, Die. Arachn., **13** : 56.

1981. *Marpissa* : Tikader and Biswas, *Rec. zool. Surv. India*, occ. pap. No. (1) : 93.

Diagnosis : Cephalothorax longer than wide, cephalic region flat and low, widest behind the dorsal eyes. Eye region occupying little more than one-third of the cephalothorax; ocular trapezium about 1.5 times broader than long, parallel sided. Chelicerae with one tooth on inner margin and two teeth on outer margin. Sternum narrowed in front. Legs usually 1423 in the male and 4132 in female. In both sexes tibiae and matatarsi I and II provided with three and two pairs of ventral spines respectively.

Type-species : *Marpissa muscosa* Clerck.

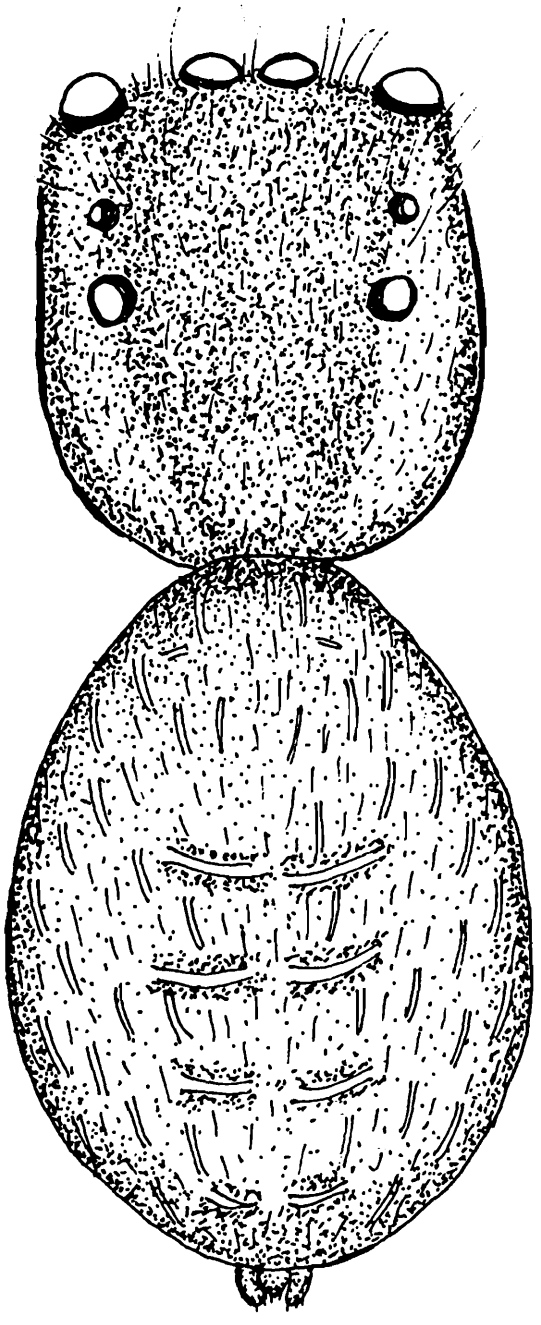
Distribution : Cosmopolitan.

2. ***Marpissa pauariensis*** sp. nov.

(Figs. 4-6)

General : Cephalothorax deep brown, yellowish brown and legs are light brown in colour. Total length 7.50 mm. Carapace 3.50 mm. long, 3.00 mm. wide; abdomen 4.50 mm. long, 3.00 mm. wide.

Cephalothorax : Longer than wide, slightly high in front, gradually slopping towards posterior and lateral sides. Flat cephalic region with profuse fine hair and few comparatively long hair at the front of the cephalothorax. Three rows of eyes. Pearly white antero-median eyes are longer than the laterals. Second row of eyes are very small and situated more or less in equidistant from antero-



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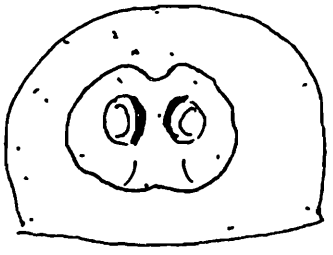

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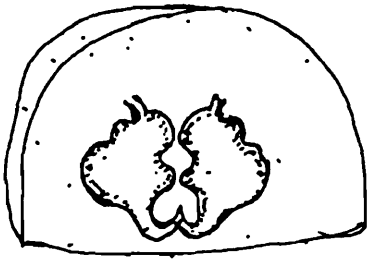

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Figs. 4-6. : (*Marpissa pauriensis*) sp. nov. ♀

4. Dorsal view (legs are omitted)
5. Epigyne
6. Internal genitalia

lateral to postero-laterals. Posterior row of eyes larger than the second row of eyes. Chelicerae with one tooth on inner and very small two teeth on outer margin. Labium longer that wide, maxillae provided with scopulae. Sternum nearly oval narrowing anteriorly covered with whitish hair. Legs I and II provided with two pairs of ventral spines. Legs formulae are 4321.

Abdomen : Longer than wide, light brown, clothed with fine whitish hair. Ventral side pale in colour.

Type species : Holotype female preserved in rectified spirit (70%). Registration number is 5584/18.

Type-locality : Duga, District Pauri, Uttaranchal, India, 26.vi.2004, coll. S.K. Chatterjee & party.

Distribution : India : Uttaranchal, Duga.

Remarks : This species nearly resembles with Marpissa decorata Tikader but it is separated as follows (1) Colour pattern of abdomen is different. (2) There is no whitish lateral and longitudinal band in Marpissa pauriensis Sp. nov. which is present in Marpissa decorata Tikader (3) Epigyne and internal genitalia are also structurally different.

Genus ***Misumenoides*** Cambridge

1900. *Misumenoides* Cambridge, *Biol. Centr. Amer. Zool.*, **2** : 136.

1963. *Misumenoides* : Tikader, *Proc. Indian Acad. Sci.*, **58** (5) : 258.

1965. *Misumenoides* : Tikader, *Proc. Indian Acad. Sci.*, **61**(5) : 279.

Diagnosis : Cephalothorax relatively flatter, clypeus vertical, with a white anterior carina curving to allatum; lateral eyes situated on a common and strongly projecting processes. Tibiae I and II without prolateral spiniforms and without a proventroapical spiniform; tarsi I and II without prolateral spiniforms. Abdomen oval, wider behind than the middle.

Type species : *Misumenoides magna* (Keyserling)

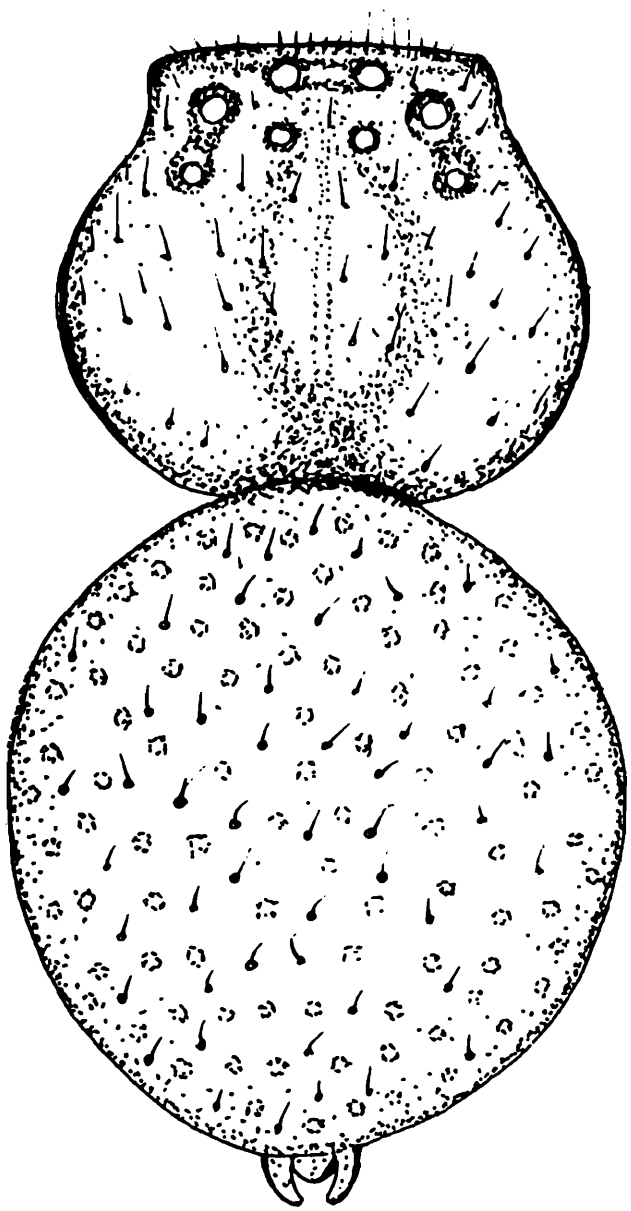
Distribution : America, Asia.

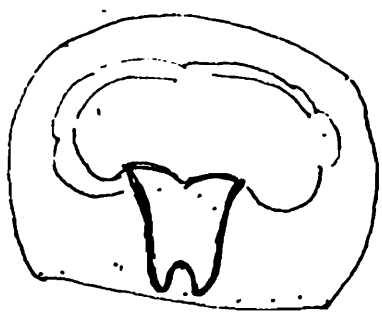
3. ***Misumenoides naginae*** sp. nov.

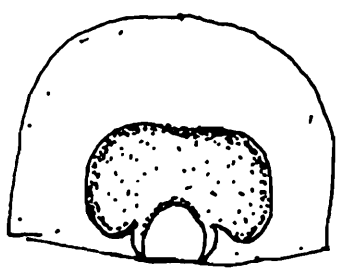
(Figs. 7-9)

General : Cephalothorax brownish yellow, legs yellowish brown, abdomen creamy in colour. Total length 8.50 mm. Carapace 3.00 mm. long, 2.50 mm. wide; abdomen 6.00 mm. long, 5.00 mm. wide.

Cephalothorax : Cephalothorax slightly longer than wide, scanty hair present. Cephalic region slightly high. Eyes are round, black, both rows recurved. Posterior row of eyes are strongly recurved than the anterior row. Eyes are ringed with white tubercle. Anterior and posterior lateral eyes are







Figs. 7-9. : (*Misumenoides naginae*) sp. nov. ♀

7. Dorsal view (legs are omitted)
8. Epigyne
9. Internal genitalia

situated on prominent white tubercles. Ocular quad wide than long. Clypeus high, margin provided with seven spines directed forwardly. Posterior median region of cephalothorax is slightly yellowish in colour and slightly high than the laterals. Presance of number of "red-dots" with hair on cephalic region. Sternum heart-shaped, pointed behind with fine hair. Legs are long and stout. Legs formulae are 2134. Tibiae of I and II with six pairs of spine-like projections and metatarsus with seven pairs of ventral spines.

Abdomen : Round, sac-like in appearance. Dorsum of the abdomen ornamented with number of red-dots having spiny projections from it. Posterior end of abdomen slightly pointed than the anterior. Middle part of ventral side of abdomen with chalk-white dots. Epigyne with characteristic features.

Type species : Holotype female preserved in rectified spirit (70%). Registration number is 5586/18.

Type-locality : Haridwar, Garwall Hills, Uttaranchal, India, 26.x.2003, coll. Bijan Biswas.

Distribution : India : Haridwar, Uttaranchal.

Remarks : Misumenoides naginae Sp. nov. is closely related to Misumenoides shulli Tikader but it can be distinguished from it as follows (1) Ocular area with deep brown patch present on Misumenoides shulli Tikader but there is no such Misumenoides naginae Sp. nov. (2) Postero-median of cephalothorax yellowish in colour in Misumenoides naginae Sp. nov. but in Misumenoides shulli Tikader there is no such colour. (3) Epigyne and internal genitalia are also structurally different.

Genus ***Agroeca*** Westring

1961. *Agroeca* Westring, *Araneae Svocicae Descriptae*, Goathoburgi : Sumter at Litteris, D.F. Bennier.

1940. *Agroeca* : Comstock, J.H. *The Spider Book*, : 588.

1972. *Agroeca* : Kaston, B.J. *How to know the spiders*, : 219.

Diagnosis : Cephalothorax rather flat, about three fourths as wide as long, usually orange brown with dusky blotches and with a black marginal stripe. Both row of eyes are procurved. The abdomen is orange brown with grey blotches.

Type-species : *Agroeca protensis* Westring

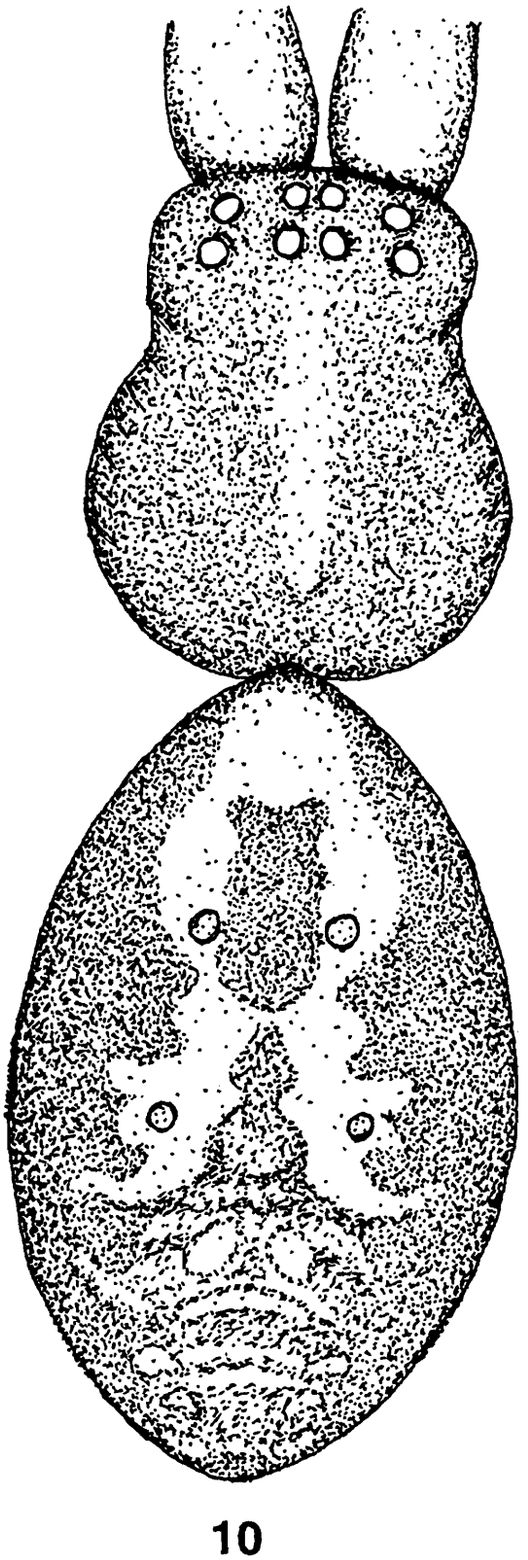
Distribution : New England.

4. ***Agroeca gangotrae*** sp. nov.

(Figs. 10-12)

General : Cephalothorax deep brown; abdomen and legs are light brown in colour. Total length 12.00 mm. Carapace 6.50 mm. long, 4.50 mm. wide; abdomen 7.50 mm. long, 5.00 mm. wide.

Cephalothorax : Longer than wide, cephalic region high. Eyes are in two rows. Both rows are slightly recurved. Both laterals are very close to each others. Posterior median eyes comparatively



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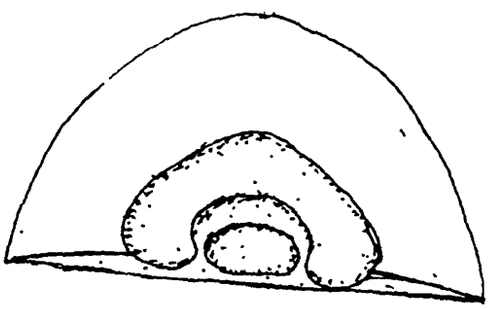

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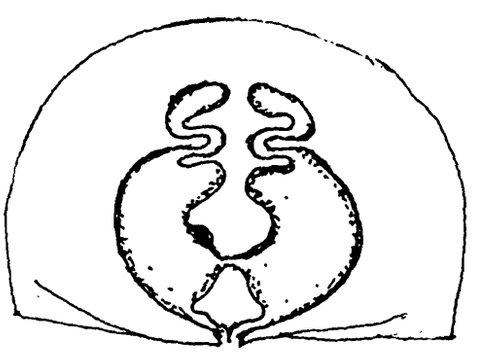

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Figs. 10-12. : (*Agroeca gangotrae*) sp. nov. ♀

10. Dorsal view (legs are omitted)

11. Epigyne

12. Internal genitalia

larger in size and pearly white in colour. Markings along the radial furrows are very faint. Sternum heart-shaped, pointed behind. Maxillae longer than wide, stout and with pubescence. Labium moderate size with hair. Chelicerae covered with dense hair and with eleventh teeth on outer margin and nine teeth on inner margin. Legs are long, stout and covered with hair and spines.

Abdomen : Oval in shape, covered with spine-like hair, light brown in colour. Dorsum of the abdomen covered with broad and small white patches. Two pairs of sigilla present. Lateral side of the dorsum with deep brown longitudinal patches. Epigyne with characteristic features.

Type species : Holotype female, paratype five females preserved in rectified spirit (70%). Registration numbers are 5588-89/18.

Type-locality : Forest area *ca* 3 K.M. from Sandar on Chaubata Road, Dist. Pitoragarh, Uttaranchal, India, 19.xii.1989 (1900 Mtrs.), coll. *S. C. Verma.*

Distribution : India : Uttaranchal, Pittorogarh, Elsewhere : New England.

