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THREE NEW OSTRACODS OF THE GENUS ENTOCYTHERE FROM THE HIWASSEE DRAINAGE SYSTEM IN GEORGIA AND TENNESSEE

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During the course of a survey of the crayfishes and their commensal associates of the Hiwassee Drainage System, Mr. Kenneth W. Simonds encountered the three new ostracods described below and has kindly permitted us to describe them. Two of these ostracods are relatives of *Entocythere daphnioides* Hobbs (1955) and *E. runki* Hobbs (1955), and the third is a member of the Columbia Group. This latter species we are naming in honor of its discoverer.

We have examined a large number of ostracods of the genus *Entocythere* in recent months and are convinced that there is such marked similarity in many of the structures that in the past have been repeatedly described in detail it is unnecessary to repeat descriptions that apply equally well to other species and in detail to the new ones included below. For example, even in such distantly related forms as *E. simondsi* and *E. cyma* (see below) the mandibles and maxillae are almost indistinguishable (c.f. figs. 7 and 12; and 8 and 13). For this reason, the reader is referred to detailed descriptions of certain appendages previously recorded by the senior author.

Entocythere simondsi, sp. nov.

Male.—Shell (fig. 9) elliptical with the posterior portion slightly higher than the anterior; margins entire, lacking spines or distinct emarginations. Marginal setae regularly spaced on both valves anteriorly, ventrally, and posteriorly and lacking dorsally. The shell size (in mm.) of 10 specimens follows:

Length	Height	Length/Height
.325	.200	1.63
.335	.200	1.68
.355	.200	1.78
.345	.200	1.73
.350	.205	1.71
.350	.200	1.75
.345	.200	1.73
.330	.200	1.65
.345	.200	1.73
.345	.200	1.73

Mandible (fig. 7) and maxilla (fig. 8) entirely similar to those of *E. daphnioides* Hobbs (1955: 328) except setae are lacking on convex dorsal surfaces of both. Terminal setae on maxilla blunt distally instead of acute.

Copulatory complex (figs. 1-6) with distal portion of base extending distally slightly beyond external border of clasping apparatus, with an undulating anterior margin, and distally bifid with what appear to be, in lateral aspect, ridges on antero- and posterodistal margins; *accessory groove* (AG) lacking (c.f. figs. 1 and 17). Dorsal finger of the usual type and directed ventrally; ventral finger strongly curved near base (extension of axes of rami forming an angle of about 100 degrees) and a second curve (about 140 degrees) near distal end. Finger guard lacking. Clasping apparatus (fig. 6), although not angular, with distinct horizontal and vertical rami of subequal lengths; external border of horizontal ramus entire; internal border with two teeth on distal half; and distal extremity with four denticles.

Female.—Triunguis female not known. Shell of biunguis female (fig. 10) with a slight ventral concavity slightly anterior to midlength.

Type Locality and Range.—Dunn Creek, 1.9 miles west of Fighting Town Creek on Hell's Hollow Road, Fannin County, Georgia. The hosts are *Cambarus bartonii bartonii* (Fab.) and *Cambarus* sp. Another ostracod, being described by Mr. E. A. Crawford, was associated with *E. simondsi* on these crayfishes. *Entocythere simondsi* was also found 0.2 miles west of Ocoee, Polk County, Tennessee on *Cambarus longulus longirostris* Faxon, *C. striatus* Hay, and *Orconectes erichsonianus* (Faxon); from 1.8 miles south of Benton, Polk County, Tennessee on *C. longulus longirostris;* and from 1.9 miles north of Georgetown, Meiggs County, Tennessee on the latter species and an unidentified member of the genus *Orconectes.*

Disposition of Types.—The holotype is deposited in the United States National Museum. Paratypes are in the collections of E. A. Crawford and the senior author.

Relationships.—E. simondsi is a member of the Columbia Group and appears to have its closest affinities with *E. neglecta* Westervelt and Kozloff (1959), *E. occidentalis* Kozloff and Whitman (1954), and *E. erichsoni* Kozloff (1955). The clasping apparatus is less strongly curved than in any of these species, and whereas in *E. neglecta* and *E. erichsoni* there are three teeth on the internal border of the clasping apparatus there are two in *E. simondsi* as in *E. occidentalis.* The latter two may be distinguished by the C-shaped clasping apparatus and the absence of a deep emargination on the distal portion of the base in *E. occidentalis.*

Remarks.—Specimens collected from near Benton, Tennessee are more elongate with the posterior portion of the shell not so high as in specimens from the other localities. The shell sizes are as follows: two males, .385 by 200 and .395 by .210 mm.; a biunguis female .420 by .235 mm. The shell size of the single male from .2 mile west of Ocoee is .390 by .210 mm.

