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RECORD AND ABUNDANCE OF EARTHWORMS AT BALLAVPUR WILDLIFE SANCTUARY, BIRBHUM, WEST BENGAL

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INTRODUCTION

With a view to study the earthworm fauna of Ballavpur Wildlife Sanctuary, Birbhum three study tours were conducted during 2003–2004. The Ballavpur Deer Park near Viswavarati University, Santiniketan, Birbhum is well known to the people of Kolkata. The area was developed as a Deer Park measuring about 200 hectares forest land and was promoted to the status of Wildlife Sanctuary by the Government of West Bengal on 11th July, 1977.

Ballavpur Wildlife Sanctuary (Fig. 1) is the best place for observing the wildlife fauna particularly, the birds of Birbhum. This Sanctuary is about 20 minutes drive from Bolepur (Santiniketan) Railway Station. The terrain of undulating and eroded lateritic soil partly mixed with morum and clay (the famous 'Khoai' of Santiniketan) was converted into a forest by plantation during the year 1954–55. Nearly 50 years have passed, and very little improvement is noticed to add the growth of the tree on the nutrient poor soil. Further the practice of sweeping away all leaf litters has only compounded to the misery of the soil and the flora. There is virtually no undergrowth.

The principal trees of the Sanctuary are Akashmoni (*Acacia monilliformis*), Sal (*Shorea robusta*) Sishu (*Dalbergia sissoo*), Cashew Nut tree (*Anacardium occidentale*), Behera (*Terminalia bellerica*), Amloki (*Emblica officinalis*), Chhatim (*Alstonia scholaris*), *Ficus* sp., etc.

Although the whole of the Sanctuary is fenced, the boundary has been destroyed at many places. However, an inner hundred acres separately wired off, holds only one species of ungulate, the Chital or spotted Deer (*Axis axis*). In the book named, Wildlife in West Bengal published by Government of West Bengal in 1985 reported 17 black Buck and 71 Chittal were available in the park. At present, only Chital is available, while the blackbuck (*Antilope cervicarpa*) did not survive there.

