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DISPARITHELPHUSA PECKI, A NEW GENUS AND SPECIES OF FRESH-WATER CRAB FROM MEXICO (BRACHYURA: PSEUDOTHELPHUSIDAE)

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ABSTRACT

A new fresh-water crab, *Disparithelphusa pecki,* of the tribe Pseudothelphusini, distinguished by the presence of approximately 380 distinctive setae born on the apex of the male gonopod, is described from the State of Oaxaca, Mexico.

A small series of a fresh-water crab from Oaxaca, Mexico, donated to Tulane University by Dr. Stewart Peck, is described as a new genus and species in the tribe Pseudothelphusini. The female genital openings of Pseudothelphusidae have not been routinely used as taxonomic characters, in spite of numerous problems existing in this family resulting from species descriptions based solely upon females. The female gonopores are described herein, and their routine description for other species is urged. A discussion of gonopod terminology, which is intended to resolve differences in terminology of previous authors, follows the species description. The significance of terminal pore setae for pseudothelphusid classification is discussed.

Disparithelphusa, new genus

Description.—First male gonopod with large, approximately circular, apical setal field directed laterad at about 45° angle to transverse plane of gonopod, bearing large numbers of terminal pore setae; setae decreasing slightly in diameter distally, about 250 in setal field proper, about 130 in spiral from opening of sperm channel to well-developed posterior crest; posterior margin of setal field with strong border, forming lateral trough with posterior crest. Lateral expansion reduced, face oriented proximad; caudal process broadly appressed to mesial lobe. Notch between marginal process and mesial lobe shallow, mesial lobe well developed, with lateral groove. Process distal to marginal process, apparent extension of mesial crest, bearing 18 conical teeth. Additional gonopod setae: 31 fringed marginal; 14 fringed caudal; 18 apical pore lateral; about 30 long, fringed medial on coxopodite; 10 fringed caudal on coxopodite.

Teeth of major chela *Tehuana*-like, not *Pseudothelphusa*-like; i.e., teeth robust, those of dactylus not abruptly diminishing in size distally, proximal four large, subequal. Upper margin of front of carapace tuberculate, moderately well developed.

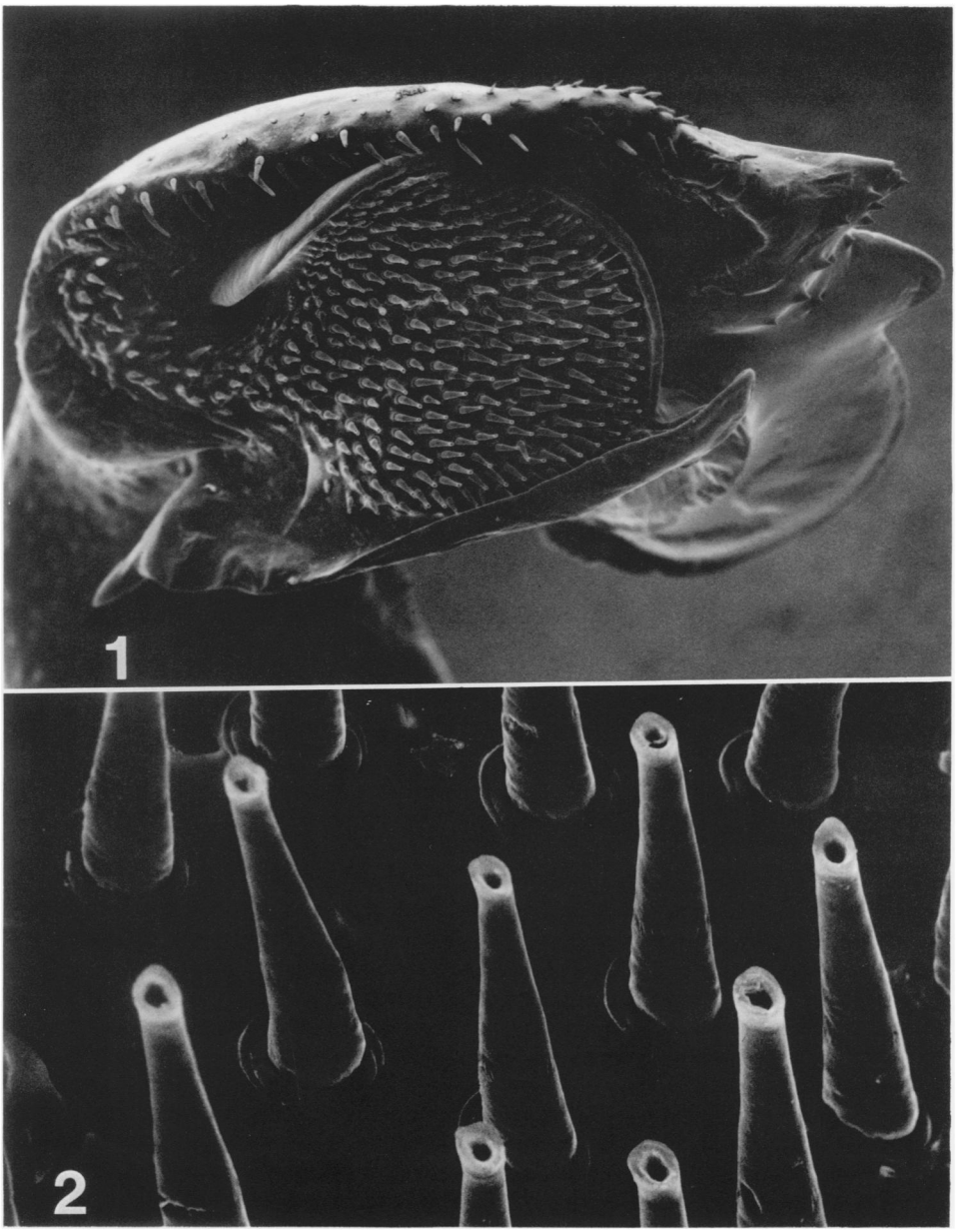
Type-species.—*Disparithelphusa pecki,* described below, the only known species.

