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Two New Crawfishes of the Genus *Pro-* *cambarus* from Texas, Louisiana, and Arkansas (Decapoda, Astacidae)¹

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The two crawfishes described here belong to the *spiculifer* group of the *blandingii* section of *Procambarus*. Prior to the discovery of these two species, the members of the group were known to occur in south Atlantic and Gulf drainage streams from Georgia (Altamaha River) to Louisiana (Little River). The two new species extend this range westward to the Trinity River in Texas. Listed from east to west the *spiculifer* group now consists of *P. spiculifer* (LeConte, 1856, p. 401), *P. versutus* (Hagen, 1870, p. 51), *P. penni* Hobbs (1951, p. 273), *P. vioscai* Penn (1946, p. 27), *P. natchitochae*, new species, and *P. dupratzi*, new species. The last probably marks the western limit of the *spiculifer* group, as explorations west of its known range in Texas have failed to turn up additional specimens.

Procambarus dupratzi, new species

Figures 1-7, 10-14

HOLOTYPE MALE, FORM I: Cephalothorax (figs. 1, 2) subovate, slightly wider than high (18.5-17.5); abdomen slightly longer than cephalothorax (41.5-38.8). Greatest width of cephalothorax a little caudad of dorsal region of cervical groove.

Areola relatively broad (4.8 times longer than wide) with nine or 10 setiferous punctations in narrowest part. Cephalic section of cephalo-

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thorax about 2.7 times as long as areola (length of areola about 27.1 per cent of total length of the cephalothorax).

Rostrum long, excavate; sides converging to base of acumen which is set off by acute lateral spines. Acumen less than a third as long as total length of rostrum (4.8–12.8). Margins of rostrum not swollen and only slightly raised. Upper surface with a rather well-defined median carina.

Postorbital ridges prominent, grooved laterad and terminating in acute, cephalolaterally projecting spines. Branchiostegal spine strong. Two strong acute lateral spines present on each side of cephalothorax behind the cervical groove; length of either spine slightly less than the distance between the two spines (as measured between center bases). Upper surface of cephalothorax with setiferous punctations; lateral portion caudad of cervical groove finely granulate.

Cephalic section of telson with three spines in each caudolateral corner; the more lateral one of each side about twice the length of the median one.

Epistome (fig. 3) about 1.5 times as wide as long, with raised margins which converge anteriorly to form a definite point.

Antennules of usual form. Antennae reaching to end of abdomen. Antennal scale (fig. 4) long and narrow; widest point caudad of middle; total length approximately equal to length of areola (10.2–10.5); lateral margin terminating in a strong spine.

Right chela (fig. 5) subovate, somewhat depressed, long and slender. Hand entirely tuberculate; inner margin of palm with a single row of eight tubercles. Opposable margin of immovable finger with a single row of nine small, rounded tubercles (fourth from base largest), and a single large, pointed tubercle beyond these; dactyl with two rows of tubercles, upper row consisting of 12 small, rounded ones, lower row consisting of four large ones, the largest of these lying opposite the largest one on base of the immovable finger. Fingers meeting for entire length when closed.

Carpus (fig. 5) tuberculate on upper surface, with two strong spines on inner margin near distal end; under side with two strong spines on distal margin.

Hooks (fig. 6) present on ischiopodites of third and fourth pereopods; hook on third long, straight, and slender; hook on fourth similar but shorter. Basipodite of fourth pereopod with a conspicuous swelling opposite hook on ischiopodite. Coxopodites of fourth and fifth pereopods with conspicuous caudomesial projections.

First pleopod (figs. 10, 11, 12) reaching to middle of coxopodite of third pereopod when abdomen is flexed. Apex terminating in four dis-

tinct parts which as a unit extend caudad at about a 40-degree angle to the shaft of the pleopod. Mesial process spiculiform; basal two-thirds directed caudodistad at about a 45-degree angle to shaft of pleopod; apical third bent so that it extends directly caudad. Cephalic process corneous, subacute, excavate caudad, and extending caudodistad at about a 40-degree angle to shaft of pleopod. Caudal element consisting of three parts: caudal knob in lateral aspect not conspicuous, subacute, non-corneous; caudal process corneous, acute, and directed caudomesiad; accessory process corneous, forming an inconspicuous, thin, transverse ridge caudad of the central projection. Central projection corneous, subacute, extending caudodistad at about a 40-degree angle to shaft of pleopod; fusion line of its two components clearly marked.

