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EARTHWORMS OF NEW YORK STATE

BY HENRY W. OLSON¹

The contents of this paper include a descriptive list of earthworms for the State of New York belonging to the families Glossoscolecidae and Lumbricidae. Very few regional papers have been published on the North American earthworms. However, much has been written on their probable distribution. Dr. Frank Smith (1928) has published a very complete list of the earthworm fauna of Illinois. The author has published two regional papers for Ohio

and Missouri, respectively, and the present paper on the earthworms of New York is based on collections from The American Museum of Natural History, collections made by Dr. Charles E. Johnson of the New York College of Forestry, and the numerous collections made by the author. It is hoped that this paper will be a small contribution toward a better understanding of the earthworm fauna of New York.

DEFINITION OF TERMS USED IN IDENTIFICATION

Smith (1917) has published a definite system of terms and symbols, and his statements with some modifications will be adopted for this paper.

The limits of somites externally are indicated by the intersegmental grooves between the segments, while internally the septa or partitions serve this purpose. The somites are numbered from the anterior end, not counting the prostomium, which is not a segment. Each somite is designated by arabic numerals. Should the first intersegmental groove be obscure, one can distinguish the second somite, since it is the first to bear setae. The intersegmental grooves for any two adjacent somites are represented by a formula; $5/6$ indicates the groove between segments 5 and 6.

In the Lumbricidae there are eight setae to a somite, and these are usually arranged in pairs, two pairs on a side. They may be closely or widely paired, or separate. The setae on either side are indicated by the use of letters, *a*, *b*, *c*, and *d*. The ventral-most seta is designated by *a*, the next by *b*, the next *c*, and the dorsal-most by the letter *d*. Should the distance from *a* to *b* and from *d* to *c* be less than

one-third of the distance between *b* and *c*, the setae are said to be closely paired.

If the prostomium divides the peristomium completely and the longitudinal grooves from its lateral boundaries extend clear to the intersegmental groove $1/2$, the prostomium is said to be tanylobic. Should the prostomium and its lateral grooves extend only part way across the peristomium and fail to reach the groove $1/2$, it is said to be epilobic. When the prostomium and the peristomium are entirely fused or coalesced, it is said to be zygotbic (*Sparganophilus*).

On some of the somites of the clitellum, along the ventral edges, there are glandular ridges termed tubercula pubertatis. They may vary as to their position in the clitellar region, and in some cases they may be absent. The spermathecae are pouches which open to the exterior and receive the sperm cells from another individual. They vary as to position, and in some species they are totally absent. The oviducal pores are on somite 14 in the Lumbricidae. The spermiducal pores are on the 13th or 15th somite in the Lumbricidae.

Lumbricidae

This family has eight setae to a somite. The anterior border of the clitellum is

¹ Wilson Teachers College, Washington, D. C.

posterior to the spermiducal pores which in most cases are on somite 15 but in a few species they are from one to three somites further anterior. The calciferous gland is situated in the region of the gonads. A gizzard is present at the anterior end of the intestine. There are no typical prostates extending free into the coelomic cavity. The spermaries and the spermiducal funnels are in 10 and 11. The ovaries are in somite 13. The oviducal pores are in the 14th somite.

HELODRILUS HOFFMEISTER 1845

This genus is distinguished by the absence of special sperm vesicles enclosing the spermaries and spermiducal funnels.

The following are subgenera for North America: *Eiseniella*, *Eisenia*, *Allolobophora*, *Dendrobaena*, and *Bimastus*. A description of each of these will be given under the subgeneric heading.

SUBGENUS EISENIELLA MICHAELSEN 1900

The oviducal pores open slightly mesad of *a*, instead of slightly dorsal of *b*, as they do in all other Lumbricidae. *Eiseniella* differs from all other subgenera, except *Eisenia*, in having the pores of the paired spermathecae between seta line *d* and the mid-dorsal line. This subgenus also possesses a somewhat shorter gizzard which is chiefly restricted to the 17th somite and ordinarily involves, in addition, more of the 18th somite in others.