The specimens from Meiggs County are smaller than the typical form. The males vary from .300 by .160 to .305 by .175 mm. and the biunguis females from .265 by .135 to .320 by .185. In addition the extremity of the distal portion of the base of the copulatory complex is directed more anteriorly; the clasping apparatus is more strongly curved and is proportionately heavier, and lies more ventrally, than in the typical form (fig. 2).

Entocythere cyma,[1] sp. nov.

Male.—Shell (fig. 11) subelliptical with dorsal margin a little more convex than ventral margin. Maximum height immediately posterior to midlength of shell. Marginal setae a little closer together anteriorly and

[1]Cyma, G. — anything swollen. Name chosen because of the swollen distal portion of the base of the copulatory complex of the male.

posteriorly than ventrally. Dorsal margin devoid of setae. Shell size of five specimens (in mm.) follows:

Length	Height	Length/Height
.385	.210	1.83
.390	.220	1.77
.395	.215	1.84
.385	.215	1.79
.400	.220	1.82

Maxilla and mandible (figs. 12 and 13) similar to those of *Entocythere simondsi*.

Copulatory complex (figs. 14-16) consisting of the usual elements. Distal portion of base swollen (fig. 15) with a spine-like prominence, directed posteriorly, immediately distal to penis. Accessory groove lacking. Dorsal finger stout and short; ventral finger with a strong curve just proximal to midlength. Finger guard less conspicuous than illustrated, although not differing in size, narrow, and bifid distally. Clasping apparatus bent so that extension of axes of two rami form an angle of 70 to 75 degrees. Horizontal ramus conspicuously longer than vertical one. Both internal and external borders of horizontal ramus without teeth; distal extremity with a fluted expansion bearing five denticles.

No specimens of *E. cyma* were found in copula and it has not been possible to associate any female with the male.

Type Locality and Range.—Four Mile Creek, 1.8 miles southeast of Benton, Polk County, Tennessee. The host is *Cambarus longulus longirostris* Faxon. It was also found associated with the crayfish, *Cambarus striatus* Hay and *Orconectes erichsonianus* (Faxon) 0.2 mile west of Ocoee, Polk County, Tennessee. Ostracod associates include the undescribed species mentioned above, *E. simondsi* and *E. mecoscapha*.

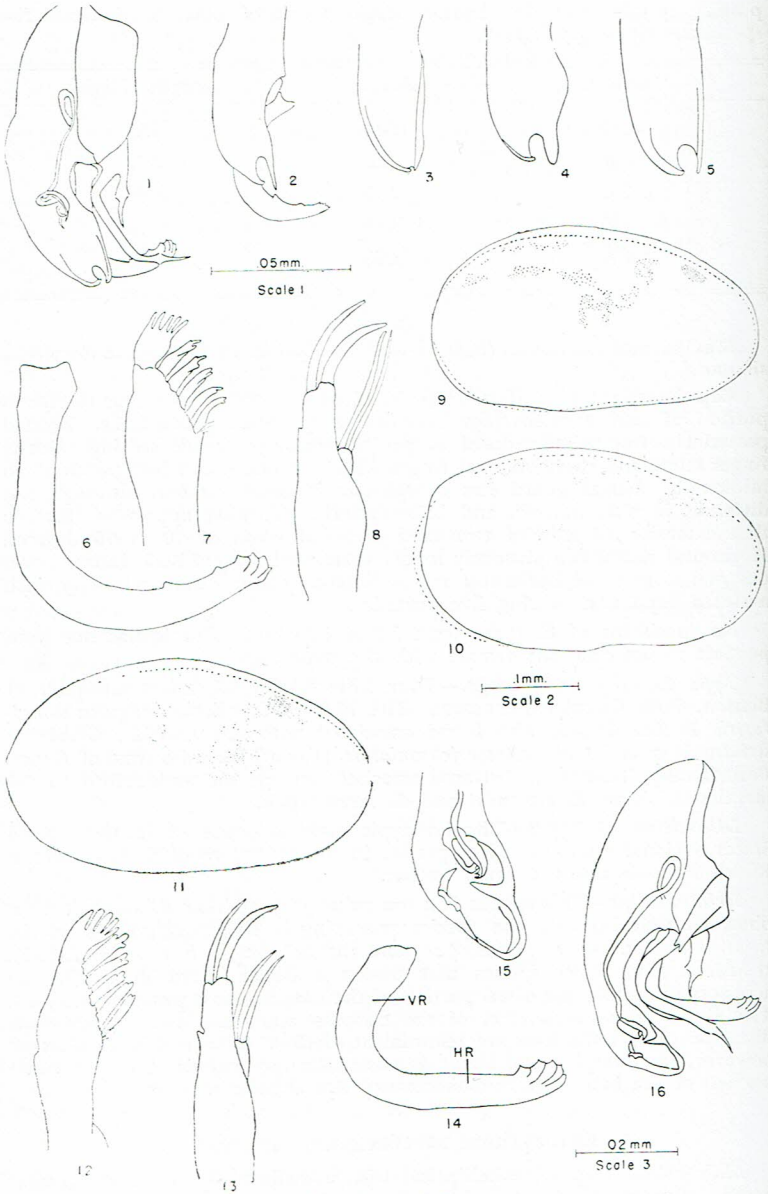
Disposition of Types.—The holotypic male is deposited in the United States National Museum. Paratypes are in the collections of E. A. Crawford, K. W. Simonds, and the senior author.

