EARTHWORMS OF MISSOURI

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Earthworms are among the most common of our animal forms but they have received very little attention from taxonomists and the fauna of this country is not very well known. Because the natural history of the earthworm is but little known to the average reader, it is commonly regarded as a useless and uninteresting creature, which may occasionally serve for bait. However, earthworms play a very important part in the teaching of zoology and in research, they are used quite extensively for studies of reactions, embryology, histology and regeneration; and to the ecologist they present some interesting problems in distribution.

Our knowledge of the group has chiefly been developed by Michaelsen, Stephensen, Eisen, Vaillant, Vejdovsky, Benham and Beddard, who are responsible for the literature on the Lumbricidae. The literature on North American earthworms is decidedly meager. Several foreign zoologists have worked on American material, but naturally they have been greatly handicapped in securing sufficient collections. Professor Frank Smith has given them more attention than any other American worker. Among other things, he has published (1928) a very complete list of the earthworm fauna of Illinois. The author (1928) published a paper on the earthworms of Ohio with a study of their distribution in relation to the hydrogen-ion concentration, moisture, and organic content of the soil. To my knowledge these are the only regional papers published on North American earthworms. I have not been able to discover a single record for any species of earthworms in Missouri. The present paper is based on my personal collections which have extended into 25 counties of the state during a period of four years. In addition collections were made by various friends and students.

DEFINITION OF TERMS USED IN IDENTIFICATION

Smith (1917) has published a definite system of terms and symbols and his statement with some modification will be adopted for use in 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 formulae; 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 each 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 setae is designated by a, the next by b, and the next by c, and the dorsal-most by the letter d. Should the distance between a and b and between c and d 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 which form 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 of the way across the peristomium and fails 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 *zygolobic* (Spargonophilus).

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

FAMILY LUMBRICIDAE

This family has eight setae per somite. The anterior border of the clitellum is posterior to the spermiducal pores which in most cases are on somite 15, but in few cases are from

KEY TO THE EARTHWORMS OF MISSOURI

Clitellum	Tubercula pubertatis	Prostate pores	Spermaducal pores	Spermathecal pores	Sperm sacs	Setae	Number of Somites	Length (cm)	Color antero-dorsal	Name
13–18 sad.		18, 20	19	7/8, 8/9	9, 12	Wide	135–160	20–27	Brown	*Diplocardia riparia*
13–18 sad.		18, 20	19	6/7, 7/8, 8/9	9, 12	Wide	125–160	18–30	Pale	*Diplocardia communis*
13–18 cing.		18, 20	19	6/7, 7/8, 8/9	9, 12	Wide	90–120	5–10	Pale	*Diplocardia singularis*
22, 23–36, 27	23–25, 26		13	9/10, 10/11 dorsal	9, 11, 12	Close	80–100	4–6	Brown	*Helodrilus tetraedrus* f. *typica*
22, 23–27	23–25, 26		15	9/10, 10/11 dorsal	9, 11, 12	Close	80–100	4–6	Brown	*H. tetradrus* f. *hercynius*
22–29	None		15	None	11, 12	Close	100–110	4–7	Brown-red	*H. gieseleri* var. *hempeli*
25, 26–32	29–31		15	9/10, 10/11	9–12	Close	130–150	4–8	Pale red	*H. roseus*
24, 25 or 26–32	28–30, 31		15	9/10, 10/11	9–12	Close	75–125	5–15	Brown & Buff (bands)	*H. foetidus*
26–31	28–30		15	9/10, 10/11	9, 11, 12	Wide	80–125	5–8	Red	*H. subrubicundus*
26–31	29, 30 (indistinct)		15	None	11, 12	Wide	90–110	4–8	Red	*H. tenuis*
27–34, 35	31, 33		15	9/10, 10/11	9–12	Close	100–250	5–20	Rose-red	*H. caliginosus* f. *typica*
27–34, 35	31–33		15	9/10, 10/11	9–12	Close	100–250	5–20	Rose-red	*H. f. trapezoides*
27–37	None		15	None	11, 12	Close	110–140	10–12	Chestnut-brown (purplish)	*H. zeteki*
27–32	28–31		15	9/10, 10/11	9, 11, 12	Close	90–145	7–13	Reddish-brown (violet)	*Lumbricus rubellus*
29–37	31, 33, 35		15	8/9, 10/11	9–12	Close	80–125	5–7	Greenish	*H. chloroticus*
30–35	31–34		15	9/10, 10/11	9–12	Wide	100–170	5–16	Pale-pink	*Octolasium lacteum*
31, 32–37	33–36		15	9/10, 10/11	9, 11, 12	Close	125–175	15–25	Brown-violet	*Lumbricus terrestris*

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 prostate glands extending free into the coelomic cavity. The spermaries and spermiducal funnels are in somite 10 and 11. The ovaries are in 13. The oviducal pores are in 14.

