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The Genus Sparganophilus is Exploding in North America!

John Warren Reynolds

Oligochaetology Laboratory, 9-1250 Weber Street East, Kitchener, ON N2A 4E1 Canada and Research Associate, New Brunswick Museum, 277 Douglas Avenue, Saint John, NB E2K 1E5 Canada

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Abstract

Original Research Article

This manuscript brings together for the first time all the known species in the genus *Sparganophilus*. The checklist includes the distribution data and maps for the 20 species in this expanded genus. Since more scientists are now studying oligochaetes in North America, it is expected that more species new to science will be described for this and other Nearctic species.

Keywords: North America, Oligochaeta, Sparganophilidae, Sparganophilus, Distribution

INTRODUCTION

Oligochaeta in the family Sparganophilidae are primarily limicolous, or mud-dwelling species living in very wet habitats that include the saturated soils along the banks and in submerged sediments of streams, ponds, lakes, springs, spring-runs, wetlands, caves, flood plains, as well as in moist litter covering the soil / muddy surfaces, and occasionally in saturated tree-wood in these areas (Reeves *et al.*, 2024). *Sparganophilus* appear to thrive in relatively oxygen-poor, waterlogged soils of permanent streams and lakes Rota *et al.*, 2016) and have been collected from aquatic habitats several metres in depth with the aid of Ekman dredges (Reynolds, 1977a, 1977b, 1980).

The Family Sparganophilidae, most likely originating in the Nearctic Region, consists of one genus, *Sparganophilus* (typ: *Sparganophilus tamesis* Benham, 1892), found in North America, Europe and the Philippines (Reeves *et al.*, 2024; Reynolds, 1980, 2008). For 83 years it was a monotypic genus, although several newly described species turned out to be synonyms of *S. tamesis*. The first explosion was in 1980 when 13 taxa were included in the genus (Reynolds, 1980). The second, and most recent explosion was in 2025, when Carrera-Martínez *et al.* (2025) added seven new species and three unnamed species to be described in full later.

MATERIALS AND METHODS

The distributional information for *Sparganophilus* records presented in this paper are based on specimens in my personal collection (Oligochaetology Laboratory), specimens

sent to me by colleagues and the general public for identification, and data presented in the literature cited and references included herein, most recently in Reeves *et al* (2024) and Reynolds (2024). The details for the site locations can be found in Eisen (1896), Reynolds (1975, 1977a, 1977b, 1980, 2024; Reeves *et al.* (2024), and Carrera-Martínez *et al.* (2025).

CLASSIFICATION AND CHECKLIST

Classification

Phylum – Annelida Lamarck, 1802
Class – Clitellata Michaelsen, 1919
Subclass – Oligochaeta Grube, 1850
Order – Crassiclitellata Jamieson, 1988
Suborder – Lumbricina Bouché, 1970
Family – Sparganophilidae Michaelsen, 1919
Genus – Sparganophilus Benham, 1892

Checklist

 Sparganophilus tamesis Benham, 1892 (= S. eiseni Smith, 1895; S. benhami + ss. guatemalensis Eisen, 1896; Helodrilus elongatus Friend, 1921; Pelodrilus cuenoti Tétry, 1934; S. langi Bouché and Qui, 1998; Quart. Journal Microsc. Soc. (n.s.), 34: 156; Types in British Museum Natural History, cat. no. 1892:12:16:1-21 (Reynolds and Wetzel, 2025).



Figure 1. The known global locations of *Sparganophilus tamesis* Benham, 1892 and its synonyms. Dots may represent more than one record of *S. tamesis* from sites that, at this scale, are in close proximity to one another (from Reynolds, 2024).

Distribution: North America (Canada, 4 provinces; Guatamela, 2 departments; Mexico, 2 states; USA, 36 states), *Europe* (England, 5 counties; France, 1 department; Germany, 1 state; Italy, 1 region; Switzerland, 1 canton), Asia (Philippines, 4 provinces) (Černosvitov, 1945); Graefe and Beylich (2011); Magahud *et al.* (2017); Joshi *et al.* (2020) (Figure 1).

 Sparganophilus smithi Eisen, 1896; Memoirs of the California Academy of Sciences 2(5): 154; Types, unknown (Reynolds and Wetzel, 2025).

Distribution: USA (1 state, 1 county). CA, San Francisco (Figure 2).

3. Sparganophilus sonomae Eisen, 1896; Memoirs of the California Academy of Sciences 2(5): 154; Types, unknown (Reynolds and Wetzel, 2025).

Distribution: USA (2 states, 2 counties). CA, Sonoma; OR, Curry (**Figure 2**).

