

PROCEEDINGS
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NEW ENTOCYTHERID OSTRACODS FROM
KENTUCKY AND TENNESSEE

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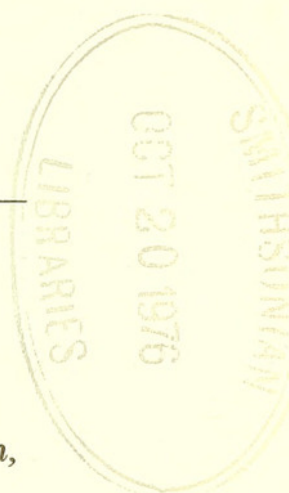
Four new ostracods are described from crayfishes collected in the Cumberland and Tennessee River basins in Kentucky and Tennessee. One, a member of the genus *Ascetocythere*, is believed to be restricted to a burrowing crayfish, whereas the other three, assigned to the genus *Dactylocythere*, infest stream dwelling members of the genus *Cambarus* and perhaps also two species of the genus *Orconectes*. The most recent keys and summary of the genera *Ascetocythere* and *Dactylocythere* are those of Hart and Hart (1974).

Except for four lots of specimens, from three localities, which were collected by Perry C. Holt, (1 lot), Joseph F. Fitzpatrick, Jr., and H. H. Hobbs, Jr., (2), and Daniel J. Peters, Jean E. Pugh, and H. H. Hobbs, Jr. (1), all were donated to us by Raymond W. and Judith Way Bouchard who also supplied us with identifications of the hosts collected by them. We gratefully acknowledge the gift from the Bouchards and Perry C. Holt, and the assistance given to us by the other collectors. We also wish to thank Margaret A. Daniel, C. W. Hart, Jr., and Raymond B. Manning for their critical reading of the manuscript.

Ascetocythere riopeli, new species

(Figure 1a-d)

Male: Eye pigmented and located between one-fourth and one-fifth shell length from anterior margin. Shell (Fig. 1a) ovate with greatest



