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EARTHWORMS OF HEMIS NATIONAL PARK, JAMMU & KASHMIR, INDIA

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INTRODUCTION

Earthworms are distributed in tropical, subtropical and temperate regions of the world. Their presence in soil is primarily dependent on the availability of sufficient soil moisture and organic matter. The earthworms of Jammu & Kashmir have been studied by Stephenson (1922, 1923), Soota and Halder (1980), Sharma and Kaul (1974), Julka (1988), and Paliwal and Julka (2005). However, the trans-Himalayan region of the state remained unexplored for earthworms until recently Julka and Paliwal (in press) reported the occurrence of two species from Cold Desert ecosystem of Ladakh.

Hemis National Park is located (latitude 33°38'–34°11' north to longitude 77°00'–77°44' east) in the trans-Himalayan Cold Desert region of the Jammu & Kashmir. It is characterized by varying climatic conditions from temperate to sub-arctic, with scanty rainfall and sparse vegetation. Soil is sandy having low organic matter and moisture. The present communication deals with the earthworm diversity of Hemis National Park which has not so far been surveyed for earthworms. These species belong to the holarctic family Lumbricidae and occur mostly near human habitation in the Park, indicating their recent introduction in the region possibly due to accidental transportation in soil around roots of plants.

SYSTEMATIC ACCOUNT

Phylum ANNELIDA
Class OLIGOCHAETA
Order HAPLOTAXIDA
Suborder LUMBRICINA
Superfamily LUMBRICOIDEA
Family LUMBRICIDAE

Genus ***Allolobophora*** Eisen, 1874

1. ***Allolobophora parva*** Eisen, 1874

1874. *Allolobophora parva,* Eisen, *Ofvers. K. Vetensk Acad. Forh. Stockh.,* **31** : 46.

1972. *Bimastos parvus,* Gates, *Trans. Am. phil. Soc.,* **62** : 87.

1983. *Allolobophora parva,* Easton, In Satchell, J.E., *Earthworm Ecology from Darwin to Vermiculture* : 475.

Length 25-52 mm, diameter 1.5-2.5 mm, 95-104 segments. Colour reddish on dorsum, venter yellowish. Body cylindrical. Prostomium epilobic, tongue open. First dorsal pore 5/6. Clitellum saddle-shaped, 24-30, rarely extending to 31; tubercula pubertatis absent. Setae lumbricine, closely paired, *aa* = 3.18-3.67 *ab* = 1.09-1.14 *bc* = 2.92-5.0 *cd* = 0.31-0.41 *dd* on 12, *aa* = 2.67-3.82 *ab* = 1.14-1.31 *bc* = 5.0-6.0 *cd* = 0.31-0.47 *dd* on 36; genital tumescences lacking. Nephridiopores inconspicuous. Male pores minute, paired, at the base of small transverse clefts, located on somewhat circular whitish tumescences, confined to 15, extending laterally to mid *bc*. Female pores paired, tiny, shortly above *b*, on setal arc of 14. Spermathecal pores absent.

Pigmented, pigment red. Septa 5/6-12/13 slightly muscular. Typhlosole simple, lamelliform. Nephridial vesicles J-shaped in 14 and anterior segments with curved part directed caudad; U-shaped in 15 and posteriad segments with curved parts directed cephalad; lateral ends of vesicles closed. Holandric; testes and male funnels free, in 10 and 11; seminal vesicles paired, small, in 11 and 12. Spermathecae absent. Atrial glands well developed, reaching above longitudinal muscle layer, extending into 14 and 16; sometimes atrial glands rudimentary.

Type locality : Mount Lebanon, New York New England, U.S.A.

Material examined : Coll. H.S. Mehta : 0-0-4 Karu, 30 Aug 1994, 0-0-7 Toko Khud, Nimu, 2 Aug 1998; coll. R. Paliwal 1996 : 0-0-9 Upshi, 11 Aug, 1-4-5 Hemis, 12 Aug; 1-0-9 Sumda, 31 July 1998, coll. T.R. Sharma.

Distribution : INDIA : Jammu & Kashmir, Himachal Pradesh, Punjab, Uttarakhand, Uttar Pradesh, Bihar, West Bengal, Rajasthan and Tamil Nadu.

Outside India : Pakistan, Myanmar, Malaya, Indonesia, Tibet, China, Korea, Central Asia, Russia, Kazakstan, Japan, Afghanistan, Tahiti, Hawaii, Australia, Mauritius, St. Paul, South Africa, South West Africa, Iceland, Denmark, Germany, England, Wales, Portugal, Spain, Switzerland, Italy, Corsica, Rhodes, Hungary, Romania, Bulgaria, St. Helena, U.S.A., Mexico, Guatemala, Costa Rica, Brazil, Argentina.

