

Results of the Rumphius Biohistorical Expedition to Ambon (1990)



Part 7. The Trapeziidae (Crustacea: Brachyura: Xanthoidea) of Indonesia

P. Castro

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P. Castro, Biological Sciences Department, California State Polytechnic University, Pomona, CA 91768-4032, U.S.A. (e-mail: pcastro@csupomona.edu).

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Twenty-four species of trapeziid crabs, symbionts of scleractinian corals and other colonial cnidarians, are listed from Ambon and other locations throughout Indonesia. Sixteen of these species were collected by the Rumphius Biohistorical Expedition to Ambon (1990). Eight species (*Quadrella reticulata* Alcock, 1898, *Tetraloides heterodactyla* (Heller, 1861), *Trapezia flavopunctata* Eydoux & Souleyet, 1842, *T. formosa* Smith, 1869, *T. garthi* Galil, 1983, *T. lutea* Castro, 1997, *T. punctipes* Castro, 1997 and *T. serenei* Odinetz, 1984) are new records for Indonesia. The taxonomic status of *Quadrella boopsis*, *Q. reticulata*, *Tetralia rubridactyla* Garth, 1971 and *Trapezia garthi* Galil, 1983 are also revised. A key for the identification of the Indonesian species of *Quadrella*, *Tetralia* and *Trapezia* is given.

Introduction

A collection of trapeziid crabs made during the Rumphius Biohistorical Expedition to Ambon, Maluku (Moluccas), Indonesia in 1990 provided the basis of this study. *Trapezia* and *Tetralia* are obligate symbionts of scleractinian corals. All species of *Trapezia* use pocilloporid corals (*Pocillopora*, *Seriatopora*, *Stylophora*) as primary hosts, whereas *Tetralia* and *Tetraloides* use acroporid corals (*Acropora*). *Quadrella* species are mostly found on gorgonians and antipatharians, although one species, *Q. boopsis*, appears to be associated exclusively with azooxanthellate (ahermatypic) scleractinian corals. *Jonesius* and *Palmyria* are symbionts of several genera of scleractinian corals.

The Rumphius material, although preserved in 70% alcohol, kept its original colour remarkably well. Colour photographs and collection of live specimens complemented information about the colour pattern of some of the species. Additional Indonesia material from collections in several museums, particularly that collected by the Snellius Expedition (1929-30), was also identified.

Materials and Methods

Geographic names in English follow for the most part their spelling in the ninth revised edition (1993) of the *Times Atlas of the World* (Times Books, London) and the third edition (1982) of the *Gazetteer of Indonesia* (Defense Mapping Agency, Washington D.C.). Motteler (1986) was consulted for the names of Pacific Ocean islands. Stations of the Rumphius Biohistorical Expedition in Ambon were described by Strack (1993), while those of the Snellius Expedition were described by Boschma (1936). Measurements given for specimens refer to carapace width (cw) and carapace length (cl).

Specimens examined are deposited in the following museums and institutions:

ASIZ	Institute of Zoology, Academia Sinica, Taipei, Taiwan
BMNH	Natural History Museum (formerly British Museum [Natural History]), London, United Kingdom
BPBM	Bishop Museum, Honolulu, Hawaii, U.S.A.
CBM	Natural History Museum and Institute, Chiba, Japan
CHCD	Taiwan Museum, Taipei, Taiwan
LACM	Natural History Museum of Los Angeles County, Los Angeles, California, U.S.A.
MNHN	Muséum National d'Histoire Naturelle, Paris, France
MHNR	Muséum d'Histoire Naturelle, St.-Denis, La Réunion
NHS	Nanki High School, Tanabe, Japan
NUS	Zoological Reference Collection, National University of Singapore, Singapore
RMNH	Nationaal Natuurhistorisch Museum (formerly Rijksmuseum van Natuurlijke Historie), Leiden, The Netherlands
SAM	South African Museum, Cape Town, South Africa
SMF	Forschungsinstitut Senckenberg, Frankfurt am Main, Germany
UMZ	University Museum of Zoology, Cambridge University, Cambridge, United Kingdom
USNM	National Museum of Natural History, Smithsonian Institution, Washington, D.C., U.S.A.
YU	Department of Biology, York University, York, U.K.
ZMA	Zoölogisch Museum, Universiteit van Amsterdam, The Netherlands
ZMG	Zoologisches Museum, Göttingen, Germany (on permanent loan to SMF)
ZMMU	Zoological Museum, Moscow State University, Moscow, Russia