Remarks : Agroeca gangotrae Sp. nov. is closely related to Agroeca ornata Bank due to their morphological characters but differs of the two such as (1) Size, length, colour and abdominal ornamentation of two varied. (2) Presence of eleventh teeth on outer and nine teeth on inner margin of chelicerae in Agroeca gangotrae Sp. nov. but no such in Agroeca ornata Bank. (30 Epigyne and internal genitalia are also structurally different.

Genus ***Gnaphosa*** Latreille

1804. *Gnaphosa* Latreille, *Nouv. Dict. Hist. Nat.*, **24** : 134.
1948. *Gnaphosa* : Kaston, *Bull. Conn. St. goel. nat. Hist. Surv.*, **70** : 1-87.
1966. *Gnaphosa* : Tikader, *Rec. Indian Mus.*, **59**(4) : 439.
1982. *Gnaphosa* : Tikader, *Fauna of India*, Araneae : Spiders, **2**(2) : 329.

Diagnosis : Cephalothorax nearly oval and broader in front, not attenuated. Pattern of widening streaks diverging from short fovea. Anterior row of eyes procurved occupying one third to one-half width of head. Posterior row considerably longer than anterior row and rather strongly recurved, madians irregular in outline, larger than laterals and further than each other. Sternum oval, pointed behind. Chelicerae not strong, inner margin with a prominent chitinous ridge, whose edge is concave and serrated. Outer margin with two teeth. Legs uniform in colour as carapace. Abdomen black or deep brown with generally six faint marks or impressions dorsally. Male palp with a strong single tibial apophysis.

Type-species : *Gnaphosa lucifuga* (Walckenaer)

Distribution : Europe, Asia, Africa, America.

5. ***Gnaphosa kankhalae*** sp. nov.

(Figs. 13-15)

General : Cephalothorax and legs are reddish brown, abdomen look like a leopard. Total length 10.50 mm. Carapace 4.50 mm. long, 3.00 mm. wide; abdomen 6.00 mm. long, 3.50 mm. wide.

Cephalothorax : Much longer than wide, gradually narrowing in front, convex, a prominent fovea at the middle of posterior part of the cephalothorax. Middle region of the cephalothorax comparatively light in colour, margin provided with the deep brown markings. A tuft of brownish hair present at the front of the cephalothorax. Two row of eyes, anterior row moderately recurved. Where as posterior row more or less straight or slightly procurved. Posterior median eyes comparatively large, elliptical in shape and pearly white in nature. Antero and postero lateral eyes are close to each other. Sternum nearly oval narrowing posteriorly. Broad labium not convergent in nature. Plate like maxillae with scopulae. Chelicerae strong, inner margin with very small three and outer margin with moderately big three teeth present. Legs are relatively strong, long and stout clothed with hair. Legs formulae are 4132.

Abdomen : Nearly elliptical, clothed with fine hair, beautifully ornamented with black and yellow stripes, like tiger. Ventral side pale yellow with brown dots. Three pairs of spinnerets.

Type species : Holotype female preserved in rectified spirit (70%). Registration number is 5585/18.

Type-locality : Rishikesh, Garwall Hills, Uttaranchal, India, 25.x.2003, coll. Bijan Biswas.

Distribution : India : Uttaranchal, Rishikesh.

Remarks : Gnaphosa kankhalae Sp. nov. is compared with Gnaphosa harpax Cambridge due to their morphological closeness but differs few points as such : (1) Lateral eyes of Gnaphosa harpax Camb. are equal in size where as antero and postero lateral eyes of Gnaphosa kankhalae Sp. nov. differs in size. (2) Presance of prominent sigilla is one of the remarkable abdominal characater of Gnaphosa harpax Camb. but completely absent in Gnaphosa kankhalae Sp. nov. (3) Epigyne and internal ganitalia differs accordingly in two species.

Genus ***Flanona*** Simon

1898. *Flanona* Simon, *Hist. Nat. das Araignees.*, **2**(2) : 349.

1924. *Flanona* : Gravely, *Rec. Indian Mus.*, **26** : 588.

Diagnosis : This genus contains very small spiders (Total length not more than 2.00 mm.). Eyes of the anterior row equal in size; anterior laterals pearly white and anterior row of eyes as long as

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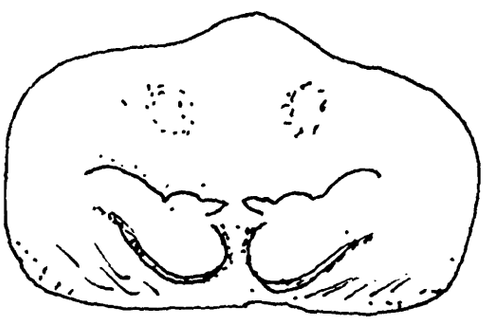

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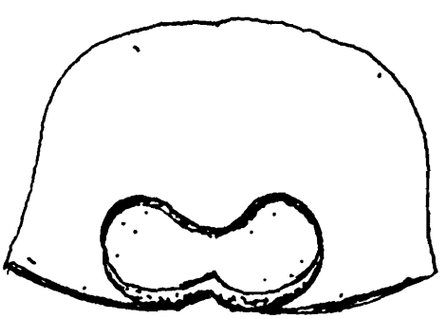

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Figs. 13-15. : (*Gnaphosa kankhalae*) sp. nov. ♀

13. Dorsal view (legs are omitted)
14. Epigyne
15. Internal genitalia

the second row. Space enclosed between posterior eyes much wider behind than in front and long. Anterior and posterior spinnerets equal in length and apical pieces of both short and round.

Type-species : *Flanona puellula Simon*

Distribution : Sri Lanka.

6. ***Flanona harduarae*** sp. nov.

(Figs. 16-18)

General : Cephalothorax is moderately brown where as abdomen brownish black and legs are yellowish brown with deep alternate bands. Total length 8.00 mm. Carapace 3.50 mm. long, 2.50 mm. wide; abdomen 4.50 mm. long, 3.00 mm. wide.

Cephalothorax : Longer than wide, convex, cephalic region abruptly narrow in front. Two rows of eyes both are slightly recurved. Postero-median eyes larger than antero-median eyes. Posterior row of eyes are pearly white in nature. Eyes are with black rim. Quad is wider than long. Centre of cephalic region provided with a distinct fovea and radiate few deep brown bands towards the marginal side. Sternum heart-shaped, pointed behind, deep brown colour and provided with hair. Labium brown, wide, tapers towards base. Maxillae broader at the distal end. Legs are long and slender with hair and spines. Legs formulae are 4231.

Abdomen : Longer than wide, anterior part of abdomen is abruptly taper. Dorsum of the abdomen clothed with fine hair. Ventral side of the abdomen is comparatively pale with brown patches at the middle region. Both pair of spinnerets are same size, short and round.

Type species : Holotype female preserved in rectified spirit (70%). Registration number is 5587/18.

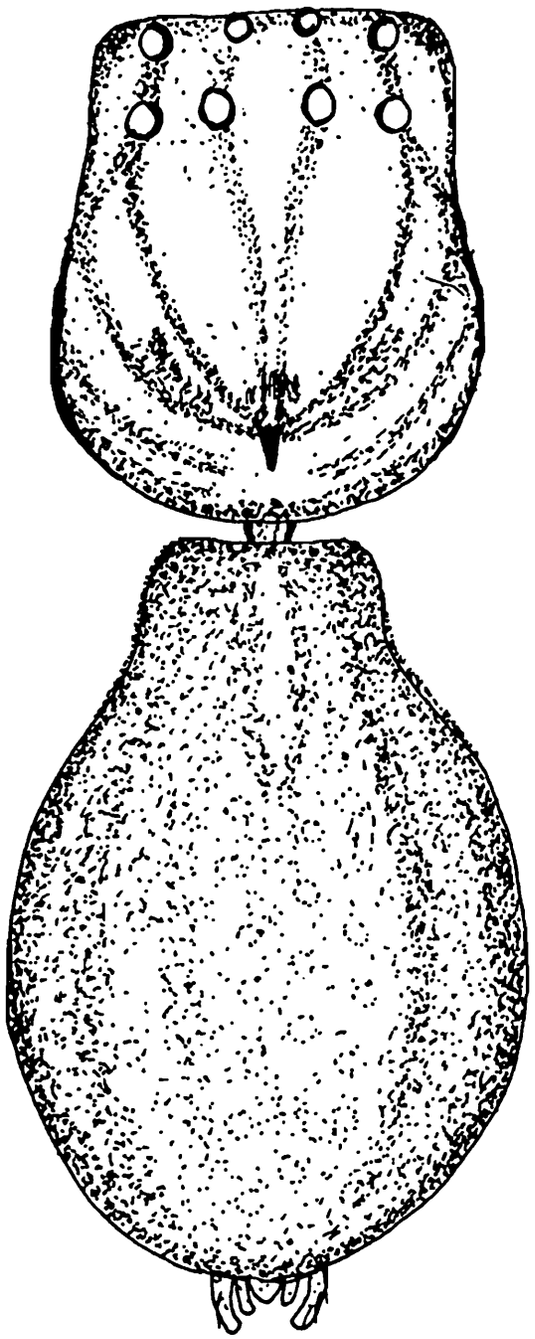
Type-locality : Copta, Chamoli, Garwall Hills, Uttaranchal, India, 19.vi.1978, coll. R.N. Bhargav.

Distribution : India : Uttaranchal, Copta; Chameli, Elsewhere : Sri Lanka.

Remarks : This species is closely similar to *Flanona puellula* Simon but differs from few points (1) The size of the body of *Flanona harduarae* Sp. nov. bigger than *Flanona puellula* Simon (2) Spinnerets are dissimilar in size (3) Epigyne and internal genitaalia are also structurally different.

SUMMARY

Six new species of spiders are described in this paper. Most of the species were collected from Uttaranchal, India. The new species belong to six genera under the families Dictynidae, Salticides, Thomisidae, Clubionidae, Gnaphosidae and Lycosidas. Out of the six genera, three genera as such *Lathys, Agroeca* and *Flanona* are the first time recorded from Indian Sub-continent and also from South East Asia.



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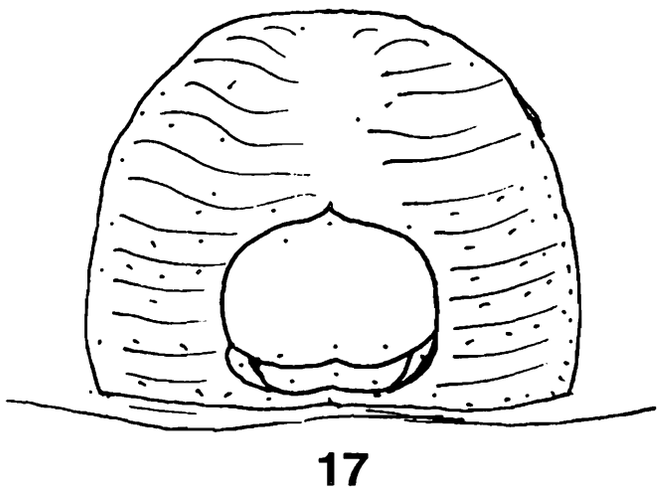

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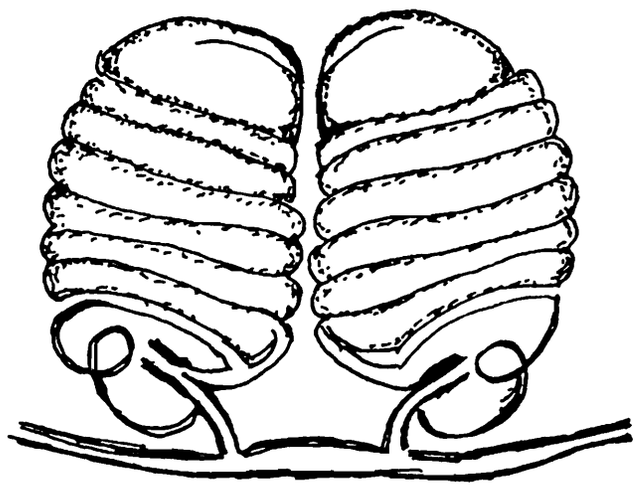

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Figs. 16-18. : (*Flanona harduarae*) sp. nov. ♀

16. Dorsal view (legs are omitted)
17. Epigyne
18. Internal genitalia

ACKNOWLEDGEMENT

Our sincere thanks to Dr. J.R.B. Alfred, Director, Zoological Survey of India for preparation of this paper.

REFERENCES

Biswas Bijan and Roy Rakhi. 2004. Description of a new species of spider genus *Pachygnatha* Sundevall (Araneae : Tetragnathidae) from India. *Rec. zool. Surv. India*, **103**(3-4) : 183-185.

Biswas Bijan and Roy Rakhi. 2005. Description of three new species of spiders of the genera *Thomisus* Walk., *Cheiracanthium* Koch, C.L. and *Tinus* Cambridge of the families Thomisidae, Clubionidae and Pisauridae from India. *Rec. zool. Surv. India*, **105**(3-4) : 37-42.

Biswas Bijan and Biswas Kajal. 2006. *Fauna of Arunachal Pradesh.* Part-2, Araneae : Spiders *State Fauna Series No.* **13** : 491-518.

Biswas Bijan and Biswas Kajal. 2007. *Fauna of Mizoram,* Araneae : Spiders, *State Fauna Series No.* **14** : 455-475.

Chamberlin, R.V. and Gertsch, W.J. 1858. *The Spider Family Dictynidas in America North of Maxico* : 25.

Comstock, J.H. 1940. *The Spider Book, :* 1-729.

Gravely, F.H. 1924. *Rec. Indian Mus.*, **26** : 588.

Kaston, B.J. 1980. *How to know the Spiders,* : 218-219.

Koch. 1845. *Die. Arachn.*, **13** : 56.

Simon. 1884. *Bull. Sec. Zool. France*, **9** : 321.

Simon. 1898. Hist. *Nat. des Araignees.*, **2**(2) : 349.

Tikader, B.K. 1966. *Rec. Indian Mus.*, **59**(4); 439.

Tikader, B.K. 1970. Spider Fauna of Sikkim, Araneae : Spiders, *Rec. zool. Surv. India*, **64**(1-4) : 1-83.

Tikader, B.K. 1980. *Fauna of India,* Araneae : Spiders, **1**(1) : 1-247.

Tikader, B.K. and Biswas Bijan. 1981. Spider Fauna of Calcutta and vicinity, *Rec. zool. Surv. India, Occ. Pap. No.* **30**(1) : 1-149.

Tikader, B.K. 1982. *Fauna of India,* Araneae : Spiders, **2**(1-2) : 1-533.

Rec. zool. Surv. India : **108**(Part–1) : 59-61, 2008

A NEW SPECIES OF *DIETA* SPIDER (ARANEAE : PHILODROMIDAE) FROM JABALPUR, MADHYA PRADESH, INDIA

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INTRODUCTION

The genus *Dieta* was established by Simon, 1880 with the type species *Dieta parnassia* Simon. Since the establishment of the genus Tikader (1980) in the *Fauna of India, Spiders*, described three species from India.

A new species *Dieta kanishkai* sp. nov. is being described herein from Jabalpur. The genus also being reported here for the first time from Madhya Pradesh. The type-specimen will be deposited in due course in the National Collection, Zoological Survey of India, Kolkata.

Dieta kanishkai sp. nov.

General : Cephalothorax, legs and abdomen light yellowish green. Total length 6.00 mm. Carapace 2.40 mm. long 2.20 mm. wide; abdomen 4.00 mm. long 2.00 mm. wide.

Cephalothorax : Slightly longer than wide, cephalic region abruptly narrowing in front and the base of cephalothorax comparatively narrow; thoracic region uniform in colour. Eyes black and bases of all eyes provided with prominent silivery tubercles. Both the eye rows recurved. Anterior row of eyes strongly recurved and shorter than the posterior row, anterior medians smaller than the adjacent laterals and equidistant to each other. Posterior row to eyes slightly recurved, posterior medians smaller than the adjacent laterals and closer to each other than to posterior laterals. Ocular quad slightly longer than wide and as wide behind as in front as in fig. 1. Clypeus provided with two fine hairs like spines directed forward. Legs I and II longer than III and IV and cylindrical, clothed with fine long hair like spines and hairs. Tibiae and metatarsi of I and II legs provided with four pairs of ventral long spines. End of tarsi provided with well developed claw-tufts. The prolateral distal extremity of I tibiae not provided with a brown conspicuous patch.