4. *Sparganophilus pearsei* Reynolds, 1975; Megadrilogica 2(2): 10; Types in British Museum Natural History, cat. no. 1935:2:28:50-51 (Reynolds and Wetzel, 2025).

Distribution: USA (7 states, 19 counties). NC, Buncombe, Swain; CO, Freemont, Weld, Yuma; CA, Kern, San Luis Obispo, Santa Clara, Contra Costa, Solano; GA, Grady, Harris; VA, Westmoreland; FL, Bay, Marion, Orange; NM, Catron, Grant, Hidalgo (**Figure 2**). **5.** Sparganophilus tennesseensis Reynolds, 1977; Megadrilogica 3(3): 63; Types in Canadian Museum of Nature, cat. no. 1978-375 (Reynolds and Wetzel, 2025).

Distribution: USA (6 states, 12 counties). CT, New Haven, New London; FL, Alachua, Columbia, Indian River, Wakulla; MA, Essex; MI, Leelanau; NC, Haywood, Pitt; TN, Hamilton, Polk (**Figure 2**).

6. Sparganophilus gatesi Reynolds, 1980; Megadrilogica 3(12): 194; Types destroyed (Reynolds and Wetzel, 2025).

Distribution: USA (3 states, 4 counties). FL, Okaloosa; MI, Benzie, Leelanau; NC, Avery (**Figure 3**).

 Sparganophilus helenae Reynolds, 1980; Megadrilogica 3(12): 195; Types in New Brunswick Museum, Saint John, cat. no. 980.79.14 (Reynolds and Wetzel, 2025).

Distribution USA (2 states, 2 counties). NC, Brunswick; SC, Oconee (**Figure 3**).

 Sparganophilus komareki Reynolds, 1980; Megadrilogica 3(12): 195; Types in New Brunswick Museum, Saint John, cat. No. 980.79.6 (Reynolds and Wetzel, 2025).

Distribution: USA (4 states, 5 counties). GA, Toombs; SC, Greenville; NC, Haywood; MI, Leelanau (**Figure 4**).

9. Sparganophilus kristinae Reynolds, 1980; Megadrilogica 3(12): 195; Types in New Brunswick Museum, Saint John, cat. no. 980.79.3 (Reynolds and Wetzel, 2025).

Distribution: USA (2 states; 2 counties). NC, Chatham; VA, Virginia Beach (**Figure 2**).

Sparganophilus meansi Reynolds, 1980; Megadrilogica 3(12): 195; Types in New Brunswick Museum, Saint John, cat. no. 980.79.5(Reynolds and Wetzel, 2025).

Distribution: USA (4 states, 4 counties). MS, Benton; FL, Sarasota; MI., Marquette; IL, Peoria (**Figure 2**).

11. Sparganophilus pearsei libertiensis Reynolds, 1980; Megadrilogica 3(12): 195; Types New Brunswick Museum, Saint John, cat. no. 980.79.11(Reynolds and Wetzel, 2025).

Distribution: USA (1 state, 1 county). FL, Liberty (**Figure 3**).

12. Sparganophilus pearsei sarasotae Reynolds, 1980; Megadrilogica 3(12): 196; Types in New Brunswick Museum, Saint John, cat. no. 980.79.10 (Reynolds and Wetzel, 2025).

Distribution: USA (3 states, 3 counties). AZ, Coconino; FL, Sarasota; TN, Maury (**Figure 3**).

13. Sparganophilus wilmae Reynolds, 1980; Megadrilogica 3(12): 198; Types in New Brunswick Museum, Saint John, cat. no. 980.79.2 (Reynolds and Wetzel, 2025).

Distribution: USA (1 state, 1 county). FL, Leon (Figure 5).

14. Sparganophilus youngae Carrera-Martínez, 2025; Zootaxa 5589(1): Types in Georgia Museum of Natural History, cat. no. GTIC-11468 (Carrera-Martínez et al., 2025).

Distribution: USA (1 state, 1 county). SC, Union (Figure 3).

15. Sparganophilus jenkinsi Carrera-Martínez, 2025; Zootaxa 5589(1): Types in Georgia Museum of Natural History, cat. no. GTIC-11478 (Carrera-Martínez et al., 2025).

Distribution: USA (1 state, 1 county). SC, Union (Figure 3).

 Sparganophilus oconeeae Carrera-Martínez, 2025; Zootaxa 5589(1): Types in Georgia Museum of Natural History, cat. no. GTIC-11493 (Carrera-Martínez et al., 2025).

Distribution: USA (1 state, 2 counties). GA, Jones, Greene (**Figure 5**).

 Sparganophilus williamsae Carrera-Martínez, 2025; Zootaxa 5589(1): Types in Georgia Museum of Natural History, cat. no. GTIC-11488 (Carrera-Martínez et al., 2025).