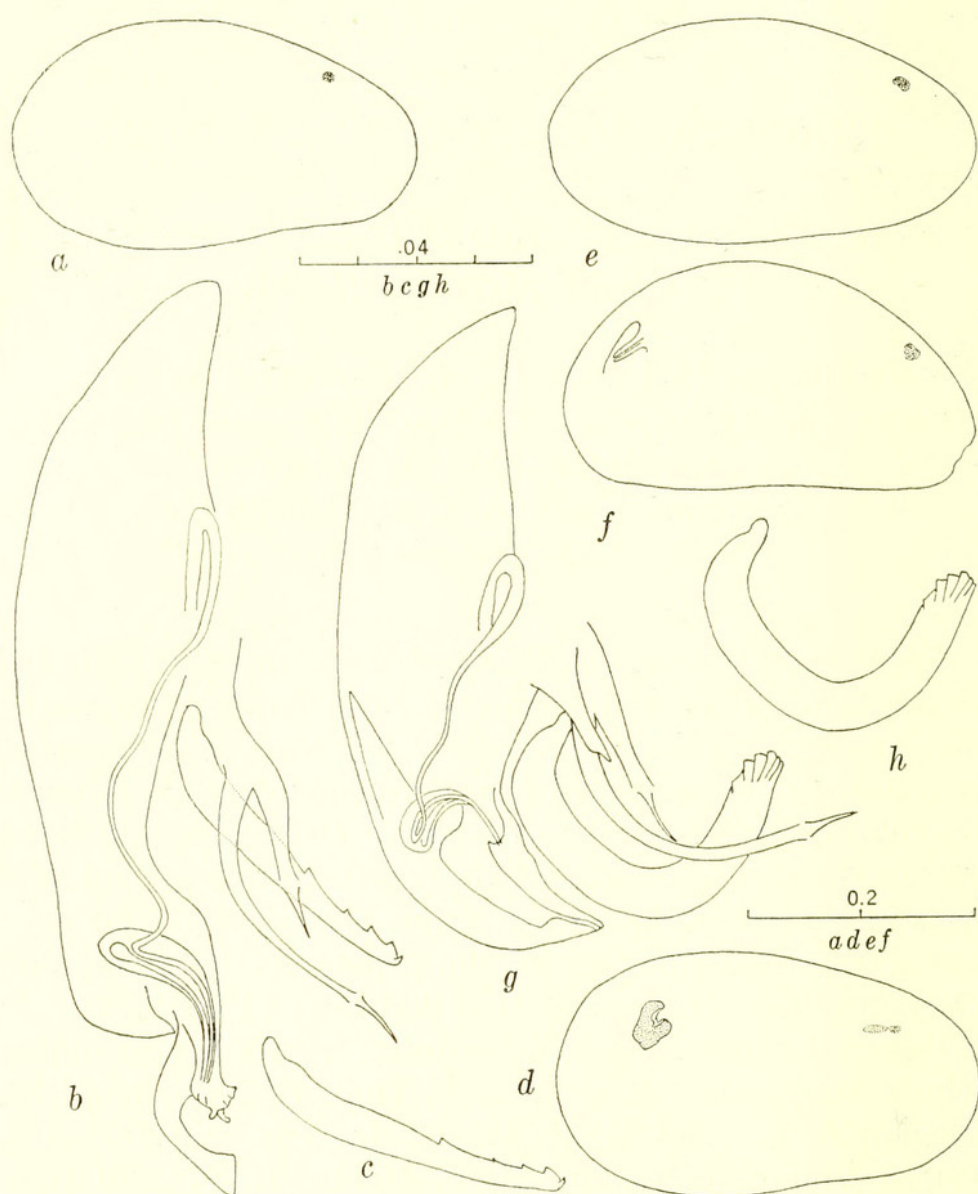


FIG. 1a-d, *Ascetocythere riopeli*, new species; 1e-h, *Dactylocythere apheles*, new species. a, e, Shell of male; b, g, Copulatory complex of male; c, h, Clasper apparatus of male; d, f, Shell of female. Scales in mm.

height one-third shell length from posterior margin where about 1.4 times height at level of eye; margin entire. Submarginal setae present except dorsally, closer together anteriorly and posteriorly than ventrally.

Copulatory complex (Fig. 1b, c) with bulbous ventral portion of peniferum bearing following processes: that borne on cephaloventral margin, and serving as conduit guiding penis, swollen distally and

flared with margin produced in several small prominences; adjacent ventrally directed process slender, subsinuous with cephaloventral extremity slightly broadened and turned laterally; vestigial caudal process situated near caudal base of sinuous process, its subacute apex directed cephalically. Penis very prominent, L-shaped, with spermatic and prostatic elements gaping for some distance at and on both sides of midlength of penis, two converging in basal part of cephaloventral process of peniferum and emerging on mesial surface of swollen distal region. Clasp apparatus only slightly curved, tapering from base, its postaxial border entire; preaxial border with 3 teeth on distal third followed by 2 apical ones. Dorsal finger moderately heavy, its setiform tip overreaching midlength of uniformly curved ventral finger, tip of which directed anteroventrally.

Triunguis Female: Eye pigmented and situated approximately one-fourth shell length from anterior margin. Shell (Fig. 1d) elongate ovate, highest about one-third shell length from posterior margin where 1.3 times height at level of eye. Submarginal setae disposed as in male but closer together anteroventrally than elsewhere. Genital complex consisting of small, weakly sclerotized prominence with concave apical margin and embedded in heterogeneous mass projecting posteroventrally from posterodorsal part of body.

Measurements (in mm): 4 males and 1 female.

	Holotype	Males	Allotype
Length (range)	0.39	0.38–0.41	0.41
Average		0.39	
Height (range)	0.22	0.22–0.24	0.22
Average		0.22	

Type-locality: Poor Fork of the Cumberland River, at Upper Cumberland School, 0.6 mi from Virginia state line, Letcher County, Kentucky. The specimens were retrieved from a collection of crayfishes containing *Cambarus* (*Jugicambarus*) *dubius* Faxon, *C. (J.) distans* Rhoades, *C. (Puncticambarus) robustus* Girard, and *C. (P.) buntingi* Bouchard.

