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TWO NEW FRESH-WATER CRABS FROM NICARAGUA.

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FRESH-WATER crabs occurring in small streams at high altitudes in Central Nicaragua belong to two undescribed species of the large genus *Pseudothelphusa*. Two new subgenera are erected to accommodate them, following the same general criteria of gonopod morphology used in a review of the Costa Rican Pseudothelphusidae (Smalley, 1964 a). Neither of the new species is related to the crabs of the plateau region of Costa Rica, which apparently do not cross the low region of the Nicaraguan lakes and Rio San Juan, but one of the species is related to a group of crabs widespread in the streams and lakes of Mexico, Guatemala, and El Salvador.

All collections were made along the highway between the towns of Matagalpa and Jinotega.

Gonopod terminology follows Smalley (1964 b).

Family **Pseudothelphusidae.**

Genus PSEUDOTHELPHUSA.

ANAPHYRMOS, subgen. nov. (Figs. 3–6.)

Description: Gonopod with straight margin except at tip, area bearing apical spines normal to sperm channel or sloping laterad at not more than 45 degrees. Single, large, distal, mesial lobe, very compressed in cephalocaudal plane, border with one or two lobes or teeth; one or two strong teeth more or less centrally located on cephalic surface of lobe. Marginal, lateral, and mesial setæ. Middle three or four teeth of fixed finger of major chelæ of large males strongly protuberant, much larger than teeth on either side. *Anaphyrmos* (masc.): confusion, referring to the taxonomy of the species in the subgenus.

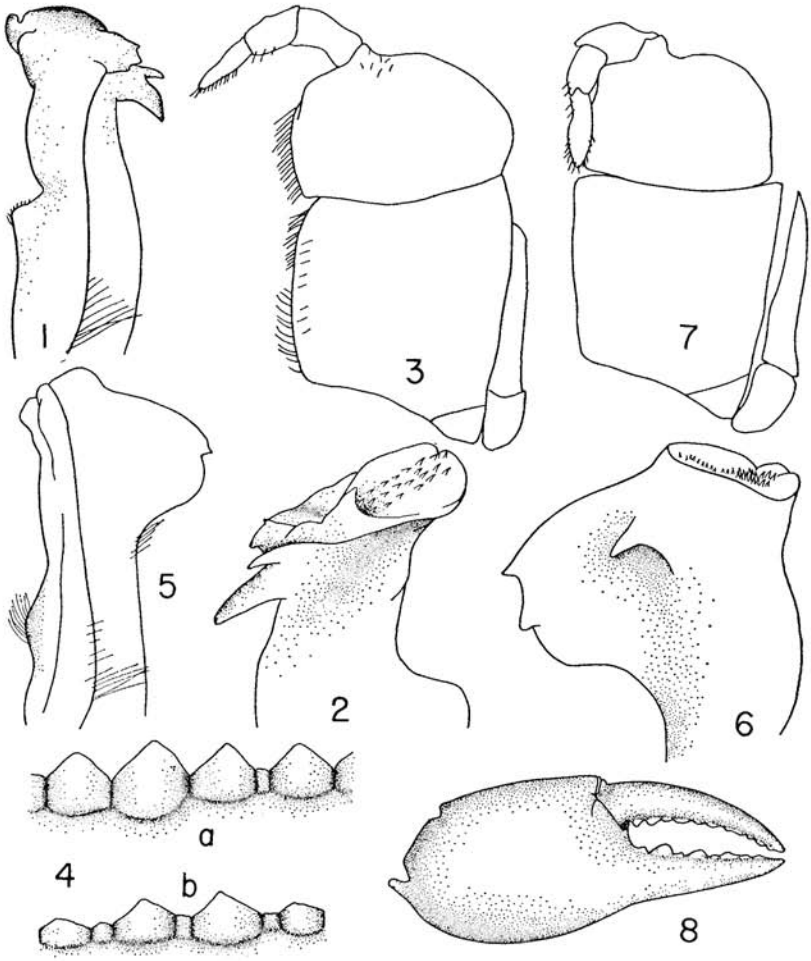
Type species, *Pseudothelphusa tuberculata* Rathbun, 1897. Other species: *P. bocourti* (A. Milne-Edwards, 1866); *P. maxillipes* Rathbun, 1898; *P. similis* Rathbun, 1905; *P. cobanensis* Rathbun, 1905; *P. cobanensis mertensi* Bott, 1956; *P. orestria* sp. nov.

Species included in Rathbun's monograph (1905) as belonging to the *P. bocourti* group, but which are described from females and whose subgeneric status is uncertain, are *P. gracilipes* (A. Milne-Edwards, 1866); *P. propinqua* Rathbun, 1905; and *P. proxima* Rathbun, 1905.

Species included by Rathbun in the *P. bocourti* group but which definitely do not belong in *Anaphyrmos*, are *P. conradi* Nobili, 1897; *P. garmani* Rathbun, 1898; *P. magna* Rathbun, 1896; and *P. caputii* Nobili, 1902.

The inclusion of the species in *Anaphyrmos* was made on the basis of figures and descriptions in the literature, mostly from Rathbun (1898,

Figs. 1–8.