MORPHOTYPE MALE, FORM II: Very similar to holotype in general appearance; chelae and hooks on ischiopodites of third and fourth pereopods greatly reduced; median carina of rostrum not developed. First pair of pleopods (figs. 13, 14) reaching to middle of coxopodite of third pereopods when abdomen is flexed; all processes reduced and non-corneous.

ALLOTYPE FEMALE: Very similar to holotype in general appearance;

TABLE 1

MEASUREMENTS (IN MILLIMETERS) OF *Procambarus dupratzi*, NEW SPECIES

	Holotype	Allotype	Morphotype
Cephalothorax			
Length	38.8	41.8	33.8
Width	18.5	19.4	15.3
Height	17.5	18.5	14.5
Areola			
Length	10.5	11.2	9.0
Width (at narrowest part)	2.2	2.5	2.0
Rostrum			
Length	12.8	14.4	11.7
Width at base	5.2	6.4	5.6
Abdomen			
Length (to tip of telson) .	41.5	43.1	35.0
Chela ^a			
Length of outer margin of hand	35.8	19.9	24.2
Length of dactyl	18.3	11.0	13.4
Width of palm	11.1	6.7	7.4
Length of inner margin of palm	14.5	7.7	9.8

^a The right chela is regenerated on the allotype, thus these measurements are for the left chela on this specimen, but for the right chela of the holotype and morphotype.

chela greatly reduced; median carina not developed on rostrum. Annulus ventralis (fig. 7) immovable, about twice as wide as long; with an anteromedian depression which splits into two forks caudad, a prominent caudal cone-shaped protuberance lying between these two forks; cephalic margin raised into a rounded, more or less transverse ridge on either side of the anterior depression; the sinus originates in the anterior depression near the midline, then proceeds caudosinistrad into the left fork of the depression before turning caudodextrad up the cephalic face of the caudal protuberance, then turns back sinistrad to the midline before terminating on the apex of the protuberance. Sternum of the fourth thoracic segment (fig. 7) produced into two groups of prominent rounded tubercles (one group on each side of midline) which somewhat underhang the cephalic margin of the annulus.

TYPE LOCALITY: The holotype, allotype, and morphotype were collected from Attoyac Bayou, 5.6 miles southwest of Timpson (on U. S. highway 59), Shelby County, Texas, on April 6, 1952, by Royal D. Suttkus and Paul K. Anderson. Attoyac Bayou is a tributary of the Angelina River which itself is a tributary of the Neches River. At the collecting site Attoyac Bayou is a small (20 feet wide), usually clear, shallow creek with a silted-sand and hard-clay bottom, sparse aquatic vegetation, and open or brushy banks. No other species of crawfishes were collected at this locality.

DISPOSITION OF TYPES: The holotype, allotype, and morphotype are deposited in the United States National Museum, Nos. 93652, 93653, and 93654, respectively. The 72 paratypes are in the following collections: United States National Museum, the American Museum of Natural History, Academy of Natural Sciences of Philadelphia, Museum of Comparative Zoölogy of Harvard College, Carnegie Museum at Pittsburgh, the personal collection of Dr. Horton H. Hobbs, Jr., at the University of Virginia, and Tulane University.