Etymology.—*Dispar* (Latin) meaning "different" referring to the unusual gonopod; and *Thelphusa,* a generic name for a fresh-water crab.

Disparithelphusa pecki, new species

Figs. 1–6

Material.—Two ♂♂ and 5 ♀♀ from 10 km south of Valle Nacional, Oaxaca, Mexico (17°42'N, 96°19'W), at an altitude of 600 m, in a stream; 19 May 1971; collected by Stewart Peck. Designated and labeled as types and deposited in the crustacean collection of the Museum of Natural History, Tulane University; the ♂ holotype, including the left first gonopod mounted on a SEM stub, TU-6210; 1 ♂ (with



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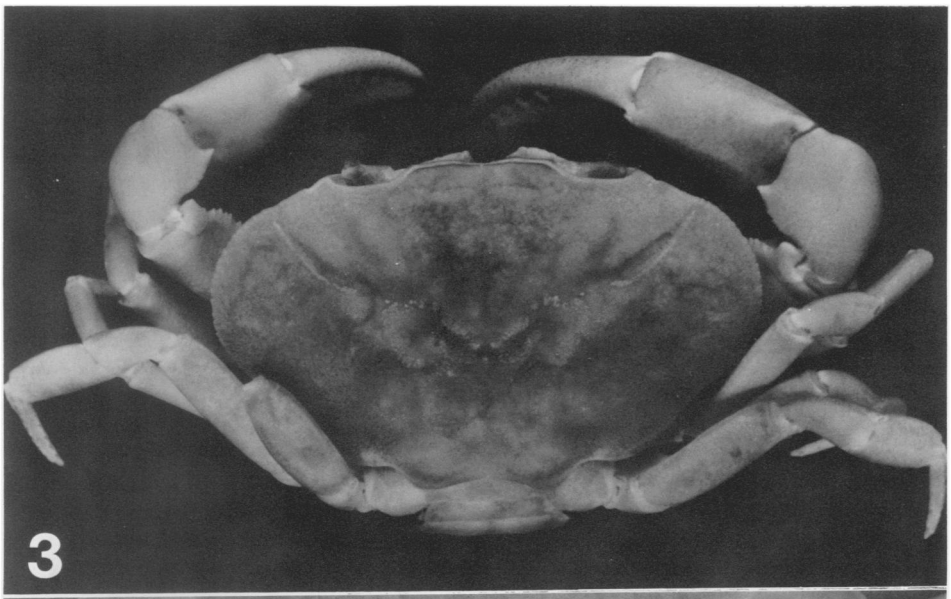
