

A NEW BRANCHIOBELLID OF THE GENUS
CAMBARINCOLA ELLIS, 1912, (OLIGOCHAETA,
BRANCHIOBELLIDAE) FROM KENTUCY¹

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Since Ellis in 1912 recognized the genus *Cambarincola*, assigned Leidy's species *Branchiobdella philadelphia* (Leidy) to it, and described in some detail *Cambarincola macrodonta* Ellis, 1912, several new species of this genus have been discovered. It appears that this may be the most widespread of the North American genera of the Branchiobdellidae, but as yet the morphological limits of the genus have not been fully determined. Still less well known are the ranges of the species.

The species described below seems clearly to belong to this at present ill-defined genus, yet it possesses some unusual characteristics, particularly certain features of the reproductive system, and in one respect (the eversibility of the penis) it differs from all previously described species in what has been considered a generic character (Goodnight, 1940). One also occasionally encounters references to animals assigned to the genus *Cambarincola* that clearly do not conform to any of the described species (Woodhead, 1950). Because of such references and the features mentioned above, the description of the new species presented in this paper is offered as an addition to our knowledge of the genus and with the hope that shortly the species that belong to it and their distribution will be understood well enough to justify a synthetic treatment.

Cambarincola macbaini sp. n.²

Figs. 1-6

Diagnosis. Lips entire; dental formula 5/4, jaws small and delicate in appearance, resembling those of the members of the genus *Pterodrilus*; major annulations of the body segments not significantly elevated over the minor annulations, giving a smooth outline to the body form; bursa large, greater than body diameter in length, bent at the dorsal border of the coelom; spermatheca likewise large and exceeding body diameter in length, constricted between the spermathecal duct and the bulb, bulb of the spermatheca lying longitudinally or transversely to the gut.

Description. *Cambarincola macbaini* is a relatively small species. The following measurements are of five specimens mounted entire. *Total length:* 1.01-1.31 mm. (average 1.17 mm.). *Diameter, segment I:* 0.13-0.14 mm. (average 0.134 mm.). *Diameter, segment VI:* 0.21-0.28 mm. (average 0.25 mm.) *Diameter,*

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²This species is named in honor of Rodney MacBain, who very kindly made collections for me in Kentucky and discovered this undescribed species.

suckers 0.16-0.22 mm. (average 0.19 mm.). *Head length*: 0.18-0.24 mm. (average 0.21 mm.). *Head diameter*: 0.13-0.16 mm. (average 0.14 mm.).

These worms have a slender and relatively smooth appearance in specimens mounted entire (Fig. 1). The peristomium is divided into two lips that are smooth and devoid of indentations forming lobes or tentacles. The head is subequal to segment I in diameter.

The jaws, with excavated bases and delicate teeth, are markedly dissimilar to those of previously well described species of *Cambarincola*, resembling, to a great degree, those of the species of *Pterodrilus*. The dental formula is $5/4$ (Figs. 3-6). There is nothing of unusual interest about the remainder of the digestive system. The gut is dilated in segments III, IV, and VIII and the anus appears to open between segments IX and X.

The anterior nephridiopore is not readily apparent due to the small size of the animals and to the difficulty of detecting this structure in whole mounts, but judging from the course of the outlet ducts it is located on the dorsum of segment III.

The reproductive system is peculiar and distinctly visible in well cleared whole mounts. The male funnels, efferent ducts, and vasa deferentia are like those of the species of *Pterodrilus*. The spermatocyst is relatively large and usually disposed vertically in segment VI, though inclined somewhat posteromesiad in the specimen from which the figure was drawn (Fig. 2). The accessory sperm tube, shorter than the vesicle, is relatively large (as compared with such forms as *C. philadelphica*), and resembles that of the members of the genus *Pterodrilus* in being histologically similar to the vesicle. The bulb-like structure which forms the blind end of the accessory sperm tube of most species of *Cambarincola* is absent in *C. macbaini* and the blind end of the accessory sperm tube in the latter species is composed of tall columnar epithelial cells apparently identical with those composing the remainder of the organ.

The ejaculatory duct is not unusual in either length, diameter, or histological appearance, but lies more or less horizontally in the segment, as a result of the position assumed by the greatly elongated bursa. It is the excessive development of the bursa which characterizes, to a most unusual degree, the male reproductive system of this species. The bursa is approximately one and a half times as long as the diameter of the body and is consequently folded either transversely dorsad to the gut or in a posteroventrad direction as illustrated in Figure 2. This greater length of the bursa is in striking contrast to the condition of the bursa in the two species of *Cambarincola* in which the male reproductive system has been most fully described (*C. macrodonta*

Ellis by Ellis, 1912, and *C. philadelphica* (Leidy) by Holt, 1949). In both of these species the bursa is small and globular. The difference between *C. macbaini* and the two species mentioned is due to the greater length of the part of the bursa ensheathing the penis and a still greater length of the penis itself. *C. macbaini* has not been studied in sectioned material, but the penis is a long tube, considerably longer than the ensheathing part of the bursa, and almost surely eversible. The so-called non-eversible character of the penis in the genus *Cambarincola* (Ellis, 1912) thus becomes questionable.

The spermatheca of the branchiobdellids is divided into two main portions (Holt, unpublished data), a proximal, thin-walled bulb in which spermatozoa are stored and a distal outlet duct. The spermatheca of *C. macbaini* (Fig. 2) is another distinctive characteristic of this species. The spermathecal duct is greatly enlarged and its length is approximately equal to the body diameter. At the junction of the duct and the bulbular portion there is a slight constriction. The bulb, which lies either longitudinally along the gut or transversely dorsad to the gut, is flattened and triangular in shape.

Type locality. Charles Creek, Boyd County, Kentucky.