GEOGRAPHIC DISTRIBUTION: The type series of *Procambarus dupratzi* was collected from 12 localities in Texas and Louisiana; all were taken from tributary streams of the Sabine, Neches, and Trinity rivers. These records and a summary of their deposition are as follows:

Texas: Anderson County: Neches River, 14 miles east of Palestine, (date unknown), B. W. Evermann (U.S.N.M. No. 22512); tributary of Neches River, 4.1 miles east of Slocum, April 7, 1952, R. D. Suttkus and P. K. Anderson (A.M.N.H.; M.C.Z.); Masons Creek (tributary of Trinity River), 3.7 miles west of Elkhart, April 7, 1952, R. D. Suttkus and P. K. Anderson (T.U. No. 2829). Nacogdoches County: Little Loco Bayou (tributary of Angelina River), 4.7 miles west of Nacogdoches, April 7, 1952, R. D. Suttkus and P. K. Anderson (H.H.H.); tributary of Naconicho Bayou, 2.5 miles southwest of Garrison,

April 6, 1952, R. D. Suttkus and P. K. Anderson (A.N.S.P.). Panola County: Tributary of Sabine River, nine-tenths of a mile northwest of Joaquin, April 6, 1952, R. D. Suttkus and P. K. Anderson (T.U. No. 2763). Shelby County: Attoyac Bayou, 5.6 miles southwest of Timpson, April 6, 1952, R. D. Suttkus and P. K. Anderson (U.S.N.M.; T.U. No. 2797). Louisiana: Sabine Parish: Bayou Negreet, 5 miles southwest of Negreet, November 24, 1950, A. H. Chaney (C.M.); tributary of Toro Creek, 1.5 miles north of Hornbeck, August 3, 1951, C. D. Hancock (T.U. No. 2556). Vernon Parish: Tributary of Sabine River, 11 miles west of Anacoco, June 30, 1948, L. L. Ellis (T.U. No. 422); tributary of Bayou L'Anacoco, 3.2 miles northwest of Anacoco, April 5, 1952, R. D. Suttkus and P. K. Anderson (U.S.N.M.); tributary of Sabine River, 2.3 miles east of Leesville, April 5, 1952, R. D. Suttkus and P. K. Anderson (T.U. No. 2772).

This species is named in honor of Antoine Simon Le Page du Pratz (1695–1775), a planter and naturalist who lived in and explored the infant French colony of Louisiana for 16 years (1718 to 1734). A score of years after returning to Paris he published his important three-volume account of the colony, the "Histoire de la Louisiane." Among other things of interest, this work contains the first descriptions (amateurish though they are) of the more common plants and animals (including three recognizable species of crawfishes) of Louisiana and eastern Texas. It seems fitting that a species which inhabits at least part of this area should be named for M. Le Page du Pratz.

Procambarus natchitochae, new species

Figures 8–9, 15–19

This species is closely related to *P. dupratzi* and resembles it in general appearance, hence the description is abbreviated wherever possible.

HOLOTYPE MALE, FORM I: Cephalothorax ovate, width a fraction greater than height (19.0–18.6); abdomen slightly longer than cephalothorax (43.7–42.9). Greatest width of cephalothorax a little caudad of dorsal region of cervical groove.

Areola relatively broad (4.7 times longer than wide), with six or seven punctations in narrowest part. Cephalic section of cephalothorax about 2.6 times as long as areola (length of areola about 27.5 per cent of total length of cephalothorax).

Rostrum as in *dupratzi*. Acumen about a third as long as total length of rostrum (5.5–14.5). Margins of rostrum not swollen, but slightly raised. Upper surface with an ill-defined, low, median carina.

Postorbital ridges, branchiostegal spine, and lateral spines as in *dupratzi*. Upper surface of cephalothorax punctate; lateral portion caudad of cervical groove finely granulate.

Spines on telson as in *dupratzi*.

Epistome (fig. 8) slightly less than twice as long as wide, with raised margins; sides converging to a broadly rounded cephalic edge.

Antennules of usual form. Antennae reaching nearly to end of abdomen. Antennal scale as in *dupratzi*; total length slightly greater than length of areola (12.5–11.8).

Right chela regenerated; left chela subovate, somewhat depressed, long and slender. Hand entirely tuberculate; inner margin of palm with a single row of nine tubercles. Opposable margin of immovable finger with a single row of 10 small, rounded tubercles extending from base, terminating in a larger, pointed tubercle; dactyl with four small, rounded tubercles at base followed by one large rounded tubercle and a row of 11 smaller rounded tubercles distally. Fingers meeting for entire length when closed. Carpus as in *dupratzi*.