***Helodrilus (Eiseniella) tetraedrus*, (Savigny) 1826, form *typica*, Michaelsen**

Length 4–5 cm. Somites 70–80. Color a variable shade of brown. Prostomium epilobic. Setae paired; slightly posterior to clitellum, $aa:ab:bc:cd:dd = 3:1:3:1:6$; near posterior end, $aa:ab:bc:cd:dd = 5:2:5:2:6-8$. Clitellum on somites 22 or 23–26 or 27. Tubercula pubertatis on 23–25 or 26. First dorsal pore on 4/5. Spermiducal pores on somite 13. Oviducal pores on 14, slightly mesad to *a*. Spermathecal pores on somites 9/10 and 10/11 between *d* and mid-dorsal line. Septa 7/8–11/12 slightly thickened. The calciferous gland is very poorly developed compared to other Lumbricidae and the

longitudinal partitions are narrow. Sperm sacs in 9–12. Spermathecae are on the dorsal side chiefly in septa 9/10 and 10/11.

Helodrilus tetraedrus form *typica* is usually found in water-soaked banks of streams, lakes, and ponds. It has been collected in Europe and in many parts of the world where Europeans have settled. In the United States it has been collected in Pennsylvania, California, Michigan Indiana, Illinois, Colorado, Washington (Puget Sound region), and Ohio.

In New York this species has been collected in these counties: Tompkins, Schuyler, Chemung, Yates, and Allegany by the writer. The collections of The American Museum of Natural History and those made by Dr. Charles E. Johnson list this species for the following localities: Bronx, Syracuse University campus, Warrensburg College campus, Pratt Falls, White Lake, Lake Placid, and Cornell University campus.

***Helodrilus tetraedrus* form *hercynia* Michaelsen, 1890**

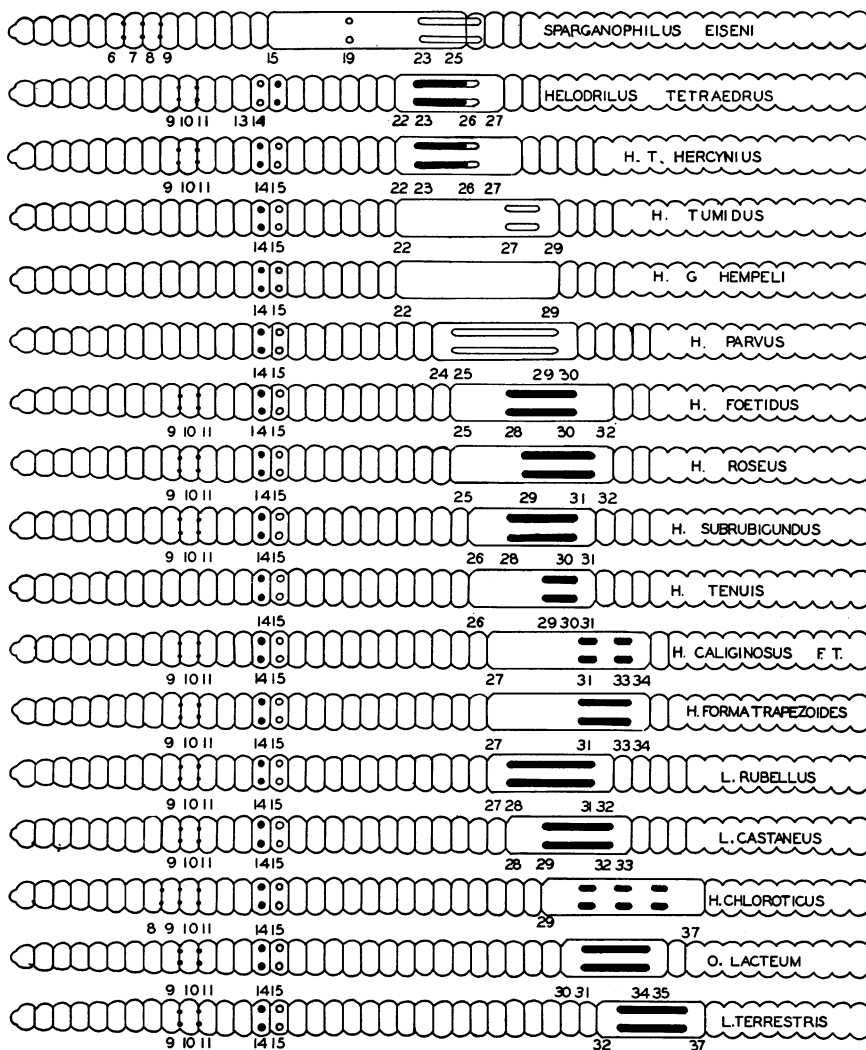
This variety is very similar to that of *Helodrilus t. f. typica* except that the spermiducal pores are on 15 instead of 13.

