The Identities of *Pinnotheres nudus* Holmes, 1895 and *P. nudus* sensu Weymouth, 1910 (Crustacea: Decapoda: Pinnotheridae)

Ernesto Campos and Raymond B. Manning†

(EC) Facultad de Ciencias, Universidad Autónoma de Baja California, Apartado Postal 2300, Ensenada, Baja California, 22800 México; (RBM) Department of Invertebrate Zoology, National Museum of Natural History, Smithsonian Institution, Washington, D.C. 20560-0163 U.S.A.

**Abstract.**—The eastern Pacific species *Pinnotheres nudus* Holmes, 1895 is synonymized with *Opisthopus transversus* Rathbun, 1893. *Pinnotheres nudus* sensu Weymouth, 1910, named *P. holmesi* by Rathbun in 1918, also from the eastern Pacific, is shown to be a synonym of the western Atlantic *Zaops geddesi* (Miers, 1880), the second species to be assigned to the genus *Zaops* Rathbun, 1900.

Our ongoing studies of pinnotherids crabs of the Americas continue to yield new information on the identity of American species, newly discovered synonyms for them, and newly recognized genera and species from the Americas, including *Tumidotheres* Campos, 1989; *Juxtapabia* Campos, 1993; *Epulotheres* Manning 1993; and *Nannotheres* Manning & Felder, 1997.

Here we clarify the identity of two species from California originally placed in the genus *Pinnotheres* Bosc, 1802: *P. nudus* Holmes, 1895, which we show to be a synonym of *Opisthopus transversus* Rathbun, 1893; and *P. nudus* sensu Weymouth, 1910, named *P. holmesi* by Rathbun (1918), which we believe is a synonym of *Zaops geddesi* (Miers, 1880), a western Atlantic species. This latter species probably was introduced in California, where it apparently has not become established.

Rathbun’s (1893; 1918) accounts of the two species discussed here are so accurate that we quote them directly. We have added a few additional characters, indicated in italics, to her description of *Z. geddesi*.

Abbreviations used in the text include: cb, carapace width; cl, carapace length; MXP3, third maxilliped; WL, walking leg(s). The acronym USNM indicates material in collections of the National Museum of Natural History, Smithsonian Institution, Washington, D.C., and UABC in collection of the Laboratorio de Invertebrados, Facultad de Ciencias, Universidad Autónoma de Baja California, México.

*Opisthopus transversus* Rathbun, 1893

Figs. 1, 2

*Opisthopus transversus* Rathbun, 1893:252 [type locality: Monterey, California (36°35′N, 121°55′W)]; 1918:172, fig. 110, pl. 37, figs. 4, 5.—Schmitt et al., 1973:131 [complete synonymy].

*Pinnotheres nudus* Holmes, 1895:563, pl. 20, figs. 1–5 [type locality: Santa Cruz, California].—Rathbun, 1918: 83, pl. 64.—Schmitt et al., 1973:60 [see for a complete synonymy based on the unique original record]. [Not *P. nudus* sensu Weymouth, 1910:53 = *Zaops geddesi* (Miers, 1880).]

**Material examined.**—2 males, Punta San Miguel, Todos Santos Bay, 13 Oct 1985, in *Aplysia vaccaria* Winkler, Ensenada, Baja California; 3 females (1 juvenile), Punta Sofia, 26–27 Dec 1989, in *Pseudochama*...
exogyra (Conrad); 1 male, in Modiolus capax (Conrad); 2 males, 2 females, 28–29 Dec 1990, in P. exogyra. 1 juvenile female, El Rincón, in cultured Crassostrea gigas (Thunberg), 2 males, 3 females, La Baja-
da, 30–31 Dec 1990, in Atrina tuberculosa (Sowerby), Tortugas Bay, Baja California Sur (27°39′N, 114°54′W).

Description (from Rathbun 1918:83, as P. nudus).—Carapace a little broader than long, subquadrate with corners rounded, the anterior half nearly same shape and size as posterior half; surface curving downward toward all margins, smooth and naked; regions not defined. Front not protruding. Orbs ovate.

Chelipeds smooth, hands rather thick, widest immediately behind articulation of dactyl; fingers nearly or quite as long as palm, subconical, not conspicuously dentate on inner margin, partly covered by a very short, dense pubescence.

Three anterior legs subequal, fourth smaller; all are smooth, little compressed, and have acute, nearly straight tarsi, those of four pair being relatively longer and more slender than those preceding.

Abdomen of the female nearly circular, covering entire sternal surface, composed of seven separate segments of which the fourth, fifth, and sixth are subequal and larger than the others.

