EARTHWORMS FROM NORTHERN INDIAN STATES WITH *OCNERODRILUS OCCIDENTALIS* EISEN, 1878 AS A NEW REPORT FROM PUNJAB

Neena Dhiman [1, 2] and S.K. Battish [1]

[1] Department of Zoology and Fisheries, Punjab Agricultural University, Ludhiana, Punjab 141004, India
Email: [2] neena_dhiman@hotmail.com

The published work on terrestrial oligochaetes of India includes short publications as well as work on comprehensive fauna. Michaelsen (1909) published a consolidated account on taxonomic studies of Indian oligochaetes including keys for identification of and description of all known species in India and adjacent countries until then. Stephenson (1923) documented the earlier work on earthworms in the *Fauna of British India* volumes. Gates' (1972) work culminated in the publication of a monograph, including the description of species from northeastern India and Andaman and Nicobar Islands, while Julka (1988) further substantiated work on Oligochaeta. This note lists thirty species of earthworms including twenty from Punjab and the Union Territory of Chandigarh and reports *Ocnerodrilus occidentalis* Eisen (1878) as new record from Punjab.

Material and Methods: Earthworms were collected regularly from various ecological niches such as litter, kitchen drainage, manure heaps, different types of soils, margins of freshwater bodies, pastures, grasslands, forests, cultivated fields etc. spread over the northern Indian states including Punjab, Haryana, Himachal Pradesh, Uttaranchal, Delhi and adjoining areas. These areas were explored for a period of more than three years, from July 1999 to August 2003, except in the months of December and January due to non availability of worms during extreme cold conditions in the upper soil profile. Live worms were brought to laboratory for identification. For diagnostic taxonomic characters, they were dissected after narcotizing in 30% ethyl alcohol, fixing in 10-15% formalin for 24 hours and finally preserving in 10-12% formalin. The anatomical details were examined under dissecting binocular microscope.

Results and Conclusions: The species so identified belong to six families namely Eudrilidae, Lumbricidae, Moniligastridae, Megascolecidae, Ocnerodrilinae and Octochaetidae and are presented in Table 1 along with information regarding important taxonomic features for each species. The habitat of their occurrence and month of collection for each species is also given. The most widely distributed species found in Punjab is *Metaphire posthuma* followed by *Lampito mauritii* and *Amynthas morrisi*. However, *Eudrilus eugeniae* and *Eisenia fetida* are best for vermiculture. Potentialities in future also exist to exploit *Perionyx excavatus* and *Allolobophora parva* for vermiculture. *Ocnerodrilus occidentalis* is reported for the first time from Punjab. *Perionyx barotensis* is strictly available in district Barot of Himachal Pradesh and so far is not recovered elsewhere.

REFERENCES

Gates, G.E. (1972). Burmese earthworms An introduction to the systematics and biology of megadrile oligochaetes with special reference to Southeast Asia. *Transactions of the American Philosophical Society* NS 62: 1-326.

Julka, J.M. (1988). *The Fauna of India and the adjacent countries Megadrile oligochaeta (Earthworms) Haplotaxida: Lumbricina: Megascolecoidea: Octochaetidae*. Zoological Survey of India, Calcutta, 400pp+xiv.

Michaelsen, W. (1909). The Oligochaeta of India, Nepal, Ceylon, Burma and the Andaman Islands. *Memories of Indian Museum* I.

Stephenson, J. (1923). Oligochaeta. In: *The Fauna of British India*. Francis and Taylor, London.

Stephenson, J. (1930). *The Oligochaeta*. Clarendon Press, Oxford, 978pp.

ACKNOWLEDGEMENTS

The authors are thankful to Dr. J.M. Julka, Consultant, Earthworm Identification and Vermiculture, Zoological Survey of India, Solan for his timeless help in identification and confirmation of species and for providing valuable suggestions during the studies.

