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Taxonomy of the Neotropical freshwater crab family Trichodactylidae III. The genera *Fredilocarcinus* and *Goyazana*

(Crustacea: Decapoda: Brachyura)

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With 11 figures

Abstract

The genera *Fredilocarcinus* and *Goyazana* (tribe Dilocarcinini) of the freshwater crab family Trichodactylidae are revised. Five species are recognised within these two genera, including two new species which are described.

Introduction

A monographic treatment of the neotropical freshwater crab family Trichodactylidae was started by Magalhães & Türkay (1996a). They proposed a new generic system for the group on the basis of the morphology of the endophragmal system, the male first pleopod, and the segmentation of the abdomen. In a second study, four genera of the tribe Valdiviini were revised (Magalhães & Türkay 1996b), while this present paper, which continues the series, deals with the revision of two genera of the tribe Dilocarcinini: *Fredilocarcinus* and *Goyazana*. Keys to the species for each genus, as well as illustrations of the carapace and the male first pleopod are provided.

The measurements given in the descriptions of the individual species refer to (in mm): Carapace-breadth : Carapace-length : Body height: Frontal breadth. Plp 1 and plp 2 were used for referring to the first and second male pleopods, respectively.

The following abbreviations have been used throughout the paper:

EPA = Expedição Permanente na Amazônia; FMNH = Field Museum of Natural History, Chicago; INPA-CR= Coleção Sistematica de Invertebrados, Seção Crustacea, Instituto Nacional de Pesquisas da Amazônia; IRSNB = Institut Royal des Sciences Naturelles de Belgique, Bruxelles; LACNHM = Los Angeles County Natural History Museum; MNHN = Muséum National d'Histoire Naturelle, Paris; MNRJ = Museu Nacional, Universidade Federal do Rio de Janeiro, Rio de Janeiro; MZUSP = Museu de Zoologia da Universidade de São Paulo, São Paulo; NHML = The Natural History Museum, London; NHMW = Naturhistorisches Museum Wien, Wien; NNHM = Nationaal Natuurhistorisch Museum, Leiden; SMF = Senckenberg Museum, Frankfurt a. M.; SMNK = Staatliches Museum für Naturkunde, Karlsruhe; UFPB = Coleção de Crustacea da Universidade Federal da Paraiba, João Pessoa; USNM = National Museum of Natural History, Smithsonian Institution, Washington, D. C.; ZSM = Zoologische Staatssammlung, München.

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Systematic part

Fredilocarcinus Pretzmann 1978

1978 *Dilocarcinus* (*Fredilocarcinus*) Pretzmann, Sitz.-Ber. österr. Akad. Wiss. math. naturw. Kl., (1) **187** (6–10): 168.

Key to the species of *Fredilocarcinus*

1. Apex of male plp 1 flattened, relatively large; marginal suture strongly twisted to the ventro-lateral face near to the tip 2
— Apex of male plp 1 slender, tapering, not strongly flattened; marginal suture twisted to the ventral face very near to the tip ..... *F. apyratii* n. sp.
2. Subdistal lobe of male plp 1 well developed, rounded; apex shorter than the subdistal lobe ..... *F. musmuschiae*
— Subdistal lobe of male plp 1 poorly developed; apex clearly longer than the subdistal lobe ..... *F. raddai*

Fredilocarcinus apyratii n. sp.

(Figs. 1, 2, 7)

Holotype: ♂ (INPA-CR 650), Brazil, Estado do Acre, Sobral, left bank of Rio Juruá, 20.III.1992, M.N.F. da Silva, col.
Paratype: ♂ (SMF 22351), data as holotype.

Diagnosis: Six spine-tipped anterolateral teeth behind exorbital tooth of carapace. Male abdomen subtriangular, relatively large. Distal part of male plp 1 slender, with a reduced subdistal lobe; tip tapering, with a small subcylindrical distal opening.

