

A NEW CRAWFISH OF THE GENUS
CAMBARELLUS FROM TEXAS, WITH NEW
TEXAS DISTRIBUTIONAL RECORDS FOR THE
GENUS (DECAPODA, ASTACIDAE)

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ABSTRACT. Discovery of *Cambarellus texanus*, from the Gulf coastal plain of southeastern Texas, helps clarify relationships within the genus. New distributional records for the three species previously known from Texas include 15 new county records.

Two females of the species described below have been in the collections at Tulane University (TU P-649) since 1941, but they were conjecturally identified as *Cambarellus puer*. Penn and Hobbs (Texas J. Sci. 10: 452-483, 1958) listed an erroneous locality for *C. puer* based on these specimens, collected in Matagorda County, 4 mi S of Bay City. The new species was first recognized as such by the junior author, who collected it in Jackson and Matagorda Counties in 1966. Adequate material for study was not obtained until 1972, when the senior author found it in two additional counties.

Discovery of this crawfish, a relative of *Cambarellus ninae* and an associate of *C. puer* over part of its range, helps define the relationship between the latter two species, which formerly was held in question (Hobbs, Proc. Biol. Soc. Washington 63: 89-96, 1950).

Reports on the distribution of *Cambarellus* in Texas have been few (Hobbs, Amer. Midl. Nat. 34: 466-474, 1945; Hobbs, 1950; Penn and Hobbs, 1958). The localities reported here, based on collections made by the authors, constitute major extensions of the known ranges of the three species previously recorded from Texas.

***Cambarellus texanus* new species**

Cambarellus puer.—Penn and Hobbs, 1958, p. 475, fig. 67 (in part).