Dr. Frank Smith states that this species is very abundant about Urbana, Illinois, and that it is found in association with *typica*. The writer (1928) listed this variety for Ohio. This specimen was taken from White Lake.

SUBGENUS EISENIA MALM, 1877

The characters used as a basis for separation of *Eiseniella* from *Eisenia* are as follows: shorter gizzard, which is chiefly confined to the 17th somite in *Eiseniella*, while in *Eisenia* it ordinarily involves more of the 18th; the location of the spermathecal pores, which are near the mid-dorsal line, slightly dorsal of *d*. The location of the spermathecal pores are alike in both *Eiseniella* and *Eisenia*, and the position of the spermathecal pores alone separates this subgenus from all others except *Eiseniella*. The oviducal pores are slightly mesad of *a*, instead of slightly dorsal of *b*, as in all other subgenera, with the exception of *Eiseniella*.

DIAGRAMMATIC KEY TO NEW YORK EARTHWORMS



EXPLANATION

- — — TUBERCULA PUBERTATIS (— — — PRESENT — — — INDEFINITE)
- OVIDUCAL PORES.
- SPERMIDUCAL PORES.
- SPERMATHECAL PORES.

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Helodrilus (Eisenia) foetidus
(Savigny), 1826

Length of specimens collected 7–14 cm. Somites 80–120. This worm has a very conspicuous and characteristic coloring due to transverse purple-brownish bands on the middle area of the somites, and alternating with an almost pigmentless intersegmental area. Prostomium epilobic 1/2. Setae closely paired. Clitellum on somites 24, 25, or 26–32. Tubercula pubertatis on 28–30 or 31. First dorsal pore on 4/5. Spermiducal pores on 15, between *b* and *c* and not close together. Oviducal pores on 14, slightly in a dorsal position of *b*. Spermathecal pores on 9/10 and 10/11, near the mid-dorsal line. The septa of the anterior somites are not very thick, those of 7/8–9/10, 13/14, and 14/15 are slightly thicker. The sperm sacs are in 9–12. The sperm sacs in 9 and 10 are smaller. The spermathecae are in 9 and 10 and are usually in close relation to the septa 9/10 and 10/11. They may be in a position posterior to the septa.

This species is very widely distributed in the various parts of the world. In North America, where it is very abundant, it has been collected along the Atlantic and Pacific coasts, in the Mississippi Valley, Rocky Mountain region, and the Gulf states (Smith, 1917). In New York it was found in all the counties where collections were made.

Helodrilus (Eisenia) roseus
(Savigny), 1826

Length 4–8 cm. Somites 130–150. Color pale red; the body walls without pigment. Prostomium epilobic 1/2. Setae closely paired. Clitellum on somites 25–32 and may involve 24 or 33. Tubercula pubertatis usually on 29–31, occasionally 30–31. Glandular papillae may be modified genital setae, often including one or more setal bundles of 9, 10, 12, or 13. First dorsal pore on 4/5. Spermiducal pores on 15 near *b*. Oviducal pores on 14, slightly dorsal of *b*. Spermathecal pores on 9/10 and 10/11 situated near the mid-dorsal line. Septa 6/7–9/10, thickened considerably; others to 14/15, slightly.