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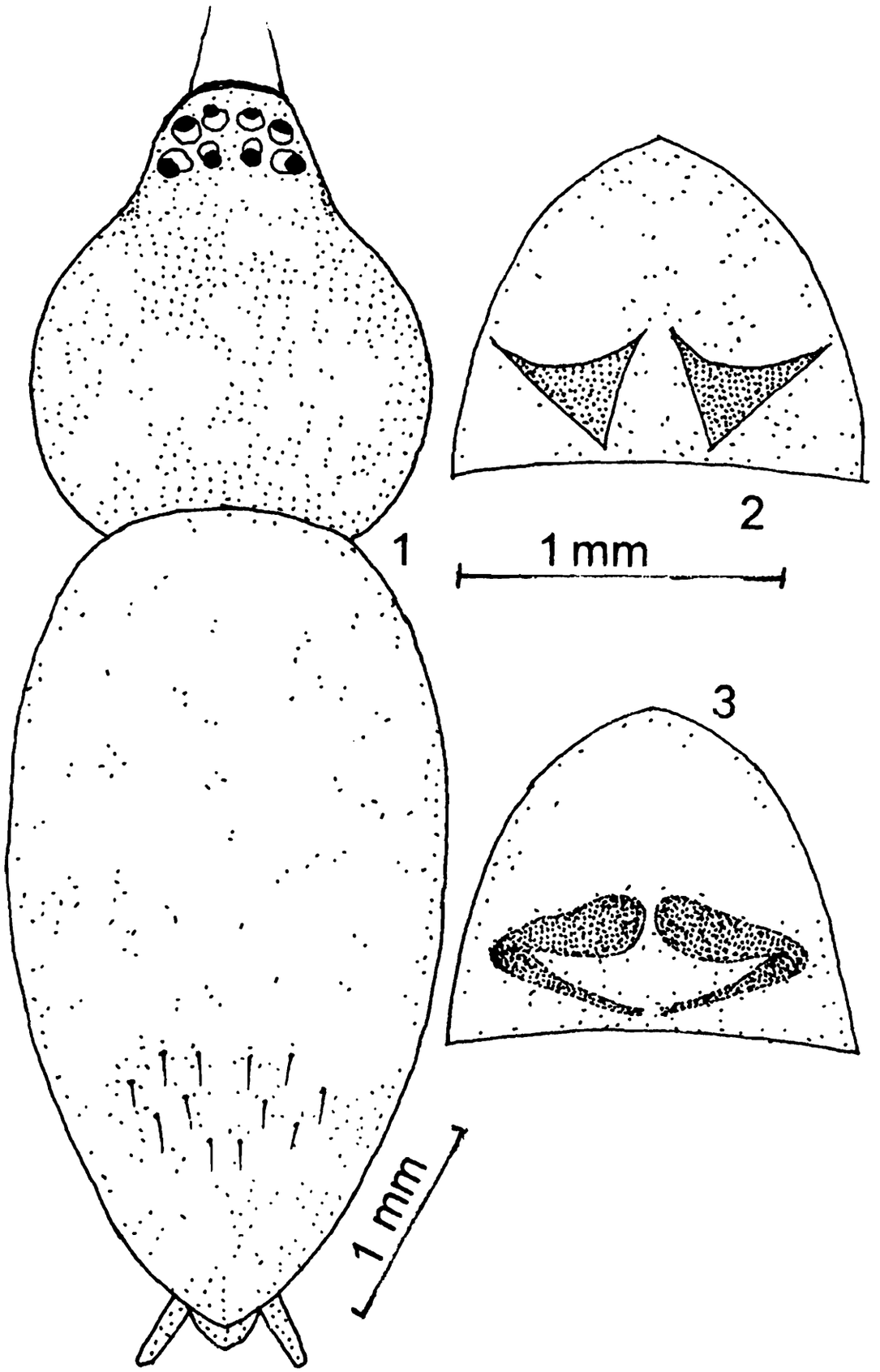

Figs. 1-3 : *Dieta kanishkai* sp. nov.; 1. Dorsal view of female, legs omitted. 2. Epigyne. 3. Internal genitalia

Abdomen : Long, narrow, tapering behind, slightly overlapping in front of cephalothorax, clothed with fine hairs and some spine like short hairs, uniform. Ventral side uniform light in colour. Spinnerets situated at the posterior tip of the abdomen. Epigyne as in fig. 2. Internal genitalia as in fig. 3.

Type-specimen : *Holotype* female in spirit, other details as above.

Type-locality : Tilwaraghat, Jabalpur. Coll. *U. A. Gajbe*, 2.IX.2006.

This species closely resembles *Dieta elongata* Tikader, but differs from it as follows : (i) Cephalothorax uniform but in *D. elongata* cephalothorax provided with conspicuous pink spots. (ii) The prolateral distal extremity of I tibiae provided with a brown conspicuous patch but in *D. elongata* no such patch is present. (iii) Abdomen dorsally uniform but in *D. elongata* abdomen dorsally provided with inconspicuous brown markings. (iv) Epigyne and internal genitalia also structurally different.

ACKNOWLEDGEMENTS

I am thankful to The Officer-In-Charge Zoological Survey of India, Central Regional Station, Jabalpur for facilities. Thanks also due to Shri M. E. Limje Photographer, Central Regional Station, Zoological Survey of India, Jabalpur, for typing the manuscript.

REFERENCE

Tikader, B. K. 1980. *Fauna of India, Spiders*, (Thomisidae) vol. **1**(1) : 1-247.

Rec. zool. Surv. India : **108**(Part–1) : 63-65, 2008

A NEW SPECIES OF *MISUMENA* SPIDER (ARANEAE : THOMISIDAE) FROM JABALPUR, MADHYA PRADESH, INDIA

U. A. GAJBE*

Zoological Survey of India, Central Regional Station, Jabalpur-482 002

INTRODUCTION

The genus *Misumena* was established by Latreille, 1804 with the type species *Misumena vatia* (Clerck). Since the establishment of the genus Tikader (1980) in the *Fauna of India, Spiders*, described nine species from India.

A new species *Misumena ritujae* sp nov. is being described here in from Jabalpur. The type-specimen will be deposited in due course in the National Zoological Collection, Zoological Survey of India, Kolkata.

Misumena ritujae sp. nov.

General : Cephalothorax and legs light yellowish-green, abdomen light brownish green. Total length 6.00 mm. Carapace 3.00 mm. long. 2.50 mm. wide; Abdomen 3.50 mm. long, 2.70 mm. wide.

Cephalothorax : Slightly longer than wide, narrowing in front, brown patches to lateral sides and two triangular light brown patches just below the posterior median eyes, armed with only very few short fine spines as in Fig. 1. Cephalic region slightly high. Both the eye rows recurved, anterior row of eyes more recurved than the posterior tow. Anterior row of eyes slightly recurved, anterior medians smaller than the anterior laterals and equidistant to each other. Posterior row of eyes slightly recurved, posterior medians smaller than the posterior laterals, madians closer to each other than to adjacent laterals, both the posterior and anterior lateral eyes situated on the elevated confluent black tubercles. The median ocular area longer than wide and a little narrow in front

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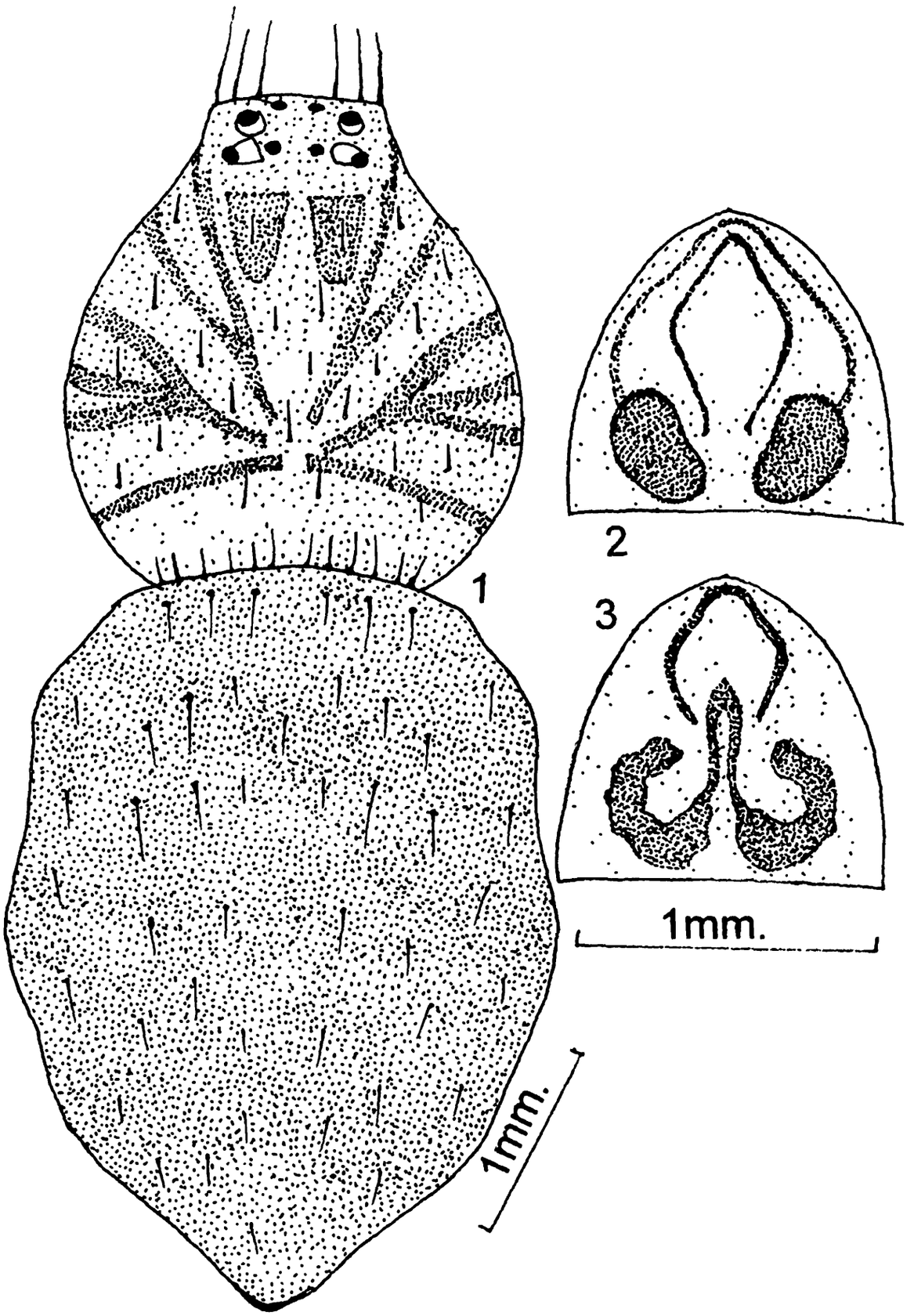

Figs. 1-3. : *Misumena ritujae* sp. nov.; 1. Dorsal view of female, legs omitted; 2. Epigyne; 3. Internal genitalia.

than behind. Clypeus high, margin provided with six long line spines Sternum heart-shaped, slightly pointed behind, clothed with tine spine like hairs. Legs I & II much longer than III & IV, clothed with conspicuous spines and fine spine like short hairs.

Abdomen : Longer than wide, broadest just behind the middle, clothed with long One spines. Ventral side light green in colour, provided with light brownish roundish spots. Epigyne as in Fig. 2. Internal genitalia as in Fig. 3.

Type specimen : *Holotype* female in spirit, other details as above.

Type-Locality : Tilwaraghat, Jabalpur, Coll. *U.A. Gajbe*, 2.IX.2006.

This species closely resembles *Misumena nicobarensis* Tikader but differs from it as follows : (i) Cephalothorax provided with light brown patches and two triangular patches but in *Misumena nicobarensis* cephalothorax provided with conspicuous broad dark brown patch to lateral sides, (ii) Abdomen uniform but in *Misumena nicobarensis* abdomen dorsally decorated with chalk-white and brown pigmented dots, (iii) Epigyne and internal genitalia also structurally different.

ACKNOWLEDGEMENTS

I am thankful to The Officer-in-Charge, Zoological Survey of India, Central Regional Station, Jabalpur, for facilities. Thanks also due to Shir M.E. Limje, Photographer, Central Regional Station, Zoological Survey of India, Jabalpur, for typing the manuscript.

REFERENCE

Tikader, B.K. 1980. *Fauna of India, Spiders*, (Thomisidae) Vol. **1**(1) : 1-247.

Rec. zool. Surv. India : **108**(Part–1) : 67-79, 2008

FOUR NEW SPECIES OF NEMATODES (NEMATODA : DORYLAIMIDA AND ISOLAIMIDA) FROM RAJASTHAN, INDIA

PADMA BOHRA AND RAZIA SULTANA

Desert Regional Station, Zoological Sruvey of India, Jodhpur (Rajasthan)

INTRODUCTION

In the present paper four new species of Plant and Soil nematodes belonging to Order Dorylaimida and Isolaimida have been described and illustrated. During survey (2005-06) to districts of Rajasthan, large number of soil samples around roots of various host plants have been collected by the first author. These samples yielded wide variety of nematodes and few species have been found as new to science out of which *Dorylaimus murlii* sp. n., *Ischiodorylaimus baqrii* sp. n., *Nygolaimus shamimi* sp. n. and one species of very rare and curious genus (*Isolaimium*) of nematodes *Isolaimium rajasthanicus* sp. n. has been described and illustrated. This genus has been reported for the first time from India.

MATERIAL AND METHOD

The nematodes were killed and fixed in hot 4% formalin and mounted on slides in anhydrous glycerine.

Dorylaimus murlii sp. n.

(Fig. 1)

Material examined : 2 females, 2 males.

Measurements : *Holotype female* : L = 2.30 mm; a = 33; b = 4.9; c = 15.9; c' = 4.1; V = 44; odontostyle = 29 µm; odontophore = 35 µm; guiding ring = 18µm. pharynx = 465 µm; prerectum = 205 µm; rectum = 40 µm; tail = 145 µm; anal body width = 35 µm.

Paratype female (n = 1) : L = 2.37 mm; a = 45; b = 4.8; c = 14.7; c' = 6.4; V = 46; odontostyle = 30 µm; odontophore = 31 µm; guiding ring = 19 µm; pharynx = 485 µm; prerectum = 194 µm; rectum = 40 µm; tail = 161 µm; anal body width = 25 µm.

Paratype males (n = 2) : L = 2.40-281 mm; a = 35; b = 5; c = 109-122; c' = 4.1; T = 50-55; odontostyle = 32 µm; odontophore = 34-36 µm; guiding ring = 19-20 µm; pharynx = 465-550 µm; prerectum = 300-325 µm; spicules 54-58 µm; lateral guiding pieces = 18-20 µm; ventromedian supplements 24-28; tail = 22 µm; anal body width = 35-40 µm.

Female : Body slightly ventrally curved in posterior half upon fixation, tapering at both ends, more in the anterior region. Cuticle finely straited transversally, marked with 32-34 longitudinal lines, its thickness 4-8 µm (thickest at tail). Lateral hypodermal chords about 1/3rd-1/4th of body width near middle. Ventral body pores distinct 7-9 in oesophageal region and below oesophageal region 10-11 ventral body pores. Lip region narrower than body, marked with slight depression. Amphids stirrup shaped; their apertures 6-7 µm from anterior end and occupying 60-66% of corresponding body-width. Fussus 15 µm from amphidial slits. Odontostyle 2.1-2.4 of lip-region width; odontostyle aperture 6-9 µm or 20-25% of odontostyle length. Guiding ring located at 1.5-1.6 lip region width from anterior extremity. Odontophore 1.0-1.2 times odontostyle length. Nerve ring encircles slender part of pharynx at 150-155 µm or 34-36% of neck length from anterior end. Basal expanded part of pharynx occupying 42-55% of neck length. Cardia 12 × 12 µm, conoid with rounded tip. Oesophageal gland nuclei and their orifices are as given below :

DO = 58.43-58.95; DN = 59.00-59.50; DO-DN = 0.55-0.57; S_1N_1 = 62.23-63.50; S_1N_2 = 72.90-73.45; S_2O = 79.43-80.51; S_2N = 80.95-81.00.

Vulva a transverse slit; Vaigna 25-26 µm across the body or about 1/4th to 1/3rd of the body width, with moderately sclerotized distal region. Reproductive system amphidelphic, uterus and oviduct separated by sphincter; oocytes arranged first in single row then in double rows and in multiple rows in germinal region. Prerectum 5.8-6.0 and body-with long. Rectum 0.77-1.1 anal body-width long. Tail elongate conoid with rounded terminus, 4.1-5.3 anal body-width long; with 2 caudal pores on each side.

Male : Similar to female in general morphology except in tail shape and reproductive system. Spicules 2.1-2.4 anal body-width long medially. Lateral guiding pieces well developed, 18-20 µm long. Supplements consists of an adanal and 24-28 contiguous series of ventromedians. Copulatory muscles extending beyond supplement region. Prerectum 8.1-8.5 anal body-width long. Tail short, bluntly rounded, 0.88-0.92 anal body-width long, 2 caudal pores on each side.

Type specimens : Collected in September 2005. Holotype female along with one paratype male and one paratype female and male on slide no. IV/1944-45.

Type habitat and Locality : Collected from soil around roots of jowar (*Sorghum vulgare*) at district Alwar, Rajasthan, India.