Description: Carapace smooth, with some scattered minute hairs seen under higher magnification; carapace strongly convex longitudinally, slightly curved transversally; post-frontal lobes as very low protuberances, barely visible, H-shaped central groove

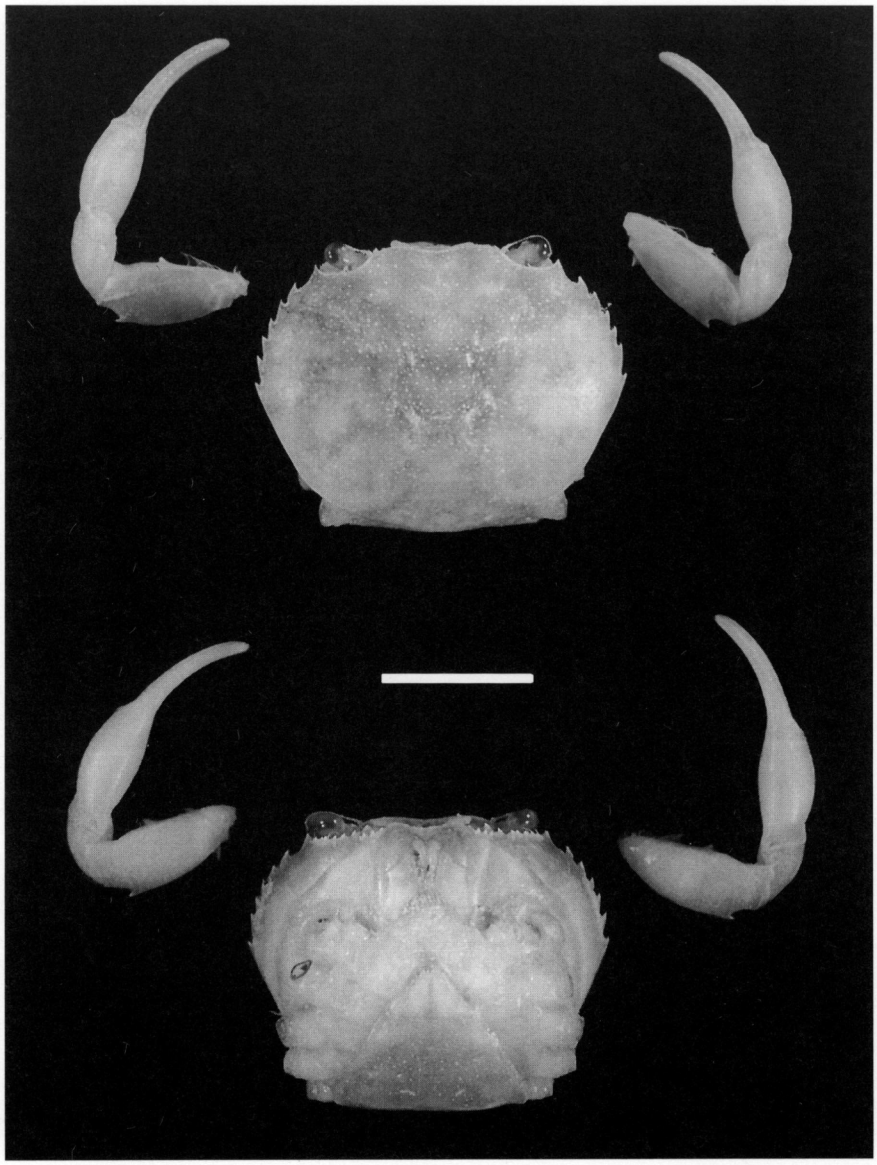


Fig. 1. *Fredilocarcinus apyratii* n. sp. (holotype, INPA-CR 650), dorsal and ventral aspect. — Scale 10 mm.

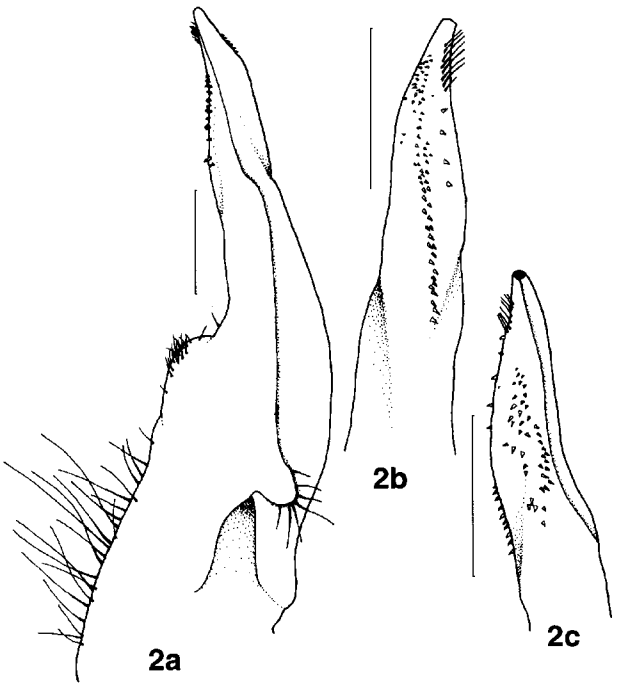


Fig. 2. *Fredilocarcinus apyratii* n. sp. (holotype, INPA-CR 650), right male plp 1; scales 1 mm. — a) Whole limb, ventro-mesial aspect; b) distal part, dorso-lateral aspect; c) distal part, ventral aspect.