Sperm sacs in 9–12. The spermathecae are on the dorsal side of 10 and 11 with short ducts.

This species is widely distributed in Europe and in various parts of the world. In the United States it has been reported for New York, Georgia, Indiana, Illinois, Louisiana, Arizona, California, Maine, Ohio, and Missouri. The writer found this species to be widely distributed in New York.

SUBGENUS ALLOLOBOPHORA EISEN, 1874

Michaelsen (1900) gives the following description for the subgenus *Allolobophora*: "The prostomium is usually epilobic, very seldom tanylobic. The setae are more or less closely paired. Spermiducal pores on 15. Spermathecal pores consisting of two or three pairs in the setal line *cd*. Gizzard including more than one segment. The testes and seminal funnels are free; 4 pairs of sperm sacs in 9–12. Sperm sacs of 10 are as large as those of 9. (Always?)"

Helodrilus (Allolobophora) caliginosus
form *typica* Savigny, 1826

Length 7–20 cm. Somites 100–250. Color of the anterior dorsal surface is a brown-red iridescent color, which is variable in intensity in different specimens. Prostomium epilobic. Setae closely paired, those of lateral pairs especially. Clitellum situated on somites 27–34 or 35. Tubercula pubertatis on 31 and 33. There are conspicuous glandular papillae which surround the ventral setae 9, 10, and 11 and are usually present on 32–34 and may be absent on 28 and 30. First dorsal pore on 9/10. Spermiducal pores on 15, rather more than halfway from *b* to *c*. Oviducal pores are on somite 14, slightly dorsal to *b*. The spermathecal pores on 9/10 and 10/11 are in line with the dorsal bundles. The septa 6/7–9/10 are very strongly thickened, while those of 5/6 and 11/12–14/15 are less so. The longitudinal partitions of the calciferous gland are about 55–65 in number. The sperm sacs are in somites 9–12. The spermathecae are within the septa 9/10 and 10/11 and do not extend freely into the somite cavities.

This species is well distributed in soils of woodlands, gardens, and cultivated fields. However it is not as abundantly found as *Helodrilus caliginosus trapezoides*. The author in previous papers has listed this species for Ohio and Missouri. It has been collected in the following counties of New York: Allegany, Wyoming, Onondago, Oswego, Oneida, Albany, Delaware, Jefferson, and Franklin. The American Museum of Natural History collections and those of C. E. Johnson list it for the Bronx, Syracuse University campus, and Pratts Falls.

***Helodrilus (Allolobophora) form trapezoides* Duges, 1828**

This variety differs from f. *caliginosus* only in the position of the tubercula pubertatis. In *typica* they are on somites 31 and 33, while in *trapezoides*, they are continuous on 31 to 33, inclusive.

This variety is very widely distributed in the United States. It has been collected in the following counties of New York: Tioga Cortland, Allegany, Wyoming, Onondago, Delaware, Columbia, Warren, Jefferson, Oswego, and Lewis.

***Helodrilus (Allolobophora) chloroticus* Savigny, 1826**

Length 5-7 cm. Somites 80-125. Color more or less greenish. Prostomium epilobic. Setae closely paired. Clitellum on somites 29-37. Tubercula pubertatis consists of three pairs of sucker-like elevations on somites 31, 33, and 35. First dorsal pore on 4/5. Spermiducal pores on 15, between *b* and *c*. Oviducal pores on 14, slightly dorsal to *b*. Spermathecal pores on 8/9-10/11, in line with the dorsal bundles. Septa 6/7-13/14 are moderately thickened; those from 9/10 diminish gradually toward the posterior. Sperm sacs in 9-12. Spermathecae are in 9, 10, and 11, extending freely into the somite cavities with ducts of moderate length.