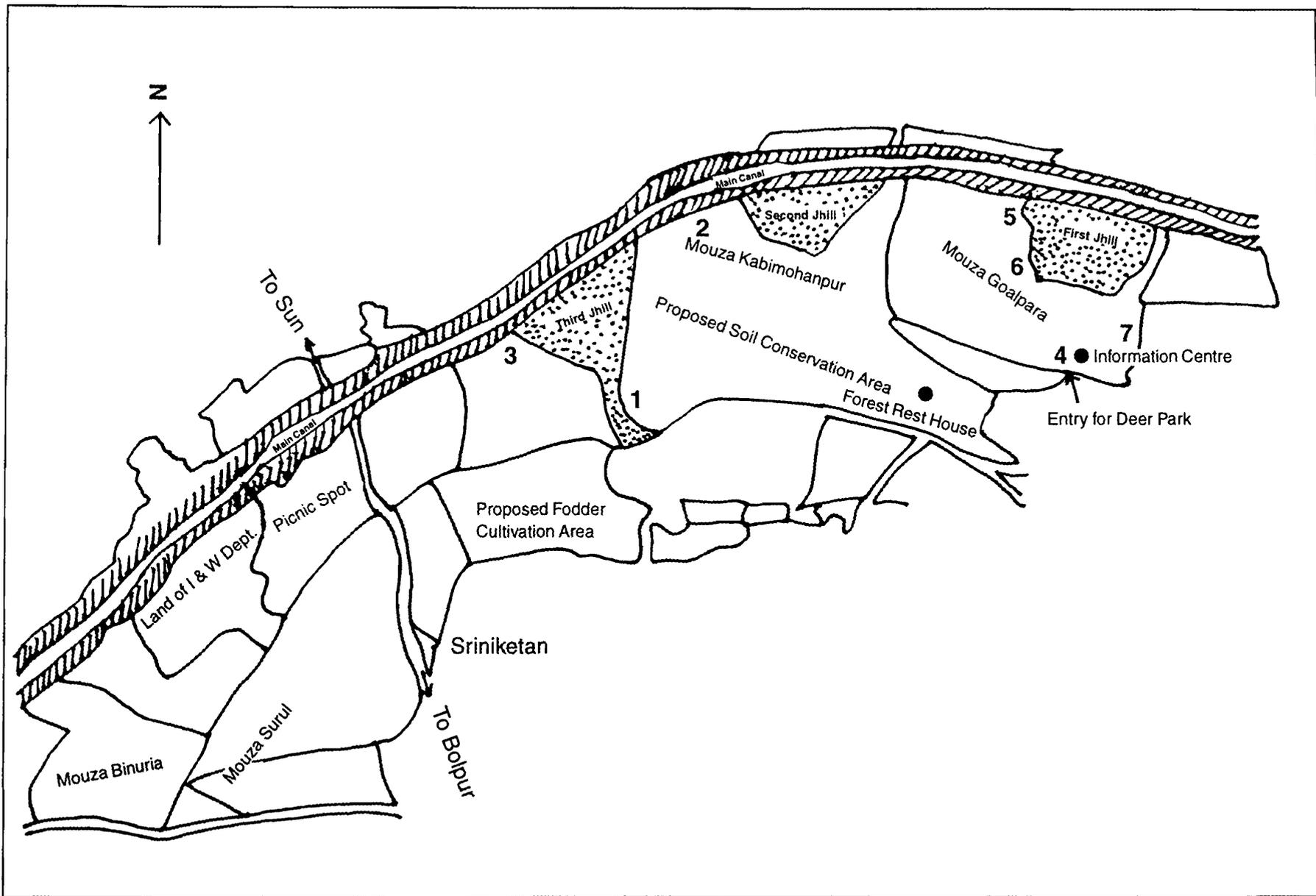


Fig. 1. : Map of Ballavpur Wildlife Sanctuary, Birbhum showing the collecting stations (1 to 7)
(Not to Scale)

There are three water bodies in the Sanctuary. They are named very imaginatively Jheel No. 1, 2 and 3. The first one falls within the privileged 100 acres and is the most spectacular aspect of the Sanctuary. This Jhill is separately fenced and cannot be approached over ground. One Watch Tower at the edge provides excellent views of the water fowl, specially ducks during the winter. Records show ducks are predominantly available in the Jheel. Pintail numbers the most followed by Lesser Whistling Teal. Tufted Duck, Comb Duck, Cotton Teal are few in number. The prevalent species—the Pin-tailed leave the Jheel at sun down in great silent batches of hundreds which form a dark cloud for a brief movement and then spreads out in rippling waves and flies away to the south-east in search of paddy fields.

Ducks are accompanied by other water birds. The purple Moorhen and the Bronze-winged Jacana with their chicks. Egrets and Herons softly tread the weed-covered edges searching for an unwary insects and amphibians. They in turn bring in the winged hunters. The Kestrel, the Honey Buzzer and then of course the Marsh Harrier swooping and snatching at the mass of Ducks—spreading them to a clear patch of water in the hope that a helpless victim may become isolated—a Moorhen perhaps.

The trees away from water also hold a variety of birds. There is a provision of spot entry permit on payment of a nominal sum. There is also a forest Bungalow at the edges of the forests, booking for which is available from the Division of the Forest Officer, Siuri, Birbhum, West Bengal or the Conservator of Forest, Central Circle, 35, Gopal Nagar Road, Kolkata-700 027.

From the literature (Gates, 1972; Halder, 1998; Julka, 1988; Julka & Senapati, 1987 and Stephenson, 1923) it appears that there is no published information on the earthworms fauna of Ballavpur Wildlife Sanctuary, Nadia. However, Halder (1988) recorded nine species of earthworms from Birbhum district, West Bengal. The present study reveals the presence the fourteen species in and around Ballavpur wildlife Sanctuary including eleven species from the sanctuary proper. In this connection, it may be mentioned here that earthworms are considered as an indicator of soil condition of the area concerned. On the other hand, reserve areas are the places where any group of organisms may live sustainably, if proper measures are taken. The soil of the Ballavpur Wildlife Sanctuary is of laterite type, locally called 'morum' which is not ideal for soil living organisms. It is perhaps, due to the continuous efforts of the Forest department by suitable afforestation programme, the sanctuary supports a good earthworm faunal diversity.

