

# DESCRIPTIONS OF A NEW GENUS AND SPECIES OF THE DISCODRILID WORMS.

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Some worms collected on crayfish in the creeks of the Great Basin near Salt Lake City, Utah, by Mr. George Haley, were sent in to the zoological division of this bureau in December, 1913, and were found by the writer to be discodrilids. A comparison with the forms given in Pierantoni's (1912) valuable monograph and with the new species added by Ellis (1912) showed that the Utah specimens constitute a new genus and species. The writer is indebted to Prof. J. Percy Moore, of the University of Pennsylvania, for assistance in connection with the literature dealing with this group of annelids.

According to Pierantoni (1912) the discodrilids constitute a quite homogeneous group of modified oligochaetes, ranging in size from 1 mm. to 12 mm. long, with a maximum width, when in a state of moderate distension, not to exceed one-tenth of the body length. According to Pierantoni the maximum width is attained in the posterior third of the body, the ends always being narrower, but Ellis (1912) lists *Cambarincola philadelphica* as having the head as wide as or wider than the greatest body width.

There is a distinct oval or cylindrical cephalic region, with a more or less profound median sulcus. The mouth is surrounded by a fleshy ring, sometimes divided into two or more equal or unequal lobes which may be prolonged into digitiform or tentaculiform appendages. Inside of the mouth, at the base of this fleshy ring or sucker is a circlet of numerous minute papillae. The median sulcus is at the base of the circumoral sucker. The cephalic region is divisible into 3 segments, the præstomium and 2 succeeding segments, the third very small. The first extends to the median sulcus. The division is based on the structure of the nervous and circulatory systems in this region.

The trunk region always consists of 11 segments, of which 8 are quite distinct, the last 3 being small and rather indistinct. The last segment is prolonged into a terminal sucker. The 8 prominent anterior segments are constantly divided into 2 unequal parts by a sulcus toward the posterior fourth of the segment. The region immediately following the cephalic is somewhat narrower than the cephalic in all species. The fifth, sixth, and seventh segments are

frequently somewhat swollen and in mature specimens the sixth and seventh form a clitellum. Paired or unpaired nephridial apertures occur in segments 3 and 9 of the trunk. The spermatheca opens in the mid-ventral line in segment 5; the male sexual aperture is similarly located in segment 6. The female sex apertures, paired, open on the sides of the posterior portion of segment 7. The anus is in the mid-dorsal line of segment 10.

The body cavity is divided by 7 dissepiments, forming the trunk segments 1 to 8.

The digestive cavity runs in a comparatively straight line from the mouth to the anus which is on the dorsum just in front of the sucker. The buccal region is provided with a powerful musculature and armed internally with a pair of solid chitinous dental plates, one dorsal and the other ventral, the dorsal being usually a little the larger. When these plates are of different form there is a hiatus in one to fit a tooth in the other. A muscular pharynx in the cephalic segments is followed by a short esophagus in the first trunk segments, passing without distinct demarcation into the intestine which terminates in an anus with a muscular sphincter.

The nervous system consists of a pair of supraesophageal ganglia in the head region. Circumesophageal commissures from these unite ventrally to form 3 pairs of simple or bilobed ganglia and 3 large pairs of lateral nerve trunks, which indicate the tripartite segmentation of the head. Following this there is a chain of 8 ganglia, usually double or bilobed, which becomes in the last 3 trunk segments a ganglionic mass, corresponding, as its nerves show, to 3 pairs of bilobed ganglia.

The circulatory system consists of a dorsal and a ventral vessel, connected anteriorly by 4 pairs of transverse trunks and posteriorly by 1 pair. From the third to the eighth trunk segment the dorsal vessel forms the pulsatile heart. The ventral vessel divides posteriorly into two branches which pass up around the intestine and unite to join the posterior limit of the dorsal vessel.

The excretory system consists of 2 pairs of nephridia. The anterior pair has its ciliated apertures in the second trunk segment and opens externally by lateral pores or a single dorsal pore just behind the dissepiment separating segments 2 and 3. These nephridia are not bilaterally symmetrical. The anterior tubule may extend from the third into the first segment and the posterior from the third into the fourth. The second pair of nephridia are symmetrical and are in the eighth trunk segment with the nephridiopore opening externally just behind the dissepiment separating segments 8 and 9.

The discodrilids are always hermaphroditic, the genital organs being in the fifth, sixth, and seventh segments. The male organs consist of a pair of testes in the anterior part of the fifth segment, with sometimes another pair in the anterior part of the sixth, the

male sexual products being liberated in the body cavity in these segments. There are 2 or 4 spermaducts, according to the number of testes, located in the dissepiments between segments 5 and 6 in the first case and also in that between 6 and 7 in the second case. The spermaducts open into a single atrium after each pair has united to form a deferent vessel. The atrium always consists of an enlarged distal portion and a narrower portion which forms a short bursa. Within the bursa is the penis, usually eversible, though *Cambarincola macrodonta* is listed as not having an eversible penis. The two ovaries are paired on the dissepiments between trunk segments 6 and 7, and project into segment 7. Frequently 2 or 3 large eggs in an advanced stage of maturation may be found in this segment. The organ for the emission of these eggs consists of 2 funnel-like ciliated pores in the latero-ventral wall near the posterior limit of the seventh trunk segment.