List of the species

- Family Trapeziidae Miers, 1886
 Genus *Jonesius* Sankarankutty, 1962
 Jonesius triunguiculatus (Borradaile, 1902)
 Genus *Palmyria* Galil & Takeda, 1986
 Palmyria palmyrensis (Rathbun, 1923)
 Genus *Quadrella* Dana, 1851

- Quadrella boopsis* Alcock, 1898
- Quadrella coronata* Dana, 1852
- Quadrella maculosa* Alcock, 1898
- Quadrella reticulata* Alcock, 1898

Genus *Tetralia* Dana, 1851

- Tetralia cinctipes* Paulson, 1875
- Tetralia fulva* Serène, 1984
- Tetralia nigrolineata* Serène & Dat, 1957
- Tetralia rubridactyla* Garth, 1971

Genus *Tetraloides* Galil, 1986

- Tetraloides heterodactyla* (Heller, 1861)

Genus *Trapezia* Latreille, 1828

- Trapezia cymodoce* (Herbst, 1801)
- Trapezia digitalis* Latreille, 1828
- Trapezia ferruginea* Latreille, 1828
- Trapezia flavopunctata* Eydoux & Souleyet, 1842
- Trapezia formosa* Smith, 1869
- Trapezia garthi* Galil, 1983
- Trapezia guttata* Rüppell, 1830
- Trapezia lutea* Castro, 1997
- Trapezia punctipes* Castro, 1997
- Trapezia rufopunctata* (Herbst, 1799)
- Trapezia septata* Dana, 1852
- Trapezia serenei* Odinetz, 1984
- Trapezia tigrina* Eydoux & Souleyet, 1842

Key to the Indonesian species of *Quadrella*, *Tetralia* and *Trapezia*

1. Anterior border of carapace with conspicuous, often triangular, teeth-like lobes. Carapace hexagonal, its posterior border slightly wider than or as wide as anterior border. On antipatharians (black corals), gorgonians, alcyonaceans (soft corals) or azooxanthellate (ahermatypic) scleractinian corals *Quadrella* 2
- Anterior border of carapace with relatively small lobes or no lobes at all. Carapace trapezoidal or oval, its posterior border shorter than anterior border. On zooxanthellate (hermatypic) scleractinian corals (genera of Acroporidae or Pocilloporidae) 5
2. Thoracic sternum is crossed from side to side by a suture (suture 2/3) 3
- Thoracic sternum is not crossed by complete transversal suture (suture 2/3) except in juveniles and small adults 4
3. Chelipeds relatively short, their merus less than two thirds carapace length and armed with relatively short teeth. Anterior border of carapace with short teeth provided with rounded tips. Posterior border of propodus of walking legs smooth, without spines *Quadrella boopsis*
- Chelipeds long, their merus more than two thirds carapace length and armed with 8-12 long, curved, spine-like teeth. Anterior border of carapace triangular and with pointed tips. Posterior border of propodus with spines

- *Quadrella coronata*
4. Chelipeds relatively short; merus armed with 8-12 short triangular teeth that extend along its entire length. Posterior margin of dactylus of fourth walking legs with 12-13 teeth that increase in size toward the tip *Quadrella reticulata*
- Chelipeds long; merus armed for most of its length with short pointed or blunt (obtuse) tubercles, with only 2-3 distal ones conspicuous and tooth-like (only juveniles and small adults with short teeth along entire length of merus). Posterior margin of dactylus of fourth walking legs with 15 or 16 teeth of approximately the same size *Quadrella maculosa*
5. Chelipeds very dissimilar in size. Male abdomen with seven segments. In acroporid corals (*Acropora*) 6
- Chelipeds only slightly dissimilar in size. Male abdomen with five segments. In pocilloporid corals (*Pocillopora*, *Seriatopora*, *Stylophora*) *Trapezia* 10
6. Largest cheliped with setae-filled depression on dorsal, proximal surface of propodus. Thoracic sternum with median suture *Tetralia* 7
- Largest cheliped without a setae-filled depression. Thoracic sternum without median suture *Tetraloides heterodacyla*
7. Walking legs banded brown. Surface of chelipeds with heavy granules. Endopod of first maxilliped with slightly concave anterior edge *Tetralia cincipies*
- Walking legs not distinctly banded. Surface of chelipeds smooth or with microscopic granules. Endopod of first maxilliped with straight or slightly concave anterior edge 8
8. Anterior, distal border of cheliped merus with prominent dentate crest. Distal portion of cheliped dactylus orange-red *Tetralia rubridactyla*
- Anterior border of cheliped merus with a shallow crest or no crest at all. Distal portion of cheliped dactylus not conspicuously coloured 9
9. Thin orange to orange-red line along anterior border of carapace; gray band may be present along anterolateral borders. Endopod of first maxilliped with rectangular inner anterior edge and rounded outer edge *Tetralia fulva*
- Conspicuous black band followed by a thin blue-green line along anterior and anterolateral borders of carapace. Endopod of first maxilliped with both inner and outer edges rounded *Tetralia nigrolineata*
10. Upper and outer borders of cheliped propodus with conspicuous tomentum that consists of many long setae; propodus with keel-like (subacute) upper border .. 11
- Upper and outer borders of cheliped propodus without tomentum along entire length, although microscopic or visible setae may be present; propodus with rounded upper border 12
11. Conspicuous suture between second and third thoracic sternites always present. Carapace with almost straight anterolateral borders except in largest specimens; epibranchial teeth acute except in largest specimens. Dorsal surface of carapace purplish to brownish blue, with a row of orange-red spots across; dactylus of chelipeds distally black only to about two thirds its length *Trapezia cymodoce*
- Suture between second and third thoracic sternites present only in smaller specimens, partially or completely fused in larger ones. Carapace with rounded anterolateral borders; epibranchial teeth acute in smaller specimens, blunt (obtuse) in larger ones. Carapace orange; dactylus of chelipeds almost entirely black