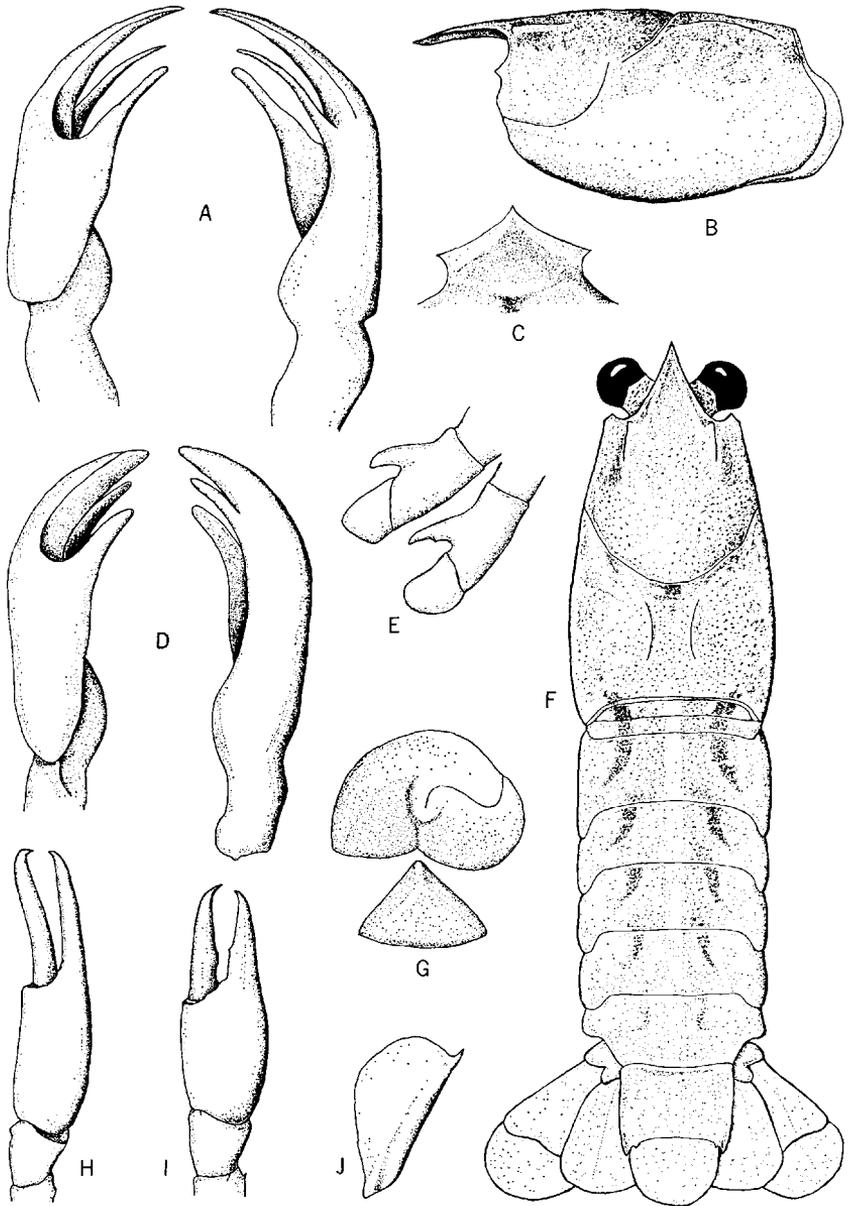


Fig. 1. *Cambarellus texanus* new species. A, mesial and lateral views of first pleopod of first form male; B, lateral view of carapace; C, epistome; D, mesial and lateral views of first pleopod of second form male; E, ischium and basis of second and third pereopod; F, dorsal view of carapace and abdomen; G, caudoventral view of annulus ventralis; H,

Diagnosis.—Body and eyes pigmented. Areola broad, 2.6 to 3.7 times longer than broad. First form male with well developed hooks on ischia of second and third pereopods, those on third bituberculate. Palm of chela smooth. Postorbital ridges terminating anteriorly in short spines in fewer than half of specimens observed; lateral surface of carapace devoid of spines. First pleopod of first form male extending to coxa of third pereopod and terminating in three distinct parts all bent caudad at about 60 degree angle to shaft. In both first and second form males, central projection longer than other two elements; caudal process intermediate in length or terminating at about same level as mesial process. First pleopod of second form male with terminal elements non-corneous, directed at about 45 degree angle to main shaft. Annulus ventralis semiovalate with sinus entirely to left (or right) of midline.

Holotypic male, form I.—Carapace (Fig. 1-B, F) subovate in cross section, compressed laterally. Greatest width of carapace just behind caudodorsal portion of cervical groove, where width subequal to body depth. Areola 3.0 times longer than wide and 28.7 per cent of entire length of carapace. Rostrum broad at base with nearly straight margins converging to acute tip, reaching almost to distal end of penultimate segment of antennule. Surface of rostrum with setiferous punctations. Postorbital ridges terminating anteriorly in smooth, rounded tubercles. Subrostral ridges visible in dorsal aspect along most of length of rostrum. Surface of carapace punctate. No spine on lateral surface. Suborbital angle prominent and approximating right angle; branchiostegal spine absent.

Abdomen (Fig. 1-F) longer than cephalothorax and slightly narrower. Cephalic section of telson with two spines at each caudolateral corner; inner spine about one third size of outer.

Epistome as seen in figure 1-C. Antennules of usual form; small spine present on ventromesial margin of basal segment. Antennae extending caudad to middle of telson. Antennal scale (Fig. 1-J) broadest slightly distal to midlength; spine on outer margin extending cephalad to middle of distal segment of peduncle of antennule.

Palm of chela (Fig. 1-H) long, slightly inflated; fingers slender, not bearing ridges. Opposable margins of both fingers with minute denticles and hairs. Chela sparsely covered with setiferous punctations.

chela and carpus of first form male; I, chela and carpus of female; J, antennal scale. All illustrations were made from paratypes, which were first form males except as indicated. Pubescence removed from all structures illustrated.

Hooks on ischia of second and third pereopods as seen in figure 1-E; that on third bituberculate. Coxa of fourth pereopod bearing conspicuous ventrally projecting prominence; that of fifth pereopod with much smaller, more compressed one.

First pleopod (Fig. 1-A) reaching cephalad to coxa of third pereopod, and terminating in three conspicuous slender elements. Central projection corneous and extending caudodistad well beyond other elements. Mesial process non-corneous, terminating bluntly, and lying subparallel to central projection. Caudal process, slenderest of three elements, arising from caudolateral margin, non-corneous, more acute than mesial process, directed subparallel to other two elements, extending slightly beyond mesial process. Cephalic process absent.

Measurements are given in table 1.