As a complement of the genital system, there is always in the fifth trunk segment an unpaired spermatheca, opening in the middle of the segment in the mid-ventral line. This is of variable form, globular, flask-shaped, cylindrical, or more or less elongate-bifid, extending into the following segment. The blind end is usually free, but may be contracted against the dorsal wall by means of a peritoneal investment. Odier (1823) described the copulation of two individuals.

The discodrilids live on crayfish. They are not parasitic when young, a study of the intestinal tract at this period showing vegetable detritus and small animals. In the adult stage the teeth are used to break the skin of the host animal in order to suck the blood. I have found several pieces of striated, voluntary muscle fiber in the intestine of the adult discodrilid described in this paper.

According to Pierantoni (1912) discodrilids are recorded from Europe, North America, oriental Asia, and Japan. Moquin-Tandon (1846) lists 2 species, *Branchiobdella chilensis* and *Br. auriculæ*, from Santiago de Chile, South America, designating them as not well-known species.

The features of systematic importance are the external form, preoral lobe, structure of the dental plates and of the genitalia.

According to Prof. J. Percy Moore (in correspondence) the name Discodrilidae dates from Vejdovsky (1884) which is not available to me. While this name has the family termination, it is merely a group name, as there is no genus from which the name Discodrilidæ could be derived. This name should be suppressed in favor of the family name Branchiobdellidae. In the available literature I find Branchiobdellidae first used by Ludwig (1886), but it probably antedates that. As these annelids make up a very distinct group, quite unlike other annelids, I have proposed here the following classification.

Superfamily BRANCHIOBDELLOIDEA Hall, 1914.

*Superfamily diagnosis.*—Annulata: Modified oligochaetes with the characteristics given in the foregoing part of the paper.

*Type and only family.*—Branchiobdellidae.

Family BRANCHIOBDELLIDAE.

*Family diagnosis.*—Branchiobdelloidea: With the characters of the superfamily.

*Type genus.*—*Branchiobdella* Odier, 1823.

The following key to the genera of Branchiobdellidae is based in part on Pierantoni's (1912) paper and partly on Ellis's (1912) paper:

1. Trunk region provided with dorsal or ventral appendages..... 2  
Trunk region smooth, not provided with such appendages..... 4
2. Trunk region bearing appendages on dorsal side..... 3  
Trunk region bearing appendages on ventral side..... *Cirrodrilus*.
3. Head not provided with tentaculiform appendages..... *Pterodrilus*.  
Head provided with tentaculiform appendages..... *Ceratodrilus*.
4. With 1 pair of testes..... *Branchiobdella*.  
With 2 pair of testes..... 5
5. Prostomium plurilobate, with or without digitiform appendages... *Stephanodrilus*.  
Prostomium entire or divided into a dorsal and ventral lobe..... 6
6. Spermatheca bifid, dental plates colorless, penis eversible, pair of large clear glands  
in each of 9 post-cephalic segments..... *Bdellodrilus*.  
Spermatheca not bifid, dental plates colored, penis not eversible, no large clear  
glands in the 9 post-cephalic segments..... *Cambarincola*.

*Key to the North American species of Branchiobdellidae.*

*Branchiobdella* Odier, 1823.

- Prostomium entire, dental plates dissimilar, the dorsal with 5 and ventral with 4  
teeth..... *B. americana*.  
Prostomium bilobed, dental plates with 2 lateral and 2 median teeth... *B. tetrodonta*.

*Bdellodrilus* Moore, 1895.

1. Dental plates dissimilar..... *Bd. illuminatus*.  
Dental plates similar..... 2
2. Prostomium entire..... *Bd. instabilis*.  
Prostomium bilobed..... *Bd. pulcherrimus*.

*Pterodrilus* Moore, 1895.

- Dorsal appendages on segments 3, 4, 5, and 8..... *Pt. alvicornus*.  
Dorsal appendages on segments 2 to 8, inclusive..... *Pt. distichus*.

*Cambarincola* Ellis, 1912.

- Head as wide as or wider than greatest body width, campanulate; 1 lip, slightly  
crenate; dorsal plate with 7 teeth, ventral with 10..... *C. philadelphica*.  
Head not as wide as greatest body width, tapering anteriorly; 2 lips; dorsal plate with  
5 teeth, ventral with 4..... *C. macrodonta*.