Remarks.—Pinnotheres nudus was described and named by Holmes (1895) on the basis of two females (cl 20 mm, cb 24 mm and cl 15.5 mm, cb 19 mm) from Santa Cruz, California. The female holotype and other female collected in Santa Cruz and Monterey, California, respectively, deposited in the California Academy of Sciences, were destroyed in the fire following the San Francisco earthquake in 1906 (Rathbun 1918).

Analysis of the Holmes’s (1895) original description of P. nudus resulted in our finding that its morphology agrees very well with that observed in actual specimens of O. transversus Rathbun, 1893 (Fig. 2A–J). Both have the carapace dorsally smooth and naked, subquadrate in outline, with rounded corners. They have a MXP3 with a carpus shorter than the spatulate propodus, and a spoon-shaped dactylus that is inserted proximally on the ventral margin of the propodus, with its apex extending beyond the tip of the propodus. Both have the WL1-3 subequal in length and shape, WL4 being shortest; an abdomen, nearly circular, composed of six somites and telson free, with somites 4–6 subequal and larger than the others. Other shared features include the large antennae, visible when dorsally, cheliped shape, and pubescence on the cheli-
pered, MXP3, and abdomen. The lack of a suture between the ischiium and merus of MXP3 in the original figure of P. nudus (Fig. 1E) is interpreted as an inaccuracy in the original artistic work. Further, that char-
acter was not mentioned in the original de-
scription. Females of O. transversus have a visible suture, although, as in some males, it sometimes is faintly indicated and can be overlooked. Crosnier (1969) reported a male lacking this suture. The carapace of Opisthopus transversus is variable in shape, in some specimens more quadrate, in others more rounded (Fig. 2A–C).

Based on the close similarity between ac-
tual specimens of O. transversus and the description and figures of P. nudus we be-
lieve that these two taxa should be consid-
ered synonyms.

Opisthopus transversus now ranges from Santa Cruz, California, U.S.A. to Laguna de San Ignacio, Baja California Sur, México. It is a symbiont in a wide variety of hosts including amphineuran mollusks, gastro-
pods, bivalves, polychaetes and holothu-
roids (see Campos et al. 1992).

Zaops geddesi (Miers, 1880), new combination
Figs. 3, 4C–E

Pinnotheres geddesi Miers, 1880:86 [type locality: Veracruz, Mexico (19°11′N, 96°10′W); syntypes in The Natural History Museum, London].—Rathbun,
Fig. 1. Pinnothereos nudus Holmes, 1895, female holotype. A: Abdomen; B: Carapace; C. Left cheliped, outer aspect; D. Fourth WL; E. MXP3. (from Holmes 1895:pl. 20).

1918:70, fig. 32, pl. 16, figs. 1–4.—Schmitt et al., 1973:45 [complete synonymy].

Pinnothereos ostrearius Rathbun, 1901:20, fig. 3 [type-locality: Mayaguez, Puerto Rico (18°13′N, 67°09′W)]

Pinnothereos nudus.—Weymouth, 1910:53, fig. 1 [Monterey Bay, California (Monterey = 36°35′N, 121°55′W)] [not P. nudus Holmes, 1895 = Opisthopus transversus Rathbun, 1893].

Pinnothereos holmesi Rathbun, 1918:68, fig. 31, pl. 15, figs. 1, 2 [type locality: ?Pacific Grove, California (36°36′N, 121°56′W)].

Material examined.—Pinnothereos ostrearius Rathbun, holotype and paratype, USNM 23767; P. holmesi Rathbun, holotype, USNM 51000.

Description (except underlined, from Rathbun, 1918: 70, as P. geddesi).—“Carapace very soft and yielding, transversely suborbicular, broad behind. Gastric region
distinctly outlined by a furrow, cardiac region less distinct. Front rounding downward, slightly projecting, truncate in dorsal view. Orbits circular, eyes partly visible in dorsal view.

Ischiu-merus of outer maxillipeds robust, outer margin regularly convex, inner margin with bluntly rounded angle near distal extremity; carpus and propodus robust, the latter rounded and ciliated at distal end; dactyl very slender, styliform, reaching about to extremity of propodus.

Chelipeds smooth; palm rapidly increasing in width from proximal to near distal end, which articulates almost vertically with dactylus; upper margin convex at widest
Fig. 4. Species of *Zaops*. A, B, F, *Z. ostreum* (Say, 1818), C–E, *Z. geddesi* (Miers, 1880), new combination (C, D, type of *F. ostrearius* Rathbun, 1901). A, Left cheliped, dorso-inner aspect; B, MXP3; C, Left chela, outer aspect; D, MXP3; E, Right chela, outer aspect. (A, B from Manning 1993:fig. 5; C, D, from Rathbun 1901:fig. 3 and Rathbun 1918:fig. 32).