Disposition of Types: The holotypic male and allotypic female are deposited in the National Museum of Natural History (Smithsonian Institution), numbers 155317 and 155318, respectively, as are the paratypes.

Range and Specimens Examined: Six specimens from two localities in Kentucky: Type-locality, 30 March 1974, R. W. and J. W. Bouchard, coll. and Marrowbone Creek at State Route 195 and Elkhorn Creek at State Route 197 (combined collection), Pike County, Kentucky, 29 March 1974, R.W.B. and J.W.B., coll.

Hosts: Although five species of crayfishes are represented from the collections containing this ostracod (*Cambarus* (*Jugicambarus*) *dubius*,

C. (J.) distans, *C. (Puncticambarus) robustus*, *C. (P.) buntingi*, and *Orconectes juvenilis* (Hagen)), it is highly probable that this ostracod is confined to *C. (J.) dubius*.

Entocytherid Associates: In the type-locality, *Ascetocythere riopeli* was found in a collection containing *Dactylocythere spinata* Hobbs and Walton (1970:860), *Dactylocythere* sp.?, and *Donnaldsoncythere donnaldsonensis* (Klie, 1931:334). In the Pike County locality, there were no associates.

Relationships: *Ascetocythere riopeli* is a member of the Asceta Group and is perhaps more closely allied to *As. sclera* Hobbs and Hart (1966: 42) than to any other member of the Group. The absence of a cephalic process on the peniferum of the male and the presence of a slender sinuous sclerotized process projecting ventrally from the bulbous area provide a unique combination of characters separating this species from its congeners.

Etymology: This ostracod is named in honor of our mutual friend, James L. Riopel, Director of the Mountain Lake Biological Station of the University of Virginia, who, for a number of years, has encouraged us in our studies of the entocytherids.

***Dactylocythere apheles*, new species**
(Figure 1e-h)

Male: Eye pigmented and located between one-fifth and one-sixth shell length from anterior margin. Shell (Fig. 1e) subovate; greatest height slightly posterior to midlength where almost 1.4 times that at level of eye; ventral margin weakly convex. Submarginal setae somewhat closer together anteriorly and posteriorly than ventrally, and absent dorsally. Sternal spine lacking.

Copulatory complex (Fig. 1g, h) with slender, distally tapering finger guard provided with anteriorly eccentric tip; peniferum moderately slender with ventral part curved anteroventrally and tapering rather rapidly to acute anteroventral angle; ventral part of tip corneous. Peniferal groove opening anteroventrally, almost closed in apical region, its least diameter approximately one-tenth that of corresponding diameter of vertical ramus of clasping apparatus. Penis L-shaped with arms subequal in length. Accessory groove represented by short triangular clear area posterodorsal to base of penis, its apex barely or not reaching level of spermatic loop. Clasping apparatus C-shaped with short proximal area subparallel to longer distal segment (horizontal ramus); apparatus of almost uniform diameter throughout and with margins entire; distal part with distally radiating grooves extending toward 5 or 6 apical denticles. Dorsal and ventral fingers comparatively slender, latter about twice length of former and gently curved with distal half directed anteriorly.

Triunguis Female: Eye pigmented, situated as in male. Shell (Fig. 1f) strongly arched dorsally and with almost straight ventral margin;

greatest height slightly posterior to midlength where about 1.5 times that at level of eye. Submarginal setae disposed as in male. Posterior margin of shell entire, smoothly rounded. Genital complex consisting of weakly sclerotized, slender, tubular papilla directed posteroventrally; usual J-shaped rod and amiculum lacking.

Measurements (in mm): 3 males and 4 females.

