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A REPORT ON EARTHWORM SPECIES OF TARAKESWAR AND ADJOINING AREA OF HOOGHLY DISTRICT, WEST BENGAL WITH SOME ECOLOGICAL NOTES

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INTRODUCTION

Earthworms are elongated soft bodied segmented small invertebrates. In 1881 Darwin realised that the earthworms play an important role on the fertility of the soil. They burrow under the soil, leave the castings outside and help in mixing and churning of the soil. The burrows increase drainage and aeration. Moreoever, the castings are rich in macro and micro nutrients, which are essential for plants growth.

Recently (due to so called green revolution), farmers are suffering from the loss of soil fertility, water content deficiency and many other problems due to indiscriminate use of chemical fertilisers and pesticides.

Now all people are searching for a sustainable lifestyle and agronomists are also recommending sustainable agriculture, which may succeed by the use of bio-pesticide and bio-fertiliser, which are very costly till now. If farmers make their own compost by simple methods then it may succeed.

For commercial Vermicomposting we need some special epigeic species (Edwards Lofty 1977, Dash, 1994). In our country mainly two exotic species, namely, *Eisenia foetida* and *Eudrilus eugeniae* are being used for this purpose. But these species are costly and their extensive use may be harmful in ecological aspect, as some conservationist are shouting about this matter. Most of the earthworms feed on decaying organic matter in the soil and after its assimilation in the alimentary canal, excrete the soil as cast (vermicast) which is rich in nutrients. This vermicast contains various amino acids, minerals and micro-organisms which humify the organic matter in the surrounding soil and act as soil conditioners and biofertilisers. However, the capability of decomposing organic matter varies from species to species. It is very essential to select suitable species of earthworms for the purpose of waste conversion by Vermicomposting. Therefore, we need detailed information

about the availability of earthworm species, their habitat, conditions of living, and nature of a particular area (Annonymous, 1993).

So it is very urgent to inventorise the local species of earthworms before going to commercial Vermicomposting in a certain locality.

Keeping these words in our mind, we are going for a random survey for earthworm species available in and around Tarakeswar locality, for the compatible species of earthworm for Vermicomposting.

Out of about 3900 global species and some 390 species reported from India, and 63 species are known to occur in West Bengal (Halder, 1994). The present report is based on the study made during July-September, 2004. Out of 46 specimens collected so far, 9 species were identified belonging to 6 genera and 2 families. Seven species are reported for first time from Hooghly district, where as one species namely *Drawida willsi* is recorded here for the first time from this state.

The diagnostic characters and proper habitat of each species are provided in this short communication with short ecological notes (Gates, 1972; Julka, 1988).

SYSTEMATIC ACCOUNT

Phylum ANNELIDA

Class OLIGOCHAETA

Order HAPLOTAXIDA

Family MEGASCOLECIDAE

1. *Amynthus morrisi* (Beddard, 1892)
2. *Amynthus diffringens* (Baird, 1809)
3. *Amynthus alexandri* Beddard, 1900
4. *Lampito mauritii* Kinberg, 1867
5. *Metaphire posthuma* (Vaillant, 1868)
6. *Perionyx excavatus* Perrier, 1870
7. *Polypheretima elongata* (Perrier, 1872)

Order MONILIGASTRIDA

Family MONILIGASTRIDAE

8. *Drawida nepalensis* Michaelesen, 1907
9. *Drawida willsi* Michaelesen, 1907

Family MEGASCOLECIDAE

Diagnosis : Setae sigmoid with simple pointed tip. Clitellum multilayered. Male pores behind female pores. Dorsal pores present. Intestinal origin behind ovarian segment. Last pair of hearts behind XI. Seminal vesicles trabeculate; prostates racemose without central canals; Ovaries in XIII, fan shaped.