(delimited by the posterior and lateral borders of the gastric and lateral borders of the cardiac regions) shallow; meso- and urogastric regions relatively lower, branchial regions slightly more elevated; post-gastric pits present. Frontal margin smooth, moderately convex, directed downwards. Exorbital tooth slender and spine-tipped; anterolateral borders bearing six regularly spaced acute teeth, posterolateral borders unarmed, marked by a conspicuous ridge. Suborbital borders with eight to nine slender spines increasing size towards inner corner, the one at the inner corner being the largest and strongest. Anterolateral corner of the buccal cavity bearing four strong triangular spines. Epistome advanced, barely visible in dorsal view; opening of the efferent channels moderately arched. Grooves dividing subhepatic and pterygostomial regions deep, with some scattered hairs.

Merus of third maxilliped trapezoidal, with its slightly convex outer margin about 2.5 times longer than the inner one, and showing a distinct blunt tooth-like projection at the distal corner. Outer margin of ischium slightly concave. Exopodite about 0.8 times as long as the endopodite and bearing a well developed flagellum.

Chelipeds slender, left chela a little larger than the right one. Merus with a subterminal acute spine on its outer border, a blunt median spine on the inner upper border, a small spine at its distal corner of its inner lower border, and a regular oblique row of short hairs on its upper surface. Carpus with a strong acute spine on its upper border. Palm smooth, with a small distal spine on the upper border. Fingers slender, with no distinct gap between them, bearing triangular blunt teeth that become a little larger towards their distal ends. Second to fifth pereiopods smooth, lower margin of dactylus with longitudinal row of hairs [in both specimens all the pereiopods were detached from the body].

Median line of sternum present in somites V–VIII; furrow corresponding to the endosternite IV/V reaching the midline, the following ones ending about halfway between beginning of the sterno-abdominal cavity and the midline.

Male abdomen relatively broad, with segments III–VI fused; lateral borders nearly straight to slightly concave. Telson about 1.9 times broader than long, its lateral borders roughly continuous with those of the sixth abdominal segment.

Male plp 1 slightly bent in lateral direction, its ventral border with proximal part distinctly bulged and bearing several short and long setae; distal part slender, ventral border with subdistal lobe reduced, very weakly developed. Subterminal spine fields arranged in two discontinuous, poorly developed patches in the ventral and the dorsal surfaces. Marginal suture on mesial surface, following general line of the plp 1 along major part of the stem, being slightly twisted to the ventral surface very near to the tip. Apex somewhat flattened, mainly on the mesial surface; tip assymetrical, tapering, bearing a tuft of subterminal setae and a small subcircular distal opening, placed terminally. Plp 2 only slightly longer than the plp 1.

Measurements: 21.9 : 17.2 : 1.0 : 8.2 (holotype ♂).

Type locality: Brazil, Estado do Acre, Rio Juruá, in Sobral.

Distribution: To date, only known from the type locality, on the southwestern Amazon region.

Remarks: When compared with *F. raddai* and *F. musmuschiae*, the plp 1 morphology of *F. apyratii* n. sp. is different in that the torsion of the distal segment is weak, the apex is not so flattened, the distal lobe is feeble and the distal opening is terminal. This very peculiar pleopod characterises *F. apyratii* n. sp. as a distinct species.

Etymology: From the Tupy-Guarani language "apyra" (tip) and "tii" (slender), in reference to the shape of the distal part of the male plp 1.

Fredilocarcinus musmuschiae Pretzmann & Mayta 1980

(Figs. 3, 4, 7)

1980 *Dilocarcinus* (*Fredilocarcinus*) *musmuschiae* Pretzmann & Mayta, Anz. österr. Akad. Wiss. math.-naturw. Kl., **1980** (9): 142, figs 13–14.

1992 *Fredilocarcinus musmuschiae*, — Rodriguez, Faune tropicale, **31**: 132, figs. 2F, 4V, 5L, 7G, 10J, 13H, 46A-H.

Holotype: ♂ (NHMW 4384), Peru: Departamento Loreto, San Juan, near Aguaitia.