LIST OF SPECIES OF EARTHWORM COLLECTED FROM BALLAVPUR WILDLIFE SANCTUARY, BIRBHUM

Phylum ANNELIDA
Class OLIGOCHAETA
A. Order MONILIGASTRIDA

I. Family MONILIGASTRIDAE

1. Genus *Drawida* Michaelsen, 19001. *Drawida nepalensis* Michaelsen

Order HAPLOTAXIDA

Family ALMIDAE

Genus *Glyphidrilus* Horst, 18892. *Glyphidrilus tuberosus* Stepheneson

Family OCTOCHAETIDAE

Genus *Eutyphoeus* Michaelsen, 19003. *Eutyphoeus incommodus* (Beddard)4. *Eutyphoeus nicholsoni* (Beddard)5. *Eutyphoeus waltoni* (Michaelsen)Genus *Octochaetona* Gates, 19626. *Octochaetona beatrix* (Beddard)7. *Octochaetona surensis* (Michaelsen)

Family GLOSSOSCOLECIDAE

Genus *Pontoscolex* Schmande, 18618. *Pontoscolex corethrurus* (Muller)

Family MEGASCOLECIDAE

Genus *Amyntas* Kinberg, 18679. *Amyntas diffringens* (Baird)Genus *Lampito* Kinberg, 186710. *Lampito mauritii* KinbergGenus *Metaphire* Sims & Easton, 197211. *Metaphire houletti* (Perrier)12. *Metaphire planata* (Gates)Genus *Perionyx* Perrier, 187213. *Perionyx excavatus* Perrier14. *Perionyx sansibaricus* Michaelsen

SYSTEMATIC ACCOUNT

Class OLIGOCHAETA

Order MONILIGASTRIDA

Family MONILIGASTRIDAE

Genus *Drawida* Michaelsen, 19001. *Drawida nepalensis* Michaelsen, 19071907. *Drawida nepalensis* Michaelsen, *Mitt. naturh. Mus. Hamb.*, 24 : 146.*Material* : 5 ex., Ballavpur Stn. 3, 20.07.2003.

Diagnosis : Length 50-130 mm, diameter 2-5 mm, segments 120-180; clitellum in IX to XIV; dorsal pore absent; spermathecal pores one pair, small transverse slits, just median to C; genital markings one small, circular, translucent area lateral or anterior to each male porophore, another similar one on VII, just anterior to each spermathecal pore; male pores paired at or median to m B C in 10/11, and just in front of female pore (11/12).

Gizzards 2-4, in XII-XX; prostates glandular, prostatic capsules 2-4 mm long, slenderly club-shaped; spermathecal ampula irregularly pear-shaped; diverticulum sac-like, 3-5 mm long in VII with regular annulations.

Remarks : Recorded under grasses in forest floor with moderately rich organic matter. However, there abundance is very poor.

Order HAPLOTAXIDA

Family ALMIDAE

Genus *Glyphidrilus* Horst, 18892. *Glyphidrilus tuberosus* Stephenson, 19161916. *Glyphidrilus tuberosus* Stephenson, *Rec. Indian Mus.*, 12 : 349.*Material* : 9 ex., Ballavpur Stn. 1, 20.07.2003; 13 ex., Ballavpur Stn. 4, 23.07.2003.

Diagnosis : 55-115 mm, diameter 2.5-3 mm, segments 215-220; prostomium prolobic; clitellum annular on XIV, XV, XVI-XXVIII, XXIX, with lateral, longitudinal and protuberant ridges (wing like) on XX-XXIV, extending forwards as slight ridges to XIV and sometimes back to XXVIII; spermathecal pores minute, 2-4 on each side in 13/14 and 14/15; genital markings small rounded papillae postsetal, usually arranged in a set of 6 in a transverse row on a segment-2 in A A, 1 in A B, slightly lateral to B on X-XII, XIII, 1 medial to A, 1 in A B and 1 lateral to B on XVI, XVII, XVIII-XIX, XXIV-XXVIII, XXX; male pores inconspicuous; female pores paired, minute, slightly lateral to B lines, pre-setal on XIV.

Gizzard in VII, sometimes extending in VI; intestine begins in XV; last pair of hearts in XI; spermathecae small spherical sacs without diverticula, 2-4 on each side in XIV & XV.

Remarks : Originally described from Orissa and endemic to India. Prefer moist soil or submerged soil only with high organic matter, and observed abundantly during post monsoon season.