Key to Genera

1. Nephridia stomate, ... *Perionyx*
– Nephridia astomate, at least in some parts of body 2
2. Gizzard in front of 7/8, ... *Lampito*
– Gizzard behind 7/8 4
4. Intestinal caeaca present 5
– Intestinal caeaca absent ..... *Polypheretima*
5. Copulatory pouches present ..... *Metaphire*
– Copulatory pouches absent ..... *Amynthus*

Genus ***Amynthus*** Kingberg

Diagnosis : Body cylindrical. Setae numerous, regularly arranged around each segment. Clitelum annular, XIV–XVI, rarely beginning on XIII. Spermathecal pores paired, occasionally numerous and single, between 4/5–8/9. Female pore single, rarely paired, on XIV. Copulatory pouches absent.

Key to Species

1. Spermathecal pores four pairs 2
– Spermathecal pores two pairs and in 5/6–6/7 ..... *A. morrisi*
2. Preclitellar genital markings present ..... *A. diffringens*
– Preclitellar genital markings absent ..... *A. alexandri*

1. ***Amynthas morrisi*** (Beddard, 1892)

Materials : One example, from Dhallyan, Tarakeswar, date 5.vii.2004, Coll. Kaustav Ghosh.

Diagnosis : Length 40–150 mm, diameter 2.5 mm, segments 75–102. Clitelum in XIV–XVI; spermathecal pores two 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 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.

Ecological notes : Occurs in soil of gardens, lawns, open area and jungles; living in soil under bamboos and banyan trees. We observed its high population at the shed of a large Bamboo bush. Polulation counted as –30\ sq. ft. Status of this species here considered as plenty.

Remarks : The original home of this species is China. In West Bengal, it was reported to occur from Darjeeling and Kolkata. Now it's reported for the first time from Hooghly district.

2. ***Amynthas diffringens*** (Baird, 1809)

Materials : 2 exs., ploughed field at Bhanjipur village, dated 4.vii.2004, Coll. S. Mitra.

Diagnosis : Length 45–170 mm, diameter 3–6 mm, segments 79–121; clitelum 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; spermathecal pores 4 pairs, minute, superficial, each in a small circular to transversely elliptical disk in 5/6–8/9; female pores mid ventral. Gizzard large, somewhat conical, narrow in front; intestinal origin usually in XVI; last pair of hearts in XIII.

Ecological notes : It prefers soils in forest floor with high organic matter, under stones and rocks and rotten woods near pond water. We collect it from the surrounding area of a cultivated field. Status of this species is moderately common.

Remarks : This species originated from China, and successfully colonized in the Himalayas and other high altitude regions of India. Previously reported from four districts namely Darjeeling, Jalpaiguri, Burdwan and Midnapore (E), now it is reported for the first time from Hooghly district.

3. ***Amynthus alexandri*** Beddard, 1900

Materials : 2 exs., Bhanjipur, Tarakeswar, 5.vii.2004, Coll. S. Mitra; 3 exs., B.P.R. Gate, Tarakeswar, 4.vii.2004, Coll. K. Ghosh.

Diagnosis : Length 105–290 mm, diameter 4–9 mm, segments 90–141. Prostomium rudimentary, Clitellum XIV–XVI, occasionally reaching XVII. Setae 40–50 on VIII, 58–76 on XX, 9–22 between spermathecal pores and 9–28 between male pores. First dorsal pore at 12/13. Genital markings absent. Spermathecal pores 4 pairs, minute, superficial, in 5/6–8/9. Female pore midventral. Male pores minute, superficial, on XVIII, each in a rather circular disc. Septa 8/9–9/10 lacking. Intestinal origin in XV; Last pair of hearts in XIII, Prostates XVI–XXII.

Ecological notes : This species was collected from the soil beneath the rotten cow dung beside a cultivated land. It is also collected from the hard soil of Jute field. Generally it occurs in soils of

gardens, lawns, open fields, bamboo groves and deciduous jungles, rain forests, under logs. Status of the species here is not so common.