H. chloroticus is widely distributed in Europe and in various parts of the world where Europeans have settled. In North America it has been reported from Greenland, Vancouver, Mexico, Guatemala, North Carolina, California, District of

Columbia, Indiana, Colorado, Ohio, and Missouri. This species was not found abundantly in the collections made. It was found in the following counties of New York: Tioga, Delaware, Jefferson, and Allegany.

SUBGENUS DENDROBAENA EISEN, 1874

The characters for this subgenus are as follows: Setae widely paired or separate. The spermathecal pores on 9/10 and 10/11 in the setal lines of *c* or *d*. Three pairs of sperm sacs in 9, 11, and 12.

***Helodrilus (Dendrobaena) subrubicundus* Eisen, 1874**

Length 5-8 cm. Somites 80-125. The anterior dorsal surface is of a variable red color. Prostomium epilobic 2/3. Setae widely paired; *bc:cd:dd* = 2:1:4; *cd* is a little greater than *ab*. Clitellum on somites 26-31, and may invade 25 or 32. Tubercula pubertatis on somites 26-30. First dorsal pore on 5/6. Spermiducal pores on 15, between *b* and *c*? Oviducal pores on somite 14, slightly dorsal of *b*. Spermathecal pores on 9/10 and 10/11, in seta line *c*. Septa 7/8 and 8/9 moderately thickened, 6/7, 9/10, 13/14, and 14/15 slightly thickened. Sperm sacs in 9, 11, and 12. Spermathecae in 9 and 10, free in somite cavities, with very short ducts which enter the septa near the body wall.

This species is distributed very widely in Europe and various parts of the world. It has been reported in North America from Newfoundland, California, Colorado, Canada (Niagara), Illinois, Ohio, and Missouri.

Helodrilus subrubicundus is usually found in wet soil where there is more or less sewage contamination. This species and *H. foetidus* are often found together.

In New York this species has been taken from the following counties: Tioga, Oswego, Schuyler, Tompkins, Rensselaer, Warren, Chautauqua, Broome, and Ulster.

SUBGENUS BIMASTUS H. F. MOORE, 1893

In this subgenus the tubercula pubertatis are indistinct or lacking. There are but two pairs of sperm sacs, which are in

somites 11 and 12. The spermathecae are not normally developed. The clitellum in most of the species under this subgenus does not extend posterior to 32.

Helodrilus (Bimastus) tumidus

Eisen, 1874

Length 2-5 cm. Somites 40-60. Color reddish brown. Prostomium epilobic 3/4. Setae closely paired. Clitellum on somites 22-29. Tubercula pubertatis on somites 27 and 28, rather inconspicuous. Spermiducal pores on 15, with small glandular elevations. Oviducal pores on 14, slightly dorsal to *b*. First dorsal pore on 5/6. The septa 6/7-9/10 are slightly thickened, 8/9 somewhat thicker, and 13/14 and 14/15 are about the same as 8/9. The longitudinal partitions are about 40 in number. Spermaries and spermiducal funnels are in somites 10 and 11. Sperm sacs are in somites 11 and 12. The spermathecae are lacking.

This species is found under moss and leaves in damp woods. It has been listed for New York. The writer found only a few of these specimens near Oneida Lake.

Helodrilus (Bimastus) gieseleri

var. *hempeli* Smith, 1915

Length 4-7 cm. Somites 100-110. Color of the dorsal half of the body is brown-red, while the ventral half lacks pigment. The setae are close, posterior to the clitellum, $aa:ab:bc:cd:dd = 20:4:16:3:52$. The clitellum is situated on 22-29 and sometimes on part of 30. Tubercula pubertatis lacking. First dorsal pore on 5/6. Spermiducal pores on 15, slightly dorsal of *b*. Oviducal pores on 14, slightly dorsal of *b*. Septa 6/7, 7/8, and 13/14 slightly thickened. Longitudinal partitions of the calciferous gland about 40 in number. Sperm sacs are in somites 11 and 12. Spermathecae are lacking.