Table 1. Earthworms from northern Indian states

Species	Location	Month of collection	Habitat	Avg length; Diameter (cm)	Total segments / Ciltellar segments / Type of clitellum	Prosto-mium	Location of prostate glands	Spermathecae number / Location
Family: Eudrilidae								
Eudrilus eugeniae Kinberg, 1867	Chandigarh	May, 2001	Shaded grasslands, mud	12-14; 0.48	200; XII-XVII; A	Epi	XVI-XXVI; As euprostates	1 pair; XIV
Family: Lumbricidae								
Allolobophora caliginosa caliginosa Beddard, 1895	Kullu, Manali, Solan (H.P.)	May, 2001	Earth around potted plants, gardens, fields, compost	6-16; 0.45	100-245; XXVI-XVII or XXVIII-XXXV; S	Epi	XXXII-XXXIV	2; 9/10, 10/11
Allolobophora parva Eisen, 1874	Roopnagar, Nawanshehar, Kajli, Jodhan, Marhana, Thaka, Aujla, Narangwal, Dhaliwal (Punjab)	April, 2003 - August, 2003	Waste effluents of habitations, under logs, gardens, fields, humus, manure	2.5- 4; 0.14	85-124; XXIV-XXX; S	Epi	XV-XVI	Lacking
Dendrodrilus rubidus Savigny, 1826	Manali (H.P.)	July, 2002	Litter, compost, fields, meadows	5-6; 0.35	74-110; XXV or XXVI-XXXI or XXXII; S	Epi	Unidentifiable	2; 9,10

Manuscript 1203; Received 08 May 2004; Finally accepted 10 October 2005; Date of publication 21 December 2005