TABLE 1
Measurements (mm) of *Cambarellus texanus* new species

| | Holotype | Allotype | Morphotype |
|--------------------------------|----------|----------|------------|
| Carapace: | | | |
| Length | 9.4 | 10.7 | 9.2 |
| Width | 4.7 | 5.4 | 4.4 |
| Height | 5.0 | 5.6 | 4.7 |
| Areola: | | | |
| Length | 2.7 | 3.4 | 2.8 |
| Width | 0.9 | 1.1 | 0.9 |
| Rostrum: | | | |
| Length | 2.2 | 2.4 | 2.4 |
| Width at base | 1.2 | 1.6 | 1.3 |
| Chela: | | | |
| Length of inner margin of palm | 3.7 | 3.0 | 2.4 |
| Width of palm | 1.9 | 2.0 | 1.6 |
| Length of outer margin | 7.6 | 5.9 | 5.1 |
| Length of dactyl | 3.6 | 2.9 | 2.6 |

Allotypic female.—Similar to holotype except for secondary sexual characters and the following. Chelae (Fig. 1-I) showing usual sexual dimorphism, being much shorter than those of male. In addition, chela distinctly more setose; both fingers bearing weak submedian longitudinal ridge above; opposable margin of immovable finger with single small tubercle, opposable margin of dactyl with two tubercles. Annulus ventralis (Fig. 1-G) movable, compressed in plane transverse to axis of body, semiovate in caudal aspect with longitudinal furrow dextral to midline of caudal surface. Sinuate sinus beginning on promi-

nence sinistral to furrow, curving around left edge of annulus ventralis, ending near base. Sternal plate immediately caudal to annulus acute.

Morphotypic male, form II.—Differs only slightly from holotype. Chela reduced, more setose; hooks on ischia of second and third pereopods much reduced. Acute tubercles on rostral margins delimiting short acumen; postorbital ridges ending anteriorly in acute tubercles. Three terminal elements of first pleopod (Fig. 1-D) all present although none corneous; central projection longest of three elements; caudal process intermediate in length between other two elements.

Color notes.—In overall appearance this crawfish is olivaceous, stippled with numerous dark chromatophores. The most conspicuous markings are those on the dorsal surface of the abdomen (Fig. 1-F). The carapace is olive dorsally with dense stippling and dark vermiculations; laterally it tends more toward brown, with an irregular mottled pattern; the lower third of the lateral surface is very light and lacks markings. The abdomen has a pale olive ground color, and there is a middorsal stripe lighter than the ground color and outlined by dense strippling. A dark band of moderate intensity runs the length of the abdomen at a level about midway between the dorsal dark markings and the edge of the tergites. There are no markings below this band. The chela and carpus have an irregular mottled pattern on the dorsomesial surface but lack conspicuous markings. The antennal scale is pigmented only near its center; uropods and telson lack conspicuous markings.

Size.—The largest specimen collected is a female; 11.8 mm in carapace length. The largest and smallest first form males have corresponding lengths of 10.1 and 6.7 mm.

Type-locality.—Ditch beside Farm Road 521, 1.5 mi S, 1 mi W of Wadsworth, 12 mi S of Bay City, Matagorda County, Texas. Crawfish were captured by dipnet from the grass-choked ditch, filled with water from recent rains.

Type series.—From the type-locality on 28 September 1972 (DWA 427), except for the morphotypic second form male from 8.5 mi W of Palacios, Matagorda County, in Jackson County, Texas (JBB 153).

Disposition of types.—The holotypic first form male, morphotypic second form male, and allotype female (Nos. 144191, 144193, 144192, respectively) are deposited at the United States National Museum together with 8 ♂ I, 1 ♂ II, and 8 ♀ from the paratypic series. Other paratypes are deposited at the Museum of Comparative Zoology (3 ♂ I,