HISTORICAL

The genus *Lumbricus* and the old *genus Allolobophora* are practically the only important terrestrial genera of the Oligochaetous worms prevalent in North America and Europe. Michaelsen (1910), in a discussion and revision of various genera of Lumbricidae, reduced the genera to three. They are *Helodrilus*, *Lumbricus*, and *Octlasium*, and are widely distributed in all parts of the world except in the tropics, and are especially abundant in the United States. Smith (1928) listed 18 species in this family for the state of Illinois. The author (1928, 1933) listed 19 species for the state of Ohio.

Genus **Lumbricus** Linneaus (1758) Amended Eisen (1874)

Prostomium completely divides peristomium and longitudinal grooves which form its lateral boundaries extend to inter-segmental groove 1/2 (tanylobic). Spermaries and spermiducal funnels inclosed in sperm vesicles. Sperm sacs are in 9, 11, and 12. Setae closely paired posterior to clitellum.

Lumbricus terrestris Linnaeus (1758)

Length 15 to 25 cm. Somites 125 to 175. Color, anterior dorsal surface, brownish blue, reflecting prominent greenish-violet color. Clitellum covers somites 32 to 37, and may begin on somite 31. Tubercula pubertatis on 33 to 36. Prostomium, tanylobic. Setae closely paired. First dorsal pore on 7/8. Oviducal pore 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 gland, 70 to 75 in number. Septa, 6/7–9/10, strongly, and 10/11–14/15, moderately, thickened.

This species is widely distributed in Europe and has been reported in North America, from Massachusetts, New York, Maine, Connecticut, Maryland, District of Columbia, Michigan, Colorado, California, Illinois, and Ohio. In Missouri it has been collected from St. Louis, Franklin, Marion, Lewis, Adair, Cooper, and Cape Girardeau counties. This species has not been listed in Missouri heretofore.

Lumbricus rubellus Hoffmeister, 1843

Length 7–13 cm. Somites 90–145. Color, reddish brown or deep violet; color more pronounced on the anterior dorsal surface. The clitellum covers somites 27–32. Tubercula pubertatis on 28–31. The prostomium is tanylobic. Setae closely paired. The oviducal pore is on somite 14, slightly dorsal to b. Spermiducal pores on 15. Spermathecal pores on 9/10 and 10/11, in line with cd. Sperm sacs in 9, 11, and 12. There are about 60 longitudinal partitions of the calciferous gland. Septa 6/7–8/9 somewhat thickened; others but very little, with the exception of those in the regions of the sperm sacs. Spermathecae are in 9 and 10.

This species is usually collected among debris. It is widely distributed in Europe and Siberia, and in North America it has been reported from Newfoundland, California, Oregon, Washington, Michigan, and Ohio. It has been collected in St. Louis county. This species has not been listed in Missouri heretofore.

Genus **Helodrilus** Hoffmeister, 1845

The species of this genus are distinguished by the absence of special sperm vesicles enclosing the spermaries and the spermiducal funnels.

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

Subgenus **Eiseniella** Michaelson, 1900

Michaelsen (Oligochaeta in "Das Tierreich") considered *Eiseniella* a genus. This group was later reduced to subgeneric rank by Michaelsen in 1910 when considered *Eiseniella* very closely related to the subgenus *Eisenia*. So closely related are they that the only character used as a basis for their separation is the somewhat shorter gizzard which is chiefly restricted to the 17th somite in *Eiseniella* and ordinarily involves, in addition, more of the 18th in others. The position of the oviducal pores is also a significant character. Smith states that the American material of *Helodrilus tetraedrus*, *H.t hercynia*, and Eisen's *Tetragonurus pupa* has shown that in every specimen examined the oviducal pores open slightly dorsal to b, as they do in all the Lumbricidae. *Eiseniella* differs from other subgenera, except *Eisenia*, in having the pores of the paired spermathecae between the setae line d and the mid-dorsal line.

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

Length of specimens 4–6 cm. Somites 80–100. Color usually some variable shade of brown. Prostomium epilobic. Setae closely paired. Clitellum situated on somites 22 or 23–26 or 27. Tubercula pubertatis on 23–25, seldom on 26. First oviducal-pore on 4/5. Spermiducal pores on 13. Oviducal pores on 14th somite, usually situated mesad of a. The spermathecal pores on 9/10 and 10/11 between d and mid-dorsal line. Septa 7/8–11/12 are slightly thickened.