Material: Peru: Depto. Huánuco, 1 ♂ (NNHM 35941), Quebrada Panguana, 14.III.1983, M. S. Hoogmoed; 1 ♂ (SMNK 484), Panguana (09°37'S 74°56'W), Rio Yuyapichis, tributary of Rio Pachitea, 220–260 m, primary forest, barber traps near to a shallow stream of abt. 1 m width, 20. V. – 3. VI. 1984, leg. M. Verhaagh; 1 ♀ (SMF 22352), idem, 26. XI. – 24. XII. 1983; 1 ♂ (SMF 22353), 1 ♂ (INPA-CR 653), idem, 21. I. – 18. II. 1984; 1 ♂ (SMNK 485), idem, 29. X. – 26. XI. 1983; 2 ♂ 8 ♀ (SMNK 485), idem; 1 ♂ (SMF 22354), idem, 27.V.1981, leg. L. Meckling.

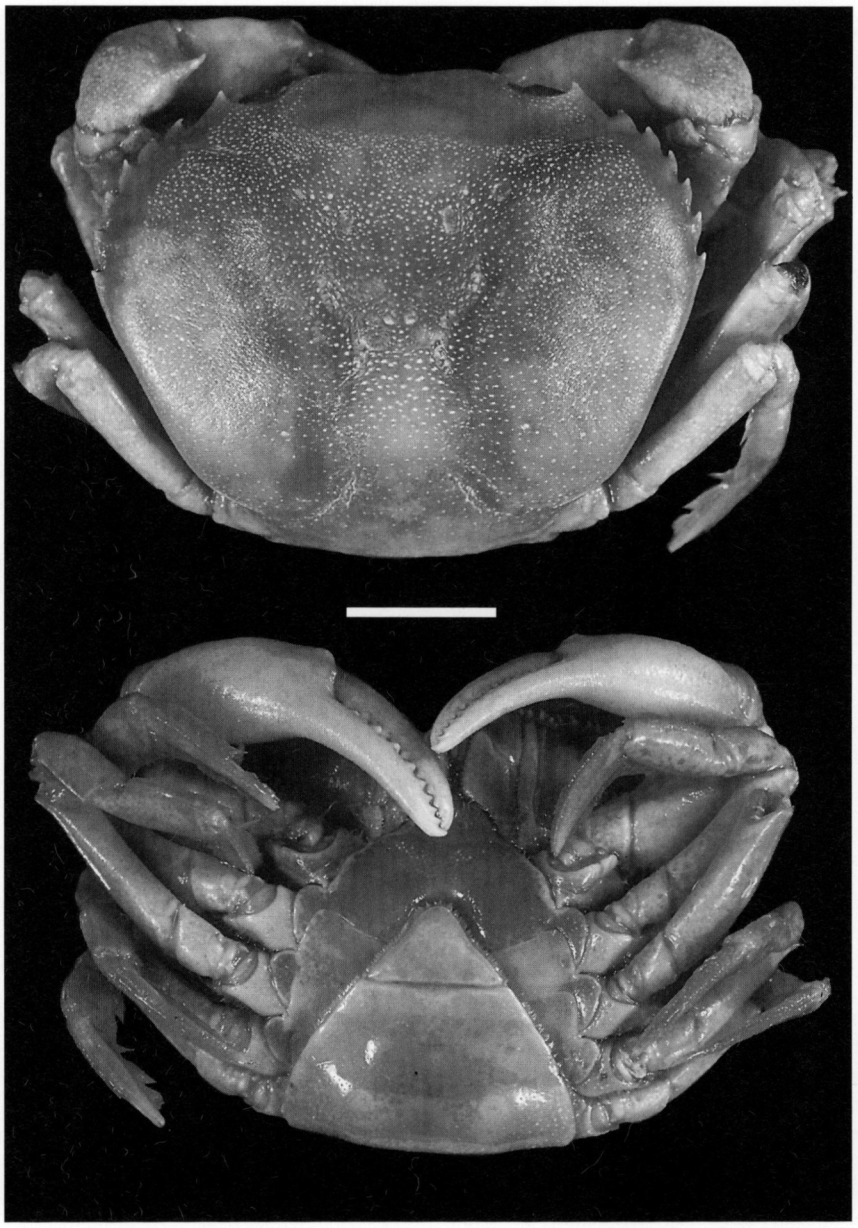


Fig. 3. *Fredilocarcinus musmuschiae* (NNHM 35941), dorsal and ventral aspect. — Scale 10 mm.