Family OCTOCHAETIDAE

Genus *Eutyphoeus* Michaelsen, 1900

3. *Eutyphoeus incommodus* (Beddard, 1901)

1901. *Typhoeus incommodus* Beddard, *Proc. zool. Soc. Lond.*, 1901 : 200.

Material : 3 ex., Sriniketan, 17.12.2002; 7 ex., Agricultural Field, Surul, 21.07.2003.

Diagnosis : Length 25-145 mm, diameter 2.5-6 mm, segments 90-191; prostomium pro/epilobic or pro/tanylobic; clitellum annular on XIII to XVII, XVIII; spermathecal pores paired, small transverse slits in 7/8, slightly lateral to B; genital markings paired, postsetal at AB, on XII, XIII-XVI; male pores within slight transversely placed fissures, at or close to B, each fissure at the centre of a disc-shaped conical porophore; female pores paired, pre-setal at or slightly median to A lines. Lateral intestinal caeca absent, ventral intestinal caeca 3-9 in XXVII-XXXVI, supra-intestinal glands 3-6 pairs in LXII-LXXV; penial setae ornamented with sparse, rather widely separated rows of very fine spines, tip bluntly rounded; spermathecae paired, in VIII, each with a circle of seminal chambers or 4-5 stalked ental diverticula; genital marking glands absent.

Remarks : Rarely occurring, available only during post monsoon period only.

4. *Eutyphoeus nicholsoni* (Beddard, 1901)

1901. *Typhoeus nicholsoni* Beddard, *Proc. zool. Soc. Lond.*, 1901 : 195.

Material : 7 ex., 21.07.2003, Agricultural Field, Surul.

Diagnosis : Length 145-185 mm, diameter 5-5.5 mm, segments 190-225; clitellum annular on XIII to XVII; female pore single on left side of XIV; spermathecal pores paired at or just lateral to A; genital markings paired, circular or oval, in 15/16.

Prostrate coiled, duct muscular and long, in an S-shaped curve; penial setae about 4 mm long; seminal chambers in one or two clusters or a semi-circular row, on posterior face of duct.

Remarks : This species is endemic to India. Deep burrowing forms with tower like castings, prominently visible above the ground.

5. *Eutyphoeus waltoni* (Michaelsen, 1907)

1907. *Eutyphoeus waltoni* Michaelsen, *Mitt. naturh. Mus. Hamb.*, 24 : 179.

Material : 4 ex., 20.07.2003, Ballavpur Stn. 3.

Diagnosis : Length 53-230 mm, diameter 4-8 mm, segments 115-201; clitellum annular on XIII/XIV to XVII/XVIII; male pore in B, in a pair of narrow transverse depression; female pore single, on left side of XIV; spermathecal pores paired, on or median to C; first dorsal pore at 11/12; genital markings paired, post-setal, ca. in A B, on IX (VIII & X), in 14/15-15/16, 18/19 (19/20-22/23).

Prostrate extends through XVI or XVII-XIX or XX; duct 5-8 mm long; penial setae 4-5 mm long; seminal vesicles extending back to 14/15.

Remarks : This species is endemic to Oriental region.

Genus *Octochaetona* Gates, 1962

6. *Octochaetona beatrix* (Beddard, 1902)

1902. *Octochaetus beatrix* Beddard, *Ann. Mag. nat. Hist.* (ser. 7), **9** : 456.

Material : 4 ex., 20.07.2003, Ballavpur Stn. 3.

Diagnosis : Length 40-134 mm, diameter 2-5 mm, segments 133-197; clitellum annular on XIII-XVII, XVIII; male field depressed, male pores minute, median to A; female pore paired, pre-setal in A A; spermathecal pores paired, minute, at or slightly anterior to setal arc of VIII & IX, median to A; genital marking absent; first dorsal pore at 12/13, occasionally at 11/12.

Gizzard between septa 4/5 & 8/9; last pair of hearts in XIII; Prostrates in XVII-XIX, ducts thin and short, prostate glands two pairs.

Remarks : This is very rare in occurrence in the Sanctuary. Occur in lawns only with moderate amount of organic matter.

7. *Octochaetona surensis* (Michaelsen, 1910)

1910. *Octochaetus surensis* Michaelsen, *Abh. Geb. Naturw., Hamburg*, **19**(5) : 88.

Material : 2 ex., 17.12.2002, Sriniketan.