Calciferous gland poorly developed compared to other Lumbricidae and longitudinal partitions narrow. Sperm sacs in 9–12. Spermathecae on dorsal side, chiefly in 9/10 and 10/11.

Helodrilus tetraedrus, forma *typica* 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 reported in Indiana, Pennsylvania, California, Michigan, Colorado, Washington, Illinois, and Ohio. This species has been collected in the following Missouri counties: Jackson, St. Louis, Cape Girardeau, Scott, Jackson, Phelps, Osage, Adair, Shelby and Boone. This species has not been listed in Missouri heretofore.

Helodrilus tetraedrus forma **hercynia** (Michaelsen), 1890

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

It has been collected in the same habitats as *typica*. In the United States it has been reported in Illinois and Ohio. The writer has collected this species from St. Louis and Cape Girardeau counties. It has not been listed in Missouri heretofore.

Subgenus **Eisenia** Malm, 1877

The characters used as a basis for separation of the *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 very near the mid-dorsal line, slightly dorsal to d. The location of the spermathecal pores are alike in both *Eiseniella* and *Eisenia*, and this character alone separates the subgenus from all others except *Eiseniella*. The oviducal pores open slightly mesad to a, instead of slightly dorsal to b, as in all the other subgenera, with the exception of *Eiseniella*.

Helodrilus (Eisenia) foetidus (Savigny), 1826

Length of specimens collected was 5–15 cm. Somites 75–125. This worm has very conspicuous and characteristic coloring, due to transverse purple brownish bands on middle area of somites, and alternating with an almost pigmentless inter-segmental area. Pigment is also lacking on the lateral area of 9–11. Prostomium epilobic 1/2. Setae closely paired. Clitellum begins on 24, 25, 26–32. Tubercula pubertatis on somites 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 from b. Spermathecal pores on 9/10 and 10/11, near the mid-dorsal line. Sperm sacs are in 9–12. Spermathecae usually in 9 and 10 and in close relation to septa 9/10 and 10/11. They may be posterior in position to the septa.

This species is the one generally used for experimental biological work and appears in such literature under the name *Allolobophora foetida*. This is due to the fact that it can readily be obtained in all seasons of the year, as it finds very favorable conditions in manure, near stagnant pools, in decayed vegetation, especially where a great deal of moisture is present.

Helodrilus foetidus is widely distributed in 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 Gulf States. In Missouri it has been found in the following counties: Scott, Cape Girardeau, Ste. Genevieve, St. Francois, Jefferson, St. Charles, Macon, Adair, Knox, Marion, Jackson, Stoddard, and Bollinger.

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 begins on somites 25–32 and may involve 24 or 33. Tubercula pubertatis, usually 29–30, occasionally on 30–31. Glandular papillae may have 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 to 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 in New York, Georgia, Indiana, Louisiana, Arizona, California, Maine, and Ohio. It was found in Ste. Genevieve, Jefferson, and Cape Girardeau counties. This species has not been listed in Missouri heretofore.

Subgenus **Allolobophora** Eisen, 1874

Michaelsen, 1900a, 480, gives the following description for the subgenus *Allolobophora:* "Prostomium is usually epilobic, very seldom tanylobic. 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. Testes are seminal funnel free; 4 pairs of sperm sacs in 9–12. Sperm sacs of 10 as large as those of 9 (always?)."

Smith (1917) adds the following: "The setae are more or less closely paired. Sperm sacs, four pairs in 9–12; those of 12 approximately as large as those of 9."

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

Length 5–20 cm. Somites 100–250. The color of the anterior dorsal surface is brown-red, which is quite variable in intensity in different specimens. Prostomium epilobic. Setae closely paired, those of the 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 side setae 9, 10, 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 half way 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 of 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 calciferous glands are about 55–56 in number. Sperm sacs are in somites 9–12. Spermathecae are within the septa of 9/10 and 10/11 and do not extend freely into the somite cavities.

This species was found in Bollinger, St. Louis, Scott, Cape Girardeau, and Boone counties. It has not been listed in Missouri heretofore.

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

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

Helodrilus caliginosus trapezoides is by far the most abundant and has a very wide distribution in the United States. It is listed for the following counties: St. Louis, Jefferson, Ste. Genevieve, St. Francois, Perry, Cape Girardeau, Scott, Bollinger, Stoddard, Mississippi, and Boone. This species has not been listed in Missouri heretofore.