Diagnosis: Six to seven anterolateral teeth behind the exorbital tooth of carapace. Abdomen with segments III–VI fused; male abdomen broadly triangular, its lateral margins slightly convex. Male plp 1 with distal part slightly bent in lateral direction; ventral border distinctly bulging, with a well developed, rounded subdistal lobe. Subterminal spine fields arranged in two discontinuous patches, the larger patch on the mesio-ventral surface, mainly along the subdistal lobe, and a smaller one as a longitudinal row on the lateral surface. Apex flattened and relatively short, its length being shorter than the length of the subdistal lobe.

Measurements: 29.3 : 25.5 : ? : ? (holotype ♂)

Type locality: Peru, Depto. Loreto, San Juan, Aguaitia river.

Distribution: To date, known from the south-western part of the Amazon basin, in tributaries of Rio Ucayali.

Remarks: Concerning carapace morphology, this species is very similar to the other two species of the genus. However, it can be easily distinguished by the morphology of the male plp 1. In *F. musmuschiae,* the apex is shorter and the subdistal lobe is larger and more prominent than in the plp 1 of *F. raddai.* The differences to the plp 1 of *F. apyratii* n. sp. were commented above.

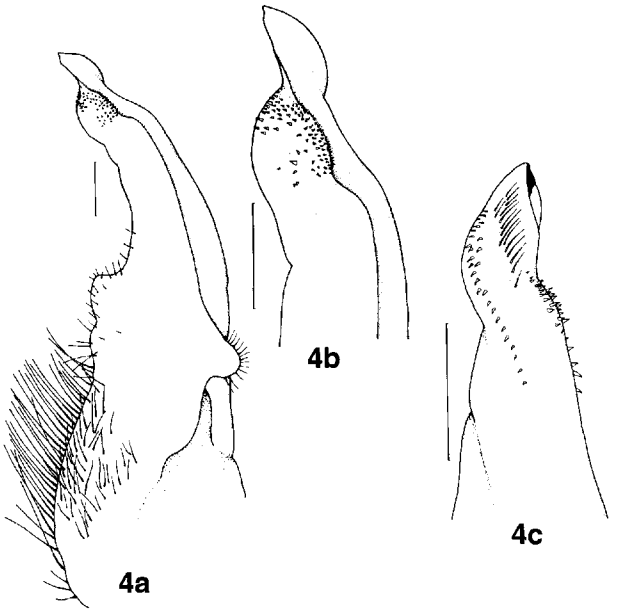


Fig. 4. *Fredilocarcinus musmuschiae* (NNHM 35941) right male plp 1; scales 1 mm. — a) Whole limb, ventro-mesial aspect; b) distal part, ventro-mesial aspect; c) distal part, lateral aspect.

Fredilocarcinus raddai Pretzmann 1978

(Figs. 5, 6, 7)

1977 *Dilocarcinus raddai* Pretzmann, Anz. österr. Akad. Wiss. math.-naturw. Kl., **1977** (7): 88 [Nomen nudum].
1978 *Dilocarcinus* (*Fredilocarcinus*) *raddai* Pretzmann, Sitz.-Ber. österr. Akad. Wiss. math. naturw. Kl., (1) **187** (6–10): 168, fig. 9.
1983 *Dilocarcinus* (*Fredilocarcinus*) *raddai*, — Pretzmann, Ann. naturhist. Mus. Wien, **84** (B): 308, pl. 1, fig. 2; pl. 2, fig. 5; pl. 3, fig. 10; pl. 4, fig. 13; pl. 5, fig. 17.
1983 *Dilocarcinus* (*Fredilocarcinus*) *raddai*, — Pretzmann, Ann. naturhist. Mus. Wien, **84** (B): 319, 324.
1992 *Fredilocarcinus raddai*, — Rodriguez, Faune tropicale, **31**: 131.

Holotype: ♂ (NHMW 4171), Peru: Depto. Loreto, ca. 20 km SW Iquitos, X.1976, leg. Radda.

Material: Peru: Depto Loreto: 1 ♂ 1 ♀ 4 juv. (NHMW 4172), ca. 20 km SW Iquitos, X. 1976, Pretzmann & Radda, leg.; 1 ♂ (NHML 1883–26), Huallaga river, Yurimaguas, Dr. Standinger.

Diagnosis: Six anterolateral teeth behind the exorbital tooth of carapace. Abdomen with segments III–VI fused; male abdomen broadly triangular, its lateral margins slightly convex. Male plp 1 with distal part slightly bent in lateral direction; ventral border distinctly bulging, with a reduced, little prominent subdistal lobe. Subterminal spine fields poorly developed, arranged in two discontinuous patches on the mesio-ventral and lateral surfaces. Apex flattened and relatively long, about 1.5 times longer than the subdistal lobe.

