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Observations on an epilobic *Lumbricus rubellus* (Oligochaeta, Lumbricidae) from the Great Smoky Mountains National Park, Tennessee, USA

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The genus *Lumbricus* L. was the first described genus of earthworms, with *L. terrestris* as its type species. The genus can be easily distinguished because it is the only lumbricid genus with a tanylobic prostomium, with the exception of the North American native *Bimastos eiseni* (Levinsen). With six known *Lumbricus* species introduced in North America (Reynolds & Wetzel, 2012), *Lumbricus rubellus* is one of the most widespread. In addition, *L. rubellus* has been associated with negative ecological effects as result of its invasion (Greiner *et al.* 2012). The Great Smoky Mountains National Park in Tennessee and North Carolina, USA, is no exception from earthworm invasions (Snyder *et al.* 2011). Recent research in an area near the extreme southwestern end of the Park (35.5538° N; 83.9943° W), resulted in the collection of ten specimens of *L. rubellus*, on 27 July 2011. Among these specimens was one that had an abnormal epilobic prostomium and under-developed tubercula pubertatis, whereas the rest had the typical *Lumbricus* tanylobic prostomia and fully developed tubercula pubertatis. To facilitate discrimination and identification in future encounters of an epilobic *L. rubellus* we provide here a full description of this specimen. To our knowledge, this is the first reported case of a specimen of *L. rubellus* with an epilobic prostomium. The specimen will be deposited in the nascent Terrestrial Oligochaete Collection at the Georgia Museum of Natural History in Athens, Georgia, USA. The specimen was fixed in 10% formalin, and is preserved in 70% ethanol.

Lumbricus rubellus Hoffmeister, 1843

For a list of synonyms see Blakemore (2002).

One adult (SI.0086, collection of M.A. Callaham, Jr., USDA Forest Service), Great Smoky Mountains National Park, Tennessee, USA (35.5538N, 83.9943W), close to Abrams Creek Shoals, coll. H. Ikeda & M.A. Callaham, Jr; 27 JULY 2011.

Length at least 30 mm (posterior amputation), width at x 3.1 mm, at clitellum 4.5 mm. Prostomium epilobic (Fig. 1). Number of segments more than 45. First dorsal pore in 5/6, small and hidden by overlapping segments. Color of preserved specimen purple, with a pale ventrum and dark-yellowish clitellum. Setae lumbricine, closely paired. At x aa:ab:bc:cd = 10:4:13:3, dd = 1/2 of body circumference. Spermathecal pores in 9/10 and 10/11, inconspicuous and level with d. Female pores in xiv, lateral to b. Male pores in xv, lateral to b. Clitellum in xxvii–xxxii, saddle-shaped. Tubercula pubertatis in xxviii–xxxi in the ventral margin of clitellum, not well developed or differentiated. Nephridiopores anterior in each segment not forming regular rows, level with or dorsal to b.

Septa 6/7–11/12 and 18/19–20/21 slightly muscular, 17/18 extremely thin and delicate. Pharynx well developed, ends in v. Calciferous glands paired in xi and xii, sacks in x, and oesophagous with calciferous lamellae in xiii. Crop in xv–xvi. Gizzard in xvii–xviii, without definite boundary from the crop. Intestinal origin in xxi. Typhlosole well developed and filiform with wrinkles oriented dorsoventrally, about 3/4 of the lumen diameter, starting abruptly in xxii. Spermathecae paired in ix and x, without diverticula. Ampulla globular, with a short duct connecting with the intersegmental furrows. Seminal vesicles in ix, xi and xii, size increasing posteriorly. Those in xii extending to xiii, passing through the 12/13 septum. Testes in x and xi. Ovaries in xiii. Meganephridia tubular and coiled. Bladder J-shaped.

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The internal characters of this specimen follow the diagnosis of the genus *Lumbricus* as defined by Fender (1985), and by Sims and Gerard (1999). Externally, the specimen follows the description of *L. rubellus* with the exception of its prostomium. Following the key of Schwert (1990), the epilobic *L. rubellus* will key to *Eisenoides lonnbergi* (Michaelsen) and/or *Eiseniella tetraedra* (Savigny). However, it can be easily distinguished from these by the location of the clitellum, tubercula pubertatis and number of spermathecae and the spermathecal pores location relative to the setal lines. Furthermore, *Eisenoides* does not have calciferous sacks in x and has U-shaped nephridial bladders (Gates 1972), whereas *Lumbricus* has calciferous sacks in x and J-shaped nephridia (Fender 1985; Sims & Gerard 1999). The epilobic specimen of *L. rubellus* can be distinguished from *El. tetraedra* by the position of its clitellum in xxii, xxiii–xxvi, xxvii, tubercula pubertatis in xxiii–xxv, xxvi. Additionally, *El. tetraedra* usually has a smaller size of less than 60mm body length and a distinctly quadratic or trapezoid shape in cross section posteriorly (Schwert 1990, Sims & Gerard 1999).

FIGURE 1. Epilobic prostomium of the specimen of *Lumbricus rubellus.*

References

Blakemore, R.J. (2002) *Cosmopolitan earthworms: an eco-taxonomic guide to the peregrine species of the World*. VermEcology, Kippax, 506 pp. [CD publication]

Fender, W.M. (1985) Earthworms of the Western United States. Part I. Lumbricidae. *Megadrilogica*, 4 (5), 93–128.

Gates, G.E. (1972) On American earthworm genera. I. Eisenoides (Lumbricidae). Bulletin of Tall Timbers Research Station, 13, 1–17.

Greiner, H.G., Kashian, D.R. & Tiegs, S.D. (2012) Impacts of invasive Asian (*Amynthas hilgendorfi*) and European (*Lumbricus rubellus*) earthworms in a North American temperate deciduous forest. *Biological Invasions*, 14 (10), 2017–2027. https://doi.org/10.1007/s10530-012-0208-y

Reynolds, J.W. & Wetzel, M.J. (2012) Terrestrial Oligochaeta (Annelida: Clitellata) in North America, including Mexico, Puerto Rico, Hawaii, and Bermuda. III. *Megadrilogica*, 15, 191–214.

Schwert, D.P. (1990) Oligochaeta: Lumbricidae. *In:* Dindal, D.L. (Ed.), *Soil Biology Guide. 1st Edition.* Wiley-Interscience. New York, pp. 341–356.

Sims, R.W. & Gerard, B.M. (1999) *Earthworms: Notes for the identification of British species*. *4th Edition*. Published for The Linnean Society of London and The Estuarine and Coastal Sciences Association by Field Studies Council, Montford Bridge, Shrewsbury, 169 pp.

Snyder, B.A., Callaham Junior, M.A. & Hendrix, P.F. (2011) Spatial variability of an invasive earthworm (*Amynthas agrestis*) population and potential impacts on soil characteristics and millipedes in the Great Smoky Mountains National Park, USA. *Biological Invasions*, 13, 349–358. https://doi.org/10.1007/s10530-010-9826-4