Discussion : *Dorylaimus murlii* sp. n. differs from *Dorylaimus siddiqii* Ahmad & Jairajpuri, 1982 in having longer body length and spicules, shorter odontostyle, anteriorly situated vulva,

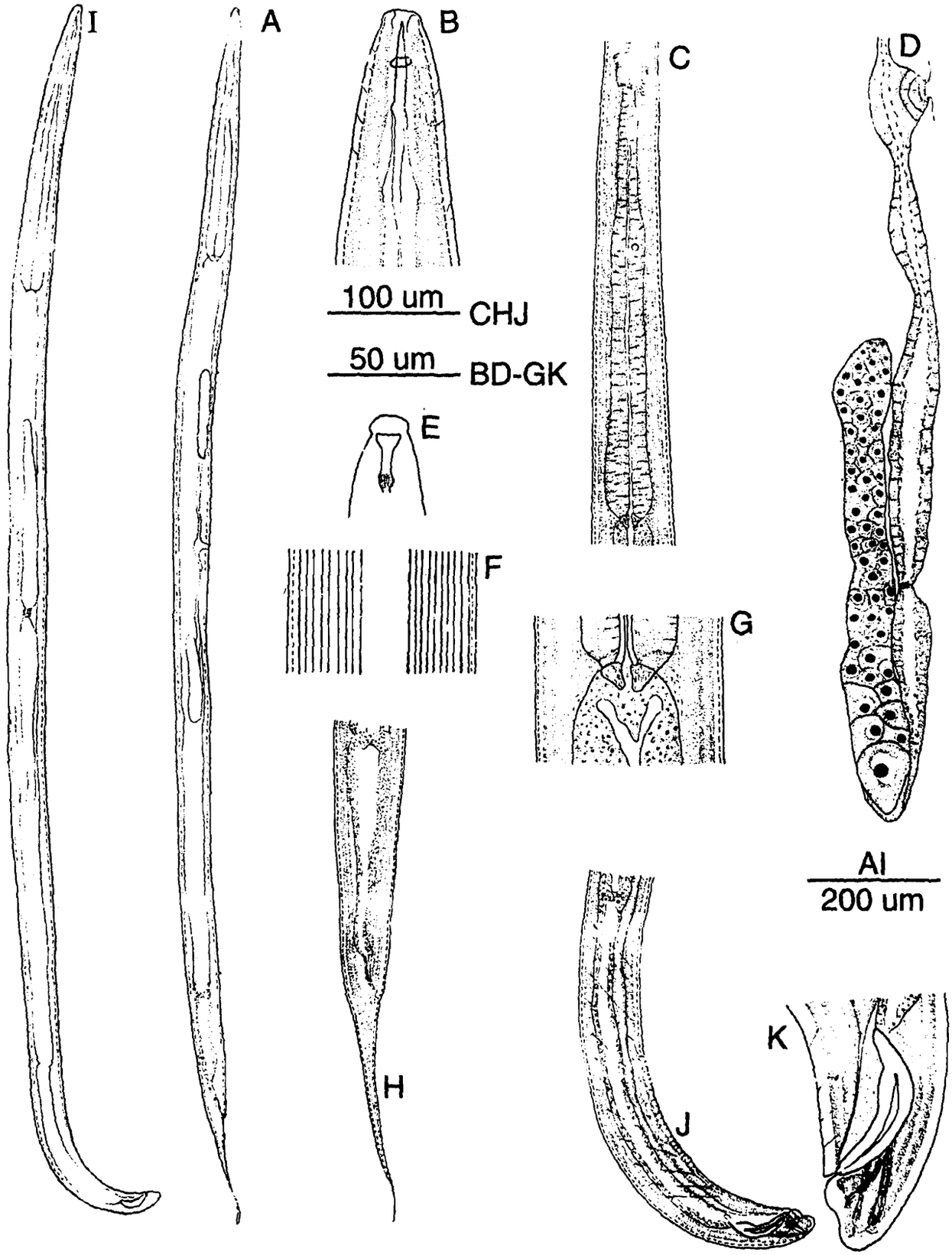

Fig. 1. *Dorylaimus murlii* sp.n. Female (A-H) A : Entire female, B : Anterior end, C : Pharynx, D : Posterior genital Branch of female, E : Amphid, F : Longitudinal Lines, G : Cardiac Region, H : Posterior end of tail. Male (I-K) I : Entire male J-K : Posterior end of Tail.

lesser number of ventromedian supplements in male (L = 2.17-2.23 mm; odontostyle = 37 µm; V = 49; spicules 50-51 µm; ventromedian supplements 31-34 (32) in *D. siddiqii*).

Dorylaimus murlii sp. n. differs from *Dorylaimus thornei* Andrassy, 1969 in having shorter body length, odontostyle and absence of vulval papillae (L = 2.7-2.8 mm; odontostyle 40 µm; a pair of vulval papillae on each side of vulva in *D. thornei*).

Ischiodorylaimus baqrii sp. n.

(Fig. 2)

Material examined : 1 females, 2 males.

Measurements : *Holotype female* : L = 3.05 µm; a = 38; b = 4.3; c = 15; c' = 5.2; V = 45; odontostyle = 44µm; odontophore = 45 µm; guiding ring = 23 µm; pharynx = 705 µm; prerectum = 245 µm; rectum = 50 µm; tail = 228 µm; anal body width = 47 µm.

Paratype male (n = 2) : L = 2.70 mm; a = 37; b = 4.0; c = 77.2; c' = 0.81; T = 55; odontostyle = 44 µm; odontophore = 44 µm; guiding ring = 22 µm; pharynx = 674 µm; prerectum = 325 µm; spicules = 85 µm; lateral guiding pieces = 13 µm; ventromedian supplements = 21 + 5 + 15; tail = 35; anal body width = 43 µm.

Female : Body slightly ventrally curved in posterior half upon fixation, tapering more in posterior region. Cuticle finely striated transversely, marked with 42 longitudinal lines, its thickness 3-5 µm; (thickest at tail). Lateral hypodermal chords about 1/3rd of body-width in middle. Ventral and dorsal body pores 10-22 in pharyngeal region respectively. Lip region narrower, marked by depression. Amphids stirrup-shaped, their apertures 10 µm from anterior end and occupying 58% of corresponding body-with. Fussus 20 µm from amphidial slits. Odontostyle 2.4 lip region-width long; aperture 15 µm or 34% of odontostyle length. Guiding ring located at 1.2 lip region-width from anterior end. Odontophore 0.9-1.0 odontostyle length. Nerve ring encircles slender part of pharynx at 1% from anterior end. Basal expanded part of oesophagus occupies 49-52% of nect length. Cardia conoid with rounded tip 10 × 9 µm. Oesophageal gland nuclei and their orifices are as given below :

DO = 59.50-60.00; DN = 60.23-61.00; DO-DN = 0.73-1.00; S_1N_1 = 68.23-68.95; S_1N_2 = 73.90-74.10; S_2O = 80.00-81.15; S_2N = 81.95-82.00.

Vulva a transverse slit; 42 µm across or about 1/5th of corresponding body-width. Reproductive system amphidelphic. Uterus and oviduct separated by sphincter. Prerectum 5.2 anal body-width long. Rectum 1.0 anal body width long. Tail elongate conoid with rounded terminus 5.2 anal body width long, bent dorsally.

Male : Similar to female in general morphology except tail shape and reproductive system. Spicules 1.9 µm anal body-width long medially. Lateral guiding pieces well developed, 13 µm

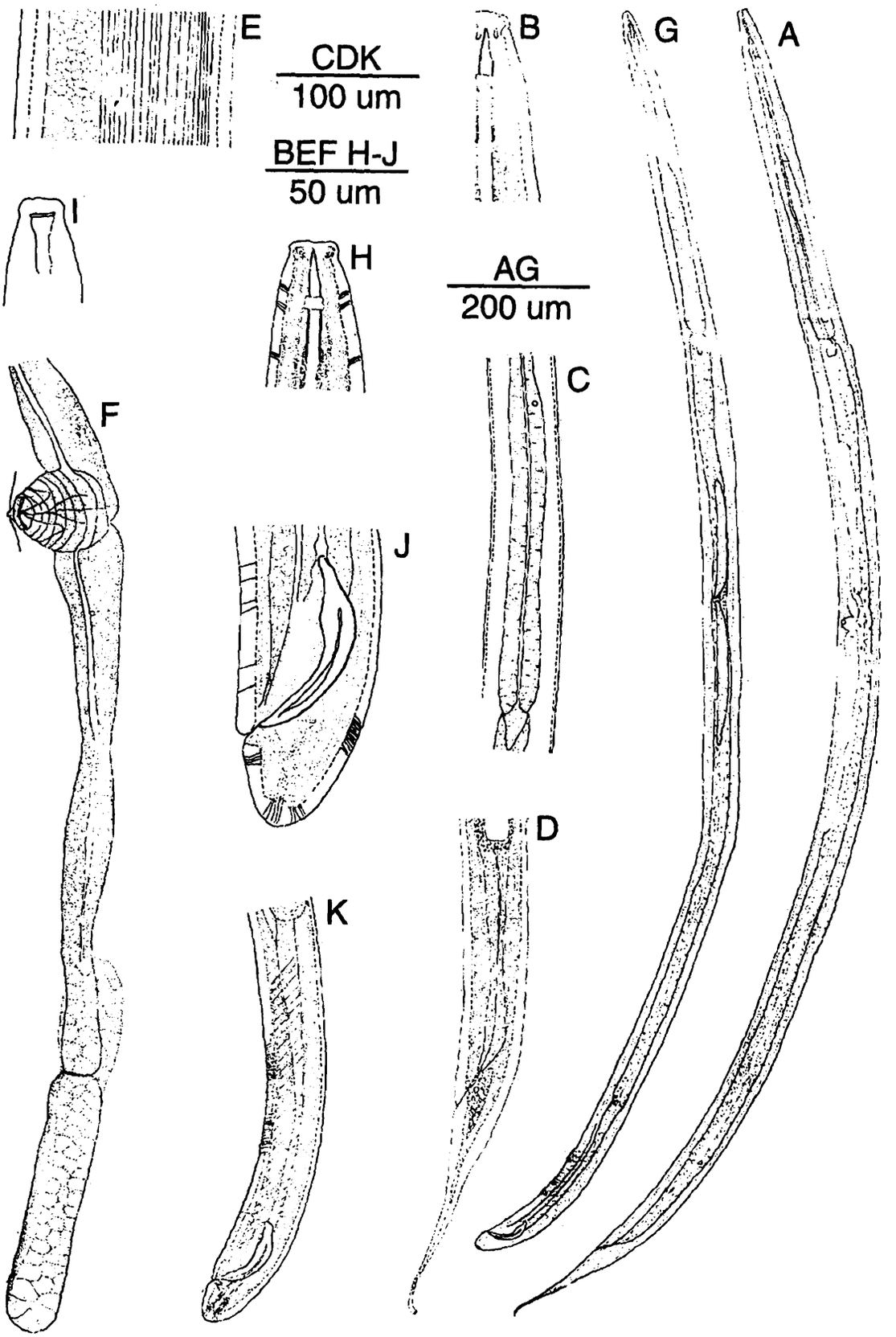

Fig. 2. *Ischiodorylaimus baqrii* sp.n. Female (A-F) A : Entire female, B : Anterior end, C : Pharynx, D : Posterior end of female, E : Posterior genital Branch of female.
Male (G-K) G : Entire male, H : Anterior end, I : Amphid, J-K : Posterior end of mail.

long. Supplements consist of an adanal and (21 + 5 + 15) ventromedians; arranged in two fassicles while five irregularly spaced supplements presents in between two fassicle. Subventral papillae arranged irregularly. Copulatory muscles in 69-70 bands, extending beyond supplements region. Prerectum 7.7 anal body-width long; begins before the region of ventromedian supplements. Tail short bluntly rounded, 0.81 anal body-widths long.

Type specimens : Collected during month of September, 2005 at Dholpur. Holotype female on slide no. IV/1943 and two paratype males on slide no. IV/1944.

Type habitat and Locality : Collected from soil around roots of Pearl millet. (*Pennisetum sativa*) at district Dholpur, Rājasthan, India.

Discussion : *Ischiodorylaimus baqrii* sp. n. differs from *Ischiodorylaimus rathori* Bohra & Baqri, 2005 in having longer odontostyle, tail and spicules and greater number of ventromedian supplements. Length of body is almost same (odontostyle 39-41 µm; tail 146-212 µm in females; spicules 65-75 µm and ventromedian supplements consisting of two groups 21-24 and 3-4 irregularly spaced supplements lying in between *Ischioddorylaimus rathori*).

From *Ischiodorylaimus paraugandanus* Khan & Ahmad, 1994 the new species differs in having shorter body length, odontostyle and spicules; greater number of ventromedian supplements (L = 4.91 mm; odontostyle 54-56 µm; female tail 321 µm; spicules 94-112 µm; lateral guiding pieces 20-22 µm; ventromedian supplements 36-38 in *Ischiodorylaimus paraugandanus*).

The new species also differs from *Ischiodorylaimus cognatus* Andrassy, 1983 in having shorter body length; tail and spicules and arrangement and number of ventromedian supplements (L = 4.0-4.3 mm; tail 70-80 µm in females; spicules 90-92 µm and ventromedian supplements consisting of two groups and eleven separated one lying in between in *T. cognatus*).

Nygolaimus shamimi sp. n.

(Fig. 3)

Material examined : 5 females.

Measurements : *Holotype female* : L = 1.05 mm. a = 42; b = 3.8; c = 58; V = 40; tooth = 4 µm; pharynx = 275 µm; prerectum = 25 µm; rectum = 17 µm; tail = 18 µm; anal body-width = 18µm.

Paratype female (n = 4) : L = 1.09-1.13 mm; a = 42-43; b = 3.2-3.8; c = 54-68; V = 40-43; tooth 3-4.5; pharynx = 277-279 µm; prerectum = 25-27 µm; rectum = 15-16 µm; tail = 16-20 µm; anal body-width = 17-19 µm.

Female : Body almost straight upon fixation; tapering towards both extremities. Cuticle 2-4 µm thick (thickest at tail). Lateral hypodermal chords 1/3rd-1-4th of body diameter. Lip region distinctly set off from body contour. Lips rounded. Amphids cup-shaped; at 7 µm from anterior end, with slit like apertures occupying 46-47% of corresponding body width. Tooth 3-4.5 µm; deltoid type.

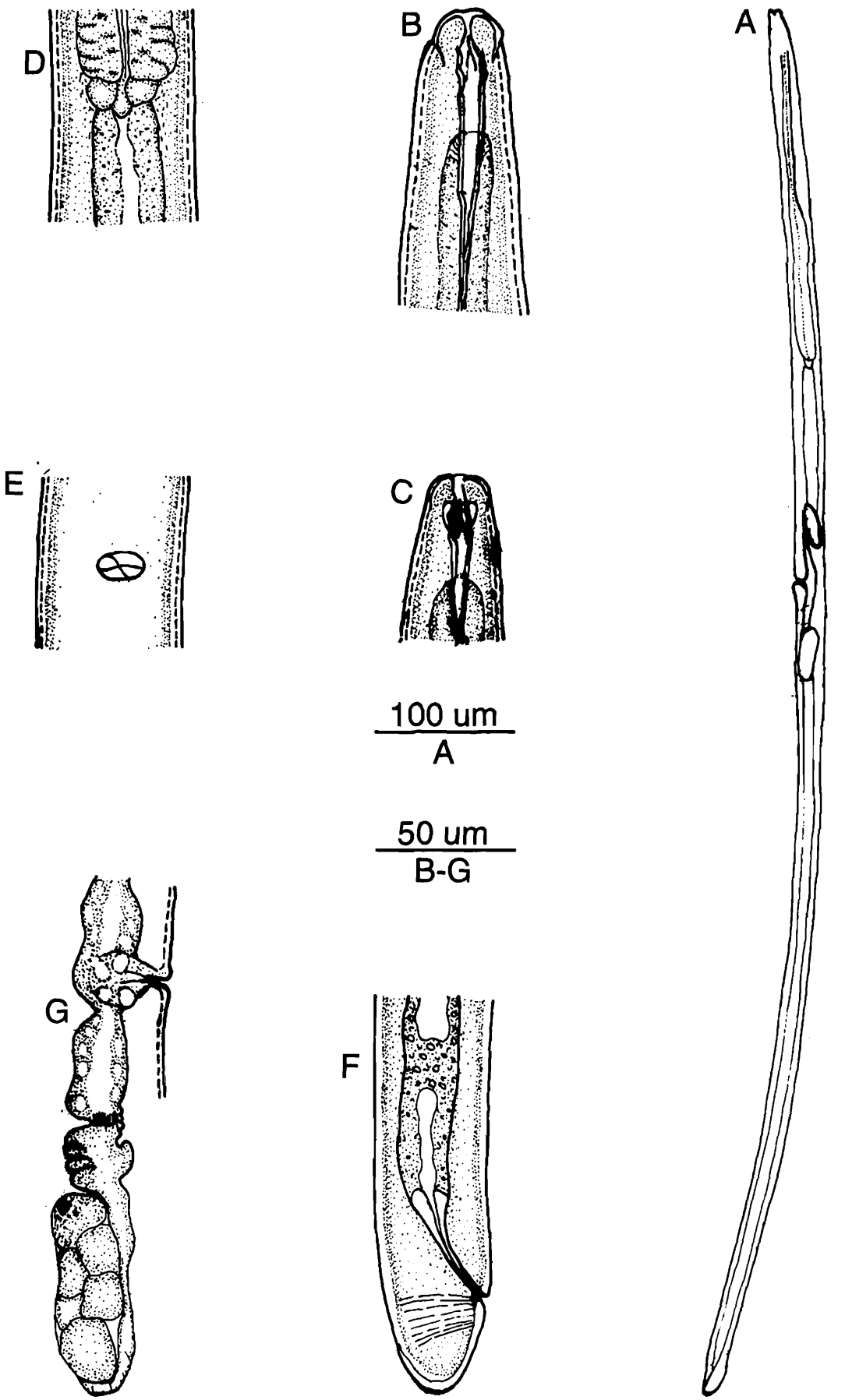

Fig. 3. *Nygolaimus shamimi* sp.n. A : Entire female, B : Anterior end, C : Amphid, D : Cardiac Region, E : Vulval Opening (Ventral View), F : Posterior end of tail, G : Posterior genital branch of female.

(Ventral arm longer). Nerve ring at 31-32% of neck length. Basal expanded part of pharynx occupying about 54-58% of neck length, with somewhat constriction near its middle. Cardia small, conoid, 5-6 × 10-11 µm long. Cardiac glands present at oesophago-intestinal junction.

Vulva a transverse slit. Vagina not distally sclerotized and 30% of corresponding body width. Female reproductive system amphidelphic, both genital branches are equally developed. Oviduct separated from uterus by a sphincture. Prerectum 1.3-1.4 and rectum 0.9 anal body width long. Tail rounded conoid 0.9-1.0 of anal body width.