Measurements: 22.1 : 19.2 : ? : ? (holotype ♂)

Type locality: Peru, Depto. Loreto, near Iquitos.

Distribution: To date, known from the western Amazon basin, in Peru.

Remarks: The differences between the three species have already been discussed. Also, the number of *Fredilocarcinus* specimens available for study was small and this is attributed to the lack of survey work in the western Amazon region.

Goyazana Bott 1969

1969 *Dilocarcinus* (*Goyazana*) Bott, Abh. senckenb. naturf. Ges., **518**: 47.

Key to species of *Goyazana*

1. Male abdomen clearly triangular, lateral margins of segments IV–VI straight to concave. Male plp 1 nearly straight, spine fields weak ..... *G. castelnaui*
— Male abdomen broadly rounded, subtriangular, lateral margins of segments IV–VI convex. Male plp 1 with stem clearly curved towards its distal part, spine fields strong .... *G. rotundicauda* n. sp.

Goyazana castelnaui (H. Milne-Edwards 1853)

(Figs. 7, 8, 9)

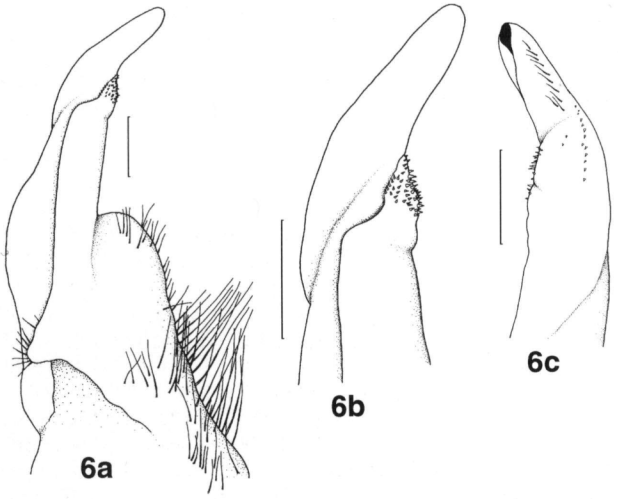
1853 *Dilocarcinus castelnaui* H. Milne-Edwards, Ann. Sci. nat., (3) **20**: 216 [part., non 1 ♂ (= *Dilocarcinus septemdentatus* (Herbst))].
1969 *Dilocarcinus* (*Goyazana*) *castelnaui*, — Bott, Abh. senckenb. naturf. Ges., **518**: 48, pl. 10, fig. 18a, b; pl. 20, fig. 49 [part., non "1 ♂ Paratypoide MPa"].
1969 *Trichodactylus argentinianus*, — Lenko, Ent. News, **80** (1): 6.
1977 *Dilocarcinus* (*Goyazana*) *castelnaui*, — Manning & Hobbs, Biota acuát. Sudamerica austral: 159.
1981 *Dilocarcinus castelmani* [sic], — Rodriguez, Aquat. Biota trop. South America, **1**: 48 [error].
1990 *Dilocarcinus* (*Goyazana*) *castelnaui*, — Zwink, Fauna de Crustáceos: 103.
1992 *Dilocarcinus castelnaui*, — Rodriguez, Faune tropicale, **31**: 115, fig. 41A–J.

Lectotype: ♂, dry specimen (MNHN 4045), "Salinas, province de Goyaz", V–VI.1844, leg. F. de Castelnau & E. Deville. [Lectotype designation by Bott (1969)].

Paralectotype: ♀, dry specimen (MNHN 4044), data as lectotype.