	Holotype	Males	Allotype	Females
Length (range)	0.41	0.40–0.41	0.39	0.36–0.39
Average		0.40		0.38
Height (range)	0.22	0.21–0.22	0.21	0.21–0.22
Average		0.22		0.21

Type-locality: Spring seep flowing across old road to Chimneys at Indian Gap (Little Pigeon River drainage), Sevier County, Tennessee. There the type-series was collected with *Uncinocythere zancla* Hobbs and Walton (1963:456) on 13 November 1971, by R. W. Bouchard and J. D. Way.

Disposition of Types: The holotypic male and allotypic female are deposited in the National Museum of Natural History (Smithsonian Institution), numbers 155319 and 155320, respectively. Paratypes are in the collection of H. H. Hobbs III and the Smithsonian Institution.

Range and Specimens Examined: Seven specimens collected at the type-locality (Little Pigeon River basin).

Host: *Cambarus* (J.) *carolinus* (Erichson).

Entocytherid Associate: *Uncinocythere zancla*.

Relationships: *Dactylocythere apheles* has its closest affinities with *Dactylocythere leptophylax* (Crawford, 1961:238). The male of both species possesses a peniferum with a reduced accessory groove, at least occasionally hardly discernible; the margins of the clasping apparatus are entire, and the distal extremity bears at least 4 denticles set off proximally by distally diverging striae. The females of both species lack the usual J-shaped rod and amiculum. Members of the new species differ from those of *Dt. leptophylax* in possessing a simple as opposed to a distally bifid or trifid finger guard; the ventral extremity of the peniferum is smooth, lacking tuberculiform prominences, and the distal part of the clasping apparatus is not expanded.

Etymology: *Apheles*, G. = smooth; referring to the absence of teeth or prominences on the preaxial border of the clasping apparatus and on the ventral margin of the peniferum of the copulatory complex of the male.

***Dactylocythere brachydactylus*, new species**
(Figure 2a–d)

Male: Eye pigmented and situated about one-fifth shell length from anterior margin. Shell (Fig. 2c) subovate with greatest height about

one-third shell length from posterior margin where approximately 1.3 times height at level of eye; ventral margin straight to weakly convex. Submarginal setae present around entire shell, slightly closer together anteriorly and posteriorly than dorsally or ventrally; other setae widely scattered over surface of shell. Sternal spine lacking.

Copulatory complex (Fig. 2*b, d*) with short, robust finger guard produced in bifurcate extension from cephaloventral side and with posterior angle at level of base of extension; peniferum comparatively heavy with ventral portion subtruncate and apical part directed antero-ventrally. Peniferal groove conspicuous, its least diameter from one- to three-fourths as wide as least diameter of vertical ramus of clasping apparatus. Penis L-shaped with rami subequal in length. Accessory groove slender and long, reaching dorsally distinctly beyond level of dorsal extremity of spermatic loop. Clasping apparatus more L- than C-shaped, rami indistinctly delimited; postaxial margin of vertical ramus with slight angle near midlength, and preaxial margin of horizontal ramus with 1 or 2 minute teeth near 3 terminal denticles and marked by oblique striae extending proximally from teeth; remaining borders of apparatus entire. Dorsal and ventral fingers slender, former about one-half length of gently and evenly curved ventral finger, latter directed anteriorly.

Triunguis Female: Eye pigmented, situated between one-fifth and one-sixth shell length from anterior margin. Shell (Fig. 2*a*) much more highly vaulted than in male, highest about one-third shell length from posterior margin where approximately 1.5 times height at level of eye; ventral margin slightly concave near midlength. Disposition of setae on shell similar to that on male. Posterior margin of shell entire and rounded. Genital complex consisting of slender, non-corneous tubular prominence, directed posteroventrally, flanked posterodorsally by similarly directed inflated sclerotized projection capped by hyalin coat and with heterogeneous material adhering to antero-ventral margin; usual J-shaped rod and amiculum lacking.

Measurements (in mm): 10 males and 10 females.