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 succer-like elevations on somites 31, 33 and 35. First dorsal pores 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 the ducts of moderate length.

This species is widely distributed in Europe and various parts of the world. In North America it has been reported from Greenland, North Carolina, Vancouver Island, California, Mexico, Guatemala, District of Columbia, Indiana, Colorado, and Ohio. It has been collected in St. Louis, Macon, and Cape Girardeau counties. This species has not been listed in Missouri heretofore.

Subgenus **Dendrobaena** Eisen, 1874

The characters for this subgenus are as follows: Setae widely paired or separate. Spermathecal pores on 9/10 and 10/11 on setae lines of c and d. There are three pairs of sperm sacs in 9, 11, and 12.

Smith (1917) states that some of these characters are combined with others belonging to other subgenera, breaking the dividing line and making classification difficult.

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. Clitellum on somites 26–31, and may invade 25 or 32. Tubercula pubertatis on somites 28–30. First dorsal pore on 5/6. Spermiducal

pores on 15, between b and c. Oviducal pores on 14, slightly dorsal to b. Spermathecal pores on 9/10 and 10/11, in the setal 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, 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 widely distributed in Europe and various parts of the world. It has been reported in North America from Newfoundland, California, Colorado, Canada, Illinois, and Ohio. Collections were made from St. Louis, Cape Girardeau, Macon, Marion, Osage, Randolf, and Adair counties. This species has not been listed in Missouri heretofore.

Subgenus **Bimastus** (H. F. Moore), 1893

In this subgenus the tubercula pubertatis are indistinct or lacking. There are about two pairs of sperm sacs, which are in somites 11 and 12. The spermathecae are normally developed. The clitellum in most of the species under this subgenus does not extend posterior to 32.

Helodrilus (Bimastus) giesseleri var. **hempeli** Smith, 1915

Length 4–7 cm. Somites 100–110. Color of dorsal half of body red-brown, while the ventral half lacks pigment. Setae closely paired. Clitellum situated on 22–29 and sometimes part of 30. Tubercula pubertatis lacking. First dorsal pore on 5/6. Spermiducal pores on 15, slightly dorsal to b. Oviducal pores on 14. Longitudinal partitions of calciferous gland about 40 in number. Sperm sacs are in somites 11 and 12. Spermathecae are lacking.

This species is usually found in decayed leaf material, under logs and rotten wood. It has been collected in Florida, Illinois, Kansas, Texas, Indiana, and Ohio, and in the following counties in Missouri: Greene, Jackson, Clinton, Cape Girardeau, Ste. Genevieve, Perry, St. Louis, Boone, Macon, Cooper, and Marion. This species has not been listed in Missouri heretofore.

Helodrilus (Bimastus) zeteki Smith and Gittins, 1915

Length 10–12 cm. Somites 110–140. Color of anterior dorsal surface purple brown. Prostomium epilobic, 1/3–1/2. Setae closely paired. Clitellum on 27–37, and extends ventrally enough to include the ventral setae of 30–36. Tubercula pubertatis entirely lacking. First dorsal pore on 5/6; spermiducal pores on 15, slightly dorsal to b. Oviducal pores thickened (on 14) slightly dorsal to b. Septa 6/7–12/13 are slightly thickened, those of 13/14 more strongly so. There are about 60–64 partitions of the calciferous gland. Sperm sacs in 11 and 12. Spermathecae lacking.

It has been collected from the following states: Michigan, Indiana, Illinois, and Ohio; and from the following Missourian counties: Cape Girardeau, Jefferson, Osage, Marion, and Adair. This species has not been listed in Missouri heretofore.

Helodrilus (Bimastus) tenuis Eisen, 1874

Length, 4–8 cm. Somites 90–100. Color of the anterior dorsal surface rose red, rest of the body decided pale color. Prostomium epilobic 2/3. Setae widely paired. The clitellum is situated on somites 26–31. Tubercula pubertatis are indistinct and often lacking; when present usually on 29 and 30. The ventral setae of the sixteenth somite are borne on glandular papillae. First dorsal pore on 5/6. Spermiducal pores on 15, between b and c, situated on glandular elevations. Oviducal pores on somite 14, slightly dorsal to b. Septa are slightly thickened throughout. There are about 40 longitudinal partitions of the calciferous gland. Sperm sacs in 11 and 12. Spermathecae not fully developed.

Helodrilus tenuis is most abundantly found under decayed leaf mold and decayed timber. It 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, New York, Maine, Indiana, Michigan, Colorado, Washington, Bering Island, Illinois, and Ohio.