Hooks on ischiopodites of third and fourth pereiopods as in *dupratzi*.

First pleopods (figs. 15, 16, 17) reaching to cephalic side of coxopodite of third pereiopods when abdomen is flexed. Apex terminating in four distinct parts. Mesial process spiculiform and directed slightly latero-distad. Cephalic process corneous, acute, excavate caudad and extending straight distad. Caudal element consisting of three parts: caudal knob in lateral aspect subacute and non-corneous; caudal process corneous, subacute, and directed mesiodistad; accessory process forming a thin, transverse, corneous ridge caudad of the central projection. Central projection corneous, truncate, and somewhat "beaked" distad; with fusion line of its two components clearly marked.

MORPHOTYPE MALE, FORM II: Very similar to holotype in general appearance; chelae and hooks on ischiopodites of third and fourth pereiopods greatly reduced. First pair of pleopods (figs. 18, 19) reaching to cephalic side of coxopodite of third pereiopods when abdomen is flexed; all processes reduced and non-corneous.

ALLOTYPE FEMALE: Very similar to holotype in general appearance; chelae greatly reduced. Annulus ventralis (fig. 9) immovable, about 1.7 times wider than long; with a median trough-like depression which widens caudad. The sinus originates in the midline of this trough about one-third of the distance posterior to the cephalic margin of the annulus; from here the sinus runs posterodextrad, then loops back in a broad sinistrad curve to the midline, then turns slightly dextrad to the caudal margin of the annulus. The sternum of the fourth thoracic segment (fig. 9) does not underhang the annulus as in *dupratzi*, and bears only two caudal protuberances.

TYPE LOCALITY: The holotype, allotype, and morphotype were collected from an unnamed tributary of Spring Creek at Melder (on

TABLE 2
MEASUREMENTS (IN MILLIMETERS) OF *Procambarus natchitochae*, NEW SPECIES

	Holotype	Allotype	Morphotype
Cephalothorax			
Length	42.9	33.4	30.0
Width	19.0	14.4	12.2
Height	18.6	14.8	12.0
Areola			
Length	11.8	8.8	8.0
Width (at narrowest part) .	2.5	2.0	1.8
Rostrum			
Length	14.5	11.0	10.3
Width at base	6.3	5.0	4.5
Abdomen			
Length (to tip of telson) .	43.7	36.0	31.5
Chela ^a			
Length of outer margin of hand	40.0	18.9	18.4
Length of dactyl	20.6	10.0	9.5
Width of palm	12.0	5.5	5.0
Length of inner margin of palm	16.0	6.6	7.0

^a The right chela is regenerated on the holotype; thus these measurements are for the left chela of this specimen, but for the right chela of the allotype and morphotype.

Louisiana highway 85), Rapides Parish, Louisiana, on April 4, 1952, by Royal D. Suttkus and Paul K. Anderson. Spring Creek is a tributary of Bayou Cocodrie which is part of the Bayou Teche drainage system. At the collecting site the creek is small (10 to 15 feet wide), usually clear, cool, and shallow, with a sand and gravel bottom, no aquatic vegetation, and shaded banks. The only other crawfishes collected at the same locality were several *Orconectes hathawayi* Penn.

DISPOSITION OF TYPES: The holotype, allotype, and morphotype are deposited in the United States National Museum, Nos. 93649, 93650, and 93651, respectively. The 60 paratypes are in the following collections: United States National Museum, The American Museum of Natural History, Academy of Natural Sciences of Philadelphia, the personal collection of Dr. Horton H. Hobbs, Jr., at the University of Virginia, and Tulane University.