Male : Not found.

Type specimens : Holotype female along with four paratype females mounted on slide No. IV/1942.

Type habitat and Locality : Collected from soil around roots of Sagwan at Chikani village, district Alwar, Rajasthan.

Discussion : The *Nygolaimus shamimi* sp. n. can be characterized in having lip region demarcated by constriction, lips rounded, labial papillae not elevated; tooth deltoid, 3-4.5 µm long, ventral arm longer; basal expanded part of oesophagus with somewhat constriction near its middle. Both genital branches are equally developed; vagina not distally sclerotized. Prerectum 1.3-1.4 anal body diameter. Tail conoid with rounded terminus, 0.9-1.0 anal body diameter long.

Nygolaimus shamimi sp. n. differs from very closely related *Nygolaimus captivitatis* (Heyns, 1968) Ahmad & Jairajpuri, 1982 in having smaller tooth; anteriorly situated vulva, tail conoid with rounded terminus (tooth 8 µm prerectum 1.2-1.3; tail bluntly convex-conoid in *Nygolaimus captivitatis*).

Isolaimium rajasthanicus sp. n.

(Fig. 4)

Material examined : 1 male, 2 juvenile females.

Measurements : *Holotype male* (1) : L = 3.8 mm; a = 60; b = 15.5; c = 65.5; c' = 1.0; Stoma = 90 µm; pharynx = 245 µm; nerve ring = 157 µm; spicules = 52 µm; gubernaculum = 12 µm; anal body width = 54 µm; tail = 58 µm.

Paratype (Juvenile) females (2) : L = 2.4-3.5 mm; a = 43-61; b = 8.9-14.5; c = 75.7-76.9; nerve ring = 132-189 µm; rectum = 26-33 µm; anal body with = 33-39 µm; tail = 33-46 µm.

Male : Body slender, 63 µm wide at midbody, open c-shaped, ventrally curved upon fixation. Cuticle 3 µm thick at midbody, 6 µm thick at tail region, marked by about 65 fine longitudinal lines. Transverse lines indistinct. Body uniformly tapering towards anterior end. Lateral chords prominent, 6 µm wide. Lip region continuous with body contour. Lips closely amalgamated. Six prominent cuticularised tubes surround stomal aperture. Amphids funnel-shaped, aperture distinct.

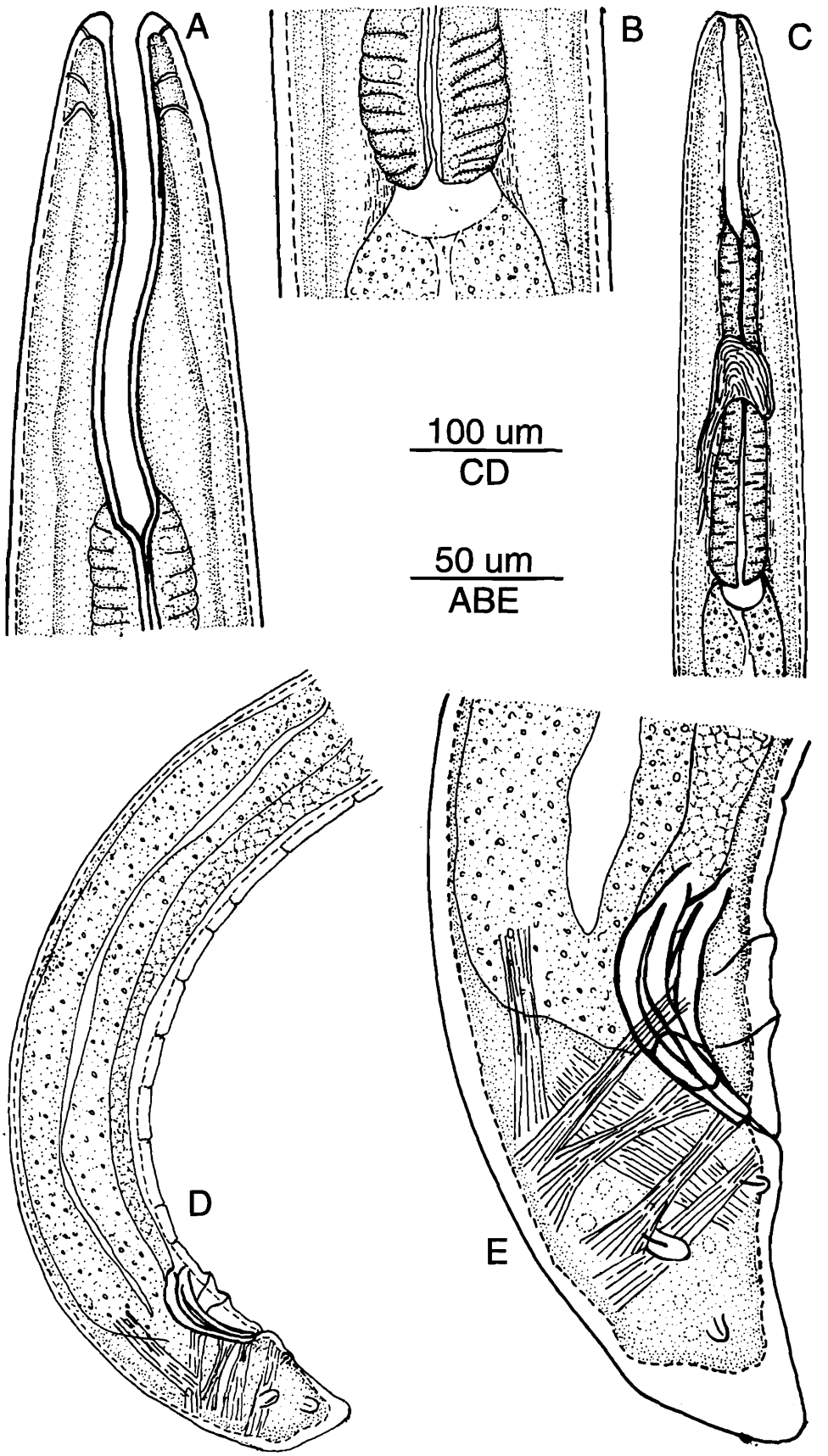

Fig. 4. *Isolaimium rajasthanicus* sp.n. A : Anterior end, B : Cardiac region, C : Pharynx D-E : Posterior end.

Stoma tubular with sclerotized walls more near anterior end, 6 µm wide, 36.7% of total pharynx length, 2.3% of entire body length. Posterior 7 µm parts of stoma surrounded by pharyngeal tissue. Body at pharyngeal base 3.3 times as wide as lip region diameter. Expanded part of pharynx occupies 63.2% of total pharyngeal length. Cardia 10 µm long. Intestine vacuolated with narrow lumen. Spicules cephalated, robust, ventrally arcuate, internally divided and 0.9 value smaller than anal body-width. Gubernaculum parallel to spicules, with posterior apophysis. Posterior end of body provided with seventeen midventral supplements with distinct innervations and irregularly spaced. Tail one anal body-width, long, with 2 pairs precloacal papillae and three pairs postcloacal papillae.

Remarks : The two juvenile females were collected but they are not completely mature hence it can not be said with certainty about their reproductive organ whether it is monodelphic or didelphic.

Type Specimens : Holotype male mounted on slide No. IV/1826. Two juvenile females mounted on Slides No. IV/1827-1829. Type specimens deposited in the National Zoological Collection at Zoological Survey of India, Jodhpur.

Type habitat and Locality : Collected from soil around roots of mausami (*Citrus* sp.) at Chikani, district Alwar, Rajasthan, India; collected by the first author during September, 2005.

Discussion : *Isolaimium rajasthanicus* sp. n. is characterized by having a 3.8 mm long body; cuticle wihout punctation, abount 65 longitudinal lines; 90 µm long stoma; male with 52 µm long, cephalated, internally divided spicules; presence of 17 midventral supplement, two pairs precloacal papillae and three pairs postcloacal papillae.

Isolaimium rajasthanicus sp. n. is close to *Isolaimium nigeriense* Timm, 1969 in body size but differs from it in having a greater b-value (15.5 *vs* 11.8-12.7), a greater c-value (65.5 *vs* 44-60), shorter spicules (52 *vs* 72-80 µm), cuticle without punctation (*vs* punctation distinct), smaller number of longitudinal lines (65 *vs* 100-120), greater number of midventral supplements (17 *vs* 6-7) and lesser number of caudal papillae (three *vs* four pairs postcloacal papillae).

Isolaimium rajasthanicus sp. n. differs from *Isolaimium collare* Andrassay, 2001 in having longer body size (3.8 *vs* 2.1 mm); greater b and c-value (b = 15.5 *vs* 10.0, c = 65.5 *vs* 63); longer stoma (90 *vs* 80 µm), absence of papilla on ventral side of neck (*vs* two large papilla on ventral side of neck region); longer spicules (52 *vs* 42-45 µm) and greater number of precloacal midventral supplements (17 *vs* 2). Andrassy (2001) also described *Isolaimium collare* on single holotype male in that case females were found juvenile.

The new species differs from *Isolaimium multipapillatum* Timm, 1969 in having smaller a-value (63 *vs* 70-78), absence of punctated cuticle (*vs* longitudinal and transverse striation froms large round distinct punctation); internally divided spicules (*vs* spicules without internal division, non-cephalated 54-56 µm long); and greater number of precloacal midventral supplements (17 *vs* 10-14).

The new species differs from *Isolaimium stictochroum* Timm, 1961 in having smaller body length (3.8 *vs* 4.1 mm); smaller c-values (65.5 *vs* 77.6-106); smaller stoma (90 *vs* 108-160 µm); cuticle smooth (*vs* presence of transverse striation and longitudinal lines consisting of rows of fine dots); longer spicules (52 *vs* 54-67 µm); smaller gubernaculum (12 *vs* 16-28 µm) and greater number of midventral supplements (17 *vs* 3 to 7).

The new species differs from *Isolaimium papillatum* Cobb, 1920 in having smaller body length (3.8 *vs* 4.7-4.9 mm); smaller a, b and c-value (60.3 *vs* 84-90, 15.5 *vs* 18.1-19.0 and 65.5 *vs* 87-99 respectively); smooth cuticle (*vs* prominent annulation with fine dots on tail); smaller spicules (52 *vs* 60-65 µm) and greater number of midventral supplements (17 *vs* 5).

Remarks : Isolaimium Cobb, 1920 is a rare genus of rather uncertain taxonomic position. Timm (1969) proposed a separate order, Isolaimiida, of it, which occupies a position between the orders Dorylaimida and Trichosyringida. Andrassy (1976) regarded it to belong to the order Dorylaimida, suborder Mermithina and superfamily Isolaimoidea. Swart and Henys (1991) retained Isolaimiida as a separate order, probably most closely related to Dorylaimida. The family Isolaimidae Timm, 1969 contains the only genus *Isolaimium.*

Although, together with the new member, 12 valid species have been described so far, they are uncommon and occur so scarcely that *Isolaimium* remains taxonomically one of the most problematic genera of the "Dorylaimida"

The *Isolaimium* species and their distribution are as follows :

I. africanum	Hogewind & Heyns, 1967 (syn. *I. multistriatum* Hogewind & Heys, 1967)—Belgium, Ethiopia, South Africa.
I. andrassyi	Hogewind & Henys, 1967—Italy
I. californicum	Timm, 1969—United States (California)
I. Collare	Andrassy, 2001—Tanzania
I. conicum	Andrassy, 1970—Ivory Coast
I. giganticum	Nesterov, 1973—Hungary, Moldavia
I. hamatispiculatum	Bernard, 1985—United States (Tennessee)
I. incus	Hogewind & Heyns, 1967—Congo Republic, south Africa
I. multipapillatum	Timm, 1969—United States (?Alabama, Georgia, South Carolina, Maryland)
I. nigeriense	Timm, 1969—Nigeria
I. papillatum	Cobb, 1920—Hungary, United States (Virginia, Kansas)
I. stictochroum	Timm, 1961—Bangladesh.

SUMMARY

The present paper reports four new species of Plant and Soil nematodes belonging to Orders Dorylaimida and Isolaimida. *Dorylaimus murlii* sp. n. can be characterized in having 2.30-2.81 mm long body; lip region narrower than adjoining body, marked with slight depression; dorsal body pores in pharyngeal region; odontostyle 29-30 µm long; odontophore 34-36 µm long; guiding ring 18-20 µm from anterior end; amphidelphic reproductive system; prerectum 5.8-6.0 anal body widthh long; rectum 0.77-1.1 anal body width hlong; female tail elongate conoid with rounded terminus, 4.1-5.3 anal body width long with 2 caudal pores; spicules 54-58 µm long; lateral guiding pieces 18-20 µm; ventromedian supplements 24-28 contiguous; male tail short bluntly rounded, 0.88-0.92 anal body width long; 2 caudal pores on each pores. *Ischiodorylaimus baqrii* sp. n. can be characterized in having 2.70-3.05 mm long body; lip region narrower than adjoining body; dorsal and ventral body pores 10-12 in pharyngeal region respectively; odontostyle 44-45 µm long; odontophore 44-45 µm long; guiding ring 22-23 µm from anterior end; females amphidelphic; prerectum 5.2 anal body width long; rectum about one anal body width long; female tail elongate conoid with rounded terminus, 5.2 anal body width long; bent dorsally; spicules 85 µm long; lateral guiding pieces 13 µm long; ventromedian supplements arranged in two fassicles 21 + 5 + 15, five irregularly spaced ventromedian supplements between two fassicles; male tail short, bluntly rounded, 0.81 anal body width long. *Nygolainus shamimi* sp. n. can be differentiated in having 1.09-1.13 mm long body; lip region distinctly set off from body; tooth deltoid, 3-4.5 µm long; female reproductive system amphidelphic; prerectum 1.3-1.4 anal body width long; rectum 0.9 anal body width long; tail rounded conoid, 0.9-1.0 anal body width long. *Isolaimium rajasthanicus* sp. n. can be characterized in having 3.8 mm long body; lip region continuous with body contour; lips closely amalgamated; six prominent cuticularised tubes surrounds stomal aperture; stoma tubular; vacuolated intestine with narrow lumen; spicules 52 µm long, cephalated, robust, ventrally arcuate, medially divided; gubernaculum parallel to spicules with posterior apophysis; ventromedian supplements with distinct innvervations and irregularly spaced; tail one anal body width long; with 2 pairs precloacal papillae and three pairs of post cloacal papillae. The description of a recently described species *Isolaimium collare* Andrassy (2001) is also based on holotype male specimen because mature females in this genus is generally uncommon.

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REFERENCES

Ahmad, W. and Jairajpuri, M.S. 1982. Some new and known species of Dorylaimoidea. *Nematologica*, **28** : 39-61.

Andrassy, I. 1969. Taxonomische der familien-Prodorylaimidae en fam. Und Dorylaimidae de Man, 1876. *Opusc. Zool., Budapest* **9**, 187-233.

Andrassy, I. 1976. Evolution as a base for the systematization of Nematodes. *Pitman Publ. Ltd., London,* 288 pp.

Andrassy, 1983. The free-living nematode fauna of the Hortobagy National Park. In : *The fauna of Hortobagy National Park Budapest*, 31-46.

Andrassy, I. 1988. The Superfamily Dorylaimoidea (Nematoda)—a review. Family Dorylaimidae. *Opusc. Zool. Budapest,* **23** : 6-63.

Andrassy, I. 2001. Some species of curious genera of the class Penetratia (Nematoda). *International Journal of Nematology,* **11** : 43-57.

Cobb, N.A. 1920. One hundred new nemas. *Contribution to a science of Nematology,* **9** : 217-343.

Heyns, J. 1968. A monographic study of the nematode families Nygolaimdia, a new family of doyrlaimoid nematodes. *Entomology Mem. Dep. Agric. Tech. Serv. Repub. S. Afr.,* **10** : 51 pp.

Khan, T.H. and Ahmad, W. 1994. Descriptions of *Ischiopareugandanus* sp. n. and Tylencholaimus asymmetricus sp. n. (Nematoda : Dorylaimida) from India. *Indian J. of Nematology,* **24** (2) : 206-210.

Bohra, P. and Baqri, Q.H. 2005. Two new species of Dorylaimida (Nematoda) from India. *Indian Journal of Nematology,* **2** : 107-111.

Timm, R.W. 1961. The systematic position of Isolaimium Cobb, 1920 (Nematoda), with a description of a new species. *Journal of the Bombay Natural History Society,* **58** : 302-304.

Timm, R.W. 1969. The genus Isolaimium Cobb, 1920. (Order Isolaimida, Isolaimiidae new family). *Journal of Nematology*, **1** : 97-106.

Rec. zool. Surv. India : **108**(Part–1) : 81-90, 2008

RECORD OF THE GENUS *PERISTENUS* FOERSTER (HYMENOPTERA : BRACONIDAE) FROM INDIA, WITH DESCRIPTIONS OF FOUR NEW SPECIES

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INTRODUCTION

The genus *Peristenus* is easily distinguished by the reduction of vein M+CU1 of the forewing, the short submarginal cell of the forewing, the short and more or less curved ovipositor and sides of petiole meeting ventrally at the base. *Peristenus* species arc koinobiont endoparasitoids of nymphs and adults of Miridae and Lygaeidae. The early instar nymph is parasitized and the mature parasite larva emerges from either the mature host nymph or adult. (Shaw, 1985 & 1988; Chen and van Achterberg, 1997). *Peristenus* was recently removed from synonymy in *Leiophron* and includes a natural assemblage of species distinct from *Leiophron* (Loan and Bilewicz-Pawinska, 1973). *Peristenus* has been revised for the Palearctic (Loan, 1974a) and Nearctic (Loan, 1974b) regions. A key to the Ethiopian species was provided by Nixon (1946). Shaw (1985) described the phylogeny of the genus *Peristenus* Foerster. Chen and van Achterberg (1997) were currently revised the genus from China.