	Holotype	Males	Allotype	Females
Length (range)	0.47	0.44–0.47	0.49	0.47–0.49
Average		0.46		0.48
Height (range)	0.27	0.25–0.27	0.29	0.27–0.29
Average		0.25		0.29

Type-locality: Goose Creek at State Route 66 southwest of Dandridge, Jefferson County, Tennessee. There the host was *Cambarus* (*C.*) *bartonii* (Fabricius); specimens of *Orconectes virilis* (Hagen) were also collected in this locality and may have been infested with

this ostracod. No other ostracod was infesting the host. Collections were made there on 16 March 1969 by R. W. Bouchard.

Disposition of Types: The holotypic male and allotypic female are deposited in the National Museum of Natural History (Smithsonian Institution), numbers 155321 and 155322, respectively. Paratypes are in the collections of H. H. Hobbs III, D. J. Peters, and the Smithsonian Institution.

Range and Localities: Little Tennessee, French Broad, Nolichucky, and Tennessee river basins in Cocke, Jefferson, and Roane counties, Tennessee.

TENNESSEE: *Cocke County*—(1) Jake Best Creek on road S from Citico Creek, SE of Acorn (Host, *Cambarus* (C.) *bartonii* (Fabricius)). *Jefferson County*—(2) Type-locality; (3) Long Creek at State Rte. 32 and U.S. Hwy. 25 E, N of White Pine (Host, *Cambarus* (*Hiaticambarus*) *longirostris* Faxon); (4) Spring Creek on U.S. Hwy. 70 W of junction with State Rte. 113 near Oak Grove (Host, *Cambarus* (C.) *bartonii*); (5) Embayment of Spring Creek off U.S. Hwy. 70 and State Rte. 9, near Douglas Lake (Hosts, *Cambarus* (C.) *bartonii*, *Orconectes virilis* (Hagen), *Orconectes forceps* (Faxon)). *Roane County*—(6) Caney Creek at Buttermilk Road, off I-40 SE of Bradbury (Hosts, C. (C.) *bartonii*, C. (H.) *longirostris*). Collections from localities 1–4 were made by R. W. Bouchard, that from 5 by D. A. Etnier, and that from 6 by Bryant.

Hosts: Although this ostracod was found in collections of crayfishes containing *Cambarus* (C.) *bartonii*, C. (H.) *longirostris*, *Orconectes forceps*, and *O. virilis*, it is probable that it is actually associated with only the former two.

Entocytherid Associates: In the Cocke County locality it was associated with *Donnaldsoncythere donnaldsonensis* (Klie, 1931:334); in the Long Creek locality in Jefferson County, it was found with *Uncinocythere simondsi* (Hobbs and Walton, 1960:17); and in the Roane County locality, with *Dactylocythere falcata* (Hobbs and Walton, 1961:379).

Relationships: *Dactylocythere brachydactylus* has its closest affinity with *Dt. chelomata* (Crawford, 1961:242). The similarities in the genitalia of the males are striking; however, members of the former possess a much longer accessory groove in the peniferum, one approaching the length of that in *Dt. mecoscapa* (Hobbs and Walton, 1960:19) and *Dt. macroholca* Hobbs and Hobbs (1970:6). In addition, the denticles along the distal preaxial border of the horizontal ramus of the clasping apparatus are not nearly so well-developed. The females of the two species may be distinguished by the absence of a J-shaped rod and amiculum in the genital complex of *Dt. brachydactylus*.

Etymology: Brachys G. = short + Dactylus, G. = finger; referring to the comparatively short finger guard on the copulatory complex of the male.