GEOGRAPHIC DISTRIBUTION: The type series of *Procambarus natchitochae* was collected from 10 localities in Louisiana and Arkansas. All of these were from small headwater tributaries of Bayou Teche and the Calcasieu River, which flow directly into the Gulf of Mexico, or in similar small tributaries of streams which empty into the Red River in

northwestern Louisiana. These records and a summary of their deposition are as follows:

Louisiana: Claiborne Parish: [Tributary of Black Lake Bayou], 8.7 miles southwest of Homer, April 9, 1952, E. A. Lachner *et al.* (U.S.N.M.). Natchitoches Parish: Tributary of Black Lake Bayou at Chestnut, March 28, 1937, G. H. Penn, P. Viosca, and H. B. Chase (T.U. No. P-562). Rapides Parish: Indian Creek, about 4 miles north of Forest Hill, February 6, 1941, G. H. Penn, and J. Lancaster (T.U. No. P-478); [Spring Creek near] Longleaf, August 15, 1925, Southern Biological Supply Company (U.S.N.M. No. 60276); Spring Creek at Melder, August 26, 1951, C. D. Hancock (A.N.S.P.); tributary of Margaret Lake (Bayou Teche drainage), eight-tenths of a mile east of Forest Hill, April 4, 1952, R. D. Suttkus and P. K. Anderson (T.U. No. 2677); tributary of Spring Creek at Melder, April 4, 1952, R. D. Suttkus and P. K. Anderson (U.S.N.M.; A.M.N.H.; H.H.H.; T.U. No. 2678). Vernon Parish: Tributary of Whiskey Chitto River near Cravens, April 17, 1949, F. R. Cagle (T.U. No. 1064). Webster Parish: [Tributary of Bayou Dorcheat], 2 miles east of Minden, July 24, 1934, C. E. Burt (U.S.N.M. No. 88503). *Arkansas*: Columbia County: Tributary of Bayou Dorcheat, 4 miles east of Taylor, June 30, 1950, E. N. Lambremont (T.U. No. 2092).

This species is named after the Natchitoché Indians, formerly a large tribe of the Caddoan Confederacy, who lived in the area traversed by the small creeks to which this crawfish apparently is restricted.