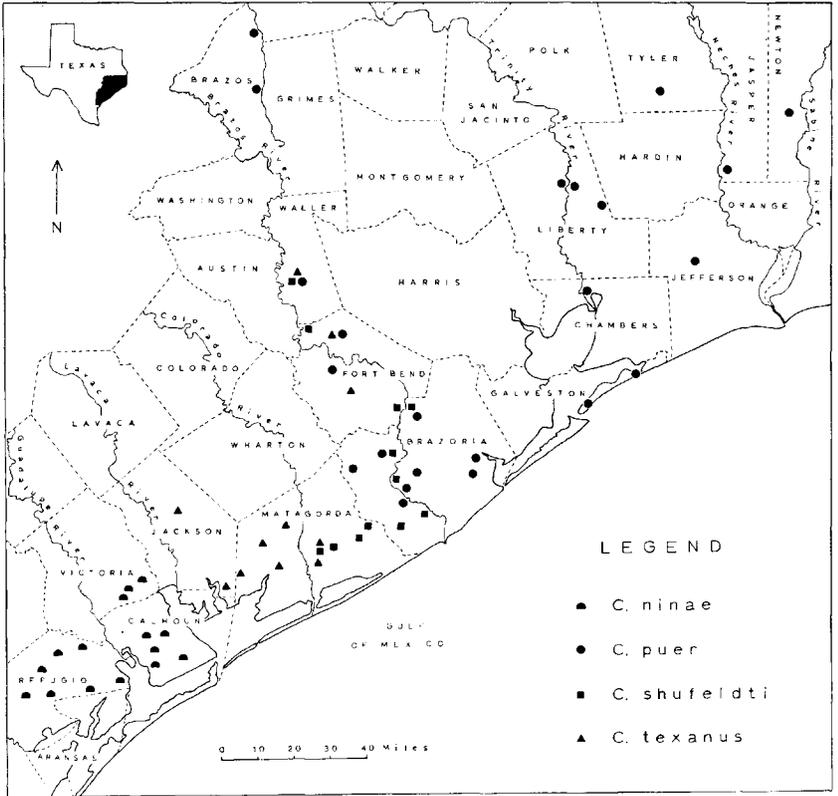


Fig. 2. New distributional records for *Cambarellus* in Texas.

1♂II, 3♀), Tulane University (3♂I, 4♀), in the collection of the junior author (3♂I, 4♀), and at Texas A&M University (5♂I, 3♀).

Distribution.—We have examined 223 specimens, from the following localities (Fig. 2): FORT BEND CO.—2 mi E Fulshear (DWA 381, 433), 5.3 mi E Fulshear (DWA 432), 7 mi S Rosenberg (DWA 431); JACKSON CO.—5 mi NE Edna (JBB 421), 8.5 mi W Palacios (JBB 153); MATAGORDA CO.—8 mi NW Palacios (DWA T16-6), 1.5 mi E Blessing (JBB 162, DWA T16-5), 7 mi NE Palacios (JBB 510), 7 mi W Bay City (JBB 163), 1.8 mi SW Wadsworth (DWA 427), 3 mi N Wadsworth (DWA T15-7, T15-8, 428); WALLER CO.—12 mi S Hempstead (DWA 379, 425).

Our collections contain 71 first form males distributed as follows: Matagorda Co., 28 west of, and 29 east of the Colorado River; Fort Bend Co., 12; Waller Co., 2. Rather extensive collecting in Jackson,

Calhoun, and Victoria Counties suggests that the range is bounded on the west by the Lavaca River and Bay, separating it from *C. ninae*. The northward and eastward limits of the range are not known.

Variations.—There is remarkably little variation in secondary sexual characters, especially considering the dissection of the known range by several major rivers. There is considerable variation, however, in degree of development of spines at the cephalic end of the postorbital ridges, on the lateral margins of the rostrum (delimiting an acumen), and on the distolateral margin of the merus. Development of each of these spines ranges from good to complete absence, and this spectrum of variation is present within collections from both eastern and western limits of the known range of the species.

Associates.—Throughout much of its range, *Cambarellus texanus* has been collected together with *Procambarus acutus*, *P. clarkii*, *P. incilis*, and *Fallicambarus hedgpethi*. At two localities it was found with *Cambarellus shufeldti*, the range of which broadly overlaps with its own. East of the Brazos River it has been found in association with *C. puer* and *P. hinei*.

Relationships.—*Cambarellus texanus* appears to have its closest affinities with *C. ninae*, whose range it abuts and of which it may prove to be a subspecies. It is similar to *C. ninae* in general appearance, and the development of the apical processes of the first pleopod is strikingly similar. However, the apical processes are not bent caudad nearly as sharply as in *C. ninae*, and the caudal process (the shortest process in *C. ninae*) is as long or longer than the mesial process. *C. texanus* appears to be a smaller crawfish than *C. ninae*, of which the largest female is 16 mm in carapace length and the largest and smallest first form males are 13 mm and 8 mm.

The occurrence of *C. texanus* together with *C. puer* indicates that these two crawfishes are, indeed, distinct at the specific level. Since *C. texanus* appears to have closer affinities with *C. ninae* than with *C. puer*, it is probable that *C. puer* and *C. ninae* also are good species.

The pigmentation of *C. texanus* is quite similar to that of *C. ninae*, but distinctly different from the markings of *C. puer*. In the latter species the abdomen is striped or marked with two rows of dots (each dot round or square); never as in figure 1-F.