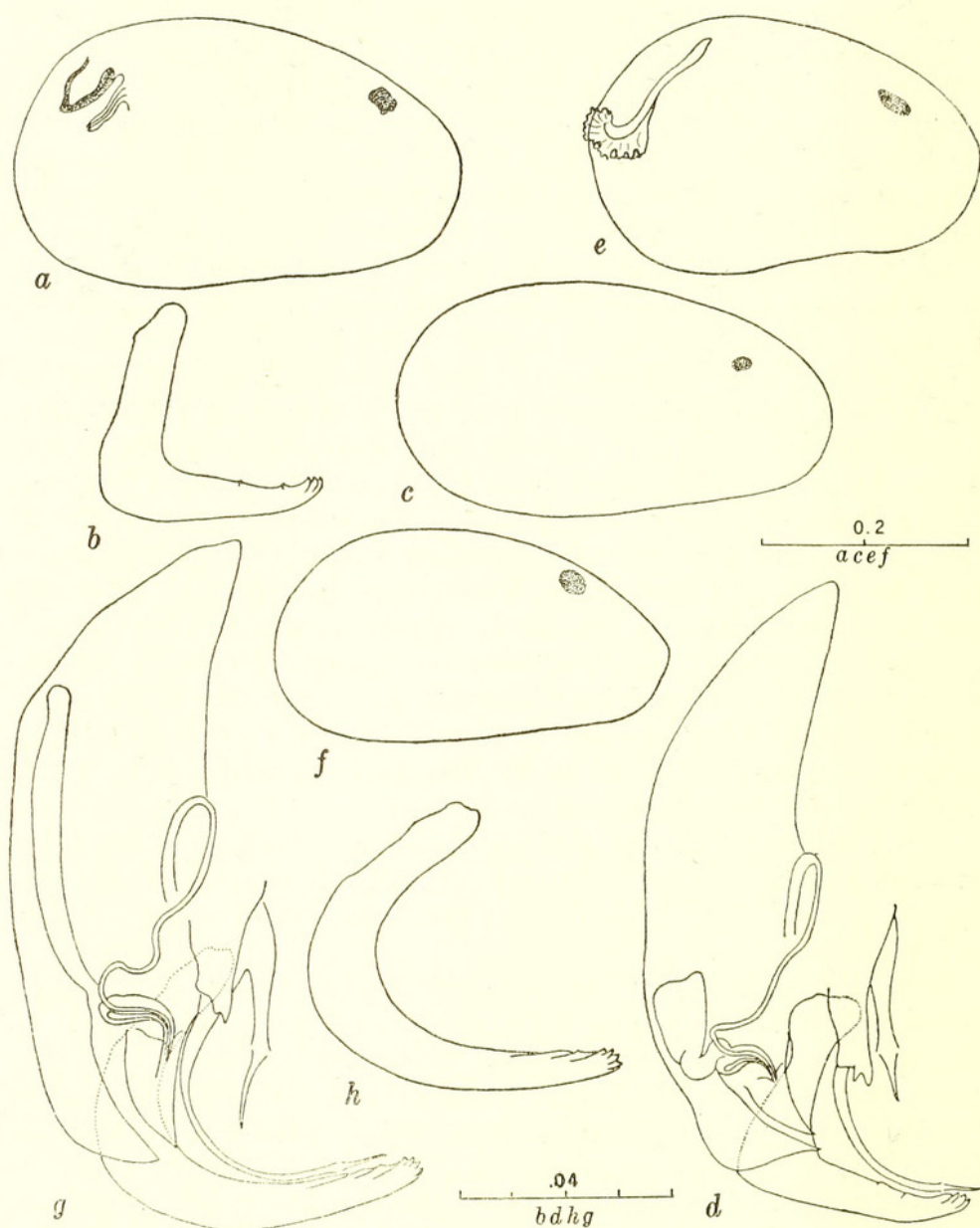


FIG. 2a-d, *Dactylocythere brachydactylus*, new species; 2e-h, *Dactylocythere demissa*, new species. a, e, Shell of female; b, h, Clasper apparatus of male; c, f, Shell of male; d, g, Copulatory complex of male. Scales in mm.

***Dactylocythere demissa*, new species**
(Figure 2e-h)

Male: Eye pigmented and situated about one-fourth shell length from anterior margin of shell. Shell (Fig. 2f) elongate ovate (about 1.8 times as long as high) with greatest height about one-third shell length from posterior margin where about 1.3 times height at level

of eye; ventral margin almost straight. Submarginal setae present except dorsally, closer together anteriorly and posteriorly than ventrally. Sternal spine absent.