This species is to be found in decayed leaf material, under logs and rotten wood. In the United States it has been listed for the following states: Florida (Monticello), Illinois, Kansas, Texas, Ohio, and Missouri. *H. hempeli* was found in the following counties of New York: Oswego, Onondago, Warren, and Chautauqua. It is abundantly

found at Cedarville and near the campus of Syracuse University.

Helodrilus (Bimastus) parvus

Eisen, 1874

Length 3-4 cm. Somites 90-110. The color of the anterior dorsal surface is brownish red. Prostomium epilobic 1/2-4/5. Setae closely paired; a little posterior to the clitellum, $aa:ab:bc:cd:dd = 18:4:16:3:48$. Clitellum on somites 24-30. There are very indefinite ridges (tubercula pubertatis) on somites 25-29, occasionally beginning on 26 or reaching 30. The first dorsal pore on 5/6. The spermiducal pores on 15, between *b* and *c*. Oviducal pores on 14, slightly dorsal to *b*. Septa 7/8 and 8/9 are slightly thickened, others scarcely any. There are about 40 longitudinal partitions of the calciferous gland. The sperm sacs are 11 and 12. The spermathecae are absent.

This species has been reported from Guatemala, Mexico, China, Japan, Africa. It has been reported in North America from California, Louisiana, Kansas, Michigan, Ohio, and Missouri. This species was found to be present in the collections of The American Museum of Natural History. The material was taken from Pratts Falls, New York.

Helodrilus (Bimastus) tenuis

Eisen, 1874

Length 4-8 cm. Somites 90-100. Color of the anterior dorsal surface is rose-red, the rest of the body is a decided pale color. Prostomium epilobic, 2/3. Setae widely paired: $aa:ab:bc:cd:dd = 12:5:10:7:35$ is about the relation slightly posterior to the clitellum. Clitellum is situated on somites 26-31. Tubercula pubertatis are indistinct and often lacking. When present usually on 29 and 30, occasionally invading 31. The ventral setae of the sixteenth somite are borne on glandular papillae. First dorsal pore on 5/6. Spermiducal pores on somite 15, between *b* and *c*, situated on glandular elevations. Oviducal pores on 14, slightly dorsal to *b*. Septa are thickened slightly throughout. There are about 40 longitudinal partitions

of the calciferous gland. Sperm sacs in 11 and 12. Spermathecae usually lacking.

Helodrilus tenuis has been collected in almost all parts of Europe, Asia, and South America. In North America it has been collected in Mexico, Alaska, Vancouver Island, Canada, California, Illinois, Maine, Indiana, Michigan, Colorado, Washington, New York, Ohio, and Missouri.

It is most abundantly found under decayed leaf mold, and decayed timber. I have collected this species in the following two counties of New York: Niagara and Chautauqua.

OCTOLASIUM ORLEY, 1885,

EMENDED BY ROSA, 1893

The prostomium of this genus is usually epilobic, but may be tanylobic. The setae are widely paired or separate. The spermaries and the spermiducal funnels are enclosed in paired sperm vesicles or narrow chambers. Four pairs of sperm sacs in 9-12.

***Octolasion lacteum* Orley, 1881**

Length 5-16 cm. Somites 100-170. A few of the anterior somites are pink in color; the posterior end is pale, while the remainder of the body, except the clitellum, is blue-gray. The prostomium is epilobic, 1/2-2/3; occasionally tanylobic. The setae anterior to the clitellum are definitely paired, and *ab* is less than *bc*; posterior to the clitellum, the setae are scarcely paired, and *ab* is equal to or greater than *bc*; *bc* is greater than *cd*, in most cases. Clitellum on somites 30-35. Tubercula pubertatis on 31-34. First dorsal pore on 8/9, 9/10, or 10/11. Spermiducal pores on 15, nearer to *c* than to *b*. Oviducal pores on 14, slightly dorsal to *b*. The spermathecal pores on 9/10 and 10/11, in line with *c* or *d*. The septa 6/7-8/9 are slightly thickened and 9/10-13/14 are still less thickened. There are about 45 longitudinal partitions of the calciferous gland. The calciferous gland communicates by its anterior end with the esophagus. The spermaries and the spermiducal funnels are in 10 and 11, included in sperm vesicles. The sperm sacs are in 9-12; those of 9 and 10 being quite different in form and ap-

pearance from those of 11 and 12, which resemble those commonly found in the Lumbricidae. The sperm sacs of 9 and 10 are digitiform and have a definite lumen extending through the greater part of the length.