Hosts. Unknown.

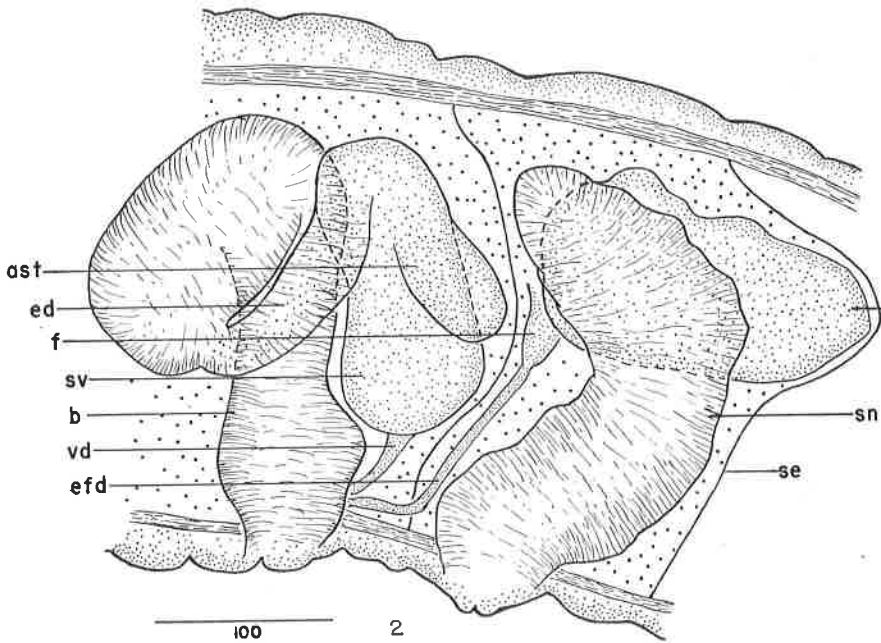
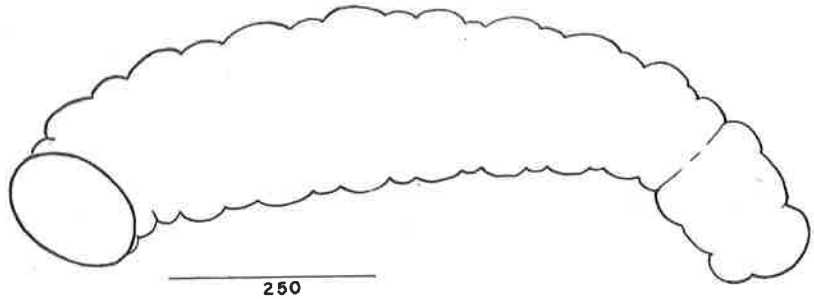
Disposition of types. The holotype is deposited in the United States National Museum, Cat. No. 25952; one paratype is in the collections of Dr. Horton H. Hobbs, Jr., University of Virginia, and the remaining six paratypes are in the author's collection.

Specimens examined and locality record. *Cambarincola macbaini* is known only from the type locality, Charles Creek, eight miles west of Ashland on State Highway No. 5, Boyd County, Kentucky, in shallow pools in a partially dried up creek bed. Eight specimens mounted entire. Collector: Rodney MacBain.

Relationships. The entire lips of *C. macbaini* place it in Goodnight's subgenus *Cambarincola*, composed of the species *C. inversa*, *C. macrodonta*, *C. vitrea*, *C. elevata*, *C. meyeri*, and *C. floridana*. With the exception of *C. macrodonta* (Ellis, 1912, and Bayliff, 1929), no descriptions have been published of the male reproductive systems of any of these species.

The jaws of *C. macbaini* resemble somewhat Goodnight's (1940) figures of the jaws of *C. elevata* and less closely those of *C. vitrea* (Ellis, 1919). Attention has already been called to the resemblance of the jaws of *C. macbaini* to those of the species of *Pterodrilus*. In respect to dental structure, then, these three species appear to constitute a link between the genera *Cambarincola* and *Pterodrilus*.

Not enough is known of the reproductive systems of the various species of *Cambarincola* to enable one to offer any sugges-



tions as to the relationships of this species to the remaining members of the genus. Certainly *C. macbaini* is not closely related in this respect to *C. philadelphia*. A further connection with the genus *Pterodrilus* is the nature of the accessory sperm tube in *C. macbaini* as pointed out above. *C. macbaini* is separated from *C. elevata* by the absence of the raised major annulation present on segment VIII of the latter and from *C. vitrea* by the size of the worm (*C. vitrea* is a much larger worm) and the simple, tubular spermatheca of the latter species.

The absence of the raised major annulations of the body segments and the structure of the upper jaw separates *C. macbaini* from *C. meyeri* (Goodnight, 1942) and *C. floridana* (Goodnight, 1941). The $5/4$ dental formula separates *C. macbaini* from *C. inversa* which has a $3/4$ dental formula (Ellis, 1919), and the elongated bursa, as well as the structure of the jaws separates *C. macbaini* from *C. macrodonta*.

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EXPLANATION OF FIGURES

Legend. ast, accessory sperm tube; b, bursa; ed, ejaculatory duct; efd, efferent duct; f, funnel; sb, bulb of spermatheca; se, septum; sn, spermathecal duct; sv, spermathecal vesicle; vd, vas deferens.

- Fig. 1. Lateral view of *Cambarincola macbaini*.
 Fig. 2. Lateral view of segments V and VI of *C. macbaini*.
 Fig. 3. Upper jaw of *C. macbaini*.
 Fig. 4. Lower jaw of *C. macbaini*.
 Fig. 5. Oblique view of upper jaw of *C. macbaini*.
 Fig. 6. Oblique view of lower jaw of *C. macbaini*.