Copulatory complex (Fig. 2g, h) with robust finger guard produced in bifurcate extension from cephaloventral side and with posterior angle at level of base of extension; peniferum comparatively stout with ventral portion truncate, anteroventral angle acute and directed anteriorly. Peniferal groove distinct, rather uniformly narrow with least diameter about one-fifth that of least diameter of vertical ramus of clasp apparatus. Penis somewhat L-shaped with distal ramus hardly more than half length of proximal ramus. Accessory groove short, not nearly reaching ventral extremity of spermatic loop, with end adjacent to penis forming inverted (ventrally directed) loop—unique in the genus in this respect. Clasp apparatus L-shaped with postaxial border distinctly angular at junction of horizontal and vertical rami; vertical ramus with postaxial border concave but otherwise entire, its preaxial border almost straight to broadly but shallowly concave; horizontal ramus with postaxial border entire, its preaxial border with 2 small teeth on distal half, and apex of ramus with 3 anterodorsally directed denticles. Dorsal finger comparatively heavier than very slender ventral finger and almost one-half as long; latter gently curved throughout most of its length and with distal portion directed anteriorly.

Triunguis Female: Eye as in male. Shell (Fig. 2e) distinctly more highly vaulted than in male (about 1.5 times as long as high) with greatest height approximately one-third shell length from posterior margin where about 1.3 times height at level of eye; ventral margin slightly concave anterior to midlength. Disposition of submarginal setae on shell similar to that on male but also with widely spaced ones dorsally. Posterior margin of shell often with eccentric prominence in vicinity of amiculum. Genital complex consisting of J-shaped rod with long vertical arm inclined subparallel to posterodorsal margin of shell and with conspicuous but short amiculum borne on curved portion of rod; amiculum with short supportive hyaline arcs and often slightly protruding from between caudal margin of valves of shell.

Measurements (in mm): 10 males and 10 females.

	Holotype	Males	Allotype	Females
Length (range)	0.42	0.40–0.43	0.42	0.40–0.43
Average		0.41		0.42
Height (range)	0.22	0.21–0.24	0.25	0.23–0.26
Average		0.23		0.25

Type-locality: Pokepatch Creek at County Road 4385, southwest of Pleasant Hill, Cumberland County, Tennessee (Caney Fork River drainage). Specimens were obtained from a collection of crayfishes (containing *Cambarus* (*Veticambarus*) *pristinus* Hobbs, *Cambarus* (*Jugicambarus*) *parvovulus* Hobbs and Shoup, and *Cambarus* (*De-*

pressicambarus) *sphenoides* Hobbs) made by R. W. Bouchard on 7 August 1969.

Disposition of Types: The holotypic male and allotypic female are deposited in the National Museum of Natural History (Smithsonian Institution) number 155323. Paratypes are in the collection of H. H. Hobbs III, J. D. Peters, and the Smithsonian Institution.

Range and Localities: Caney Fork and Obey (Cumberland River), Emory, and Tennessee river basins on the Cumberland Plateau.