Life history notes.—First form males and ovigerous females were collected in March, June, September, October, and November. Collections have not been made in other months.

DISTRIBUTIONAL NOTES. Below is a brief review of the previously reported Texas records for *Cambarellus*, and a listing of new distributional records for each species. Other crawfishes found in association with each are also noted.

Cambarellus ninae Hobbs.—Previously recorded only from the type locality, the Aransas Refuge, Aransas County (Hobbs, 1950). This crawfish was collected from roadside ditches at 20 localities (Fig. 2) in Calhoun Co. (JBB 155; DWA T18-9 through T18-12; easternmost locality 10 mi E Seadrift, DWA T18-7), Refugio Co. (JBB 159, 160; DWA T17-1 through T17-8; westernmost locality 2.5 mi ESE Refugio, DWA T17-4), and Victoria Co. (DWA T18-2, -4, -6; northernmost locality 8 mi NE Placedo, DWA T18-5). It was collected in association with *Procambarus acutus*, *P. clarkii*, *P. simulans*, and *Fallicambarus hedgpethi*. No evidence of intergradation with *C. texanus* was found.

Cambarellus puer Hobbs.—This crawfish was previously recorded from Brazos, Chambers, Liberty, Matagorda, Montgomery, and San Jacinto Counties (Penn and Hobbs, 1958). The Matagorda County record is in error, as indicated above. Our new records (Fig. 2) extend its known range southwestward, and to the very edge of the Gulf of Mexico. It was found in BRAZORIA CO.—1.7 mi E Danciger (DWA 418), S edge of Brazoria (DWA T14-1), and widespread east of the Brazos River (JBB 143, 144, 145; DWA T12-5, T13-5, -7); BRAZOS CO.—7 mi NE Kurten (DWA 383, 422), 8 mi E College Station (DWA T4-2, 386); CHAMBERS CO.—8 mi W Hankamer (JBB 422); FORT BEND CO.—4.5 mi W Rosenberg (DWA 411), 2 mi E Fulshear (DWA 381, 433), 5.3 mi E Fulshear (DWA 432); GALVESTON CO.—4 mi NE Port Bolivar (JBB 167), 0.5 mi W Gilchrist (JBB 507); JASPER CO.—6.8 mi S and 6 mi S Evadale (DWA 397, 398); JEFFERSON CO.—3 mi W Fannett (JBB 420); LIBERTY CO.—4.8 mi NW Moss Hill (DWA 403), 0.7 mi W Moss Hill (DWA 402), 3.3 mi N Hull (DWA 401); NEWTON CO.—15 mi N Deweyville (DWA 396); TYLER CO.—3.1 mi E Warren (DWA 400); WALLER CO.—12 mi S Hempstead (DWA T7-6, 414, 425).

Cambarellus puer was collected in association with *Procambarus acutus*, *P. clarkii*, *P. simulans*, *P. hinei*, *P. incilis*, and *Fallicambarus hedgpethi*, and was found together with both *C. texanus* and *C. shufeldti*.

Cambarellus shufeldti (Faxon).—This species was first recorded from Texas (Harrison, Madison, Marion, and Orange Counties) by Penn and Hobbs (1958). They expected its range in Texas to be limited to the northeast corner of the state, and postulated that their Madison and Orange County records resulted from recent introductions by man. Our records for this crawfish, from 12 localities (Fig. 2) ranging southwestward to the Colorado River, indicate that its natural range is larger than previously supposed. We found it in BRAZORIA CO.—5 mi N East Columbia (DWA 409, 416), 1 mi E East Columbia (DWA 430), 7 mi S Brazoria (DWA T14-3), 4 mi W Sandy Point (DWA T12-3), 1.5 mi N Jones Creek (DWA T14-2); FORT BEND CO.—3 mi N Simonton (DWA T9-6), 15.5 mi E Needville (DWA T11-2); MATAGORDA CO.—3 mi N Wadsworth (DWA T15-7), 5 mi NE Wadsworth (DWA T15-1), 4 mi SW Cedar Lane (JBB 148), 1 mi E Cedar Lane (JBB 147); WALLER CO.—12 mi S Hempstead (DWA T7-6).

Cambarellus shufeldti was found in association with *Procambarus acutus*, *P. clarkii*, *P. simulans*, *P. hinei*, *P. incilis*, *Fallicambarus hedgpethi*, *Cambarellus puer*, and *C. texanus*.

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