Distribution: USA (2 states, 2 counties). GA, Greene; SC, Union (**Figure 4**).

 Sparganophilus muskogee Carrera-Martínez, 2025; Zootaxa 5589(1): Types in Georgia Museum of Natural History, cat. no. GTIC-11491 (Carrera-Martínez et al., 2025).

Distribution: USA (1 state, 1 county). GA, Greene (**Figure 3**).

19. Sparganophilus carveri Carrera-Martínez, 2025; Zootaxa 5589(1): Types in Georgia Museum of Natural History, cat. no. GTIC-11503 (Carrera-Martínez et al., 2025).

Distribution: USA (1 state, 1 county). GA, Jones (Figure 4).

20. Sparganophilus borgesae Carrera-Martínez, 2025; Zootaxa 5589(1): Types in Georgia Museum of Natural History, cat. no. GTIC-11490 (Carrera-Martínez et al., 2025).

Distribution: USA (1 state, 1 county). GA, Greene (**Figure 3**).



Figure 2. The known distribution of *Sparganophilus kristinae*, *S. meansi*, *S. pearsei*, *S. sonomae*, *S. smithi* and *S. tennesseensis* in the United States of America.



Figure 3. The known distribution of *Sparganophilus borgesae, S. gatesi, S. helenae, S. jenkinsi, S. muskogee, S. pearsei libertiensis, S. pearsei sarasotae* and *S. youngae* in the United States of America.



DISCUSSION

The original species and the genus were described by Benham (1892) from specimens in the aquatic plants of the genus *Sparganium* (SPARGANIACEAE) near London (Reynolds and Wetzel, 2025). *Sparganophilus tamesis* in the following decades was described under various names, e.g. *S. eiseni* Smith, 1895; *S. benhami* and *S. b. guatemalensis* Eisen, 1896; *Helodrilus elongatus* Friend, 1913; *Pelodrilus cuenoti* Tétry, 1934; and *S langi* Bouché and Qui, 1989.

It was not until 83 and 85 years later that the second and third species of *Sparganophilus* were described -S. *pearsei* Reynolds, 1975 and *S. tennesseensis* Reynolds (1977a).

Five years later there was the first explosion of *Sparganophilus* species in the southeastern United States. Reynolds (1980) described seven species and two subspecies new to science bringing the total number of taxa in the genus to 13, e.g. *gatesi, helenae, komareki, kristinae, meansi, wilmae, pearsei* ss. *libertiensis,* and *pearsei* ss. *sarasotae*.

The second explosion occurred in this year (2025) when Carrrera-Martínez *et al.* added seven new species, e.g. *borgesae, carveri, jenkinsi, muskogee, oconeeae, williamsae,* and *youngae*. This brings the number of taxa in the genus *Sparganophilus* to 20, nothwithstanding the fact that Carrrera-Martínez *et al.* (2025) claim it to be 21 taxa. If there is another species I have missed, I don't know what it is.

There are three additional potential species new to science which Carriera-Martínez *et al.* (2025) have not formally named until they acquire additional specimens. Currently, they are very close to several of Reynolds' described species.

The most recent explosion of new species indicates that additional sampling in specific habitats, particularly in the American southeast should unearth more species of *Sparganophilus* new to science. The first indication that sampling for earthworms was possibly in the wrong habitat was mentioned by Reynolds (2001). Based on this understanding Reeves and Reynolds have concentrated on these habitats which have greatly increased the range of *S. tamesis* and several other species throughout central and western North America (Reeves *et al.*, 2024; Reeves and Reynolds, 2024; Reynolds and Reeves, 2022).

This year *Sparganophilus tamesis* was considered for Regional Red List assessment and determined to be in the non-threatened category (Phillips *et al.*, 2025).

CONCLUSIONS

This paper illustrates that continued sampling in the American southeast will probably yield additional species new to science, particularly in the case of native earthworm species.

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Data Availability Statement

The data used in this study can be found in the Literature Cited in the Reference Section.

Conflicts of Interest

The author declares no conflict of interest.

REFERENCES

Benham, W.B. 1892. A new English genus of aquatic Oligochaeta (*Sparganophilus*) belonging to the family Rhinodrilidae. Quarterly Journal of Microscopical Science 34: 155–179.

Bouché, M.B. and J.-P. Qui. 1998. A new *Sparganophilus* (Annelida: Oligochaeta) of Europe, with special considerations on earthworm palaeography. Documents Pédozoologiques et Intégrologiques (4), 16: 178–180.

Carrrera-Martínez, R., M.K. Taylor, D. Jones, S.D. Schoville, B.A. Snyder and M.A. Callaham. 2025. The unseen diversity of the semi-aquatic earthworms of the genus *Sparganophilus* (Oligochaeta: Sparganophilidae) from the Southeastern Appalachian Piedmont. Zootaxa 5598(1): 382–409.

