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CAECIDOTEA ROTUNDA, A NEW TROGLOBITIC ASELLID FROM INDIANA AND OHIO (CRUSTACEA: ISOPODA: ASELLIDAE)

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Abstract.—*Caecidotea rotunda* is described from caves in southern Indiana and Ohio, along the northeastern fringe of the Interior Low Plateaus. It appears to be a relict descended from a formerly widespread ancestor that gave rise also to the widespread species *C. antricola* and *C. beattyi.*

Unlike the southern and western parts of the Interior Low Plateaus, where caves are inhabited by the common species *Caecidotea bicrenata* or *C. stygia* (Lewis and Bowman 1981; Lewis 1982a), along the northeastern fringes of the region are found an assemblage of rare, endemic species. Besides *Caecidotea stygia,* whose range also extends into this area (Steeves 1963; Bowman and Beckett 1978), four other species are known: *C. jordani* (Eberly, 1966), *C. barri* (Steeves, 1965), *C. teresae* Lewis (1982b), and *C. filicispeluncae* Bowman and Hobbs (1983). The species described herein is a new addition to this zoogeographically interesting group of subterranean asellids.

Caecidotea rotunda, new species
Figs. 1–5

Material examined.—OHIO: Pike Co., Frost Cave, coll. H. H. Hobbs, III, 11 Sep 1982, 6.0 mm male holotype (USNM 210515); 3 male, 11 female paratypes (USNM 210516).—INDIANA: Decatur Co., Faulty Cave, coll. J. Lewis, T. Lewis, 16 Jun 1979, 4 male, 2 female paratypes (USNM 210678); Horsethief Cave, coll. J. Lewis, T. Lewis, 16 Jun 1979, 7 male, 8 female paratypes (USNM 210679). Jennings Co., Cave Spring Cave, coll. J. Lewis, T. Everitt (Lewis), 31 Dec 1977, 3 male, 4 female paratypes (USNM 210680); Meek Cave, coll. J. Lewis, T. Everitt (Lewis), 31 Dec 1977, 1 male, 1 female paratype (USNM 210681).

All specimens are deposited in the National Museum of Natural History, Smithsonian Institution.

Description.—Eyeless, unpigmented, longest male (holotype) 6.0 mm, female 7.5 mm; body slender, about 5.8× as long as wide. Head about 1.5× as wide as long, anterior margin concave, postmandibular lobes moderately produced. Pleotelson about 1.5× as long as wide, sides subparallel, caudomedial lobe moderately produced.

Antenna 1 reaching proximal end of last segment of antenna 2 peduncle, flagellum with 11 segments in holotype, 8 in 7.5 mm female, esthete formula 4–0. Antenna 2 with 53 segments in holotype and 7.5 female. Mandibles with 4-cuspate incisors and lacinia mobilis, palp with rows of plumose setae in distal segments.

[1] Sequence of authors determined by toss of a coin.

Fig. 1. *Caecidotea rotunda,* Frost Cave, Ohio: a, Habitus, dorsal, male paratype; b–h, Female paratype; b, Head, dorsal; c, Distal segments of antenna 1; d, Mandibular palp; e, Lacinia of left mandible; f, Incisor of left mandible; g, Incisor of right mandible; h, Maxilla 1.

Maxilla 1, outer lobe with 13 robust spines, inner lobe with 5 plumose setae. Maxilliped with 6 retinacula.

Male pereopod 1, propus about 1.3× as long as wide; palm with robust proximal spine, high subtriangular medial process separated by U-shaped cleft from lower,

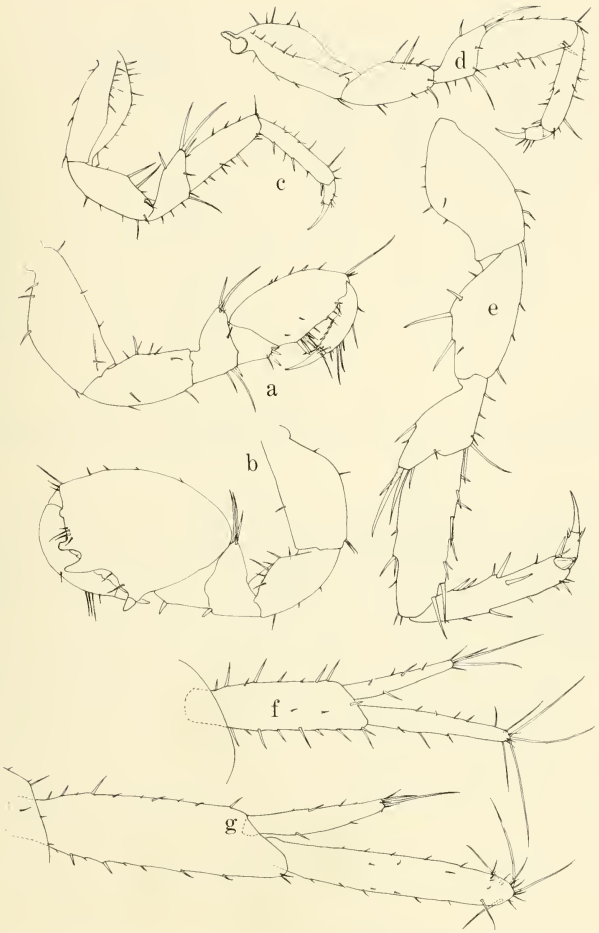

Fig. 2. *Caecidotea rotunda*, Frost Cave, Ohio: a, Pereopod 1, female; b, Pereopod 1, male; c, Pereopod 4, female; d, Pereopod 4, male; e, Pereopod 7, male; f, Uropod, female; g, Uropod, male.