Diagnosis : Length 60-140 mm, diameter 2.5-6 mm, segments 175-180; colour brown; clitellum XII-XVI; first dorsal pore at 12/13; genital markings oval, paired or unpaired and median, post setal in some of XVIII-XXII; spermathecal pores minute at or near equators of VIII-IX, in A B; male pores minute median to B; prostatic pores minute, at B; female pores paired, sometimes unpaired and median.

Gizzards between septa 4/5 and 8/9; Last pair of hearts in XII; intestine begins in XVII; seminal vesicles in IX & XII.

Remarks : Castings in the form of globules which often fused with each other to form large irregular pyramidal structure of about 4 to 5 cm height in soils with high moisture contents.

Family GLOSSOSCOLECIDAE

Genus *Pontoscolex* Schmanda, 19618. *Pontoscolex corethrurus* (Muller, 1856)1856. *Lumbricus corethrurus* Muller, *Abhandl. naturgesch. ges. Halle*, 4 : 26.*Material* : 10 ex., 14.12.2002, Ballavpur Stn. 2.*Diagnosis* : Length 48-120 mm, diameter 2 mm, segments 60-232; clitellum shaddle-shaped, XV, XVI-XXI, XXII, XXIII; lumbricine setal arrangement, first closely paired, then widely paired, and lastly "quincunx" arrangements at hinder end of the body; spermathecal pores three pairs, minute at C on 6/7-8/9; male pores minute, probably on 20/21; female pores minute, on left side at A B, slightly in front of 14/15.

Intestinal origin in XIV or XV; last pair of hearts in XI; spermathecae club-shaped, ducts slender.

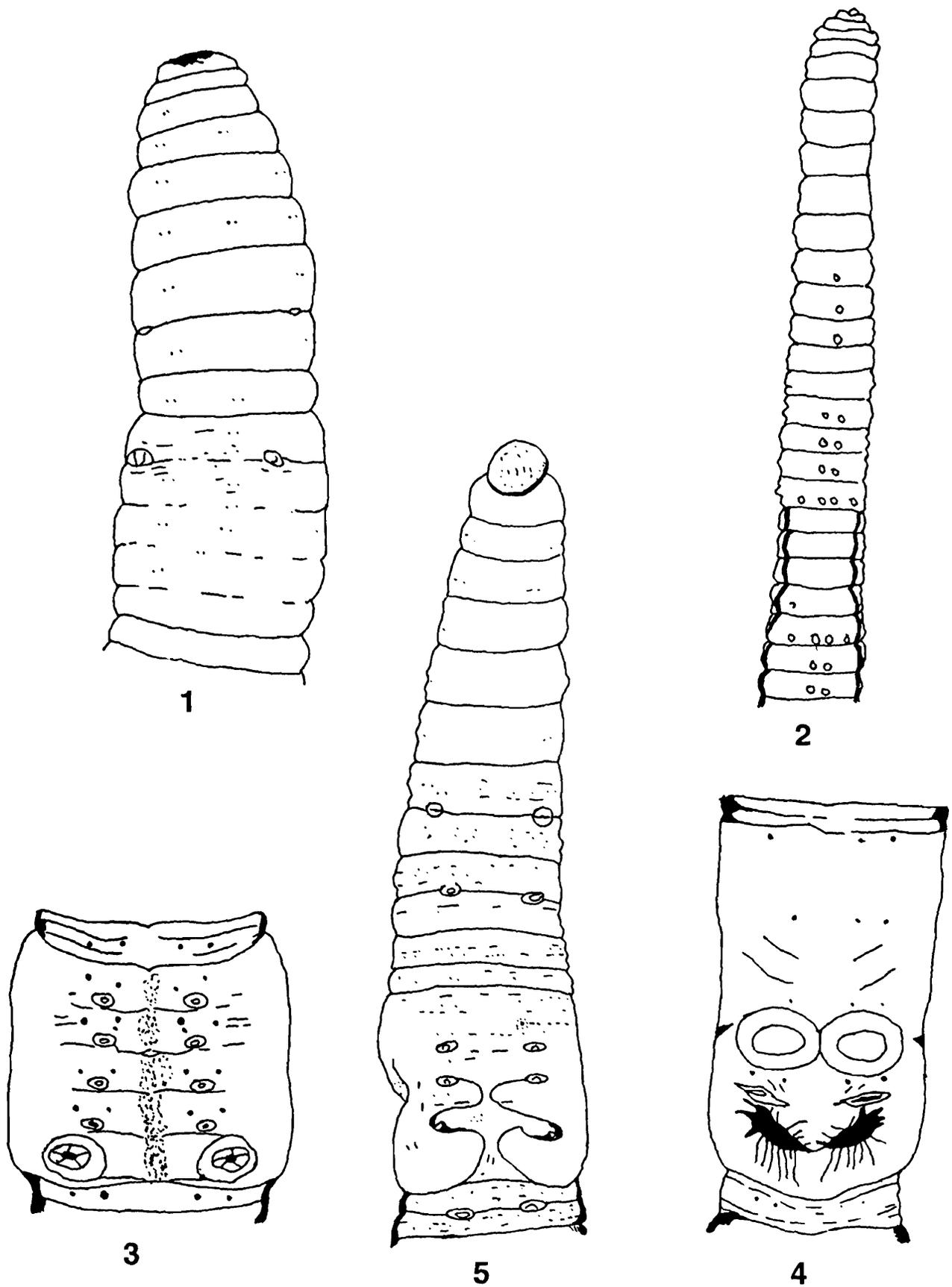
Remarks : Also recorded earlier from manure and compost heaps, humus and sandy soil, under barks of trees, under rotting tree trunks and rotting plantain trunks. In Karnataka, this species was reported to make the soil compact, hard and cloddy.