Figs. 1–5. *Disparithelphusa pecki,* new species; 1–3, holotype; 4, paratype; 5, holotype. 1, apex of gonopod, lateral view, ×43; 2, apical pore setae, ×509; 3, dorsal view, ×19; 4, female genital openings, ×6.3; 5, anterior view, ×1.9.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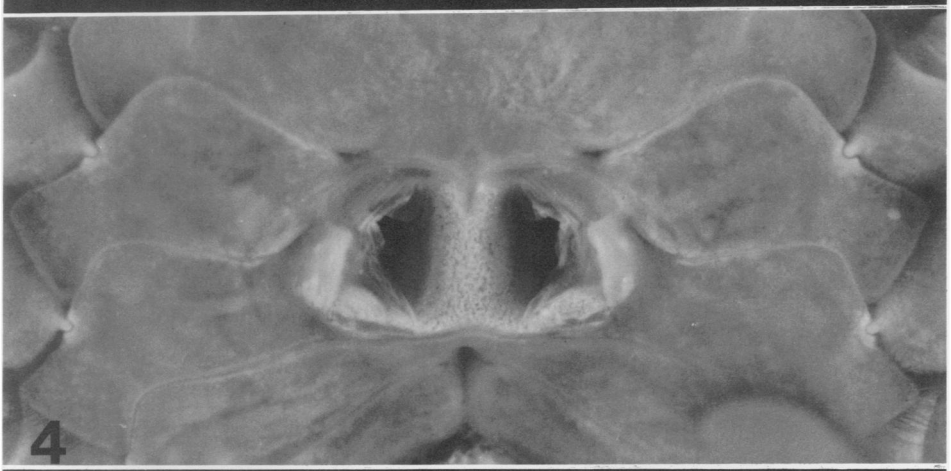
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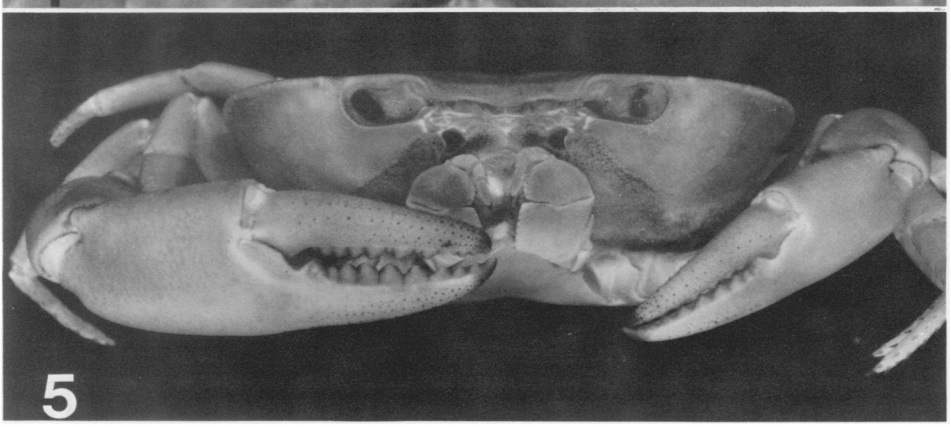
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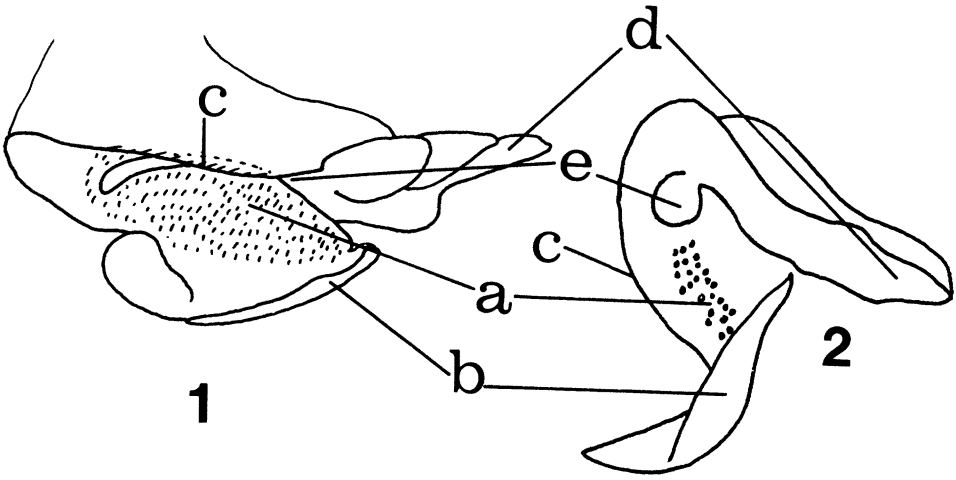

Fig. 6. Distal view of gonopods (×26) of (1) *Disparithelphusa pecki*; (2) *Pseudothelphusa jouyi*; a, apical setal field; b, lateral expansion; c, posterior crest; d, mesial process; e, sperm channel.

gonopods missing, identified by black, white-tipped setae and pattern of dark tubercles on chela) and 5 ♀ paratypes, including 1 ♀ bearing 72 young about 4 mm carapace width, TU-6377.

