

A key to Kansas earthworms, based on external anatomy.

Author: B. A. Snyder; September 2010

A simplified dichotomous key to the earthworm species of Kansas

Important considerations:

- This key only includes earthworm species known in Kansas as of August 2010.
- The key is based solely on external features.
- A glossary with descriptions of terms and depictions of some structures can be found beginning on page 3. This section explains how to count segment numbers.

1A	Earthworm has a clitellum (adult).....	2
1B	Earthworm does not have a clitellum (juvenile).....	20
2A	Setae perichaetine..... <i>Amynthas</i> spp. Note: Only <i>A. hupeiensis</i> is known from Kansas. This species usually curls up when handled and has a strong odor. Other <i>Amynthas</i> species may thrash about and try to escape.	
2B	Setae lumbricine.....	3
3A	Male pores present on segment 15.....	4
3B	Not as above.....	11
4A	Prostomium tanylobic (completely divides the peristomium); clitellum on segments 32-37..... <i>Lumbricus terrestris</i>	
4B	Prostomium epilobic (incompletely divides the peristomium).....	5
5A	Tubercula pubertatis (TP) absent.....	6
5B	Tubercula pubertatis (TP) present.....	8
6A	Clitellum annular, located on segments 20-29 or 30..... <i>Bimastos gieseleri</i>	
6B	Clitellum beginning located posterior of segment 22.....	7
7A	Clitellum saddle-shaped, segments 23,24-30,31,32..... <i>Bimastos parvus</i>	
7B	Clitellum partially annular, segments 24-30 ventrally, 25-35 dorsally..... <i>Bimastos welchi</i>	
8A	TP and clitellum on segments 30-35..... <i>Octolasion tyrtaeum</i>	
8B	Clitellum begins on or before segment 29.....	9
9A	Clitellum on segment 25,26-31,32,33..... <i>Aporrectodea rosea</i>	
9B	Clitellum begins on segments 25, 26, or 27; TP on segments 31-33.....	10
10A	Clitellum on segments 27,28-33,34; genital markings (GM) present on several segments but absent on segment 33..... <i>Aporrectodea trapezoides</i>	
10B	Clitellum on segments 27,28,29-34,35; GM present on several segments including segment 33..... <i>Aporrectodea caliginosa</i> (and/or <i>turgida</i>)	
11A	Prostomium tanylobic (completely divides the peristomium).....	12
11B	Prostomium epilobic (incompletely divides the peristomium).....	15

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- 12A Genital markings (GM) single swellings, mid-ventral, on two successive segments (8 and 9, 9 and 10, or rarely 10 and 11).....*Diplocardia kansensis*
12B GMs, when present, paired.....13
- 13A Clitellum saddle-shaped..... *Diplocardia riparia*
13B Clitellum annular or nearly so for at least some of its length.....14
- 14A Two pairs of spermathecal pores, anterior edge of segments 8 and 9.....
.....*Diplocardia rugosa*
14B Three pairs of spermathecal pores, anterior edge of segments 7-9.....
.....*Diplocardia hulberti*
- 15A Two grooves located ventrally on segments 19-21.....*Diplocardia verrucosa*
15B Two grooves located ventrally on segments 18-20.....16
- 16A Three pairs of spermathecal pores, ventral anterior edge of segments 7-9.....17
16B Two pairs of spermathecal pores, ventral anterior edge of segments 8 and 9.....18
- 17A Clitellum saddle-shaped.....*Diplocardia communis*
17B Clitellum annular.....*Diplocardia singularis*
- 18A Length smaller than 60 mm, unpigmented.....*Diplocardia longiseta*
18B Length greater than 60 mm, pigmented may or may not be present.....19
- 19A Clitellum saddle-shaped.....*Diplocardia conoyeri*
19B Clitellum annular, except for a small section mid-ventrally.....*Diplocardia smithii*

Key to juvenile earthworms

- 20A Setae perichaetine.....*Amyntas* spp.
Note: Only *A. hupeiensis* is known from Kansas. This species usually curls up when handled and has a strong odor. Other *Amyntas* species may thrash about and try to escape.
20B Setae lumbricine.....21
- 21A Prostomium tanylobic (completely divided).....
...*Lumbricus terrestris*, *Diplocardia hulberti*, *D. kansensis*, *D. riparia*, or *D. rugosa*.
Ability to differentiate individuals using only external characters depends on level of development.
- 21B Prostomium epilobic (incompletely divided).....
...no further identification possible without using internal anatomy. Specimen may be in the families Lumbricidae (genera *Aporrectodea*, *Octolasion*, *Bimastos*) or Megascolecidae (genus *Diplocardia*). The latter family is more likely if the widest part of the front end around is located in segments 5-7. Earthworms of the family Lumbricidae typically have the widest part behind segment 8.