The genus *Peristenus* is represented by only three species from Indo-Australian region *i.e.*, *P. helopeltidis* (Ferriere) from Java, *P. levigatus* Chen and van Achterberg from Yunnan and *P. pallipes* (Curtis) from Taiwan and Yunnan. In the present work this genus is recorded for the first time from India with descriptions of four new species.

METHODS

The material was collected from various regions in India by using sweeping nets. The dried specimens were mounted on triangular cards observations and illustrations were done using the

drawing tube under SV11 Zeiss steriozoom microscope. Measurements were taken with the help of ocular micrometer fitted in one of the two eyepieces of the binocular microscope.

The terminology for the various parts and wing venation is after van Achterberg (1993) while Eady (1968) has been followed for description of surface-sculpture. The following abbreviations are used in the text : AOL = Anterior ocellar line (distance between the inner edges of anterior and lateral ocelli), POL = Posterior ocellar line (distance between the inner edges of lateral ocelli), OOL = Ocello ocular line (distance from the outer edge of a lateral ocellus to the compound eye), ∅OD = Ocellus diameter, F = Flagellomere; ZDAMU = Insect collection, Zoology Department, Aligarh Muslim University.

Key to the Indian species of *Peristenus* Foerster (Females)

1. First metasomal tergite 2.2x its apical width; length of eye in dorsal view as long as temple; scutellar sulcus deep laterally margined with one median carina. ..... *P. nitidus* Shamim & Ahmad, sp. nov.

– First metasomal tergite 1.5-1.8x its apical width; length of eye in dorsal view 1.8-3.0x temple; scutellar sulcus shallow and without lateral margin with one median and six weak lateral carinae. 2

2. Mesopleuron entirely coarsely punctate; face as long as wide. ..... *P. punctatus* Shamim & Ahmad, sp. nov.

– Mesopleuron medially smooth; face 2x as long as wide. 3

3. Forewing vein m-cu postfurcal, 2.55x as long as wide; hindwing 4x as long as wide; pronotum antero-dorsally narrowly punctate, medially largely crenulate, postero-ventrally smooth; width of head in dorsal view 1.1x its length. ..... *P. alami* Shamim & Ahmad, sp. nov.

– Forewing vein m-cu antefurcal, 2.7x as long as wide; hindwing almost 5x as long as wide; pronotum entirely largely crenulate; width of head in dorsal view 1.4x its length. ..... *P. indicus* Shamim & Ahmad, sp. nov.

Peristenus alami Shamim and Ahmad, sp. nov.

(Figs. 1-2)

Female : Black except head, pronotum, metasoma beyond first tergite reddish brown; antenna, clypeus and pterostigma light brownish; legs, mandibles, tegulae and post tegulae yellowish; eyes greyish; ocelli transparent; wing membrane hyaline.

Head : Width of head in dorsal view 1.1x its length, almost as wide as long; antennal segments 18; scape 1.4x as long as wide; pedicel 1.5x as long as wide; F_1 1.5x as long as F_2; length of F_1, F_2-F_4; F_5-F_{15} and F_{16} 3x, 2x, 1.5x and 2.5x their width respectively; occipital carina weak dorsally and ventrally connected to hypostomal carina; OOL; POL : AOL; ∅OD = 5 : 4 : 6 : 1.5; length of

eye in dorsal view 1.37x its width and 1.83x temple; vertex almost 2x as wide as long, sparsely punctate; trons wider than long, punctate with mid-longitudinal carina between antennal socket; face punctate, densely setose, between eyes slightly greater than eye length; intertentorial line 2.23x tentorio-ocular line; clypeus about 2x as wide as long, smooth with long sparse setae; length of malar space 1.3x basal width of mandible.

Mesosoma : Length of mesosoma 2x its height; pronotum dorsally striate, antero-dorsally narrowly punctate, medially largely crenulate, postero-ventrally smooth; precoxal sulcus finely crenulate; mesopleuron medially smooth, dorsally and ventrally punctate to foveolate; notauli well defined, broad, deep and crenulate with large foveae posteriorly; middle lobe of mesoscutum finely punctate, lateral lobes with few sparse punctures anteriorly, smooth and polished posteriorly; scutellar suture shallow and without lateral margin, with one distinct median carina and six weak lateral carinae; scutellum oval shaped and smooth; medio-posterior depression small; side of sctutellum and metanotum crenulate; propodeum anteriorly reticulate-rugose, only basally distinctly punctate with basal transverse carina.

Wings : Forewing 2.55x as long as wide; marginal cell short, almost as long as pterostigma, pterostigma about 2x as long as wide; length of vein 1-R1 0.43x length of pterostigma, equal to width of pterostigma; r small, issued behind middle of pterostigma; r : 2-SR : SR1+3-SR = 1 : 6 : 16; SR1 curved; m-cu postfurcal and cu-a postfurcal; 1-CU1 : 2-CU1 : 3-CU1 = 2 : 9 : 4.

Legs : Hind coxa smooth and shiny; length of hind femur, tibia and basitarsus 3.56x, 8.8x and 8x their width respectively; length of hind tibial spurs 0.30x hind basitarsus.

Metasoma : Length of metasoma about 2.2x as long as wide; length of first metasomal tergite 1.6x its apical width, its surface longitudinally irregularly rugose, apically distinctly widened; spiracles at middle of first metasomal tergite; rest of tergite smooth and shiny without any indication suture between 2 and 3; ovipositor sheath visible and setose; ovipositor small and curved downwards; length of ovipositor 0.55x the length of metasoma.

Body length : 5.5 mm; forewing, 2 mm.

Male : Similar to female except body length 2.55 mm, antennal segments broken apically.

Holotype : ♀, INDIA : Uttar Pradesh, Etawah, 5.iv.2004, Coll. Mohammad Shamim (ZDAMU). *Paratype* : 1♂, with same data as holotype.

Etymology : The name of this species is after the well known Indian entomologist Prof. (Late) S. M. Alam in recognition of his great contribution in taxonomy of parasitic Hymenoptera.

Remarks : The new species *Peristenus alami* sp. nov. is closely resembles to *Peristenus indicus* sp. nov. However, it differs in having (i) Antennal segments 18 (antennal segments 17 in *P. indicus* sp. nov.). (ii) Forewing vein m-cu postfurcal (forewing vein m-cu antefurcal in *P. indicus* sp. nov.).

(iii) Pronotum antero-dorsally narrowly punctate, medially largely crenulate, postero-ventrally smooth (pronotum dorsally striate, remaining largely crenulate in *P. indicus* sp. nov.). (iv) Hindwing 6x as long as wide (hindwing 5x as long as wide in *P. indicus* sp. nov.). (v) Length of ovipositor 0.55x length of metasoma (length of ovipositor 0.11x length of metasoma in *P. indicus* sp. nov.).

Peristenus indicus Shamim and Ahmad, sp. nov.
(Fig. 3)

Female : Black except head, pronotum, metasoma beyond first tergite reddish brown; clypeus, wing veins brown, legs mandibles and basal segments of antennae yellowish; apical segment of antennae brownish yellow; ocelli transparent; eyes greyish and wing membrane hyaline.

Head : Head in dorsal view 1.46x as wide as long; antennal segments 17, distinctly shorter than body (1.62 mm); scape 1.66x as long as wide; pedicel 1.5x as long as wide; F_1 1.5x as long as F_2; length of F_1, F_2-F_3, F_4-F_{14} and F_{15} 4x, 2x, 1.5x and 2x their width respectively; occipital carina weak dorsally and ventrally connected to hypostomal carina; OOL : POL : AOL : ØOD = 5 : 6 : 4 : 2; length of eye in dorsal view 1.5x its width and 3x temple; vertex 2.13x as wide as long, sparsely punctate; frons wider than long, distinctly punctuate with mid longitudinal carina between antennal socket; face densely punctate and setose, as long as wide; clypeus smooth, almost 2x as wide as long; intertentorial line 3x tentorio-ocular line; length of malar space 1.3x basal width of mandible.

Mesosoma : Length of mesosoma 1.7x its height; pronotum dorsally striate, remaining entirely largely crenulate; mesopleuron medially smooth, dorsally and ventrally crenulate to foveolate; notauli broad deep and crenulate with large foveae posteriorly; middle lobe of mesoscutum sparsely finely punctate, lateral lobes smooth; scutellar sulcus shallow, without lateral margin, with one median longitudinal carina and six weak lateral carinae; scutellum oval shape and sparsely finely punctate; medio-posterior depression small with a median carina; side of scutellum and metanotum crenulate; propodeum reticulate-rugose, only basally narrowly punctate with distinct basal transverse carina.

Wings : Forewing 2.7x as long as wide; marginal cell short, almost as long as pterostigma; pterostigma 2.3x as long as wide; length of vein 1-R1 0.35x length of pterostigma, almost equal to width of pterostigma; r short, issued just behind the middle of pterostigma; r : 2-SR : SR1+3-SR = 1 : 6 : 15; SR1 curved; cu-a postfurcal; m-cu antefurcal; 1-CU1 : 2-CU1 : 3-CU1 = 1 : 9 : 3, hind wing almost 5x as long as wide.

Legs : Hind coxa nearly smooth and shiny, length of hind femur, tibia and basitarsus 4x, 7x and 8x their width respectively; length of hind tibial spurs 0.29x and 0.33x hind basitarsus.

Metasoma : Length of metasoma 2.25x its width; length of first metasomal tergite 1.5x as long as apical width; basal width 0.5x as long as apical width, its surface rugostriate, apically distinctly

widened; spiracles at behind middle of first tergite; rest of tergite smooth and shiny without any indication suture between 2 and 3; ovipositor sheath just visible and sparsely setose; ovipositor small and curved downwards, its length about 0.11x length of metasoma.

Body length : 2.57 mm; forewing 2 mm.

Male : Similar to female except antennae 18 segmented; face wider than long; F_2-F_{10} 2x as long as wide; F_{11}-F_{15} 1.5x as long as wide, F_{16} 2.5x as long as wide; metasoma 2x its width; first metasomal tergite 1.25x its apical width.

Hologype : ♀, INDIA : Uttar Pradesh, Etawah, 6.v.2004, Coll. Mohammad Shamim (ZDAMU). *Paratype* : ♂, with same data as holotype.

Etymology : The new species refers to country name India, where type material were collected.

Remarks : The new species *Peristenus indicus* sp. nov. is closely related to *Peristenus punctatus* sp. nov. However, it differs in having (i) F_1 4x as long as wide (F_1 3x as long as wide in *P. punctatus* sp. nov.). (ii) Vein m-cu antefurcal (vein m-cu interstitial in *P. punctatus* sp. nov.). (iii) Length of vein 1-R1 0.35x length of pterostigma (length of vein 1-R1 0.46x length of pterostigma in *P. punctatus* sp. nov.).

Peristenus nitidus Shamim and Ahmad sp. nov.
(Figs. 4-5)

Female : Black except head, pronotum, metasoma beyond first metasomal tergite reddish brown; legs, mandibles, tegulae and post tegulae yellowish; antenna brown, basally paler; ovipositor sheath, pterostigma and veins brown; ocelli and ovipositor transparent; wing membrane hyaline.

Head : Width of head in dorsal view 1.5x its length; antennal segments 24, distinctly shorter than body (2.8 mm), apical segment not distinctly wider; scape 2x as long as wide, length of F_1 2.6x F_2, length of F_1, F_2, F_3-F_9, F_{10}-F_{15}, F_{16}-F_{21} and F_{22} 2.6x, 2x, 1.6x, 1.3x, 1.1x and 2x their width respectively; occipital carina weak dorsally but strong laterally and connected to hypostomal carina ventrally; OOL : POL : AOL : ∅OD = 9 : 7 : 5 : 2; length of posterior side of stemmaticum 1.4x its lateral side; eyes in dorsal view almost as long as temple; temple roundly slightly narrowed behind eyes, sparsely punctate with hairs; vertex punctate with hairs; frons densely and evenly punctate with a thin median frontal carina between antennal socket; face densely evenly punctate and largely setose, its width 1.66x its length; intertentorial line 2.2x tentorio-ocular line; clypeus nearly smooth, its width 2.5x its length; length of malar space 1.6x basal width of mandible.

Mesosoma : Length of mesosoma 2.4x its height; pronotum dorsally striate, antero-dorsally punctate, medially crenulate, postero-ventrally smooth; precoxal sulcus only medially shortly present; mesopleuron sparsely punctate, shiny surface between punctures, smooth dorsally somewhat rugose; middle lobe of mesoscutum evenly and finely punctate, lateral lobes finely punctate, anteriorly

smooth; notauli broad and crenulate with large foveae posteriorly; scutellar sulcus wide and deep, laterally margined and one distinct median carina; scutellum sparsely finely punctate, nearly cone shaped; medio-posterior depression small; propodeum reticulate-rugose, only basal part of propodeum punctate up to basal transverse carina.

Wings : Forewing 2.8x as long as wide; pterostigma 2.27x as long as wide; length of vein 1-R1 0.4x length of pterostigma and equal to width of pterostigma; r short, issued just behind middle of pterostigma; r : 2-SR : SR1+3-SR = 2 : 10 : 25; m-cu antefurcal; cu-a postfurcal; hindwing 5x as long as wide; 1-M : 1r-m : 2-SC+R = 9 : 7 : 5.

Legs : Hind coxa smooth, its length 1.4x its width; length of hind femur, tibia and basitarsus 5.1x, 9.5x and 9x their width respectively; length of hind tibial spurs 0.44x and 0.39x hind basitarsus.

Metasoma : Length of metasoma about 2.5x as long as wide; length of first metasomal tergite 2.2x (22 : 10) its apical width, basal width 0.55x (5.5 : 10) apical width, its surface reticulate-rugose, apical margin nearly smooth, apically slightly widened; spiracles behind middle of first tergite smooth and shiny without any indication suture between 2 and 3; hypopygium setose; ovipositor sheath visible, its length 0.5x ovipositor and 0.03x forewing, slender and densely setose; ovipositor distinctly curved downwards, 0.12x the length of metasoma.

Body length : 3.75 mm; forewing, 3.5 mm.

Male : Same as holotype except antennae 30 segmented and yellowish brown; mandibles, legs brown; face with comparatively less hairs.

Holotype : ♀ INDIA : Jammu and Kashmir, Poonch, 20.ix.2004, Coll. Zaheer Ahmad (ZDAMU). *Paratype* : 1♂, with same data as holotype.

Etymology : The new species name indicates its smooth hind coxae.

Remarks : The new species *Peristenus nitidus* sp. nov. is closely related to *Peristenus montanus* Chen and van Achterberg (1997). However, it differs in having (i) Length of mesosoma 2.4x its height (length of mesosoma 1.7x its height in *P. montanus*). (ii) Length of malar space 1.6x basal width of mandible (length of malar space equal to basal width of mandible in *P. montanus*). (iii) Length of first tergite 2.2x its apical width, reticulate-rugose (length of first tergite 1.7x its apical width, longitudinally irregularly rugose in *P. montanus*). (iv) Hind coxa smooth (hind coxa finely punctate in *P. montanus*). (v) Temple and vertex sparsely punctate (temple and vertex nearly smooth in *P. montanus*).

Peristenus punctatus Shamim and Ahmad, sp. nov.

(Fig. 6)

Female : Black except ovipositor sheath, clypeus, labrum, metasoma beyond first tergite and pterostigma reddish brown; mandibles, antennae, maxillary palp, legs, tegulae and post tegulae

yellowish; ocelli and ovipositor transparent; eyes greyish; wing membrane hyaline and wing veins brownish.

Head : Width of head in dorsal view 1.6x its length, antennal segments 17; antenna distinctly shorter than body (1.65 mm); scape 1.66x as long as wide; pedicel 1.5x as long as wide; length of F_1, F_2-F_3, F_4-F_{15} 3x, 2x and 1.5x their width respectively; length of maxillary palp almost 0.6x height of head; occipital carina weak dorsally; OOL : POL : AOL : ØOD = 5 : 6 : 4 : 1; length of posterior side of stemmaticum 2x its lateral side; length of eye in dorsal view 1.4x its width and 2x temple; vertex 2.1x as wide as long, sparsely punctate; frons punctate with a mid-longitudinal carina; face as long as wide with dense and long whitish pilosity; densely punctate; between eyes slightly greater than eye length; intertentorial line 2.6x tentorio-ocular line; clypeus smooth, its width 2.6x it length; malar space as long as basal width of mandible.