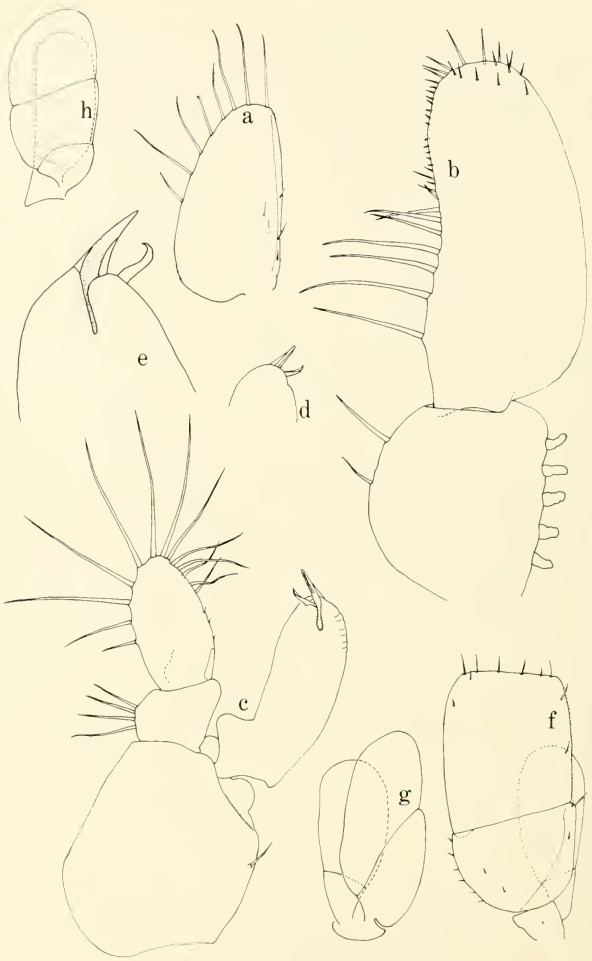

Fig. 3. *Caecidotea rotunda*, Frost Cave, Ohio: a, Pleopod 2, female; b, Pleopod 1, male; c, Pleopod 2, male, anterior; d, Pleopod 2, male, endopod tip, posterior; e, Same, anterior, from different specimen; f, Pleopod 3, male; g, Pleopod 4, male; h, Pleopod 5, male.

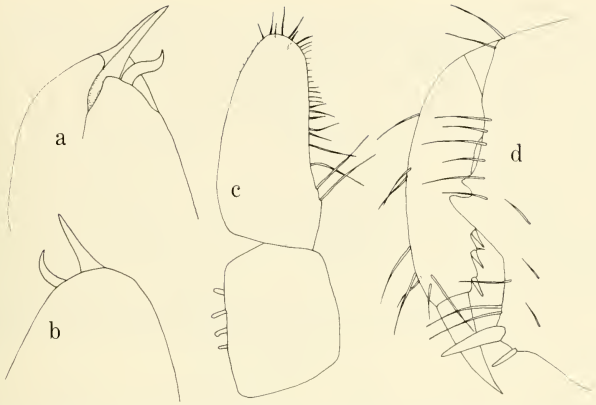

Fig. 4. *Cacidotea rotunda,* Faulty Cave, Indiana: a, Pleopod 2, male, endopod tip, anterior; b, Same, posterior; c, Pleopod 1, male; d, Pereopod 1, male.

blunt distal process; dactyl flexor margin without processes. Female pereopod 1 about 2× as long as wide, propus with large proximal spine, processes absent. Pereopod 4, carpus and propus slightly more robust in male.

Male pleopod 1 longer than pleopod 2; protopod about 0.5× length of exopod, with 5 retinacula; exopod about 2× as long as wide, apex broadly rounded, with numerous short setae, lateral margin concave, with about 7 long non-plumose setae in proximal ⅗. Male pleopod 2 exopod, proximal segment with 4 plumose lateral setae, distal segment with 9 plumose setae along lateral and distal margins, 4 non-plumose setae along mesial margin. Endopod with rounded basal apophysis, tip with 2 major processes extending subparallel to one another, nearly perpendicular to axis of endopod: (1) lateral process subterminal, tapering to recurved point, and (2) cannula elongate beak-shaped, endopodial groove separating 2 poorly defined processes. Pleopod 3 exopod distal margin with 6 plumose setae. Pleopod 4 exopod with single sigmoid suture. Pleopod 5 with 2 transverse sutures. Uropods about 1.5× as long as pleotelson in ♂, 1.1× in ♀; peduncle longer than rami, both rami slender in ♀, endopod broader in ♂.