Genus ***Dendrodrilus*** Omodeo, 1956

2. ***Dendrodrilus rubidus*** (Savigny, 1826)

1826. *Enterion rubidum,* Savigny, *Mem. Acad. Sci. Inst. Fr. (Hist.),* **5** : 182.

1972. *Dendrobaena rubida,* Gates, *Trans. Am. phil. Soc.,* **62** : 92.

1979. *Dendrodrilus rubidus,* Gates, *Megadrilogica,* **3** : 152.

1983. *Dendrodrilus rubidus rubidus,* Easton, In Satchell, J.E. *Earthworm Ecology from Darwin to Vermiculture* : 479.

1983. *Dendrodrilus rubidus norvegicus,* Easton, In Satchell, J.E. *Earthworm Ecology from Darwin to Vermiculture* : 479.

1983. *Dendrodrilus rubidus subrubicundus,* Easton, In Satchell, J.E. *Earthworm Ecology from Darwin to Vermiculture* : 479.

1983. *Dendrodrilus rubidus tenuis,* Easton, In Satchell, J.E. *Earthworm Ecology from Darwin to Vermiculture* : 480.

Length 33-67 mm, diameter 2-3.5 mm, 92-108 segments. Colour light to dark red. Body cylindrical. Prostomium epilobic, tongue open. First dorsal pore 5/6, occasionally 4/5, rarely 6/7. Clitellum saddle-shaped, 26-31, sometimes extending to 25 and 32; tubercula pubertatis 28-30, longitudinal bands just lateral to *b*, usually grooved longitudinally. Setae lumbricine, widely paired, *aa* = 1.87-2.35 *ab* = 0.98-1.17 *bc* = 1.33-1.69 *cd* = 0.31-0.37 *dd* on 12, *aa* = 2.0-2.65 *ab* = 0.90-1.20 *bc* = 1.29-2.26 *cd* = 0.33-0.42 *dd* on 36; genital tumescences incorporating setae *a*, *b* on 16, 26-31, rarely on 25, 32. Nephridiopores inconspicuous. Male pores minute, paired, on 15, at the base of transverse clefts, located on somewhat spherical tumescences confined to 15, extending from *b* to mid *bc*. Female pores paired, tiny, just lateral to *b*, on setal arc of 14. Spermathecal pores minute, paired, in 9/10/11, close to *c* lines.

Pigmented, pigment red. Septa 5/6-12/13 slightly muscular. Typhlosole 20 to 78-97, with a median longitudinal groove on the ventral face. Nephridial vesicles U-shaped like hair pins, lateral ends closed, curved parts directed cephalad. Holandric; testes and male funnels free, in 10 and 11; seminal vesicles paired, in 9, 11, 12. Spermathecae in 9, 10; ampulla medium sized, spheroidal to ovoidal, duct slender, much shorter than ampulla. Glands of tubercula pubertatis, atrium and genital setae present.

Type locality : Paris, France.

Material examined : 0-1-16 Hemis, 6 Aug 1981, coll. M. Chandra; 1-5-16 Karu, 30 Aug 1994, coll. H.S. Mehta; coll. R Paliwal 1996 : 4-4-7 Upshi, 11 Aug, 36-13-18 Hemis, 12 Aug; 25-8-27 Sumda, 31 July 1998, coll. T.R. Sharma; 1-2-3 Hemis, 20 Aug 2002, coll. R.M. Sharma.

Distribution : INDIA : Jammu & Kashmir, Himachal Pradesh, Uttarakhand, West Bengal, Sikkim, Arunachal Pradesh and Tamil Nadu.

Outside India : Pakistan, Bhutan, Manchuria, Korea, Siberia, Kazakstan, Japan, Hawaii, Juan Fernandez Island, Australlia, New Zealand, Kermadec Islands, Stewart Island, Turkey, Turkestan, South Africa, Southwest Africa, Madagascar, Reunion, St. Paul Island, Kerguelen Island, Europe, Russia, Ukraine, Moldavia, Byelorussia, Crimea, Estonia, Latvia, Lithuania, Channel Islands, Rhodes Island, Azores, Madeira, Canary Islands, Tristan da Cunha, Tierra del Fuego, Falkland Islands, Greenland, Canada, U.S.A., Mexico, Guatemala, Colombia, Ecuador, Brazil, Chile, Argentina, Uruguay.

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