- *Trapezia lutea*
12. Dorsal surface of carapace of live individuals or recently preserved specimens without coloured spots, dots, bands or lines, other than a very thin line along anterior border of carapace or distinctive band in postlarvae and juveniles 13
 - Dorsal surface of carapace ornamented with distinctive coloured spots, dots, bands or lines that very often remain in preserved specimens (if anterior border of carapace is coloured differently from rest of carapace, it is as broad band, not as very thin line, and walking legs are ornamented with coloured dots) 17
 13. Carapace and chelipeds dark brown, colour remaining in preserved specimens (broad cream band may be present across carapace in postlarvae and juveniles). Frontal border of carapace with very slight emarginations and minute teeth
 - *Trapezia digitalis*
 - Carapace orange or orange-pink. Frontal border of carapace with well demarcated emarginations and no visible teeth (microscopic in some specimens) 14
 14. Carapace with anterolateral borders strongly curved, giving carapace distinctively rounded or globose appearance *Trapezia formosa*
 - Carapace with anterolateral borders only slightly rounded 15
 15. Walking legs orange with many orange-red dots. Orange-red dots also on ventral somites and usually on abdomen *Trapezia punctipes*
 - Walking legs, ventral somites and abdomen without coloured dots (an orange-red spot may be present on each walking leg) 16
 16. Carapace orange or brown-orange. Orange-red spot on distal end of propodus of walking legs. Suture between second and third thoracic somites present only in very small specimens *Trapezia ferruginea*
 - Carapace orange-pink with conspicuous pink or purplish edges that remains in preserved specimens. No spots on walking legs. Suture between second and third thoracic somites present except in largest specimens *Trapezia serenei*
 17. Lower border of cheliped propodus armed with thick, teeth-like tubercles 18
 - Lower border of cheliped propodus smooth or with microscopic tubercles 19
 18. Frontal teeth of carapace rounded. Dorsal surface of carapace red with large yellow spots *Trapezia flavopunctata*
 - Frontal teeth of carapace triangular. Dorsal surface of carapace light orange to orange-white with red spots *Trapezia rufopunctata*
 19. Dorsal surface of carapace white to orange-white without any spots or dots, but with a brown band across frontal border between the eyes. Walking legs ornamented with red dots *Trapezia guttata*
 - Dorsal surface of carapace with dots, spots or a network of lines 20
 20. Carapace, chelipeds and walking legs with small red dots *Trapezia tigrina*
 - Carapace and chelipeds not ornamented exclusively with small red dots 21
 21. Carapace with square to irregular orange spots surrounded by dark red-purple (magenta) lines *Trapezia garthi*
 - Carapace with honeycomb-like network of red-brown lines interconnected as pentagons or hexagons on pink to orange-white background *Trapezia septata*

Descriptive part

Jonesius triunguiculatus (Borradaile, 1902)

For synonymy see Galil & Takeda, 1986: 165.