This species was taken from a greenhouse in Cape Girardeau, Missouri. Later specimens were sent to the author from St. Louis, St. Charles and Marion counties and it is here listed in Missouri for the first time.

Octolasium lacteum Orley, 1881

Length, 5–16 cm. Somites 100–170. A few of the anterior somites are pink in color; posterior end is pale, while remainder of body, except clitellum, is blue-gray. Prostomium usually epilobic, 1/2–2/3; occasionally tanylobic. Setae widely paired. Clitellum on somites 30–35. Tubercula pubertatis on 31–34. First dorsal pore on 8/9, 9/10, or 10/11, in line with c and d. The septa 6/7–8/9 are slightly thickened, 9/10–13/14 are less thickened. There are about 45 longitudinal partitions of the calciferous gland. The calciferous gland communicates at its anterior end with the esophagus. The spermaries and the spermiducal funnels in 10 and 11, included in sperm vesicles. The spermaries are in 9–12; those of 9 and 10 being quite different in form and appearance from those of 11 and 12, which resemble those commonly found in the Lumbricidae. The sperm sacs of 9 and 10 are digitiform and each has a definite lumen extending through the greater part of the length.

This species is found in greater quantity under decayed leaf mold, compost heaps and logs, and in very rich soil. It is widely distributed in Europe and in various parts of the world. It has been collected in Illinois, California, Mexico, Indiana, Colorado, and Ohio. This species has not been listed in Missouri heretofore. It has been found in Cape Girardeau and Miller counties.

Genus **Diplocardia** H. Garman, 1888

Setae paired, absent from segment 19 on which the male pores are present; spermiducal pores on 18 and 20. Clitellum, 13–18. Two

pairs of prostate pores on both somites adjacent to the male pores. There are three pairs of sperm pouch pores, the posterior one on the 9th somite. Two muscular crops, mostly in the 5th and 6th, rarely in the 6th and 7th somites; separated, pouch-shaped calciferous glands. Esophageal pouches absent. Two pairs of free testicles and sperm funnels.

Diplocardia communis Garman, 1888

Length 18–30 cm. Number of somites 125–160. Color of the anterior dorsal surface pale flesh. Setae widely separated. Clitellum saddle-shaped, situated on somites 13–18 inclusive. Prostate pores on somites 18 and 20. Spermiducal pores on somite 19 and spermathecal pores in somites 6/7, 7/8 and 8/9. Sperm sacs in 9 and 12.

This species was the first genus to be described. It differs from the others in having a double dorsal blood vessel throughout the entire length of the body. (Smith (1918) states that this species is abundant in the prairie soils of Illinois. The author (1928) listed it in Ohio. It is widely distributed in Southeast Missouri in which it has been heretofore listed and has been taken from St. Louis, Cape Girardeau, Scott, Bollinger, Jefferson, Pike, Marion, Jackson, Lafayette, Boone, Macon, Adair and Franklin counties.

Diplocardia riparia Smith, 1895

Length, 20–27 cm. Somites 135–160. Color of the anterior dorsal surface dark brown, much darker than in *D. communis*. Setae in four pairs and wide apart. Clitellum saddle-shaped, on 12–18, of a dull copper color, usually slightly developed and sometimes absent. Prostate pores on somites 18 and 20. Spermiducal pores on somite 19, near anterior margin of somite. Two pairs of spermathecae, one pair in each somite of 18 and 19, with the external openings at the anterior margins of those somites and in line with the inner rows of setae. Sperm sacs in 9 and 12. Ovaries are in somite 13, and female pores in somites 14. Spermathecal pores on somite 7/8 and 8/9.

Smith (1915) states that this species is plentiful in the rich soil bottom land forests of Illinois. The author in 1928 listed it in Ohio and lists it now for the first time in Missouri from the following counties: Cape Girardeau, Perry, and St. Louis.

Diplocardia singularis Ude, 1895

Length, 5–10 cm. Number of somites, 90–120. Anterior dorsal surface flesh color. Clitellum on somites 13–18, inclusive, and of the cingulum type. Prostate pores on somites 18 and 20. Spermiducal pores on somite 19, and the spermathecal pores on somites 6/7, 7/8 and 8/9. Sperm sacs in 9 and 12.

Smith (1915) lists this species as being quite common in the upland regions of Illinois. The author, 1928, lists it in Ohio. This species has not been listed in Missouri heretofore. It has been collected in St. Charles, St. Louis, Cape Girardeau, Scott, and Ste. Genevieve counties.

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