Remarks : This species originated from South East Asia and is endemic to Oriental Region. So far it was reported from Calcutta, Darjeeling and Jalpaiguri district from West Bengal. It is the first report from Hooghly district.

4. ***Lampito mauritii*** Kinberg, 1867

Materials : 4 exs., Dhalyan, Tarakeswar, Coll. S. Mitra, 5.vii.2004.

Diagnosis : Length 90–115 mm, diameter 3–5 mm, segments 150–178. Clitelum annular, XIV–XVII or XVIII; Setae perichaetine, 40–51 on VIII, 30–43 on XX, 10–16 between spermathecal pores and none between male pores. 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 porophore that extends from A into CE; female pores paired on XIV; genital marking absent. Intestinal origin in XV. Holandric; Testes free in X and XI. Prostates in XVIII.

Ecological notes : Greyish-yellow in living condition; living in top 10 cm of semi-moist sandy-loam soil, sometimes blackish soil; castings abundantly available in lawns and grass beds on the border line of grassy area and open area, deposited on the surface of the soil in the form of small heaps of spheroidal or nearly globular pellets. It is a commonly occurring species of this area.

Remarks : These worms are reported to be utilised as waste conditioners. But survival rate of this species is very poor in artificial culture beds. Here it is collected from a semi decomposed sandy soil beside a big pond.

6. ***Metaphire posthuma*** (Vaillant, 1868)

Materials : 3 exs., from beside a pond at Bhanjipur, Tarakeswar, 5.vii.2005, Coll. K. Ghosh.

Diagnosis : Length 60–140 mm, diameter 3–8 mm, segments 91–124. Prostomium epilobic. Tongue open. Clitellum XIV–XVI. Setae presents on clitellar segments ventrally. Genital markings paired, usually on XVII and XIX. Spermathecal pores 4 pairs minute and superficial, on posterior margins of V–VIII. Female pore single, mid-ventral on XIV, male pores minute and invaginate, on XVIII. Gizzard in VIII; intestinal origin in XV, last pair of hearts in XIII. Prostates in XV–XXI.

Ecological notes : Light to dark grey in living condition, curled into ball when touched; living in top 15 to 20 cm. of moist and semi-moist clayey loam soil, available in flower beds, grass beds and soil covered with dry heaps of leaf litter; comes out of the burrow after overnight shower; castings deposited on the surface of the soil in the form of small heaps of loose ovoidal pellets. This species is not so common in this area.

Remarks : This is a very common species in India. In West Bengal it was known to occur from Burdwan, Calcutta and 24-Parganas (N) districts only. So this the first record of this species from Hooghly district. It is commonly used as laboratory materials in India.

6. ***Perionyx excavatus*** Perrier, 1872

Materials : 12 exs., Dhalyan, 5.vii.2005; 7 exs., Padmapukur, 8.vii.2005, Coll. S. Mitra.

Diagnosis : Length 30–175 mm, diameter 3–8 mm, segments 79–121. Colour deep purple to reddish brown dorsally, pale ventrally. Prostomium epilobic, tongue open, clitelum 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. Gizzard absent or rudimentary in V; Intestinal origin in XV or XVI. Last pair of hearts in XII.

Ecological notes : Living in top 10 cm of semi-moist sandy-loam soil, manure and compost heaps, under logs, bricks, rocks at edge of a water bodies, under barks of standing and fallen trees. Leaves of aquatic plants. Soil near water cources, soil saturated with water from bathroom and kitchen. Sometimes blackish soil; castings abundantly deposited on the surface of the soil in the form of short thread or rods.

Remarks : These worms are reported being utilized as waste conditioners. Probably this is the most common Indian species which has potentialities for Vermicomposting. This species has a bad habit of escaping the vermibed just after some rain. This is the most commonly occurring species in this area.

7. ***Polypheretima elongata*** (Perrier, 1872)

Material : 1 ex., Padmapukur, 5.vii.2005, Coll. S. Mitra.