1–2, 7–8. *Pseudothelphusa* (*Camptophallus*) *botti*, new species, holotype. 1. Caudal surface of right first male pleopod. 2. Cephalic surface of same. 7. Third maxilliped. 8. Outer surface of major chela. 3–6. *Pseudothelphusa* (*Anaphyrmos*) *orestria*, new species, holotype. 3. Third maxilliped. 4 a. Teeth of propodus, holotype. 4 b. Teeth of propodus, smaller paratype. 5. Caudal surface of right first male pleopod. 6. Cephalic surface of same.

1905). Some of these species are of doubtful status, being described from females only. However, I have not had an opportunity to examine the types, and a more detailed discussion would not be appropriate here. *P. tuberculata* is designated as the type of the subgenus because it is the first species to be described from a male. Rathbun described *P. tuberculata* from a male and a female without designating a holotype. I therefore

designate the male in the U.S. National Museum (USNM 20047) as the lectotype. The range of the subgenus is from the State of Chiapas, Mexico, to Matagalpa Department, Nicaragua. There are no records in the literature from Honduras. The female type of *P. tuberculata* from Costa Rica cannot be identified with any degree of reliability.

Pseudothelphusa (*Anaphyrmos*) *orestria* sp. nov. (Figs. 3–6.)

Material examined: 3 km. N. Matagalpa, Matagalpa Dept.; 6 Aug. 1964, 2 ♂♂, 5♀♀ (TU–4605). Fuente Pura, 14 km. N. Matagalpa, Jinotega Dept., 12 July 1964; 2 ♂♂ (TU–4611). 15 km. S. Jinotega, Jinotega Dept.; 6 Aug. 1964; 5 ♂♂, 3 ♀♀ (TU–4609). 5 km. S. Jinotega, Jinotega Dept.; 6 Aug. 1964; 14 ♂♂, 8♀♀, including the male holotype (TU4606). One male in the U.S. National Museum, labelled only " Nicaragua ".

Disposition of types: Male holotype (USNM 112252), one male and one female paratype (USNM 112253, from TU–4606), one male paratype (USNM 20044), U.S. National Museum; one male and one female paratype (MCZ 12701, from TU–4609), Museum of Comparative Zoology; remaining paratypes in the Tulane University Collections.

Description: Carapace slightly convex, covered with flat, scalelike tubercles, posterior branchial, intestinal, and posterior cardiac regions covered with short black setæ. Front nearly vertical, upper margin defined by row of tubercles. H-shaped depression moderately prominent; cervical groove deep, extending to margin; anterior median groove deep, forming pronounced notch in front. Antero-lateral teeth very small, anterior margin of teeth one-fourth to one-eighth length of posterior margin; a somewhat deeper notch just anterior to cervical groove divides teeth into two series.

Orbits not deep, about 1·3 times as deep as greatest breadth of eye.

Merus of external maxillipeds with outer border very convex; shallow notch laterad to articulation of palp; exognath reaching about four-fifths length of outer margin of ischium.

Chelæ unequal, palm of major cheliped swollen, fingers gaping slightly, fixed finger with fourth tooth largest. In smaller specimens, large teeth frequently alternating with small teeth, but this character highly variable (fig. 4 a, b). Movable finger tuberculate above, tubercles forming a poorly defined ridge on inner side. No tubercle or protuberance at base of fingers.

Gonopod with apical area inclined slightly laterad, mesial lobe curving gradually to first marginal tooth. Two marginal teeth, directed downward, the more distal turned slightly caudad, the proximal slightly cephalad. One central cephalic tooth.

Measurements: Holotype, greatest carapace width, 34·0 mm.; median carapace length, 20·5 mm. This was the largest specimen examined.

Discussion: Pseudothelphusa orestria resembles *P. cobanensis mertensi* in its small size and the shape of the proximal tooth of the mesial lobe, but in the latter species the apical field is more oblique and the mesial lobe

is straight distally instead of curving gradually to the first marginal tooth. Bott's distinctive species should be accorded specific rank, since *P. cobanensis* has a small, rounded, appressed lobe on the margin of the gonopod, and the apical field is normal to the margin.

The variability in the propodal teeth is important, since Rathbun used these characters, which vary with age or individuals, in separating *P. bocourti* and *P. similis*.

P. orestria is a small species although it undoubtedly grows to a larger size than the specimens at hand. Maximum size is sometimes difficult to recognize, particularly since the gonopod may be quite well developed in crabs with chelæ lacking the large size, swollen propodus, and gaping fingers often found in large male river crabs. In my opinion, the gonopods of the holotype of *P. orestria* are sufficiently well developed to permit adequate definition of the species.

The specific epithet *orestria* refers to the mountainous habitat of the crab.

CAMPTOPHALLUS, subgen. nov. (Figs. 1–2, 7–8.)

Description: Distal part of gonopod curved laterad. Mesial surface with one large proximal and one small distal tooth. Margin produced into projection bearing several small blunt teeth, just distal to mesial teeth. Section of sperm channel just proximal to apex open, trough-like, again becoming a nearly closed slit at apex. Apical spines sparse, large, covering only part of apical field. Lateral border of gonopod with conspicuous proximal notch. Lateral setæ short, stout, sparse; marginal setæ normal in appearance.