Octolasion lacteum is abundantly found under decayed logs, leaf mold, and compost heaps. It is widely distributed in Europe and various parts of the world where Europeans have settled. It has been reported for Mexico, California, Illinois, Ohio, and Missouri. In New York it was found very abundantly in Oswego County. Other counties in which this species was collected are: Chautauqua, Onondago, and Oneida.

LUMBRICUS LINNAEUS, 1758,

EMENDED BY EISEN, 1874

Prostomium tanylobic. Setae ventrally and laterally closely paired. Clitellum saddle-shaped. Tubercula pubertatis fused to form longitudinal ridges. Spermiducal pores on 15, between *b* and *c*. Oviducal pores on 14, slightly dorsal to *b*. Two pairs of spermathecal pores on 9/10 and 10/11 in line with *cd*. Gizzard takes up more than one segment. Three pairs of sperm sacs in 9, 11, and 12. Spermaries and spermiducal funnels enclosed in an unpaired median chamber. Four species of this genera are listed for North America.

***Lumbricus rubellus* Hoffmeister, 1843**

Length 7-15 cm. Somites 95-150. Color reddish brown or violet; color more pronounced on the anterior dorsal surface. Prostomium tanylobic. Setae closely paired; *aa:ab:bc:dd* = 5:1:5:5/6:19. Clitellum on 27-32. First dorsal pore on 7/8. Spermiducal pores on somite 15 and inconspicuous; between *b* and *c*. Oviducal pores on 14, slightly dorsal of *b*. Spermathecal pores on 9/10 and 10/11, in line with *cd*. Septa 6/7-8/9 somewhat thickened; others but very little, except parts adjacent to attachments of the sperm sacs. 60 longitudinal partitions of the calciferous gland. Sperm sacs in 9, 11, and 12. Spermathecae are in 9 and 10.

This species is widely distributed in

Europe. In North America it has been reported from Newfoundland, Oregon, California, Washington, and Michigan. According to the data given with the material collected by Dr. Charles E. Johnson, this species seems to be abundant in Oswego County, New York.

***Lumbricus castaneus* Savigny, 1826**

Length 3–5 cm. Somites 75–90. Color of the anterior dorsal surface chestnut brown with violet iridescence. Prostomium tanylobic. Setae closely paired; $aa:ab:bc:cd:dd = 4:1:4:4/5:16$. Clitellum on 28–33. Tubercula pubertatis on 29–32. First dorsal pore on 6/7. Spermiducal pores on 15; inconspicuous. Oviducal pores on 14; slightly dorsal to *b*. Spermathecal pores on 9/10 and 10/11 in line with *cd*. Sperm sacs in 9, 11, and 12. Spermathecae in 9 and 10.

L. castaneus has been reported in Europe, Canada, and New York. This species was collected back of the College of Forestry building of the Syracuse University campus. Dr. Johnson's material also showed this species to be present on the University campus (near Men's Dormitory).

***Lumbricus terrestris* Linnaeus, 1758,
Muller, 1774**

Length 15–25 cm. Somites 125–175. The color of the anterior dorsal surface is brownish blue, reflecting a prominent greenish-violet color. The clitellum covers somites 32–37, clitellum may begin on 31. Tubercula pubertatis on 33–36. Prostomium tanylobic. Setae closely paired; posterior to the clitellum $aa:ab:bc:cd:dd = 4:1:3:1/2:3/4:16$. First dorsal pore on 7/8. Oviducal pores on 14, slightly dorsal to *b*. Spermiducal pores on 15, between *b* and *c*. Spermathecal pores on 9/10 and 10/11, in line with *cd*. Spermathecae in 9 and 10. Sperm sacs in 9, 11, and 12. Longitudinal partitions of the calciferous glands 70–75 in number. Septa 6/7–9/10 strongly, and 10/11–14/15, moderately, thickened.