Family MEGASCOLECIDAE

Genus *Amyntas* Kinberg, 18679. *Amyntas diffringens* (Baird, 1809)1809. *Megascolex diffringens* Baird, *Proc. zool. Soc. Lond.*, 1809 : 40.*Material* : 16 ex., 13.02.2004, Ballavpur, Stn. 3; 8 ex., 15.02.2004, Ballavpur Stn. 3.*Diagnosis* : Length 45-170 mm, diameter 3-6 mm, segments 79-121; clitellum XIV-XVI; first dorsal pore usually at 11/12; genital marking small circular or shortly elliptical disk, paired pre-setal, just median to the line of spermathecal pores in some or all or VI-IX; post-setal, just in front of spermathecal pores in some or all V-VIII; spermathecal pores 4 pairs, minute, superficial, each in a small circular to transversely elliptical disk in 5/6-8/9.; female pores mid ventral.

Gizzards large, somewhat conical, narrow in front; intestinal origin usually in XVI; last pair of hearts in XIII.

Remarks : Soils in forest floor with high organic matter; under stones and rocks and rotten woods near pond water.Genus *Lampito* Kinberg, 186710. *Lampito mauritii* Kinberg, 18671867. *Lampito mauritii* Kinberg, *Ofvers. K. Vetens. Akad. Forhandl. Stockholm*, 23 : 103.*Material* : 29 ex., 17.12.2002, Sriniketan; 36 ex., 13.02.2004, Sriniketan; 19 ex., 23.07.2003, Sriniketan; 5 ex., 15.02.2004, Ballavpur Stn. 2 Jhill No. 3; 15 ex., 14.02.2004, Ballavpur Stn. 1 (Jhill No. 3).



Figs. 1-5. : Showing the Genital regions of the Earthworms for identification. 1. *Drawida nepalensis*; 2. *Glyhidrilus tuberosus*; 3. *Eutyphoeus incommodus*; 4. *Eutyphoeus nicholsoni*; 5. *Eutyphoeus waltoni*.

Diagnosis : Length 95-155 mm, diameter 3-6 mm, segments 79-121; clitellum annular, XIV-XVII or XVIII; spermathecal pores 3 pairs, large, in EG, at 6/7, 7/8, 8/9; male pores in XVIII, at or lateral to B, in paired, circular, slightly raised porophores that extends from A into CE; female pores paired on XIV; genital marking absent.

Remark : This species is recorded abundantly throughout the year within the Sanctuary.

Genus *Metaphire* Sims & Easton, 1972

11. *Metaphire houlleti* (Perrier, 1872)

1872. *Perichaeta houlleti* Perrier, *Nouv. Arch. Mus. Hist. nat. Paris*, 8 : 99.

Material : 7 ex., 20.07.2003, Ballavpur Stn. 4; 1 ex., 17.12.2002, Sriniketan.