Miers taxon should be transferred to the genus *Zaops*. It is the second species of *Zaops* Rathbun, 1900.

Rathbun [1918:63, (key); 69, (text)] commented that one of the distinguishing features of *Pinnotheres holmesi* is that the palm widens rapidly to a point behind base of fingers (Figs. 3C, 4A); she reported the same character in her account of *P. ostrearius* (1901:20). So far as we can tell, the shape of the palm is almost the same in *Z. geddesi* (Fig. 4E) and *Z. ostreum* (Fig. 4F). The species cannot be differentiated using this character.

The major difference in the chela of the two species lies in the angle of the articulation of the dactylus to the propodus. In *Z. geddesi* the articular surface of the propodus (Fig. 4E) is almost vertical, whereas in *Z. ostreum* that surface is at an oblique angle (Fig. 4F).

Another character mentioned by Rathbun (1918:69) is that the first three legs (WL1–3) are much slenderer in *Z. geddesi* than in *Z. ostreum*. This may not be true, as the length of the propodus is almost seven times longer than high in *Z. ostreum*, less than six times longer than high in *Z. geddesi*. This may be a feature that varies with size and whether the longer or the shorter WL2 is measured.

A second, possible record for *Pinnotheres holmesi* is mentioned in a letter dated September 5, 1946 from H. W. Clark of Pacific Union College to S. A. Glassell. Clark noted:

“We found a specimen of *Pinnotheres holmesi*, as it appears to be, in the mantle cavity of a large clam. All we can find on it is in Schmitt’s Marine Decapods of California... Our specimen varies from his description in several points, not enough to make a new species, but perhaps enough to make a new subspecies. We found it on the Sonoma coast.”

So far as we can tell, this observation has never been published and we have not been able to determine whether the material is extant.

*Zaops geddesi* is the southern counterpart of *Z. ostreum*, and like *Z. ostreum*, its preferred habitat is in oysters, although no specific host has been mentioned in the literature. *Zaops geddesi* is known from Vera...
Miers taxon should be transferred to the genus Zaops. It is the second species of Zaops Rathbun, 1900.

Rathbun [1918:63, (key); 69, (text)] commented that one of the distinguishing features of Pinnotheres holmesi is that the palm widens rapidly to a point behind base of fingers (Figs. 3C, 4A); she reported the same character in her account of P. ostrearius (1901:20). So far as we can tell, the shape of the palm is almost the same in Z. geddesi (Fig. 4E) and Z. ostreum (Fig. 4F). The species cannot be differentiated using this character.

The major difference in the chela of the two species lies in the angle of the articulation of the dactylus to the propodus. In Z. geddesi the articular surface of the propodus (Fig. 4E) is almost vertical, whereas in Z. ostreum that surface is at an oblique angle (Fig. 4F).

Another character mentioned by Rathbun (1918:69) is that the first three legs (WL1–3) are much slenderer in Z. geddesi than in Z. ostreum. This may not be true, as the length of the propodus is almost seven times longer than high in Z. ostreum, less than six times longer than high in Z. geddesi. This may be a feature that varies with size and whether the longer or the shorter WL2 is measured.

A second, possible record for Pinnotheres holmesi is mentioned in a letter dated September 5, 1946 from H. W. Clark of Pacific Union College to S. A. Glassell. Clark noted:

"We found a specimen of Pinnotheres holmesi, as it appears to be, in the mantle cavity of a large clam. All we can find on it is in Schmitt’s Marine Decapods of California... Our specimen varies from his description in several points, not enough to make a new species, but perhaps enough to make a new subspecies. We found it on the Sonoma coast."

So far as we can tell, this observation has never been published and we have not been able to determine whether the material is extant.

Zaops geddesi is the southern counterpart of Z. ostreum, and like Z. ostreum, its preferred habitat is in oysters, although no specific host has been mentioned in the literature. Zaops geddesi is known from Veratrix, Mexico; Cuba; Puerto Rico; and Brazil (Rathbun 1918). The single specimen of Zaops geddesi known to occur in the eastern Pacific must have been introduced around or before the turn of the century. There is no evidence that the species occurs naturally in the eastern Pacific.