Material: Brazil: 2 ♂ 3 ♀ (NHMW 6658), lagoa Boa Vista, 30.III.1903 and 1906, Brasilien Exped.; 2 ♂ 2 ♀ (NHMW 6649), Barra, 1920; 1 ♂ (IRSNB), Amazonia. — Estado do Pará: 4 ♂ 4 ♀ (INPA-CR 312), Rio Tocantins, Acari-Pucú, V.1985, C. Rebelo; 1 ♀ (INPA-CR 383), idem, 21.XI.1985. — Estado do Maranhão: 2 ♀ (NHMW 6660), engenho da LEGISA, Parnaíba basin, 6.VI.1913, I. J. Haseman; 5 ♂ 1 ♀ (MNRJ MD-1183), Brejinho, 30 Km from Terezina, município de Caxias, 1973, L. Moojen e colab.; 1 ♀ (MNRJ MD-1193), Brejinho, Caxias, VII.1973, A. Carvalho; 1 ♀ (NHMW 6643), Caieira, riacho das Vacas; 1 ♀ (MZUSP 2393), Pres. Dutra, Independência, VI.1966, G.A. de Melo. — Estado do Tocantis: 2 ♂ 4 ♂ (MZUSP 2375), 3 ♂ 5 ♀ (MZUSP 2377), 3 ♂ (MZUSP 2378), 1 ♂ (MZUSP 2379), 4 ♂ 4 ♀ (MZUSP 2380), 1 ♂ 6 ♀ (MZUSP 2381), 2 ♂ (MZUSP 2382), 1 ♂ 1 ♀ (MZUSP 2383), 3 ♂ 2 ♀ (MZUSP 2384), 5 ♂ 3 ♀ (MZUSP 2384), 5 ♂ 3 ♀ (MZUSP 2385), 2 ♂ 1 ♀ (MZUSP 2400), 2 ♀ (MZUSP 6299), 2 ♂ 1 ♀ (INPA-CR 511), 1 ♂ 1 ♀ (UFPB 3104), 1 ♂ 1 ♀ (SMF 22261), Gurupi, 31.V.1976, G. de Melo; 1 ♂ (LACNHM), 35 km South of Peixe, 1.VI.1956, E. Y. Dawson; 1 ♂ (MZUSP 9700), córrego Guará, afl. mg. dir. Rio Bezerra (afl. Rio Paraná, afl. Rio Tocantins), foz do Bezerra, Ar-

Fig. 5. *Fredilocarcinus raddai* (NHML 1883.26), dorsal and ventral aspect. — Scale 10 mm.



raias, 15.IX.1988, P.B. Primo & W. Zwink. — Estado do Goiás: 1 ♀ (MZUSP 1653), I.1934, P. Konrad; 3 ♂ 1 ♀ (MZUSP 438), 1908; 2 ♂ (MZUSP 9697), Rio Atalainha, junto à ponte da GO-118, Monte Alegre de Goiás, 20.IX.1988, P.B. Primo & W. Zwink; 1 ♀ (MZUSP 9946), brejo do Rio Raiz, Monte Alegre de Goiás, 2.XII.1988, P. S. Young & P. B. Primo; 2 ♂ (INPA-CR 559), lagoa junto ao Rio São Domingos, São Domingos, 18.IX.1988,

Fig. 6. *Fredilocarcinus raddai* (NHML 1883.26), left male plp 1; scales 1 mm. — a) Whole limb, ventro-mesial aspect; b) distal part, ventro-mesial aspect; c) distal part, dorso-lateral aspect.