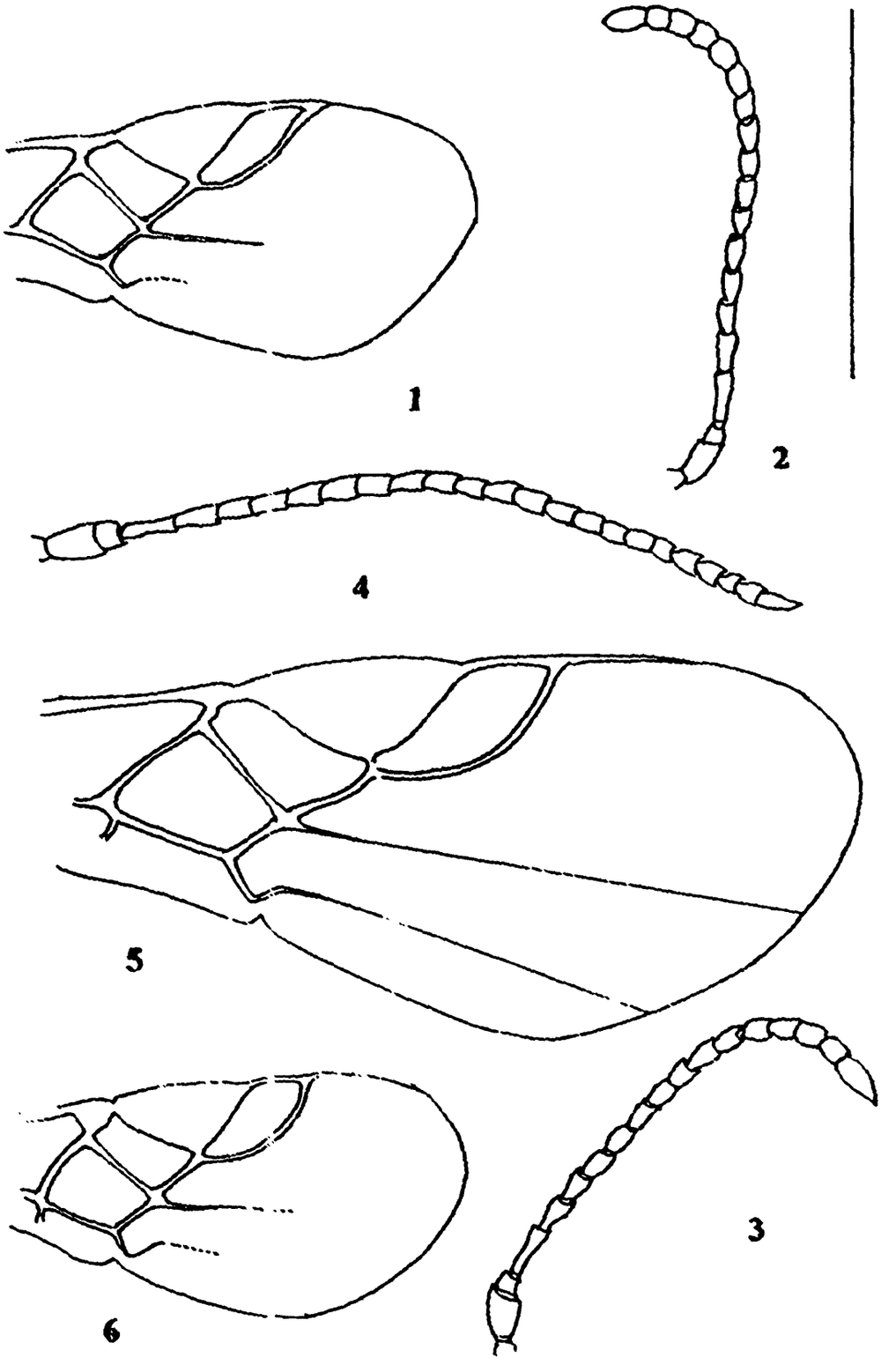
Mesosoma : Length of mesosoma 1.7x its height; pronotum dorsally striate, antero-dorsally finely punctate, medially crenulate and postero-ventrally punctate; precoxal sulcus shortly present, sparsely crenulate; mesopleuron entirely coarsely punctate; notauli broad and crenulate with large foveae posteriorly; middle lobe of mesoscutum finely punctate; lateral lobes with few sparse punctures anteriorly, smooth and polished posteriorly; scutellar sulcus shallow, without lateral margin with one median longitudinal carina and six weak lateral carinae; scutellum raised somewhat oval shaped and smooth; side of scutellum crenulate; medio-posterior depression small and oval shaped; metanotum crenulate; propodeum entirely reticulate-rugose, only basally narrowly punctate with a distinct basal transverse carina.

Wings : Forewing 2.5x as long as wide; length of vein 1-R1 0.46x length of pterostigma, equal to width of pterostigma; marginal cell short, almost as long as pterostigma; pterostigma about 2x as long as wide; r short, issued just behind middle of pterostigma; r : 2-SR : SR1+3-SR = 1 : 5 : 16; SR1+3-SR curved; m-cu interstitial; 1-CU1 : 2-CU1 : 3-CU1 = 1 : 7 : 3, 1-CU1 oblique; cu-a postfurcal and 1-SR+M straight; hindwing about 3x as long as wide; 1-M : 1-r-m : 2-SC+R = 4 : 5 : 3.

Legs : Hind coxa smooth; length of hind femur, tibia and basitarsus 3.3x, 7.5x and 6x their width respectively; length of hind tibial spurs 0.33x hind basitarsus.

Metasoma : Length of metasoma about 2.5x as long as wide; length of first metasomal tergite 1.8x its apical width, basal width 0.5x apical width, rugostriate, apically distinctly widened; spiracles at middle of first tergite; rest of tergite smooth without any indication suture between 2 and 3; ovipositor sheath small, just visible, ovipositor small and curved; length of ovipositor 0.11x length of metasoma.

Body length : 2.55 mm; forewing, 1.9 mm.



Figs. 1-2. : *Peristenus alami* Shamim & Ahmad, sp. nov.; 1. Forewing, 2. Antenna.
Fig. 3. : *Peristenus indicus* Shamim & Ahmad, sp. nov.; 3. Antenna.
Figs. 4-5. : *Peristenus nitidus* Shamim & Ahmad, sp. nov.; 4. Antenna, 5. Forewing.
Figs. 6. : *Peristenus punctatus* Shamim & Ahmad, sp. nov.; 6. Forewing.

Male : Male similar to female except length of body 2.27 mm; of forewing 1.75 mm; width of head in dorsal view 1.25x its length; length of mesosoma 2x its height; forewing 3.5x as long as wide; length of metasoma 1.8x as long as wide and F_{11}-F_{14} as long as wide.

Holotype : ♀, INDIA : Uttar Pradesh, Aligarh, 6.xi.2001, Coll. Mohammad Shamim (ZDAMU). *Paratype* : 1♂, with same data as holotype.

Etymology : The new species name indicates its mesopleuron entirely punctate.

Remarks : The new species *Peristenus punctatus* sp. nov. is closely resembles with *P. pallipes* (Curtis). However, it differs in having (i) Antennal segments 17 (antennal segments 20-25 in *P. pallipes*). (ii) Occipital carina weak dorsally but strong laterally (occipital carina strong in *P. pallipes*). (iii) Notauli broad and deep with large foveae posteriorly (notauli narrow and linear foveae in *P. pallipes*). (iv) First metasomal tergite rugostriate (first metasomal tergite striate in *P. pallipes*).

SUMMARY

The genus *Peristenus* Foerster is recorded for the first time from India. Four new species *viz.*, *Peristenus alami* Shamim & Ahmad sp. nov., *Peristenus indicus* Shamim & Ahmad sp. nov., *Peristenus nitidus* Shamim & Ahmad sp. nov., *Peristenus punctatus* Shamim & Ahmad sp. nov., are described and illustrated from India and a key to the Indian species is given.

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REFERENCES

Achterberg, C. van. 1993. Illustrated key to the subfamilies of the Braconidae (Hymenoptera : Ichneumonoidea). *Zool. Verh., Leiden*, **283** : 1-189.

Eady, R.D. 1968. Some illustrations of microsculpture in the Hymenoptera. *Proc. R. Ent. Soc. Lon.*, **43**(4-6) : 66-72.

Chen, Xue Xin and C. van Achterberg, 1997. Revision of the subfamily Euphorinae (excluding the tribe Meterorini Cresson) (Hymenoptera : Braconidae) from China. *Zool. Verh. Leiden*, **313** : 1-217.

Foerster, A. 1862. Synopsis der Families and Gattunges der Bracones. *Verh. Naturh. Ver. Preuss. Rheinl.*, **19** : 224-288.

Loan, C.C. 1974a. The European species of *Leiophron* Nees and *Peristenus* Foerster (Hymenoptera : Braconidae : Euphorinae). *Trans. R. Ent. Soc. Lond.*, **126**(2) : 207-238.

Loan, C.C. 1974b. The North American species of *Leiophron* Nees, 1818 and *Peristenus* Foerster, 1862 (Hymenoptera : Braconidae : Euphorinae). *Nat. Can.*, **101** : 821-860.

Loan, C.C. and Bilebicz-Pawinska, T. 1973. Systematics and biology of four polish species of *Peristenus* Foerster (Hymenoptera : Braconidae : Euphorinae). *Environ. Ent.*, **2**(2) : 271-273.

Nixon, G.E.J. 1946. Euphorine parasites of capsid and lygaeid bugs in Uganda (Hymenoptera : Braconidae). *Bull. Ent. Res.*, **37** : 113-129.

Shaw, S.R. 1985. A phylogenetic study of the subfamilies Meteorinae and Euphorinae (Hymenoptera : Braconidae). *Entomography*, **3** : 277-370.

Shaw, S.R. 1988. Euphorine phylogeny : the evolution of diversity in host-utilization by parasitoid wasps (Hymenoptera : Braconidae). *Eco. Ent.*, **13** : 323-335.

Rec. zool. Surv. India : **108**(Part–1) : 91-95, 2008

A NEW SPECIES OF *ANCYLOTROPUS* CAMERON (HYMENOPTERA : EUCHARITIDAE) FROM INDIA

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INTRODUCTION

The genus *Ancylotropus* was erected by Cameron (1909) based on the type species *Ancylotropus cariniscutis* Cameron. This genus was treated briefly by Narendran & Sheela (1995) and Boucek (1988). Based on their phylogenetic position, members of the genus *Ancylotropus* Cameron are probably parasites of Ponerinae in the tribe Ectatommini (Heraty, 2002). They are distributed in Palaeotropical region through the Malagasy subregion to western Malaysia. Five species are known from all over the world of which 3 species were reported from Oriental region including 1 species from Indian subcontinent. These 5 species are *A. cariniscutis* Cameron from Oriental region, *A. ivondroi* (Risbec) from Malagasy region, *A. manipurensis* (Clausen) from Oriental region (Indian subcontinent), *A. montanus* (Girault) from Oriental region and *A. seyrigi* (Risbec) from Malagasy region (Heraty, 2002, Girish Kumar, 2004 and Noyes, 2004). In this paper one new species is described from Muthanga reserve forests in the Kerala part of Western Ghats. Heraty (2002) placed the undescribed species in the couplet No. 2 of his key to species of *Ancylotropus* Cameron of the world. All the type specimens are deposited in the 'National Zoological Collections' of the Zoological Survey of India, Kolkata (NZSI).

The following abbreviations are used in the text :

F1-F9–Funicular segments 1 to 9; Gt1–Gastral tergum1; MV–Marginal vein; NZSI–'National Zoological Collections' Zoological Survey of India, Kolkata; OOL–Ocellocular line; PMV–Postmarginal vein; POL–Postocellar line; SMV–Submarginal vein; SSS–Scutoscutellar sulcus; STV–Stigmal vein.

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1. ***Ancylotropus keralensis*** Girish Kumar and Narendran sp. nov.
(Figs. 1-4)

Holotype : Female : Length 3.83 mm. Head, mesosoma and petiole black with metallic green refrigence; antenna pale yellowish brown but for yellow scape and pedicel; mandible pale brownish yellow with tip of teeth brown; eyes blackish brown; anterior ocellus reflecting brown, posterior ocelli reflecting bown; legs pale brownish yellow except coxae brownish black; claws brown; wings hyaline without any infumation around stigma, veins brown; gaster blackish brown.

Head : Transverse subtriangular (Fig. 2), 1.27x as broad as high excluding mandibles; in dorsal view 5.50x as broad as its median length including median ocellus (Fig. 3); OOL as long as POL; vertex smooth with few striations; frons with few strong transverse striations; gena and sides of lower frons with minute scattered pits; labrum 8 digitate; clypeal and supraclypeal area smooth; tentorial pit deep; vertex and frons with sparse hairs; eyes bare, separated by 1.64x their height. Antenna (Fig. 1) 12 segmented; scape cylindrical, not reaching front ocellus; relative proportions of length and width of antennal segments : scape : 3.1; pedicel : 1.1; F1 : 2.4; F2 : 4.1; F3 : 3.7; F4 : 4.1; F5 : 3.3; F6 : 5.1; F7 : 4.6; F8 : 3.4; F9 : 3.12; clava : 3.

Mesosoma : Mesoscutum and scutellum including posteriorly projecting horn with close rugoso-alveolate sculpture and moderately pubescent, interstices carinate; SSS transversely carinate; scutellum with a single horn directed straight posteriorly, almost rounded at apex (Fig. 3); callus and propodeal disc with felt like pilosity; mesepimeron with sparse pilosity; median length from SSS to apical tip of scutellar horn in dorsal view 1.31x basal width (excluding axillae) of scutellum; scutellar horn almost at the same plane of scutellum and not tilted upwards; propodeum (Fig. 4) rugulose; mesopleuron almost fully sculptured except at the anterodorsal angle; coxae sparsely pubescent; femora moderately pubescent; pubescence on tibiae and tarsi denser than those on femora. Fore wing (Fig. 1) 2.75x as long as broad, 1.76x length of mesosoma (including length of scutellar horn); fore wing densely pubescent except basal cell sparsely pubescent; SMV 1.47xMV; MV 1.58x PMV; PMV 3.42x STV; hamuli 3 in number.

Metasoma (Fig. 1) : Petiole shorter (0.72x) than hind femur, 0.61x length of gaster, with longitudinal striations; Gt_1 triquetrous, smooth and shiny.

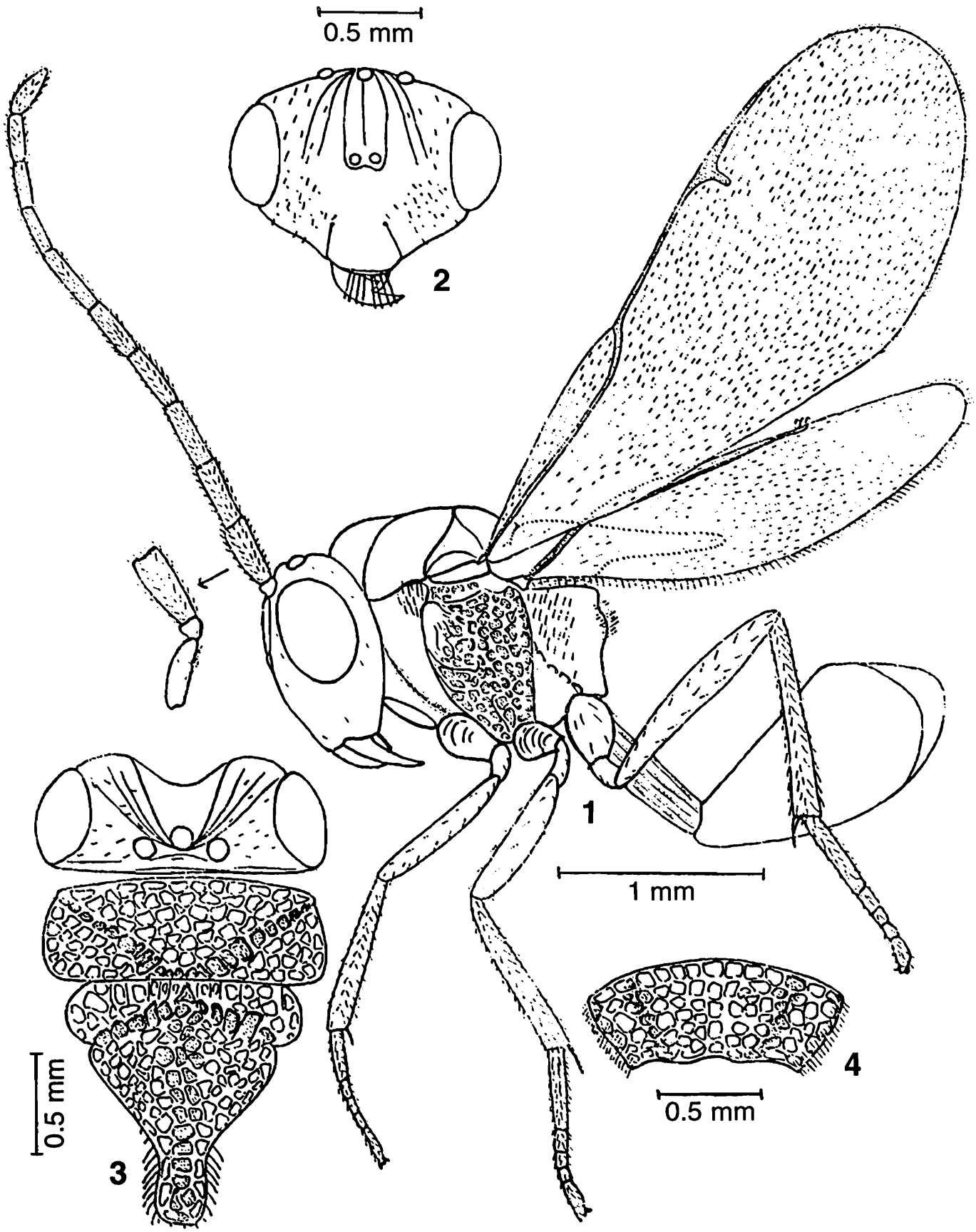
Male : Unknown.

Host : Unknown.

Biology : Unknown.

Variation : Scutellar process almost rounded to slightly incised; hamuli 3-5 in number; eyes blackish brown to pale brown and ocelli reflecting yellow to brown.

Distribution : India (Kerala).



Figs.1-4. : *Ancylotropus keralensis* Girish Kumar and Narendran sp. nov. Female. 1. Body profile; 2. Head front view; 3. Head and mesosoma dorsal view; 4. Propodeum.