Description.—Carapace flat, except for downward curving posterolateral borders and weak convexity anterior to cervical grooves. Posterior curved portion bearing numerous short, black setae with white tips. Area behind orbits with low, flat granules; entire carapace with scattered small punctae, each bearing minute seta. Posterior border of carapace strongly sinuate, exposing more of first abdominal segment than usual in members of Pseudothelphusini. Teeth of anterolateral border low, poorly defined. Notch at junction of cervical groove and posterolateral border small. Cervical groove deep, wide, curving slightly anteriorly, with wide depression at posterior terminus; groove sparsely set with black, white-tipped setae, terminating imperceptibly on anterolateral border of carapace. Well-defined notch in anterolateral border about one-fourth distance from orbit to cervical groove. Upper border of front moderately well developed, tuberculate, posterior to lower border. Lower border of front moderately well developed, smooth; area between borders narrow, concave. Median groove of carapace well defined, sharply bisecting upper border of front, expressed in lower border as shallow depression. Postfrontal lobes well defined. Border of orbit weakly granulate. Tooth at ventromedial border of orbit low, scarcely more than knob.

Merus of third maxilliped with lateral margin evenly rounded; moderately developed notch just proximal to insertion of palp; patch of terminal pore setae on inner surface. Exopod about two-thirds length of outer border of ischium. Major chelae (right in holotype) long, fingers rather short relative to palm length, palm not deep, fingers of holotype gaping slightly. Teeth as in description of genus. Propodus with numerous small, white punctae, each bearing minute seta. Fingers bearing rows of dark brown tubercles; tips dark brown, contrasting with light brown carapace.

See "Description" of genus for structure of first male gonopod.

Female genital openings broadly U-shaped, with open ends of U facing each other across median line. Medial borders of sixth sternites with angled projection

Table 1. Measurements of *Disparithelphusa pecki* in millimeters.

	Carapace breadth	Carapace length
Holotype male	38.6	23.1
Paratype female	40.2	24.0
Paratype female	33.7	20.0
Paratype male	31.4	18.8
Paratype female	18.1	11.2
Paratype female	17.1	10.7
Paratype female (with damaged carapace and not measurable).		

into soft area surrounding genital openings, this border also projecting ventrally. Posterior bridge prominent. Genital field lacking creases or plications.

Measurements.—See Table 1.

Gonopod Terminology.—Advances in our knowledge of the morphology of the pseudothelphusid gonopod have been made by several authors (Smalley, 1964; Rodriguez and Smalley, 1972; Pretzmann, 1972; Rodriguez, 1982). The terminology in this paper is derived from the scheme proposed by Rodriguez in Rodriguez and Smalley (1972, p. 100). This scheme assumes that the Pseudothelphusini, which have a gonopod with a twisted sperm channel, evolved from a species with a straight sperm channel, such as the species of the genus *Potamocarcinus*. The original marginal process (caudal process of Smalley, 1964) has become restricted to the tip of the gonopod. The mesial process of *Potamocarcinus* has become, possibly with elements of the apical process, the "lateral expansion" of *Pseudothelphusa*. When this scheme is translated from the Spanish, the terminology can be compared with Pretzmann (1972, p. 98) as follows:

Pretzmann	From Rodriguez and Smalley (1972)
Gonopodenfurche	Marginal Suture
Auricularlobus	Mesial Lobe
Apicaler Sekundarlobus	Marginal Process
Apicales Borstenfeld	Apical Setae Field
Vexillarlobus	Lateral Expansion

Delamare Deboutteville (1976) used the terms "posterior crest" and "anterior crest" for the gonopod tip of *Typhlopseudothelphusa*. These terms can be very useful, although it should be remembered that the posterior crest is probably homologous, in part, to the marginal process in the Pseudothelphusini. In Fig. 6 the parts of the gonopods, diagrammatically in distal view, of *Disparithelphusa pecki* are compared with a representative *Pseudothelphusa, P. jouyi* Rathbun.