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Species	Location	Month of collection	Habitat	Avg length; Diameter (cm)	Total segments / Ciltellar segments / Type of clitellum	Prosto-mium	Location of prostate glands	Spermathecae number / Location
Eisenia fetida Savigny, 1826	Chandigarh	May, 2001	In debris, mess, gardens, sewage, streams, meadows	12-13.5; 0.46	90-125; XXIV,XXV,XXVI to XXXIV; S	Epi	Absent	2; 9,10
Octolasion tyrtaeum Savigny, 1826	Banjar district (Kullu)	May, 2000 & April, 2001	Under stones, logs, compost, litter, mud	3-12; 0.30	75-120; XXX-XXXV; S	Epi	XIV-XV	2; 10,11
Family: Megascolecidae								
Amynthas alexandri Beddard, 1900	Ambala, Roopnagar (Punjab)	April, 1999 & July, 2001	Gardens, lawns, fields, jungles	11-12.5; 0.46-0.49	90-140; XIV-XVI; A	Rudi-mentary	XVI-XXII	4; 6/7-9/10
Amynthas corticis Kinberg, 1867	Nangal, Roopnagar (Punjab)	March, 2003 to May, 2003	Gardens, fields, forests	8-9; 0.45-0.47	90-100; XIV-XVI; A	Epi	Absent	4; 5/6-8/9
Amynthas gracilis Kinberg, 1867	Ambala, Amritsar (Punjab)	April, 2002	Gardens, green houses, drainages	9-10; 0.35 - 0.43	60-100; XIV-XVII; A	Epi	XVI-XXIV	3; 5/6-7/8
Amynthas morrisi Beddard, 1892	Ludhiana open areas	July, 2003	Garden soils, lawns,	9.5-11.5; 0.45-0.50	90-110; XIV-XVI; A	Epi	XVII-XXII	2; 5/6, 6/7
Lampito mauritii Kinberg, 1866	Ludhiana, Doraha, Sirhind, Kapurthala, Hoshiarpur, Jalandhar (Punjab)	June, 2001 to August, 2003	Gardens, manure heaps, fields	9-13.5; 0.29-0.32	168-195; XIV-XVII; A	Pro	XVIII	3; 6/7-8/9
Metaphire houlleti Perrier, 1872	Himachal Pradesh	March, 2001	Gardens, lawns, Jungles	9.2-20; 0.50 - 0.52	9.2-120; XIV-XVI; A	Epi	XVI-XXI	3; 6/7-8/9
Metaphire posthuma Vaillant, 1868	Ludhiana, Gurdaspur, Phillaur, Faridkot, Jalandhar, Kapurthala (Punjab), Anandpur sahib, Garshankar forests,, Delhi, Ambala, Panipat, Bareilly	May, 2001 to August, 2003	Lawns, gardens, mud	0.80-1.30; 0.45-0.65	90-135; XIII ½ -XVI ½ or XVII; A	Epi	XV-XXI	4; 5/6-8/9
Polypheretima elongata Perrier, 1872	Ludhiana, Sirhind, Roopnagar (Punjab)	April to June, 2000; May to June, 2001	Dairy farm yard, gardens, compost	15-21; 0.44-0.47	150-260; XIV-XVI; A	Rudi-mentary	XVI-XXI	2; 5/6, 6/7
Perionyx bainii Stephenson 1915	Kullu	June, 2001	Soils with rich organic matter and leaf litter	0.25-0.45; 0.23-0.25	90-95; XIII-XVII; A	Epi	XVIII	2; 7/8, 8/9
Perionyx barotensis Jhulka, 1993	Baroti (H.P.)	May, 1999	Soils with rich organic matter and leaf litter	7-9.5; 0.23-0.25	105-130; XIII-XVII; A	Epi	XXII-XXIII	2; 8, 9
Perionyx excavatus Perrier, 1872	Palampur (H.P.)	May, 2002 to April, 2003	Debris, under stones, sandy soils	0.30-1.80;	120-155; XIII-XVII; A 0.42-0.45	Epi	XVIII	2; 7/8, 8/9
Perionyx sansibaricus Michaelsen, 1891	Gurdaspur, Pathankot (Punjab)	March, 2001 & April, 2001	Soil with high organic matter and moisture	3.2-6.5; 0.29-0.30	80-105; XIII-XVII; A	Epi	XVII-XIX	3; 7, 8, 9
Perionyx simlaensis Michaelsen, 1907	Dholvahe (H.P.), Hoshiarpur (Punjab)	April, 2002	Soils rich in organic matter	8.5-10; 0.42-0.45	120-135; XIII-XVII; A	Epi	XVII	2; 7/8, 8/9
Family: Ocnerodrilinae								
Gordiodrilus elegans peguanus Beddard, 1892	Roopnagar, Mirzapur stream bank	October, 2001 & November, 2002	Forest, lake shores	2.6-4.7; 0.15	80-95; XIII-XVIII, XIX, XX; A	Epi	XVII-XVIII	2; 7/8, 8/9
Ocnerodrilus occidentalis Eisen, 1878	Ludhiana (Punjab)	May, 2002 to July, 2002	Soils of potted plants	1.5-3; 0.11	65-70; XIII or XIV-XIX or XX; A	Unidenti-fiable	XVII-XIX	Absent
Family: Octochaetidae								
Dichogaster bolaui Michaelsen, 1900	Roopnagar	February, 2000	Soils rich in organic matter	2-4; 0.13-0.15	75-95; XIII or XIV-XVIII, XIX, XX; S	Pro-epi	XVII, XIX	2; 7/8, 8/9
Eutyphoeus ibrahimi Stephenson, 1914	Kapurthala	July, 2000	Fields, gardens, margins of aquatic bodies	7; 0.23-0.25	185; indefinite clitellum	Tany	Not defined	1; 7/8
Eutyphoeus incommodus Beddard, 1901	Nandpur, Sanehawal, Hoshiarpur (Punjab), Ambala	April, 2002 & May, 2002	Soils rich in organic matter and moisture	9-11; 0.40	120-150; XIII-XVII or XVIII; A	Pro-epi	XVII	1; 7/8
Eutyphoeus waltoni Michaelsen, 1907	Chohal, Hoshiarpur (Punjab), New Delhi	April, 2003 & July, 1999	In dense vegetation deep in earth	9-20; 0.45-0.50	190-210; ½ XIII-XVII; A	Tany	XIV-XVII	1; 7/8