Etymology.—From the Latin "rotundus," meaning "rounded," referring to the rounded distal margin of the male first pleopod.

Range.—Known from five caves adjacent to the northeastern fringe of the Interior Low Plateaus, from Pike Co., Ohio to Jennings Co., Indiana. Locations for the Indiana localities are given by Powell (1959).

Relationships.—The male first pleopod exopod, with elongate non-plumose setae along the lateral margin, and the second pleopod endopod tip processes extending perpendicular to the axis of the endopod indicate that the general

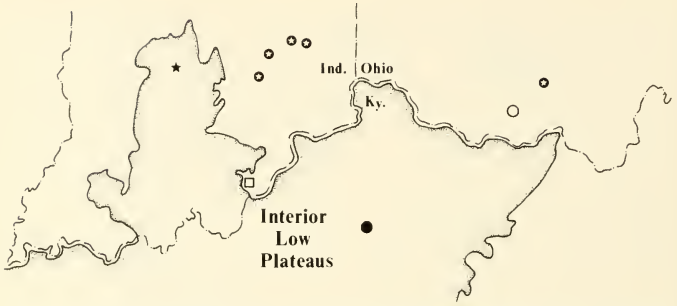

Fig. 5. Known distribution of *Caecidotea* spp. in the northwestern part of the Interior Low Plateaus. Open square, *C. teresae*; filled circle, *C. barri*; open circle, *C. filicispeluncae*; white star, *C. rotunda*, black star, *C. jordani*.

morphological affinities of *Caecidotea rotunda* lie with the Stygia Group. *Caecidotea rotunda* can be readily separated from other species found in the northeastern part of the Interior Low Plateaus (Fig. 5). *Caecidotea stygia* and *C. barri* each possess a distally truncate male first pleopod with a distolateral lobe; in *C. rotunda* the apex of the first pleopod is rounded and a distolateral lobe is absent. The male second pleopod endopod of *Caecidotea filicispeluncae* lacks the lateral process that is present in *C. rotunda*. The second pleopod endopod tip of *C. jordani* is similar to that of *C. rotunda*, but the lateral process of *C. jordani* is apically blunt; the lateral process of *C. rotunda* is curved and tapers to a point. The final species known from this part of the Interior Low Plateaus, *C. teresae*, is a member of the Hobbsi Group.

Thus, *Caecidotea rotunda* lies geographically among a group of species with which it has no more than a general affinity. However, the endopodal tip of *C. rotunda* closely resembles that of *C. beattyi* (a phreatobite inhabiting the glacial plains of Illinois) and *C. antricola* (an Ozark troglobite). In each of these three species the endopod tip consists of a beak-shaped cannula and a sigmoid lateral process, tapering distally to a point. The male first pleopods of *C. rotunda* and *C. antricola* closely resemble one another, with elongate exopods having rounded apices, but the first pleopod exopod of *C. beattyi* has a distinct distolateral lobe. The fourth pleopods of all three species have a single sigmoid suture. *Caecidotea rotunda* is clearly separated from *C. antricola* and *C. beattyi* by the structure of the male gnathopods. In both *C. antricola* and *C. beattyi*, the palm of the propodus has a triangular proximal and distal bicuspid process, while the medial process is absent. In *C. rotunda*, the proximal process is represented by a spine, which may be replaced by a process in larger individuals. A distinct medial process is present in *C. rotunda*, and the distal process is blunt, not bicuspid.

The similar morphology of *Caecidotea rotunda*, *C. antricola*, and *C. beattyi* suggests that these three species evolved from a common ancestor. In the Ozarks the result of this evolution is the common, widespread *C. antricola*. Similarly, *C.*

beattyi occurs over a large area of the Illinois Basin (Lewis and Bowman 1981). The presence of *C. rotunda* in Indiana and Ohio suggests that the ancestor of these species was once widespread over both the Ozarks and Interior Low Plateaus, and gave rise to successful species in the Ozarks and the adjacent Central Lowland, but for the most part failed to succeed in the Interior Low Plateaus, where *C. stygia* and *C. bicrenata* are now widespread (Lewis 1982a). *Caecidotea rotunda* is the only remnant along the northeastern fringe of the Interior Low Plateaus of the once widespread ancestor.

This idea is supported by the distribution of *Caecidotea teresae,* which occurs in southern Indiana at the base of the escarpment that separates the Interior Low Plateaus from the Central Lowland, and is the only member of the Hobbsi Group in the region. *Caecidotea teresae* is morphologically similar to *C. salemensis,* a common troglobite in the Ozark Plateau (Lewis 1981). The ancestor of these two species of the Hobbsi Group may have once had a distribution pattern similar to that of the three species of the Stygia Group discussed above.

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