Relationships.—This species is a somewhat disjunct one although it combines characteristics of the species possessing a finger guard (*E. runki, E. daphnioides,* and *E. mecoscapha)* and the disjunct *E. humesi* Hoff, 1943. It differs from those species that possess a finger guard in lacking an accessory groove on the distal portion of the base of the copulatory complex. The fluted terminal portion of the clasping apparatus and the corneous distal portion of the base are reminiscent of these structures in *E. humesi;* however, the clasping apparatus is more strongly curved and the distal portion of the base is more elongate and not angular in *E. cyma*.

Entocythere mecoscapha,[2] sp. nov.

Male.—Shell (fig. 18) subelliptical with a distinct excavation on ventral margin slightly anterior to midlength; maximum height in posterior half of shell. Marginal setae evenly dispersed except on dorsal side where few are present. The shell size (in mm.) of 10 specimens follows:

[2]Mecos, G.—length; Scapha, G.—trough. Name chosen because of the long accessory groove on the distal portion of the base of the clasping apparatus of the male.



Explanation of Figures

Abbreviations

AG — accessory groove
CA — clasping apparatus
DF — dorsal finger
DP — distal portion of base
EB — external border
FG — finger guard
HR — horizontal ramus
IB — internal border
VF — ventral finger
VR — ventral ramus

Figs. 1-5 and 16 drawn to Scale 1; figs. 6-8 and 12-14; to Scale 3; and figs. 9-11, to Scale 2.

Figs. 1-10, *E. simondsi,* sp. nov.

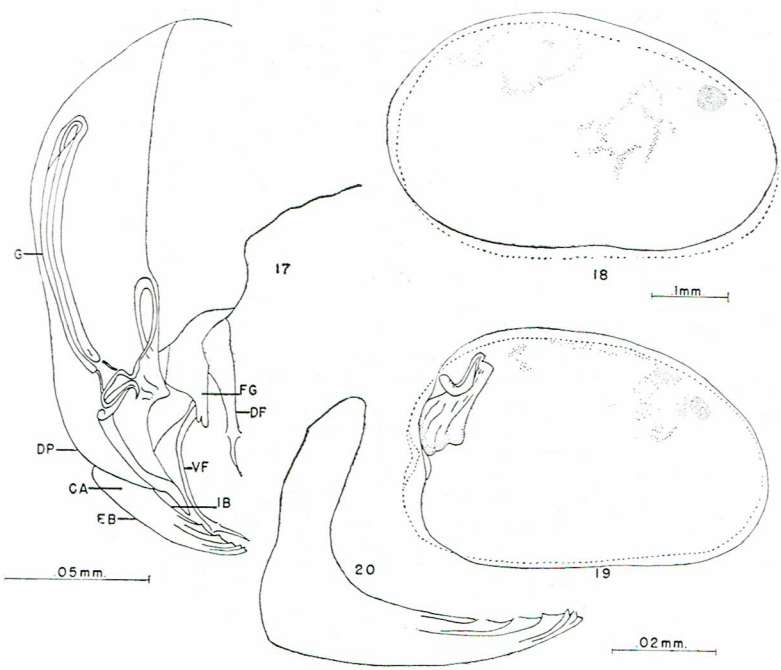
1. Copulatory complex of male.
2. Distal portion of base and clasping apparatus of Meiggs County male.
3-5. Variations in distal portion of base of males from type locality.
6. Clasping apparatus.
7. Distal portion of mandible.
8. Distal portion of maxilla.
9. Shell of male.
10. Shell of biunguis female.

Figs. 11-16, *E. cyma,* sp. nov.