Diagnosis : Length 90-105 mm, diameter 3-6 mm, segments 79-121; Clitellum annular, XIV-XVI; seta perichaetine, often present on clitellar segments; spermathecal pores 3 pairs; male pores in XVIII, minute; female pore single, mid-ventral on XIV; genital markings lacking externally; pigment reddish brown; gizzard between septa 7/8 & 10/11.

Remarks : This is a common species, however, recorded mostly during post monsoon periods.

12. *Metaphire planata* (Gates, 1926)

1926. *Pheretima planata* Gates, *Ann. Mag. nat. Hist.*, (Se. 9), 17 : 411.

Material : 11 ex., 17.12.2002, Ballavpur Sanctuary, near Jhill No. 1, Stn. 7.

Diagnosis : Length 64-176 mm, diameter 4-7 mm, segments 115-142; clitellum XIV-XVI; genital markings small, circular, just median to each spermathecal pore; first dorsal pore at 10/11 or 11/12; spermathecal pore two pairs, minute and superficial, on anterior margins on VII and VIII; female pores single, mid-ventral, on XIV; male pores minute, on XVIII.

Intestinal origin in XV; last pair of hearts in XIII; seminal vesicles in XI & XII; prostrate in XVI-XXI, duct U-shaped; genital markings glands stalked.

Remarks : This is reported to be very rare in occurrence in India and endemic to Oriental region.