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Glossary

Clitellum - swollen portion of the body wall that produces nutritive material and protective coating for cocoons (cocoon hold eggs and sperm while fertilization and development occurs). Thus, a clitellum is only present in sexually mature (i.e., adult) earthworms. The clitellum may be on the dorsal side of the earthworm (**saddle-shaped**, Fig. 1) or go entirely around the circumference of the earthworm (**annular**, Fig. 2). A clitellum that only goes all the way around the earthworm for part of its length is said to be **partially annular** (Fig. 3). Location of the clitellum is described by segment number, counting from the front (anterior) end with number 1 at the peristomium (see below). There is some variability in this position, and these numbers are indicated by commas: 24,25,26-30 means the clitellum begins on segment 24, or 25, or 26, and ends on segment 30.

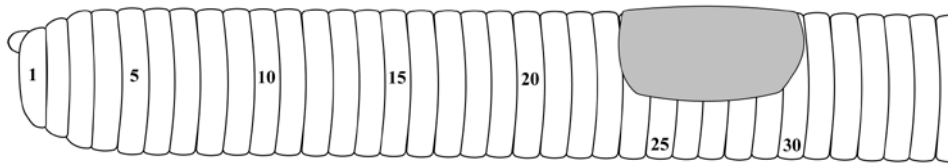


Fig. 1: **Saddle-shaped** clitellum of *Bimastos parvus*, shown on segments 24-30.

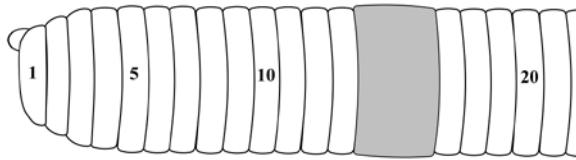


Fig. 2: **Annular** clitellum of *Amyntas* spp., segments 14-16.

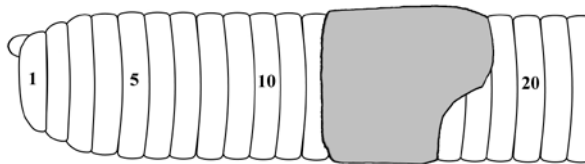


Fig. 3a: **Partially annular** clitellum of *Diplocardia hulberti*. Clitellum is located on segments 13-18, but is only annular over 13-16 or 17.

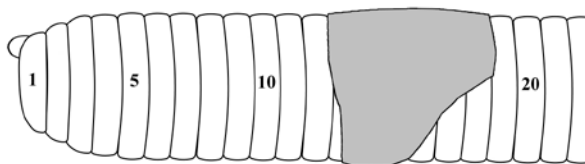


Fig. 3b: **Partially annular** clitellum of *Diplocardia rugosa*. Clitellum is located on segments 13-18, but is only annular over 13-15.

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Setal arrangements - all earthworms have setae, tiny bristles or hairs that are used for locomotion. They appear as dark dots under a dissecting microscope (setae are disproportionately large in Fig. 4 and 5). Arrangements of the setae around the circumference of their body are categorized as follows:

Lumbricine - eight setae, usually arranged in pairs (Fig. 4).

Perichaetine - many more setae than eight, often 40 or more (Fig. 5).

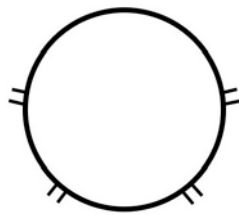


Fig. 4: Lumbricine

Dorsal ↑

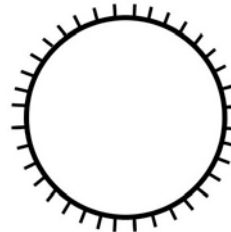


Fig. 5: Perichaetine

Prostomium - the first (most anterior) part of the body, which protrudes above the mouth and is used to gather food. The segment which goes around the mouth is called the **peristomium**. The prostomium is always located on the dorsal side of the earthworm. The arrangements of the prostomium to peristomium are categorized as follows:

Epilobic - the prostomium divides the peristomium incompletely (Fig. 6).

Tanylobic - the prostomium divides the peristomium completely (Fig. 7).



Fig. 6: Epilobic

Dorsal view; numbers indicate segment number.

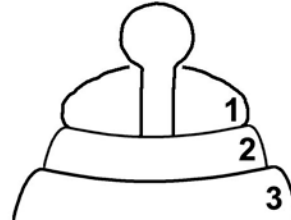


Fig. 7: Tanylobic

Tubercula pubertatis (TP) - a swollen region near or on the clitellum. The TP is used during copulation for holding on to the partner.

Genital markings (GM) - swollen regions of the body wall, also used during copulation. GM are usually associated with setae, and may be paired or single.

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Pores - these are small openings in the body wall. Pores may be surrounded by some swelling, may be found on the top of small swollen areas, or have no swelling associated with them. Pores are attached to glands and are used to move materials in and out of the body, such as when sperm are transferred during copulation. **Male pores** are attached to testes (via ducts) and release sperm; **spermathecal pores** are attached to spermathecae, or sperm-holding sacs.

Spermathecal pores, usually located near ventral setae, are frequently difficult to see. They are especially small and are often found where two segments meet, called the **intersegmental furrow**. It might be necessary to pull the segments away from each other in order to see these pores.