Camptophallus (masc.): curved gonopod.

Type and only species, *Pseudothelphusa botti*, sp. nov. new species.

Pseudothelphusa (*Camptophallus*) *botti*, sp. nov. (Figs. 1–2, 7–8.)

Material examined: Fuente Pura, 14 km. N. Matagalpa, Matagalpa Dept., 12 July 1964, 9 ♂♂, 7 ♀♀ (TU–4610). 15 km. S. Jinotega, Jinotega Dept.; 6 Aug. 1964; 1 ♂, 2 ♀♀, including the male holotype (TU–4608). 5 km. S. Jinotega, Jinotega Dept.; 6 Aug. 1964; 1 ♂, 1 ♀ (TU–4607).

Disposition of types: Male holotype (USNM 112250), one male and one female paratype, (USNM 112251, from TU–4610), U.S. National Museum; one male and one female paratype (MCZ–12700, from TU–4610), Museum of Comparative Zoology; remaining paratypes in Tulane University Collections.

Description: Carapace convex antero-posteriorly, curving down sharply along lateral border. Antero-lateral teeth small, almost tuberculate. Carapace sparsely punctate. H-shaped depression poorly marked; cervical groove deep and running nearly to margin, branchial region swollen. Front lacking upper margin, not becoming vertical or indented,

the entire margin visible dorsally. Median anterior suture poorly developed, producing a shallow indentation in lower margin of front, the latter only slightly sinuous. Orbits shallow, about 1·2 times depth of greatest eye width.

Outer margin of merus of third maxilliped gently curving, with pronounced notch just lateral to articulation of palp. Exognath long, falling just short of distal border of ischium.

Chelipeds very unequal in adult males, palm of major cheliped greatly swollen, lower border convex. Fingers slender and gaping widely, teeth small, two large proximal teeth above, the lower teeth usually alternately large and small, tips of fingers meeting. No tubercle or protuberance at base of fingers. Walking legs very slender.

Gonopods as in subgeneric description.

Measurements: Male holotype (largest specimen examined); greatest carapace width, 22·6 mm.; median carapace length, 14·6 mm.

Remarks: P. botti is a very distinctive species, with its markedly convex carapace, very large major chela, which exceeds in length the width of the carapace, and the slender red legs contrasting with an olive green carapace. I take pleasure in naming this species after Dr. Richard Bott.

Both *P. botti* and *P. orestria* were found in very small streams, apparently too small to support any fishes. One of the *P. botti* was recovered from a burrow in a dense forest under a piece of wood remaining from logging operations. The crab was about six centimetres within the burrow. A similar burrow was excavated but no crab was found. Water was reached at a depth of about 30 cm., the locality being in an area of numerous small streams and slow-flowing spring runs. At the same locality, several *P. orestria* were captured under logs and pieces of wood, but apparently were not burrowing. Numerous specimens of *P. orestria* were caught under rocks in the spray zone of a small waterfall at the station nearest Jinotega.

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References.

Bott, R. 1956. Dekapoden (*Crustacea*) aus El Salvador. 3. Süsswasserkrabben (*Pseudotelphusa*). *Senck. Biol.* **37**, 229–242.

Edwards, A. Milne. 1866. Description de trois nouvelles espèces du genre *Boscia*, crustacés brachyures de la tribu des Thelphusiens. *Ann. Soc. Entomol. France*, (4), **4**, 203–205.

Nobili, G. 1897. Viaggio del Dr. Enrico Festa nella Repubblica dell'Ecuador e regioni vicine. Decapodi terrestri e d'acqua dolce. *Boll. Mus. Zool. Anat. Comp. R. Univ. Torino*, **12** (275), 1–6.

NOBILI, G. 1902. Viaggio del Dr. Enrico Festa nella Repubblica dell'Ecuador e regioni vicine. XXIII. Decapodi e Stomatopodi. *Boll. Mus. Zool. Anat. Comp. R. Univ. Torino*, **16** (415), 1–66.

RATHBUN, M. J. 1896. Descriptions of two new species of fresh-water crabs from Costa Rica. *Proc. U.S. Nat. Mus.*, **18**, 377–379.

——. 1897. Descriptions de nouvelles espèces de crabes d'eau douce appartenant aux collections du Muséum d'Histoire naturelle de Paris. *Bull. Mus. Hist. Nat. Paris*, 58–61.

——. 1898. A contribution to the knowledge of the fresh-water crabs of America—The Pseudothelphusinae. *Proc. U.S. Nat. Mus.* **21**, 507–537.

——. 1905. Les crabes d'eau douce. (Potamonidae). *Nouv. Arch. Mus. Hist. nat. Paris*, ser. 4, **7**, 159–321.

SMALLEY, A. E. 1964 a. The river crabs of Costa Rica, and the subfamilies of the Pseudothelphusidae. *Tulane Stud. Zool.*, **12**, 5–13.

——. 1964 b. A terminology for the gonopods of the American River Crabs. *Systematic Zool.*, **13**, 28–31.