Černosvitov, L. 1945. Oligochaeta from Windermere and the Lake District. Proceedings of the Zoological Society London 114(4): 523–548.

Eisen, G. 1896. Pacific Coast Oligochaeta. II. Memoirs of the California Academy of Science 2(5): 123–199.

Friend, H. 1921. XI – Two new aquatic Annelids. The Annals and Magazine of Natural History including Zoology Botany and Geology 7(9): 137–141.

Graefe, U. and A. Beylich. 2011. First record of the aquatic earthworm *Sparganophilus tamesis* Benham, 1892 (Clitellata, Sparganophilidae) in Germany. 5th International Oligochaete Taxonomy Meeting, Beatenberg, Switzerland

Joshi, R.C., N.M. Aspe and A.E. Cope. 2020. Field Guide: Earthworms in Heirloom Rice Fields of the Philippine Cordille, 26 pp.

Magahud, J., S.L.P. Dalumpines, N. Aspe and C. Cabusora. 2017. Responses of Paddy Earthworm, *Sparganophilus* sp., to Butachlor Herbicide. IAMURE International Journal of Ecology and Conservation 21(1): 50–87.

Phillips, H.R.P., G.G. Brown, S.W. James, J. Mathieu, J.W. Reynolds, M.E. Dharmasiri, C.L. Singer, M.J.I. Briones, H.C. Proctor and E.K. Cameron. 2025. The applicability of regional red list assessments for soil invertebrates: first assessment of five native earthworm species in Canada. Biodversity and Conservation 34: 1–15.

Reeves, W.K. and J.W. Reynolds. 2024. The earthworms (Annelida: Oligochaeta) of northern Nebraska, USA. Megadrilogica 28(11): 157–164.

Reeves, W.K., J.W. Reynolds and M.J. Wetzel. 2024. *Sparganophilus* (Annelida, Oligochaeta, Sparganophilidae) in North America. Megadrilogica 28(5): 53–80.

Reynolds, J.W. 1975. *Sparganophilus pearsei* n. sp. (Oligochaeta: Sparganophilidae) a nearctic earthworm from western North Carolina. Megadrilogica 2(2): 9–11.

Reynolds, J.W. 1977a. The earthworms of Tennessee (Oligochaeta). II. Sparganophilidae, with the description of a new species. Megadrilogica 3(3): 61-64.

Reynolds, J.W. 1977b. The earthworms (Lumbricidae and Sparganophilidae) of Ontario. Life Sciences Miscellaneous Publications, Royal Ontario Museum xi + 141 pp.

Reynolds, J.W. 1980. The earthworm family Sparganophilidae (Annelida, Oligochaeta) in North America. Megadrilogica 3(12): 189–204. Reynolds, J.W. 2001. Sparganophilidae – are terrestrial oligocheatologists missing the habitat in North America? Megadrilogica 8(11): 84–86.

Reynolds, J.W. 2008. Sparganophilidae (Annelida, Oligochaeta) distribution in North America and elsewhere, revisited. Megadrilogica 12(9): 125–143.

Reynolds, J.W. 2024. Global Checklist of *Sparganophilus* species (Annelida: Clitellata: Oligochaeta: Sparganophilidae) by County Equivalents. International Journal of Zoology and Animal Biology 7(3): 000951.

Reynolds, J.W. and W.K. Reeves. 2022. New earthworm (Oligochaeta: Acanthodrilidae, Lumbricidae, Megascolecidae and Sparganophilidae) records from southern Nebraska. Megadrilogica 27(11): 135–146.

Reynolds, J.W. and M.J. Wetzel. 2025. Nomenclatura Oligochaetologica – A catalogue of names, descriptions and type specimens of the Oligochaeta. Editio Secunda. <u>URL:https://nomenclatura-Oligochaetologica.inhs.illinois.edu</u> <u>ill</u> (date accessed: 22-04-2025)

Rota, E., Martinsson, S., Bartoli, M., Beylich, A., Graefe, U., Laini, A., Wetzel, M.J. and Erséus, C. 2016. Mitochondrial evidence supports a Nearctic origin for the spreading limicolous earthworm *Sparganophilus tamesis* Benham, 1892 (Clitellata, Sparganophilidae). Contributions to Zoology 85(1): 113–119.

Smith, F. 1895. A preliminary account of two new oligochaetes from Illinois. Bulletin of the Illinois State Laboratory of Natural History 4(5): 142–147.

Tétry, A. 1934. Description d'une espèce française du genre *Pelodrilus*. Comptes Rendus de l'Académie des Sciences, Paris 199: 322.