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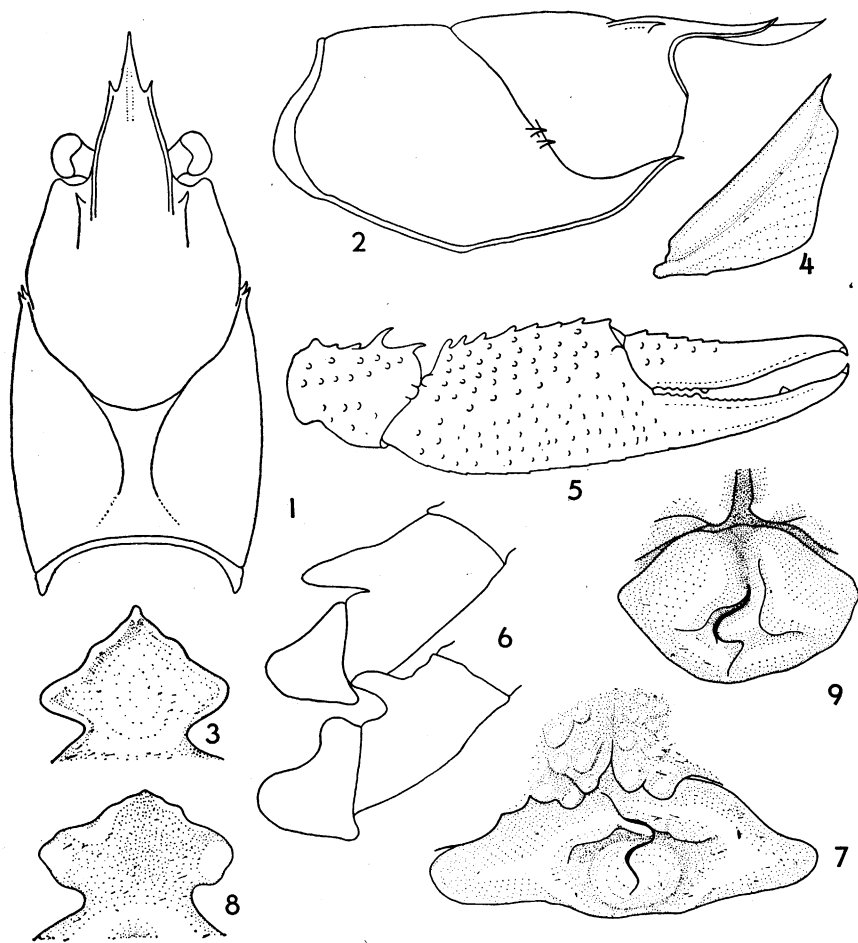
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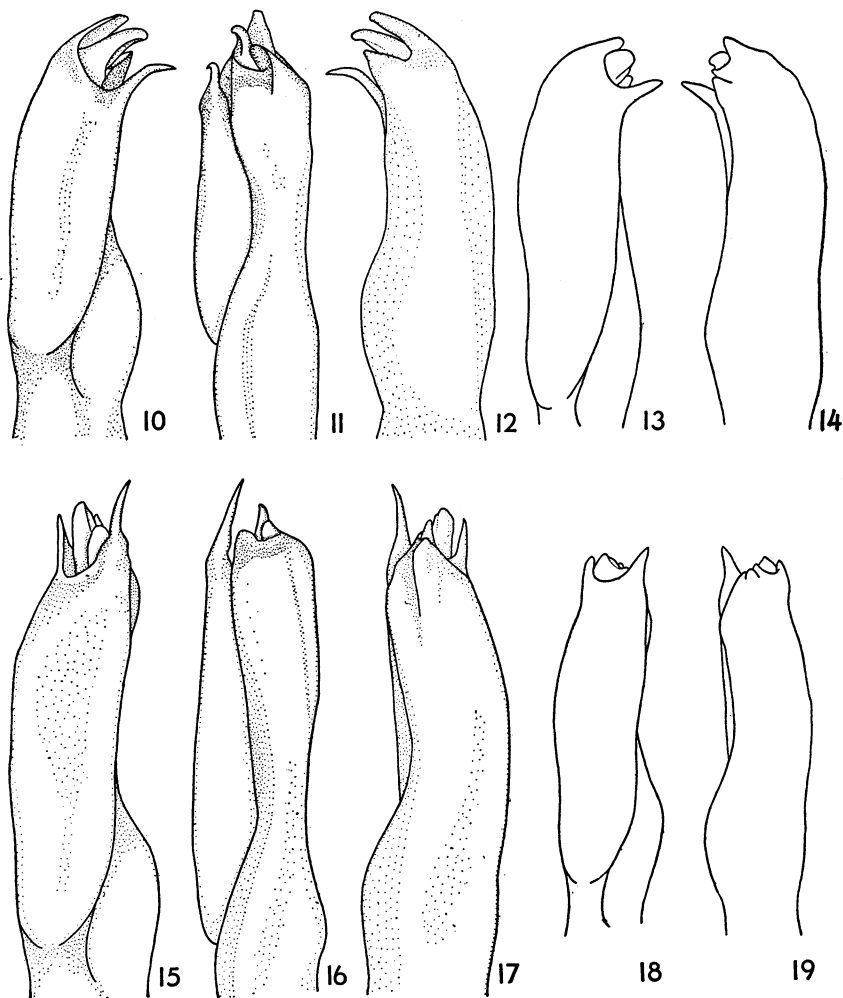
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FIGS. 1-7. *Procambarus dupratzi*, new species. 1, 2. Cephalothorax of holotype. 3. Epistome of holotype. 4. Antennal scale of holotype. 5. Chela and carpus of holotype. 6. Hooks of holotype. 7. Annulus ventralis and sternum of fourth thoracic segment of allotype.

FIGS. 8, 9. *Procambarus natchitochae*, new species. 8. Epistome of holotype. 9. Annulus ventralis and sternum of fourth thoracic segment of allotype.

Pubescence removed from all structures illustrated.



FIGS. 10-14. *Procambarus dupratzi*, new species. 10-12. Mesial, caudal, and lateral views of first pleopod of holotype. 13, 14. Mesial and lateral views of first pleopod of morphotype.

FIGS. 15-19. *Procambarus natchitochae*, new species. 15-17. Mesial, caudal, and lateral views of first pleopod of holotype. 18, 19. Mesial and lateral views of first pleopod of morphotype.

Pubescence removed from all structures illustrated.