Diagnosis : Length 40–360 mm, diameter 1.5–10 mm, segments 136–297. Prostomium rudimentary or lacking. Genital markings transversely elliptical, paired, presetal on XIX and successive segments in line with or slightly median to male pores, occasionally on VI, VII and XVII. First dorsal pore at 12/13. Female pore single, mid ventral, on XIV. Male pores paired, Septa 8/9–0/10 absent. Intestinal origin in XVI. Last pair of hearts in XII.

Ecological notes : Under compost and manure heaps, rubbish, soils—red, black cotton or black taro; castings are found on soil surface in the form of cords of about 2 mm thickness and 20–24 mm in length or in irregular piles of 10–20 mm high and 20–35 mm wide.

Remarks : The species originated from the region including Indonesia and Philippines. In Karnataka, this species was found to have rendered the soil compact, hard and cloddy. It is very

common in the Sunderban area of West Bengal and this is the first report of this species from Hooghly district.

Family MONILIGASTRIDAE

Diagnosis : Setae sigmoid, single pointed, 4 pairs per segment. Dorsal pores absent. Female pores near B. Male pores in 10/11 to 12/13. Digestive system with oesophageal gizzards behind ovarian segment, intestinal origin behind XVII but without calciferous glands, typhlosole and supraintestinal glands.

Genus ***Drawida*** Michaelsen, 1900

Diagnosis : Nephrospore present from III. Spermathecal pores paired in 7/8. Female pores paired at or just behind 11/12. Male pores paired at or near 10/11. Gizzard in region of XII–XXVII; Intestinal caeca absent. Testes in 9/10. Ovaries in XI. Capsular prostates paired in X.

8. ***Drawida willsi*** Michaelesen, 1907

Material : 1 ex., Bhanjipur, Tarakeswar, 8.vii.2004, Coll. K. Ghosh.

Diagnosis : Length 55–60 mm, diameter 2.5 mm; segments 155–160. Colour reddish grey, prostomium prolobous, transversely oval in shape. Setae closely paired, especially the lateral. Male pores on transversely oval papillae in *b*; female pores in *ab.* Spermathecal pores in *ab*, inconspicuous. Septa 6/7–8/9 thickened, especially the first two. Two gizzards, in XIV and XV. Prostates short thick tubes, somewhat bent or depressed, nearly disc like.

Ecological notes : This species was collected from the moderately hard soil beside a jute cultivated field. The soil is somewhat brownish in colour and clayey in nature. Population of this species is very scanty.

Remarks : This species was earlier recorded from Bilaspur (M.P) and Hyderabad (A.P). So, it is the first record of this species from Hooghly district as well as West Bengal.

9. ***Drawida nepalennsis*** Michaelesen, 1907

Materials : 8 exs., Bhanjipur, Tarakeswar, 12.viii.2004, Coll. K. Ghosh.

Diagnosis : Length 50–130 mm, diameter 2–5 mm, segments 120–180. Colour yellowish grey. Postomium prolobous. Setae closely paired; *aa* is little more than *bc*; *dd* a little more than ½ circumference. Dorsal pores absent, Clitellum ring shaped, IX–XIV. Male pores on prominent transverse oval papillae, midway between *b* and *c*. Female pores in *b*. Spermathecal pores just ventral from *c*. Septa 5/6–8/9 very strong. Four gizzards, in xiv–xvii, Prostates long, tube like, in a U shaped loop.

Ecological notes : This species was collected from underneath rotten leaves below a bush. It was early reported from soil in gardens, lawns, forests, under compost heaps, earth at base of bamboo bush, mud under water cress. As this species eats rotten leaves it may be suitable for Vermicomposting purpose.

Remarks : This species originated from the Himalayas and recorded earlier from six districts of West Bengal namely, Bankura, Calcutta, Coochbehar, Darjeeling, Jalpaiguri and Nadia. So, it is the first record of this species from Hooghly district.

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