## CERATODRILUS, new genus, 1914.

*Generic diagnosis*—*Branchiobdellidae*.—Prostomium bilobed, not sharply so, each lobe fringed with 4 or 5 papillae on lips. Dental plates brown, of a roughly crescentic outline, slightly dissimilar, the ventral with 6 teeth, the dorsal with 7, the teeth being of comparatively uniform size (fig. 1). The antero-dorsal border of the head is furnished with a membranous border deeply incised to form 4 tentaculiform appendages (figs. 2 and 3). The first 7 trunk segments are furnished with dorsal appendages extending from the lateral border in a pointed band, the number of points usually 6, but on some segments 7 or 8. Spermatheca cylindrical to flask shaped, not bifid. Penis eversible. Testes in segments 5 and 6.

*Type-species*.—*Ceratodrilus thysanosomus*, new species.

## CERATODRILUS THYSANOSOMUS, new species, 1914.

*Specific diagnosis*—*Ceratodrilus*.—Length, 2 to 2.8 mm. Maximum head diameter, 400  $\mu$ ; maximum body diameter, 660  $\mu$ ; maximum sucker diameter, 360  $\mu$ . Maximum length of cirriform appendages of head, about 180  $\mu$ .

The material sent in by Mr. Haley was in a poor state of preservation, as was a second consignment which he very kindly furnished. I have, therefore, only undertaken a study of the worm sufficient to fix it generically and specifically. An examination of the anterior pair of nephridia shows that the more anterior nephridium extends through the first and second segments, and that the posterior nephridium extends through the second, third, and fourth segments, but I am unable to say from the material in my possession whether these nephridia have a common opening or separate openings. The rest of the anatomy seems to conform to the general type.

*Host*.—"Crayfish."

*Location*.—The collector, Mr. Haley, writes: "They were particularly abundant among the egg masses of the female and those infested seemed to weaken and die."

*Locality*.—Streams of Great Basin, Salt Lake City, Utah.

*Type-specimens*.—Cat. No. 17708 U.S.N.M. (Bureau of Animal Industry Helminthological Collection).

The American species of *Branchiobdellidae* have been reported from the following localities and hosts:

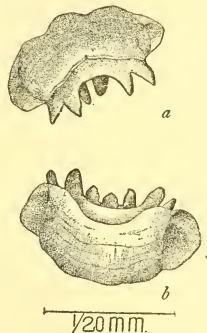


FIG. 1.—CERATODRILUS THYSANOSOMUS. DENTAL PLATES. a, VENTRAL PLATE; b, DORSAL PLATE.

*Branchiobdella americana* from *Cambarus viridis*, *C. latimanus*, *C. hayi* (Texas); *C. rusticus*, *C. immunis*, and *Cambarus* sp. (Raleigh, North Carolina).

*Branchiobdella tetrodonta* from *Astacus klamathensis* (Klamath River, California).

*Bdellodrilus illuminatus* from *Cambarus bartonii* and "crayfish" (Lake Clear, New York).

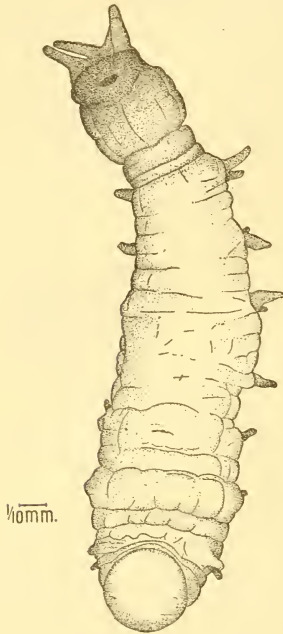


FIG. 2.—*CERATODRILUS THYSANOSOMUS*.  
VENTRAL VIEW.



FIG. 3.—*CERATODRILUS THYSANOSOMUS*.  
DORSAL VIEW.

*Bdellodrilus pulcherrimus* from *Cambarus bartonii* (Watauga County, North Carolina); "crayfish" (Lake Clear, New York).

*Bdellodrilus instabilis* from *Cambarus bartonii* (Philadelphia, Pennsylvania; Watauga County, North Carolina); "crayfish" (Lake Clear, New York).

*Cambaricola philadelphia* from *Cambarus bartonii* (Philadelphia, Pennsylvania; Watauga County, North Carolina).

*Cambaricola macrodonta* from *Cambarus diogenes* (Boulder, Colorado).

*Ceratodrilus thysanosomus* from "crayfish" (Salt Lake City, Utah).  
*Pterodrilus alvicornus* from *Cambarus acuminatus* (Watauga County, North Carolina).

*Pterodrilus distichus* from *Cambarus bartonii* (western New York).

Moore (1895:454) mentions *Bdelloodrilus manus*, new species, from *Cambarus bartonii* in western New York, but did not describe the species at the time or subsequently.

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