TENNESSEE: *Bledsoe County*—(1) McGill Creek at County Rd. 5881 S of Brayton (Hosts, *C. (D.) sphenoides* Hobbs, *C. (J.) parvculus* Hobbs and Shoup); (2) Roaring Creek off County Rd. 5881, SW of New Harmony (Hosts, *C. (D.) sphenoides*, *C. (J.) parvculus*); (3) Henderson Creek at County Rd. 5881 NE of Summer City (Hosts, *C. (D.) sphenoides*, *C. (J.) parvculus*); (4) Moccasin Creek at County Rd. 5881 SW of Milo (Host, *C. (J.) parvculus*); (5) Glade Creek at State Rte. 30, NW of Pikeville (Host, *C. (J.) parvculus*). *Cumberland County*—(6) Type-locality; (7) Caney Fork River at U.S. Hwy. 70 (Hosts, *C. (D.) sphenoides*, *C. (V.) pristinus* Hobbs); (8) Clear Creek at County Rd. 4794, 3 mi W of junction with U.S. Hwy. 127 (Host, *C. (J.) crinipes* Bouchard); (9) No Business Creek at U.S. Hwy. 127, N of Isoline (Hosts, *C. (D.) sphenoides*, *C. (J.) distans* Rhoades); (10) Little Obed River at U.S. Hwy. 127, N city limits of Crossville (Hosts, *C. (D.) sphenoides*, *C. (J.) distans*, *C. (J.) parvculus*); (11) Daddy's Creek at U.S. Hwy. 127 near Big Lick (Host, *C. (J.) distans*); (12) White Oak Creek, 3.9 mi E of White County line and 0.1 mi S of U.S. Hwy. 70 (Hosts, *C. (D.) sphenoides*, *C. (V.) pristinus*); (13) Fox Creek off County Rd. 4252 (Catoosa Wildlife Management Area) (Hosts, *C. (J.) distans* Rhoades, *C. (J.) parvculus*); (14) South Fork of Elmore Creek at County Rd. 4252 (Hosts, *C. (D.) sphenoides*, *C. (J.) distans*, *C. (J.) parvculus*); (15) Caney Fork River at County Rd. between U.S. Hwy. 70 and 70N, NE of Pleasant Hill (Hosts, *C. (D.) sphenoides*, *C. (J.) parvculus*, *C. (V.) pristinus*). *Grundy County*—(16) Firescald Creek at County Rd. 4398, in Altamont (Hosts, *C. (D.) sphenoides*); (17) Piney Creek at State Rte. 108, at Altamont (Host, *C. (D.) sphenoides*). *Putnam County*—(18) Dripping Springs Creek at State Rte. 62, SE of Monterey (Hosts, *C. (D.) sphenoides*, *C. (J.) obeyensis*). *Rhea County*—(19) Whites Creek at State Rte. 68, NW of Grand View (Hosts, *C. (D.) sphenoides*, *C. (J.) parvculus*). *White County*—(20) Pole Bridge Branch at County Rd. 4385, S of DeRossett (Hosts, *C. (D.) sphenoides*, *C. (J.) parvculus*). All of the specimens from the above localities, except stations 8, 12, and part of those from 6 were collected by R. W. Bouchard or R.W.B. and J. D. Way.

Hosts: As may be noted above, in most of the localities this ostracod was associated with *Cambarus (D.) sphenoides*, frequently with *C. (J.) parvculus*, also with *C. (V.) pristinus* in the Caney Fork drainage, and occasionally with *C. (J.) distans*.

Entocytherid Associates: The entocytherids most frequently sharing the hosts with *Dactylocythere demissa* are *Donnaldsoncythere donnaldsonensis*, and *Dactylocythere brachystrix* Hobbs and Walton (1966:2). Occasionally accompanying it are *Dt. pachysphyrata* Hobbs and Walton (1966:3), *Dt. speira* Hart and Hart (1971:113), and *Entocythere* sp. In one locality each, it was found in association with *Dt. arcuata* (Hart and Hobbs, 1961:173) and *Dt. spinata* Hobbs and Walton (1970:853).

Relationships: One of the most distinctive features of this ostracod is the very short accessory groove of the peniferum, which, in its length, is similar to that in *Dactylocythere coloholca* Hobbs and Hobbs (1970:7), *Dt. exoura* Hart and Hart (1966:5), and *Dt. speira*. In other respects, it also has as much in common with these species as with any of its congeners. In none of the three, however, is the finger guard of the copulatory complex produced in a bifid tip. While *Dt. demissa* appears to be more closely allied to *Dt. speira* than to the other two in possessing a similar clasping apparatus and a rather broad accessory groove, the peniferum of the former is truncate ventrally, the accessory groove is disposed in a distinct ventral loop, and the J-shaped rod of the genital complex of the female has an almost straight shaft with a gently curved ventral part rather than being strongly curved throughout, almost forming a spiral. In addition, *Dt. demissa* possesses a distinct amiculum that is lacking in *Dt. speira*.

Etymology: *Demissus*, L. = hanging down; so named because of the long, almost straight J-shaped rod in the genital complex of the female; also the looped ventral part of the accessory groove in the peniferum of the male suggests a collapse of the groove.

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