Female Genital Openings.—Pretzmann (1972) described the female genital openings of the Pseudothelphusidae, and illustrated these openings in twenty-two species, showing the features which will probably prove to be important taxonomic characters. He did not describe the female genital openings in subsequent species descriptions. We describe these openings, with the suggestion that they be routinely used in species descriptions. The paired female genital openings are on the sterna of the sixth thoracic somite, as in all other fresh-water crabs (Pseudothelphusidae, Trichodactylidae, and Potamidae *sensu lato*). In the Pseudothelphusidae, the openings are located on a plate or field, which completely occludes the median sutures of thoracic sternites V and VI. The area around the gonopores is not

calcified and shows considerable variation in shape and degree of turgidity from one individual to another. We have found that the openings are more expanded in females bearing eggs or young crabs than they are in individuals prior to egg-laying or after the young crabs have gone. This soft inner area is surrounded by the calcified sterna, which are modified to varying degrees by the genital field. The posterior border of the genital field forms a bridge, which appears to be part of (or derived from) sternite VII, and is also fused so as to obliterate the median suture.

Terminal Pore Setae.—The scanning electron microscope reveals that the setae at the distal terminus of the sperm channel of the male gonopod of *Disparithelphusa pecki* are not pointed, but have a large terminal pore. We use the term "terminal pore setae" for these structures. Terminal pore setae are found on the apex of the gonopod of all species of *Pseudothelphusa* examined by us. A discussion of the distribution of such setae above the level of genus is complicated by the differences in classifications of the Pseudothelphusidae proposed by Bott (1970), Pretzmann (1973), and Rodriguez (1982). However, following Pretzmann, terminal pore setae appear in a patch on the inner surface of the merus of the third maxilliped (i.e., the surface toward the mandible) in the Tribes Pseudothelphusini, Potamocarcinini, and Kingsleyini of the Subfamily Pseudothelphusinae, but neither in the Tribe Hypolobocerini, including Strengerianini Rodriguez, 1982, nor in the Subfamily Epilobocerinae. In Rodriguez's arrangement, the Tribe Hypolobocerini would contain some genera with this patch (those placed by Pretzmann in the Tribe Potamocarcinini) and some without it. The resolution of these differences is beyond the scope of this discussion, but we suggest that the occurrence of terminal pore setae merits further investigation.

Relationships.—*Disparithelphusa* has a curved sperm channel, terminal pore setae at the apex of the gonopod, smaller setae lacking a terminal pore in the sperm channel, and the typical apical gonopod processes of *Pseudothelphusa.* The mesial process of *Disparithelphusa* is large and deeply curved. Its prominent inner groove resembles more nearly that of *Tehuana* than that of *Pseudothelphusa.* The lateral expansion of *Disparithelphusa* is not *Tehuana*-like, but resembles that of *Pseudothelphusa,* particularly *P. nelsoni* Rathbun. The teeth of the major cheliped are *Tehuana*-like. However, the color of the carapace of all known species of *Tehuana* is dark brown; *Disparithelphusa* is a light tan color, as are most *Pseudothelphusa.* The setae of the gonopod demonstrate a close relationship to *Pseudothelphusa.* Generic status is accorded this species solely on the basis of the unusual morphology of the gonopod, with its proliferation of terminal pore setae which are supported on a platelike process (the "half-moon" structure behind the setae in Fig. 1), forming a trough between it and the posterior crest. The homologous part of all other *Pseudothelphusa* is oriented postero-anteriorly, whereas in *Disparithelphusa* it is oriented mediolaterally. The black, white-tipped setae of the carapace are distinctive.

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LITERATURE CITED

Bott, R. 1970. Betrachtungen über die Entwicklungsgeschichte und Verbreitung der Süsswasser-Krabben nach der Sammlung des Naturhistorischen Museums in Genf/Schweiz.—Revue Suisse de Zoologie 77: 327–344.

Delamare Deboutteville, C. 1976. Sur la radiation évolutive des crabes du genre *Typhlopseudothelphusa* au Guatemala et au Mexique avec description d'espèces nouvelles.—Annales de Spéléologie 31: 115–129.

Pretzmann, G. 1972. Die Pseudothelphusidae (Crustacea Brachyura).—Zoologia (Vienna) 120: 1–182.

———. 1973. Grundlagen und Ergebnisse der Systematik der Pseudothelphusidae.—Zeitschrift fuer Zoologische Systematik und Evolutionsforschung 11: 196–218.

Rodriguez, G. 1982. Les crabes d'eau douce d'Amérique. Famille des Pseudothelphusidae.—Office de la Recherche Scientifique et Technique Outre-Mer, Faune Tropicale 22: 1–223.

Rodriguez, G., and A. Smalley. 1972. Los cangrejos de agua dulce de Mexico de la familia Pseudothelphusidae (Crustacea, Brachyura).—Anales de Instituto Biologia de la Universidad Nacional Autonomia Mexico, 40. Series Ciencias del Mar y Limnologia 1: 69–112.

Smalley, A. 1964. A terminology for the gonopods of the American river crabs.—Systematic Zoology 13: 28–31.

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