11. Shell of male.
12. Distal portion of mandible.
13. Distal portion of maxilla.
14. Clasping apparatus.
15. Terminal portion of distal portion of base of clasping apparatus.
16. Copulatory complex.

Figs. 17-20, *E. mecoscapha,* sp. nov.

17. Copulatory complex.
18. Shell of male.
19. Shell of female.
20. Clasping apparatus.



	Length	Height	Length/Height
Type locality	.485	.245	1.98
	.485	.240	2.02
	.485	.240	2.02
	.485	.240	2.02
	.500	.300	1.67
Meiggs County	.465	.310	1.50
	.455	.295	1.54
	.460	.285	1.61
	.480	.285	1.68
	.450	.275	1.64

Mandible and maxilla, except for larger size, almost identical to those of *E. simondsi* (see figs. 7 and 8.)

Copulatory complex (figs. 17 and 20) with extremity of distal portion of base distally produced into a delicate extension continuous proximally with a long groove. Dorsal finger long and directed anteroventrad; ventral finger slender and gently curved throughout its length. Posteroproximal region of distal portion of base with a long slender *accessory groove* similar to that of *E. runki* and *E. daphnioides*, although slenderer and extending far proximally of the loop of the spermatic duct. Path of spermatic duct more irregularly convoluted than those of the latter two species. Clasping apparatus angular; external border entire, and internal border with three denticles in distal half; distal extremity bearing three dentiform serrations. Short, straight finger guard bifid distally.

Female. — Shell of triunguis female (fig. 19) occasionally with a slight concavity on ventral margin slightly anterior to midlength; posterior margin with one or two undulations, one always present ventral to terminal portion of ruffled skirt. Prominent ruffled skirt and J-shaped rod always present. Shell size (in mm.) of six triunguis females from Meiggs County follows:

Length	Height	Length/Height
.465	.305	1.52
.475	.305	1.56
.465	.300	1.55
.475	.300	1.58
.445	.280	1.59
.440	.295	1.49

No triunguis females were found among specimens from type locality. The single available biunguis female has but the single dorsal concavity in the shell posteriorly and lacks the ruffled skirt and J-shaped rod.

Type Locality and Range — South Chestuee Creek, .2 mile west of Ocoee, Polk County, Tennessee on Rte. 64. The hosts are *Cambarus longulus longirostris*, *Cambarus striatus*, and *Orconectes erichsonianus*. Additional specimens were collected 1.9 miles north of Georgetown, Meiggs, County, Tennessee. In the type locality this ostracod is associated with *Entocythere cyma*, *E. simondsi*, and the undescribed species mentioned above; in the Meiggs County locality, with the same undescribed species, *E. simondsi*, and *E. illinoisensis* Hoff, 1942.

Disposition of Types. — The holotype and allotype are deposited in the United States National Museum. Paratypes are in the collections of E. A. Crawford, K. W. Simonds, and the senior author.

Relationships. — *Entocythere mecoscapha* is more closely related to *E. runki* and *E. daphnioides* than to any other described species. Like them, it possesses both a finger guard and an accessory groove on the copulatory complex. It differs from *E. daphnioides* in lacking a projection on the posteroventral margin of the shell, and from both of them in having the distal portion of the base terminating in an acute projection and having a comparatively longer and more slender accessory groove.

Remarks. — It should be noted that the specimens from Meiggs County are both shorter and not so high as specimens from the type locality (see measurements). It is of interest that similar size differences occur in *E. simondsi* from the two localities.

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NEWS OF TENNESSEE SCIENCE

(continued from page 16)

University of Tenessee—Department of Botany

Dr. Ronald A. Pursell has left U-T to accept a position at the Penn State School of Forestry at Mont Alto, Pennsylvania.

Dr. Donald Foard from North Carolina State College has been added to the staff as Assistant Professor. Dr. Raymond Hatcher from the University of Cincinnati has been added to the staff as Instructor.

Mr. Dan Norris has been added to the staff as Instructor.

Dr. Sinske Hattori, Japan's leading hepaticologist, of Nichinan, Miyazaki, spent most of September, 1959, at U-T collecting hepatics in the Southern Appalachians and exchanging ideas with the staff.

The Department of Botany of The University of Tennessee announces that the Tenth Annual Spring Wildflower Pilgrimage will be held in the Great Smoky Mountains at Gatlinburg, Tennessee, April 28, 29, 30, 1960. Wildflower and fern hikes, bird walks, and motorcades led by competent botanists and naturalists and illustrated lectures are available to the public. Those wishing further information should write to Department W. P., Post Office Box 208, Gatlinburg, Tennnessee.

(continued on page 31)