This species is widely distributed in Europe and the following localities are listed for North America: California,

Illinois, New York, Maine, Connecticut, Maryland, District of Columbia, Michigan, Ohio, Minnesota, Newfoundland, and Mexico.

It was collected in the following counties of New York: Chautauqua, Niagara, Madison, Tioga, Ulster, Columbia, St. Lawrence, Onondaga, Oswego, Genesee, Broome, and Delaware. This species is very abundantly found on the lawns of The American Museum of Natural History and Riverside Park.

Glossoscolecidae

The setae are sigmoid, mostly single-pointed, rarely double-pronged. There are usually eight setae per somite. The dorsal pores are absent. The male pores are in the clitellar region, usually in the anterior portion of the region; or in front of the clitellum, rarely behind it. The clitellum begins behind somite 14. One gizzard is usually present directly in front of the testis segments. There are rarely two pairs of nephridia per somite. The outer end of the vas deferens is usually simple but in some cases a bursa propulsoria or copulatory pouch may be present. The prostatic glands and the penial setae are absent. However the copulatory setae are often present.

DISTRIBUTION.—Mostly terrestrial, several littoral, a number found in fresh water.

Sparganophilinae

The grooved copulatory setae are absent. The male pores are intra-clitellar, situated on a flat or depressed area. The spermathecal pores are situated in front of the testis segments. No gizzard or calciferous glands are present.

DISTRIBUTION.—Only one genus. About four or five species. England, North and Central America (United States, Mexico, Guatemala).

SPARGANOPHILUS BENHAM, 1892

The setae are closely paired. Prostomium not marked off from the buccal segment (zygoblic). Nephridiopores in setal line *a* or *ab*. The clitellum is weakly developed ventrally, to some extent accompanied by the protruding pubertatis.

The spermiducal pores are on a smooth surface upon the intersegmental groove 18/19 or in the anterior region of 19. The seminal receptacles are single or in several groups, situated anterior to the testicle somite. The esophagus is simple, no gizzard; calciferous gland and the esophagus pouches absent. The last heart in somite 11. There are two pairs of testicles and seminal funnels; two pairs of cluster-like seminal pouches in somites 11 and 12. There are numerous prostate-like glands in several pairs which open out in the ventral part of the clitellum (Translation from Michaelsen's "Das Tierreich").

Sparganophilus eiseni Smith, 1895

Length 15–20 cm. Somites 165–225. Color pink with blue and green iridescence. Setae *c* and *d* are in the dorsal half of the worm. Clitellum 15–25. Tubercula pubertatis on 17–22. Spermiducal pores on somite 19, the oviducal pores on 14, both rather inconspicuous. Spermathecal pores

are ventral to the setal line *c*, and are in the intersegmental grooves of 6/7, 7/8, and 8/9. The gizzard and the calciferous glands are absent. Spermathecae in 7, 8, and 9. Ovaries in somite 13; ovisacs in 14. Spermaries and spermiducal funnels in somites 10 and 11. Sperm sacs are lobed and paired and lie in somites 11 and 12. First typical nephridia are in somites 13 or 15. Accessory reproductive organs are present in some one or more of somites 3 to 10, or are regularly present in 23–26 or adjacent somites.

Smith (1915) states that *Sparganophilus eiseni* is abundant in the mud of the bottom and margins of many rivers and lakes east of the Mississippi River. The writer (1928) found this species to be very abundant along the shores of Lake Erie and the islands around Gibraltar Island (Ohio State University Lake Laboratory). In New York State this species was collected in the following counties: Oswego, Niagara, Chautauqua, Onondago, and Clinton.

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