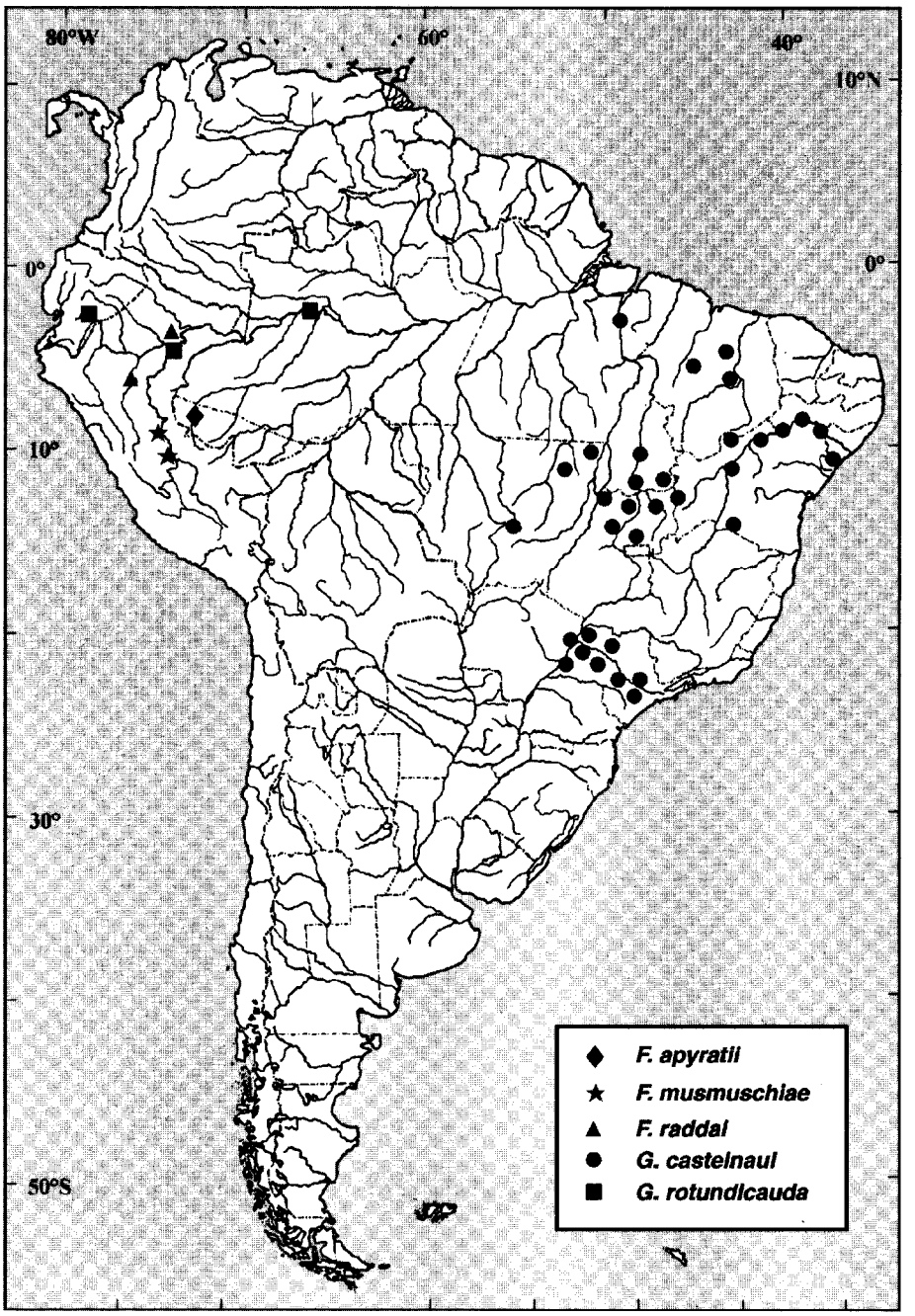


Fig. 7. Distribution map for the species of *Fredilocarcinus* and *Goyazana*.

J. C. DE OLIVEIRA & W. J. COSTA; 2 ♂ (MNRJ MD-1145), córrego Buriti, afl. Rio Tocantins, Minaçu, 25.V.1987, L. ALVARENGA e colab.; 1 ♂ 1 ♀ (MNRJ MD-1168), córrego Quineira, afl. Rio Tocantins, Minaçu, 2.VI.1987, L. ALVARENGA e colab.; 1 ♂ (MNRJ MD-1194), córrego do Curral, afl. Rio Tocantins, Minaçu, 30.V.1987, L. ALVARENGA; 1 ♂ (MNRJ MD-1221), córrego Amônia, afl. Rio Tocantins, Minaçu, L. ALVARENGA e colab.; 1 ♂ (LACNHM), 35 km North of Amaro Leite, 30.V.1956, E. Y. DAWSON; 1 ♀ (MNRJ MD-1206), Rio Indaial, Niquelândia, 9.X.1985, Eq. Malac. e Ictiol. Museu Nacional; 1 ♀ (MNRJ MD-1162), córrego Palmeira, Uruaçu, 17.X.1985, Eq. Malac. e Ictiol. Museu Nacional; 1 ♂ (MNRJ MD-1212), córrego Taquaral, Uruaçu, 4.X.1985, Eq. Malac. e Ictiol. Museu Nacional; 1 ♂ (ZSM 1088-2), Hochland von Goiás, bei Brasília, 10.VIII.1965. — Estado de Pernambuco: 2 ♂, broken (MNRJ MD-1246), mun. Boa Vista, O. SCHUBART; 1 ♀ (MZUSP 6315), Rio São Francisco, Belém de São Francisco, 16.V.1971. — Estado de Sergipe: 1 ♂ 1 ♀ (MZUSP 6331), Rio Vasa Barris, Simão Dias, 14.VIII.1971. — Estado da Bahia: 1 ♂ 1 ♀ (MZUSP 1900), Rio São Francisco; 4 ♂ 2 ♀ (MZUSP 440), Rio São Francisco, 1908, E. GARBE; 1 ♀ (USNM 47828), idem; 2 ♀ (MZUSP 6305), Rio São Francisco, Petrolândia, 18.VIII.1971, Exped. aguas Interiores; 2 ♂ 1 ♀ (MNRJ MD-1186), Rio São Francisco, Paulo