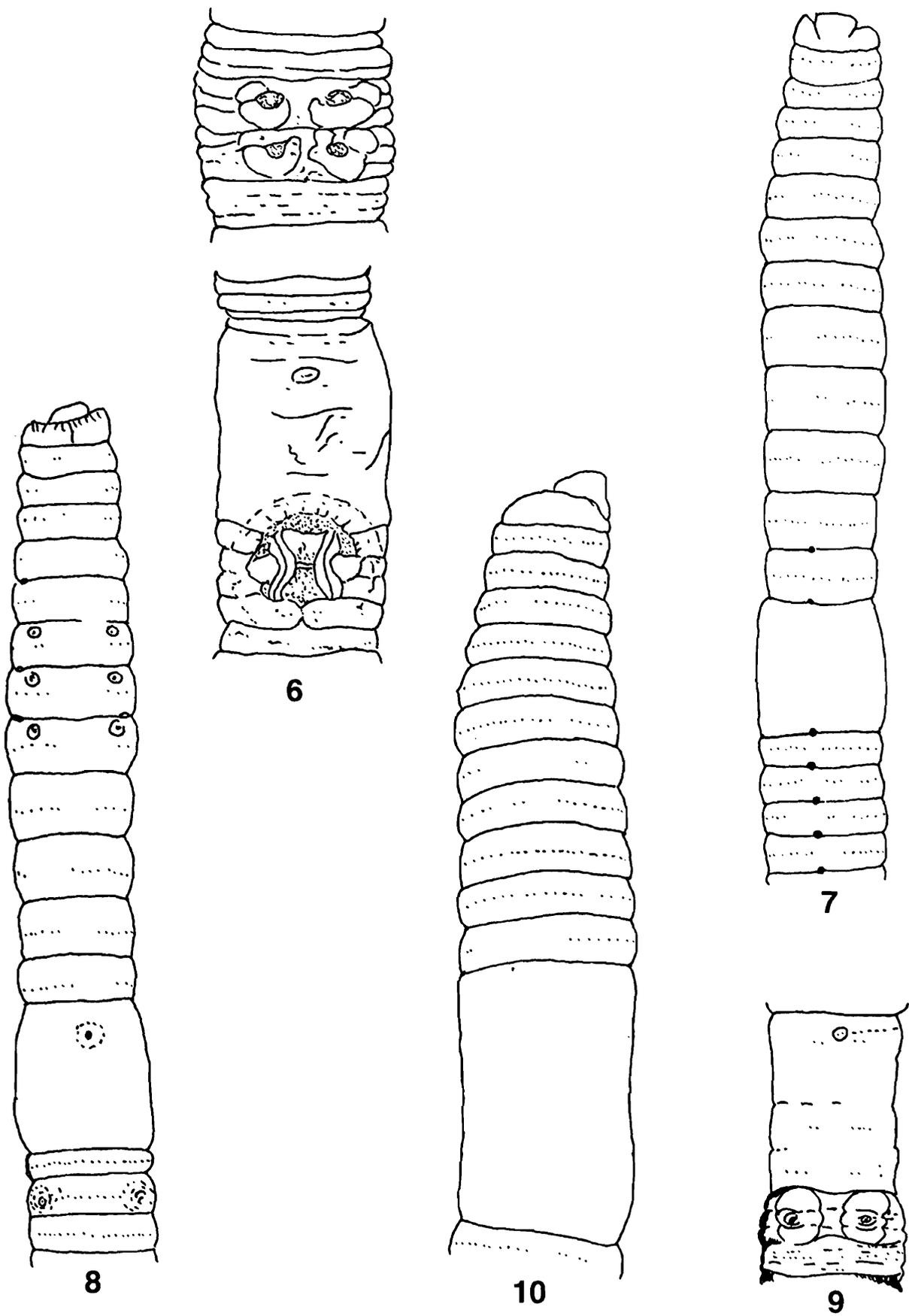
Genus *Perionyx* Perrier., 1872

13. *Perionyx excavatus* Perrier, 1872

1872. *Perionyx excavatus* Perrier, *Nouv. Arch. Mus. Hist. Nat. Paris*, 8 : 126.

Material : 19 ex., 23.07.2003, Ballavpur Stn. 6 (Jhill No. 1).

Diagnosis : Length 35-125 mm, diameter 3-7 mm, segments 79-121; Clitellum annular, XIII-XVII. Spermathecal pores 2 pairs, near mid-ventral line, in 7/8, 8/9; male pores in small transverse protuberances within a single male field, each protuberance with a slightly irregular transverse groove containing apertures of 4-9 perisetal follicles, on XVIII; female pore single, mid-ventral, on XIV; genital marking absent; nephridiopores inconspicuous, in one rather irregular longitudinal rank on each side near m L.



Figs. 6-10. : Showing the Genital regions of the Earthworms for identification. 6. *Octochaetona surensis*; 7. *Amynthes diffringens*(dorsal); 8. *Amynthes diffringens*(Ventral); 9. *Lampito mauritii*; 10. *Perionyx sansibaricus*.

Remarks : This is recorded for the first time from Nadia district. The species is also very common within the sanctuary, however, restricted to the moist humus mixed soil near kitchen drainage.

14. *Perionyx sansibaricus* Michaelsen, 1891

1891. *Perionyx sansibaricus* Michaelsen, *Mitt. Naturh. Mus. Hamb.*, **9** : 4.

Material : 3 ex., 23.07.2003, Ballavpur Stn. 5 (Jhill No. 1).

Diagnosis : Length 32-65 mm, diameter 2.5-3.5 mm, segments 84-108; clitellum annular, XIII-XVII; male pores usually pre-setal, near mid-ventral line, in a slightly depressed transverse male field; spermathecal pores paired, near mid-ventral line, in 6/7/8/9; genital markings absent.

Gizzards slightly developed in VI; intestine begins in XVI; last pair of hearts in XII; spermathecae paired in VII-IX, each with an ental pear-shaped, shortly stalked, multi-oculate diverticulum; nephridia vesiculate.

SUMMARY

The paper deals with fourteen species of earthworms under nine genera and four families, of which eleven species were recorded from the sanctuary proper.

ACKNOWLEDGEMENTS

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REFERENCES

- Gates, G.E. 1972. Burmese earthworms : an introduction to the systematics and biology of Megadrile Oligochaetes with special reference to south east Asia. *Trans. Am. phil. Soc.*, **62**(7) : 1-326.
- Halder, K.R. 1998. Annelida : Oligochaeta : Earthworms. *State Fauna Series 3 : Fauna of West Bengal*, Part **10** : 17-93.
- Julka, J.M. 1988. Fauna of India & the adjacent countries : Megadrile Oligochaeta (earthworms); Haplotaxida : Lumbricina : Megascolecoidae : Octochaetidae, XIV + 400 p.p. Zoological Survey of India, Calcutta.
- Julka, J.M. and Senapati, B.K. 1987. Earthworms (Oligochaeta : Annelida) of Orissa, India. *Rec. zool. Survey of India, Occ. Paper No.*, **92** : 1-49.
- Stephenson, J. 1923. Oligochaeta. The Fauna of British India, including Ceylon & Burma, XXIV + 518 pp. Taylor & Francis Ltd., London.