Acknowledgments

We thank James T Carlton, Williams College — Mystic Seaport, Connecticut, for his comments on introduced species in California; to Rafael Lemaitre, Gerhard Pohle and Fernando Tincao for reviewing our manuscript with great care. Figs. 1 and 2 were prepared by Alma Rosa de Campos and Figs. 3 and 4 by Lilly King Manning. We gratefully acknowledge their contributions. Campos' studies of pinnotherids are supported by program Crustaceos simbiontes del Pacifico Mexicano. Manning's studies of pinnotherids were supported by the Smithsonian Marine Station at Fort Pierce, Florida. This is contribution no. 488 from that facility.

Literature Cited


A new raninid crab (Crustacea: Decapoda: Brachyura) from the Kase Formation (lower Miocene) of Kyushu, Japan
Hiroaki Karasawa

Mizunami Fossil Museum, Yamanouchi, Akeyo, Mizunami, Gifu 509-6132, Japan

Abstract. — Carinaranina fudoujii, new species, a crab of the family Raninidae is described from the lower Miocene Kase Formation in Nagasaki Prefecture, Kyushu, southwest Japan. Recognition of this species of Carinaranina from the Miocene of Japan expands the geographic and geologic ranges of the genus, previously known from the Eocene-Oligocene of the Pacific slope of the U.S.A.

Tucker (1998) established the genus Carinaranina Tucker (1998) within the family Raninidae De Haan, 1841 and referred five species from Eocene-Oligocene rocks of Washington and Oregon to it. She also suggested using cladistic analysis that Carinaranina had close affinities with extant Raninoides H. Milne Edwards, 1837 and extinct Laeviranina Lorenthey in Lorenthey & Beurlen, 1929.

The purpose of the present paper is to describe a new species of Carinaranina from the Miocene of Japan. The specimens were collected from shale of the Kase Formation exposed in a cliff about 1.2 km east of Mottogaura (Loc. KS-1), Shikano-cho, Kitamatsu-ura-gun, Nagasaki Prefecture (33°16′28″N; 129°37′03″E) (Fig. 1). Carinaranina occurred in the deposits, in association with a pelecypod, Portlandia watasei (Kanehara, 1937), and decapods, Carcinoplax antiqua (Ristori, 1889), and Minohelenus sp. The presence of planktonic foraminifera indicates that the geologic age of the Kase Formation was the earliest Miocene (24.5 Ma and 22.4 Ma) (Sakai et al. 1990). Specimens are deposited in the Mizunami Fossil Museum (MFM), Yamanouchi, Akeyo, Mizunami, Gifu, Japan, and the Kitakyushu Museum and Institute of Natural History (KMNH IvP), Nishihonmachi 3-chome, Yahatahigashi-ku, Kitakyushu, Japan.

Systematics
Family Raninidae De Haan, 1841
Subfamily Raninoidinae Lorenthey in Lorenthey & Beurlen, 1929
Genus Carinaranina Tucker, 1998
Type species. — Eumorphocorystes nassaleanus Rathbun, 1926 by original designation.

Geologic range. — Upper Eocene—lower Miocene.

Carinaranina fudoujii, new species
Figs. 2, 3

Types. — MFM83061, holotype; 7 para-types, MFM83062-83065, KMNH IvP 300,024-300,026.

Diagnosis. — Large sized Carinaranina. Carapace longitudinally ovate in outline, length about 1.4 times width, widest almost at midlength. Orbitofrontal margin narrow. Rostrum triangular, convex dorsally. Upper orbital margin with 2 V-shaped fissures. Outer orbital tooth wide, bifid; internal branch triangular; external branch broad without supplementary spine. Inner orbital tooth small. Anterolateral margin slightly concave. Hepatic spine slender, about 12% carapace length. Posterolateral margin weakly sigmoid. Dorsal surface gently convex, finely punctuate, with median carina. Chelipeds slender, elongate; dactylus and

—. 1900. The catapetomatous or graspid crabs of North America.—American Naturalist 34:583–592.

View This Item Online: https://www.biodiversitylibrary.org/item/110038
Permalink: https://www.biodiversitylibrary.org/partpdf/49204

Holding Institution
Smithsonian Libraries

Sponsored by
Biodiversity Heritage Library

Copyright & Reuse
Copyright Status: In copyright. Digitized with the permission of the rights holder.
Rights Holder: Biological Society of Washington
License: http://creativecommons.org/licenses/by-nc-sa/3.0/
Rights: https://biodiversitylibrary.org/permissions

This document was created from content at the Biodiversity Heritage Library, the world’s largest open access digital library for biodiversity literature and archives. Visit BHL at https://www.biodiversitylibrary.org.

This file was generated 1 June 2022 at 13:50 UTC