Etymology : The species is named after the state from where the type specimens are collected.

Material examined : *Holotype* : Female, INDIA : Kerala; Wayanad Dt.; Muthanga reserve forest (11°44' N 76°29' E); Narendran T.C and Party, 7.v.2000, 9991/H3 (NZSI). *Paratypes* : 1 Female, same data of holotype, 9992/H3 (NZSI). 1 Female, same data of holotype except collection date, 6.v.2000, 9993/H3 (NZSI).

Discussion : This new species resembles to *A. manipurensis* (Clausen) in having : (1) Antenna 12 segmented; (2) Scape not reaching median ocellus; (3) Mesosoma with shallow, close, rugoso-alveolate sculpture on mesoscutum and scutellum and sparsely pubescent; (4) Gastral petiole distinctly shorter than hind femur. However this new species differs from *A. manipurensis* in having : (1) Gt_1 triquetrous (In *A. manipurensis* Gt_1 bivalved); (2) Scutellum with posterior horn almost rounded or atleast slightly incised (In *A. manipurensis* scutellum with posterior horn deeply incised at apex); (3) Scutellar horn almost at the same plane of scutellum and not tilted upwards (In *A. manipurensis* scutellar horn tilted upwards about 30° on horizontal axis of scutellum); (4) Frons with a few strong transverse striations (In *A. manipurensis* frons smooth with weak longitudinal striations on upper part joining vertex); (5) Fore wing hyaline without any infuscation around STV (In *A. manipurensis* fore wing with an infuscation around STV); (6) Head 1.27x as broad as high (excluding mandibles) (In *A. manipurensis* head 1.43x as broad as high (excluding mandibles)); (7) Eyes separated by 1.64x their height (In *A. manipurensis* eyes separated by 2.50x their height).

SUMMARY

A new species of *Ancylotropus* Cameron viz., *Ancylotropus keralensis* Girish Kumar and Narendran sp. nov. is described from India and their affinities are discussed.

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REFERENCES

Boucek, Z. 1988. Australasian Chalcidoidea (Hymenoptera). A Biosystematic Revision of Genera of Fourteen Families with a Reclassification of species. Wallingford : C.A.B. International, 832 pages.

Cameron, P. 1909. On two new genera and seven species from Borneo. *Entomologist* **42** : 229-234.

Girish Kumar, P. 2004. A review of Family Eucharitidae (Hymenoptera : Chalcidoidea) of Indian subcontinent. *In* Perspectives on Biosystematics and Biodiversity. Prof. T.C. Narendran Commemmoration Volume. Edited by Rajmohana K. *et al.* 627-646.

Heraty, J.M. 2002. A revision of the genera of Eucharitidae (Hymenoptera : Chalcidoidea) of the world. *Mem. Amer. Ent. Insti.* Vol. **68** : 1-367.

Narendran, T. C. and Sheela, S. 1995. A systematic study of the Oriental genus *Ancylotropus* Cameron (Hymenoptera : Eucharitidae). *Uttar Pradesh J. Zool.* **15** : 43-47.

Noyes, J.S. 2004. Universal Chalcidoidea Data Base. The Natural History Museum London. Website : http://www.nhm.ac.uk/entomology. Chalcidoidea.

Rec. zool. Surv. India : **108**(Part–1) : 97-99, 2008

FURTHER RECORD OF OCCURRENCE OF *RANATRA TITILAENSIS* HAFIZ & PRADHAN (RANATRINAE : NEPIDAE : HEMIPTERA)

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INTRODUCTION

The genus *Ranatra* Fabricius, distributed throughout the world except in New Zealand, has 120 species globally (Mahner, 1993), of which 12 species are known from India (Thirumalai, 1999; 2007). The present note deals with the record of occurrence of *Ranatra titilaensis* Hafiz & Pradhan from Jabalpur District of Madhya Pradesh, which has been described from Titilagarh, Patna, Bihar in 1947. While reviewing the Oriental species of the genus *Ranatra*, Lansbury (1972) could not examine *R. titilaensis*. While studying the unidentified aquatic hemipterans at Zoological Survey of India, Jabalpur, the authors have come across *R. titilaensis* from 9 localities in Jabalpur district, Madhya Pradesh and recording the occurrence of the species half a century later. The present record constitutes the report of *R. titilaensis* first time from the state of Madhya Pradesh. There are twenty-three males, forty-two females and forty-six immature stages which have been examined by the authors. It is inferred that *R. titilaensis* is commonly available in this part of the state. *R. titilaensis* is the smallest known oriental species of the genus so far described.

Male (Plate 1a) body length 20.5 mm; respiratory siphon 13 mm; female body length 25 mm; respiratory siphon 19 mm. The male genital capsule is as in Plate 1b and the distally hooked paramere (Plate 1c) is quite distinct unlike any other known species of *Ranatra*.

Material examined : 6♂, 5♀&5 immature stages from Heron river at Katangi village, Jabalpur, 15 June, 1966, Coll : H.S. Sharma; 3♂ from a River at Gwarighat, Jabalpur, 19 July, 1966, Coll : H.P. Agrwal; 1♂,1♀ from A tank in Gandhigram village, Jabalpur, 5 August, 1966, Coll : V.V. Rao; 1♀ from Baleha tank, Panagar village, Katni Road, 17 Feb., 1968, Coll : V.V. Rao; 1♂,4♀ from Surjla tank on Nagpur Road, 12 Feb., 1970 Jabalpur, Coll : H.P. Agrwal; 2♂&7 immature stages from Baria vill. on Sagar Road, Jabalpur, 20 April, 1970, Coll : H. Khajuria; 1♂,2♀ from

**Zoological Survey of India, Central Regional Station, Jabalpur-482 002*

Bhedaghat, Jabalpur, 23 April, 1970 Coll : H.P. Agrwal; 4♂, 6♀& 3 immature stages from Balasagar Tank near Medical College, Nagpur Road, Jabalpur, 23 June, 1970, Coll : H.S. Sharma; 4♂,8♀ from Amkhas, Nagpur Road, 25 June, 1970, Coll : H.S. Sharma; 1♂, 6♀& 15 immature stages from Baleha tank, Panagar village, Katni Road, 8 July, 1970, Coll : H.P. Agrwal; 2♂,7♀& 16 immature stages from Amkhas, Nagpur Road, 7 Auguust, 1970, Coll : H.S. Sharma.

CHECKLIST OF RANATRINAE KNOWN FROM INDIA

Tribe RANATRINI Douglas & Scott, 1865

Genus ***Cercotmetus*** Amyot & Serville, 1843

1. *Cercotmetus asiaticus* Amyot & Serville, 1843
2. *Cercotmetus brevipes* Montandon, 1909
3. *Cercotmetus fumosus* Distant, 1904
4. *Cercotmetus pilipes* (Dallas), 1850

Genus ***Ranatra*** Fabricius, 1790

Subgenus ***Ranatra*** Fabricius, 1790

5. *Ranatra chinensis* Mayr, 1865
6. *Ranatra digitata* Hafiz & Pradhan, 1947
7. *Ranatra distanti* Montandon, 1910
8. *Ranatra elongata* Fabricius, 1790
9. *Ranatra feana* Montandon, 1903
10. *Ranatra filiformis* Fabricius, 1790
11. *Ranatra gracilis* Dallas, 1850
12. *Ranatra longipes thai* Lansbury, 1972
13. *Ranatra parmata* Mayr, 1865
14. *Ranatra titilaensis* Hafiz & Pradhan, 1947
15. *Ranatra varipes atropha* Montandon, 1903
16. *Ranatra varipes varipes* Stål, 1861

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REFERENCES

Hafiz, H.A. and Pradhan, K.S. 1947. Notes on a collection of aquatic Rhynchota from the Patna State, Orissa, with descriptions of two new species. *Rec. Indian Mus.*, **45**(4) : 347-376.

Lansbury, I. 1972. A review of the Oriental species of *Ranatra* Fabricius (Hemiptera : Heteroptera : Nepidae). *Trans. R. ent. Soc. London*, **124**(3) : 287-341.

Mahner, M. 1993. Systema Cryptoceratorum Phylogeneticum (Insecta : Heteroptera). *Zoologica*, **48** : 1-302.

Thirumalai, G. 1999. Aquatic and semi-aquatic Heteroptera of India. Indian Association of Aquatic Biologists (IAAB) Publication No, 7 : 1-74 pp.

Thirumalai, G. 2007. A synoptic list of Nepomorpha (Hemiptera : Heteroptera) from India. *Rec. zool. Surv. India, Occ. Paper No.*, **273** : 1-85.

PLATE I

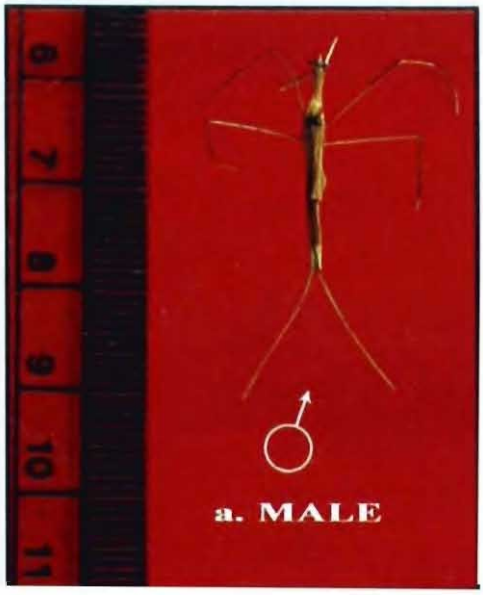

Fig. a. : *Ranatra titilaensis* Hafiz and Pradhan

Fig. b. : Male genital capsule

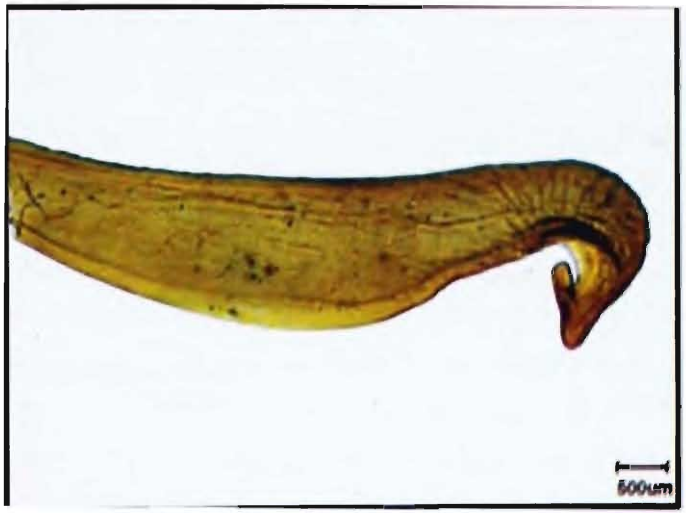

Fig. c. : Paramere

Rec. zool. Surv. India : **108**(Part–1) : 101-103, 2008

Short Communication

NEW RECORD OF *MEGACAMPSOMERIS PRISMATICA* (SMITH) (HYMENOPTERA : SCOLIIDAE) FROM DELHI AND NAGALAND, INDIA

INTRODUCTION

During the studies of large collections of Scoliidae present in the Hymenoptera Section of Zoological Survey of India, Kolkata, we found out two new records of the species *Megacampsomeris prismatica* (Smith) : one from Delhi and one from Nagaland. Gupta (1997) listed the scoliid species from Delhi. Gupta and Jonathan (2003) studied the family Scoliidae of Indian subregion in detail. Thus, this short communication is intended to report the extended distribution of this taxon to Delhi and Nagaland.

Megacampsomeris prismatica (Smith)

1855. *Scolia prismatica* Smith, *Cat. Hym. British Mus.*, **3** : 102. Female, Shainghai, China (holotype in Natural History Museum, London).

1864. *Elis* (Dielis) *prismatica* (Smith) : Saussure & Sichel, *Cat. Spec. Gen. Scolia* : 199 Female, China.

1892. *Elis* (Dielis) *lindenii* (Lepeletier) : Magretti, *Ann. Mus. Civico Stor. Nat. Genova,* **12** : 247. Female, not male, Myanmar.

1907. *Elis prismatica* (Smith) : Paiva, *Rec. Indian Mus.*, **1** : 14. Female, Darjeeling, India.

1911. *Campsomeris prismatica* (Smith) : Turner, *Ann. Mag. Nat. Hist.*, **6**(8) : 623.

1928. *Campsomeris (Megacampsomeris) prismatica* (Smith) : Betrem, *Treubia*, **9** (suppl.) : 152-153. Female, Male; Sulawesi, Kalimantan, Sarawak, Java, Sumatra, Malakka, Taiwan, China, Japan, India : Sikkim, Darjeeling Dist., Shillong, Kumaon Hills, Shimla Hills.

1928. *Campsomeris (Megacampsomeris) prismatica* var. *quinquefasciata* Betrem, *Treubia*, **9** (suppl.) : 153. Female, Mussoorie, India (holotype in Z.S.I., Kolkata). Synonymized by Gupta & Jonathan (2003).

1928. *Campsomeris (Megacampsomeris) prismatica* var. *fulvoanalis* Betrem, *Treubia*, **9** (suppl.) : 153. Female. Taiwan (Type in Berlin Museum). Synonymized by Gupta & Jonathan (2003).

1933. *Campsomeris prismatica* var. *shibatai* Uchida, *J. Fac. Agric. Hokkaido Imp. Univ.*, **32** : 259. Female, Honshu, Taiwan. Synonymized by Gupta & Jonathan (2003).

1941. *Campsomeris (Megacampsomeris) uchidai* Betrem, *Notes Ent. Chinoise*, **8**(4) : 81-82 (Male specimens from different localities of India).

1972. *Megacampsomeris prismatica* (Smith) : Betrem *in* Betrem & Bradley, *Mon. Ned. Ent. Ver.*, **6** : 164 (by reason of elevating *Megacampsomeris* to generic rank).

Diagnosis : Female. Length 10-12 mm. Body black, rarely with narrow apical bands on second and third abdominal tergites; vestiture yellowish golden, rarely reddish brown, except on fifth or sixth and following abdominal segments black; wings yellowish hyaline without any diffused infumated area beyond marginal cell; clypeus impunctate in the middle; mesoscutum with a large impunctate area posteriorly in the middle; upper plate of metapleurum punctate above, transition between its vertical and dorsal areas gradual to straight.

Material examined : 1 Female, INDIA : Delhi; Univ. Ridge, Coll. Neelam, 4.xi.1977, Reg. No. 10027/H3. 1 Female, INDIA : Delhi; Coll. Nair, R., 26.xi.1976, Reg. No. 10028/H3. 1 Female, INDIA : Delhi; Univ. Ridge, Tyagi, 16.ix.1976, Reg. No. 10029/H3. 1 Female, INDIA : Nagaland; Kohima, Coll. A.K. Hazra & Party, 25.ix.2004, Reg. No. 10078/H3. All specimens are deposited at Hymenoptera Section, Zoological Survey of India, Kolkata (NZSI).

Distribution : INDIA : Delhi, Nagaland, Arunachal Pradesh, Himachal Pradesh, Jammu and Kashmir, Manipur, Meghalaya, Orissa, Sikkim, Uttarakhand, Uttar Pradesh, and West Bengal.

Elsewhere : China, Indonesia, Japan, Korea, Malaysia, Myanmar, Nepal, Philippines and Taiwan.

Remarks : This is the first report of the species from Delhi and Nagaland.

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REFERENCES

Betrem, J.G. 1928. Monographie der Indo-Australischen Scoliiden mit zoogeographischen Betrachtungen. *Treubia*, **9** (suppl.) : 1-388, 5 plates.

Betrem, J.G. 1941. Etude systematique des Scoliidae de Chine et leurs relations avec les autres groups de Scoliidae. *Notes Ent. Chinoise*, **8**(4) : 47-188, 30 figures.

Betrem, J.G. and Bradley, J.C. 1972. The African Campsomerinae (Hym., Scoliidae). *Mon. Ned. Ent. Ver.*, **6** : 1-326. 55 figures, 6 plates, 47 maps.

Gupta, S.K. 1997. Hymenoptera : Aculeata : In *Fauna of Delhi, State Fauna Series* **6**. *Zool. Surv. India* : 421-440.

Gupta, S.K. and Jonathan, J.K. 2003. *Fauna of India and the adjacent countries*, Hymenoptera : Scoliidae. *Zool. Surv. India* : 1-277.

Magretti, P. 1892. Imenotteri; Viaggio de Leonardo Fea in Birmanicae Regioni vicini 43, parte prima Mutilledei Scoliidei Tiphiidae. *Ann. Mus. Civico Stor. Nat. Genova*, **12** : 97-266.

Paiva, C.A. 1907. Records of Hemiptera and Hymenoptera from Himalayas. *Rec. Indian Mus.*, **1** : 13-20.

Saussure, H. De and Sichel, J. 1864. *Catalogue des specierum de l'ancien generis Scolia* : 350 pages, 2 plates.

Smith, F. 1855. Mutillidae and Pompilidae. In *Catalogue of the Hymenopterus Insects in the collection of the British Museum*, 3 : 206 pages, 5 plates.

Turner, R.E. 1911. Further notes on the Thynnidae and Scoliidae : Notes on fossorial Hymenoptera V. *Ann. Mag. Nat. Hist.*, (8)**8** : 602-624.

Uchida, T. 1933. Revision der Japanischen Scoliiden mit Beschreibungen der neuen Arten und Formen. *J. Fac. Agric. Hokkaido Imp. Univ.*, **32** : 229-262, 2 plates.

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PLATE I