Species	Location	Month of collection	Habitat	Avg length; Diameter (cm)	Total segments / Ciltellar segments / Type of clitellum	Prosto-mium	Location of prostate glands	Spermathecae number / Location
Lennogaster chittagongensis Stephenson, 1917	Nathwai, Sukhna WLS	September, 2002	Soil rich in moisture	2.4-7; 0.15	120; XIII-XVII; A	Epi	XVII	1; 8
Lennogaster pusillus Stephenson, 1920	Kansal forest, Chandigarh (U.T.)	August, 2000	Soils rich in organic matter, leaf litter and humus	2.5-4.5; 0.13	100-125; XIII-XVII; A	Pro-epi	XVII	1; 8
Octochaetona beatrix Beddard, 1902	Hoshiarpur	March, 2001	Earth of potted plants	7-8; 0.35	170-180; XIII-XVII, XVIII; A	Epi	XVII & XIX	2; 8, 9
Ramiella bishamberensis Stephenson, 1914	Forest near Sukhna lake, Chandigarh (U.T.)	August, 2000	Moist neutral soils	3.5; 0.1	85; XIV- XVI; A	Epi	XVII-XIX	2; 8, 9
Family: Moniligastridae								
Drawida japonica Michaelson, 1917	Solan	June, 2003	Soils rich in organic matter	3-6; 0.26	130-142; inconspicuous clitellum	Pro	X	1; 7/8

Tany - Tanylobous; Pro - Prolobous; Epi - Epilobous; S - Saddle; A - Annular

NOTE ZOOS' PRINT JOURNAL 21(1): 2137-2139

ICHTHYOFAUNA FROM FOUR DISTRICTS OF MARATHWADA REGION, MAHARASHTRA, INDIA

C.J. Hiware

Reader, Department of Zoology, Dr. Bababsaheb Ambedkar Marathwada University, Aurangabad, Maharashtra 431004, India
Email: drhiware@rediffmail.com

The Marathwada region of Maharashtra is one of the richest in aquatic resources that includes tributaries of river Godavari, Purna, Painganga, Manjara and Dudhana apart from reservoirs and lakes. In the field of ichthyology valuable contributions have been made by Ahirrao and Mane (2000) who studied ichthyofauna from Parbhani district of Maharashtra state and Sakhare (2001) who studied ichthyofauna of Jawalgaon Reservior in Solapur district in Maharashtra state. The present work was mainly undertaken to investigate the fish diversity from this region and it is first effort in this direction.

The survey work was mainly undertaken in four major districts, namely, Aurangabad, Nanded, Parbhani and Osmanabad of Marathwada region. From these districts some of the places having small and big water resources with fishery potential were selected for collection of ichthyofauna. Some of the important places under study include:

Aurangabad district:
Collection sites: Aurangabad, Paithan, Werul, Ajantha, Sillod.
Water resources: Godavari river, Kham river, Nathsagar dam, Purna river, Salim Ali lake, Harsool lake, Tisgaon pond, Khajan pond, etc.

Parbhani district:
Collection sites: Parbhani, Yeldari, Purna, Jintur etc.
Water resources: Purna river, Kapra river, Masoli lakes, Yeldari dam, Jam pond, Rahati pond, etc.

Nanded district:
Collection sites: Nanded, Vishnupuri, Kandhar, Kinwat, Mahur
Water resources: Godavari river, Manar river, Painganga river, Vishnupuri dam, Jagatunga Samudra reservoir, Dhamdari pond.

Osmanabad district:
Collection sites: Osmanabad, Tuljapur, Naldurg, Kallam, Bhum
Water resources: Terna river, Manjara river, Sina river, Bori dam, Tugao pond, etc.

Fishes were collected during regular monthly between May 2003 and April 2004 from the local fish markets and fishing spots of different places. The local fishermen fish using different types of gill nets, cast nets, Maccharjali, disco nets operated through indigenously designed rafts and Ratnagiri type boats. After systematic identification the specimens were preserved in 4% formalin and deposited in the Zoology Department Museum, Dr. Babasaheb Ambedkar Marathwada University Aurangabad after providing appropriate registration numbers and other details. The identification of the fishes were carried out with the help of standard literature (Day, 1878; Jayram, 1981; Qureshi & Qureshi, 1983; Datta & Srivastava, 1988; Talwar & Jhingran, 1991).

Sixty-six fish species belonging to 33 genera, 16 families and eight orders were recorded from the freshwaters of four districts of Marathwada region in Maharashtra state (Table 1). The ichthyofauna consisted of carps, catfishes and trash fishes. The carps dominated overall over other groups throughout the year. The group also supported capture as well as culture fishery

Manuscript 1210; Received 28 May 2004; Revised received 16 July 2004; Finally accepted 20 September 2005; Dat e of publication 21 December 2005