Material.— **Indonesia.** TUKANGBESI IS. Binongko I., sta. 4.030, 05°55'S 123°59'E: 1 ♀, RMNH D 47028, 10.ix.1984, Indonesian-Dutch Snellius II Expedition. MALUKU (= MOLUCCAS). Banda Is., on coral: 1 ♀, MNHN-B 22196, 31.i.1975, Rumphius II Expedition, R. Serène; Gorong, sta. GO-2, on *Porites*: 1 ♂, 1 ♀, MNHN-B 9910, 26.i.1975, Rumphius II Expedition, T. Monod & R. Serène. MISOOL. On *Goniastrea*: 2 ♂♂, MNHN-B 9909, 23.i.1975, Rumphius II Expedition, R. Serène.

Colour.— A live male collected from *Porites lobata* in Oahu, Hawaiian Islands (BPBM S11359) had a mostly light brown carapace and chelipeds. The posterior third of the carapace and the merus of the chelipeds, however, were colourless. Three white spots were present along the anterior margin of the anterior portion of the carapace. The large tubercles on the cheliped propodus were red brown. This pattern is somewhat similar to that shown in a colour illustration that was given by Takeda (1982: fig. 548).

Remarks.— *J. triunguiculatus* was recorded from southern Maluku by Serène et al. (1976: 18, as *Maldivia triungulata*), Monod & Serène (1976: 26, as *M. triungulatus*) and Kastoro et al. (1980: 60, as *M. triungulata*). A second undetermined species, *Maldivia* aff. *triungulatus*, was also listed by Monod & Serène (1976: 26).

This species, a symbiont of numerous genera of scleractinian corals, is known from locations across the Indo-West Pacific region and from the Galápagos Islands in the eastern Pacific (Coles, 1982: 203; Serène, 1984: 297; Galil & Takeda, 1986: 165). Its placement in the Trapeziidae, based primarily on its association with scleractinian corals, is questionable.

Palmyria palmyrensis (Rathbun, 1923)

For synonymy see Galil & Takeda, 1986: 169.

Material.— **Indonesia.** TUKANGBESI IS. Binongko I., southwest of Taipabu, sta. 4.044b, 05°56'S 123°58.4'E: 1 ♀, RMNH D 47035, 11.ix.1984, Indonesian-Dutch Snellius II Expedition. MALUKU (= MOLUCCAS). Gorong, sta. GO-1: 1 ♂, MNHN-B 9911, 25.i.1975, Rumphius II Expedition, R. Serène.

Remarks.— *P. palmyrensis* was previously recorded, as *Maldivia palmyrensis*, from southern Maluku (Serène et al., 1976: 18; Kastoro et al., 1980: 60). It is known from relatively few specimens that have been collected in association with scleractinian corals (Serène, 1984: 296). As in *Jonesius*, evidence for the placement of *Palmyria* in the Trapeziidae is primarily based on its association with scleractinian corals. Its position in the Xanthoidea should be examined.

Quadrella boopsis Alcock, 1898 (fig. 1)

Quadrella boopsis Alcock, 1898: 227; 1899: pl. 38 fig. 1; Sakai, 1965: 163, fig. 19, pl. 80 fig. 4; 1976: 512, pl.

184 fig. 2; Serène, 1973: 201; 1975: 514, figs. 5-12, pl. 2; 1984: 287, fig. 191, pl. 41 fig. A; Kensley, 1981: 45; Takeda, 1982: 194, fig. 574; Miyake, 1983: 140, 235, pl. 47 fig. 5; Castro, 1999a: 95.
Quadrella bispinosa Borradaile, 1902: 266, fig. 58; Barnard, 1950: 819; Guinot, 1967: 275; Serène, 1968: 89; 1973: 198; Galil & Takeda, 1985: 197, fig. 1; Galil, 1986b: 278, figs. 3 A-D; Yamaguchi et al., 1987: 30.
Quadrella boopsis boopsis; Serène, 1968: 89.
Quadrella aff. *boopsis*; Serène, 1973: 202, figs. 2, 14-16.
 not *Quadrella boopsis*; Galil, 1986b: 281, figs. 4A, B (= *Quadrella reticulata* Alcock, 1898).

Material.— **Indonesia.** MALUKU (= MOLUCCAS). Saparua, sta. KU-1, 03°30'N 128°33'E, 10 m, on *Dendrophyllia micrantha*: 1 ♂ (cl = 8.8 mm, cw = 10.7 mm), 2 ♀♀ (cl = 5.4, 10.0 mm, cw = 7.0, 12.4), MNHN-B 9950, 20.i.1973, Rumphius I Expedition, Sukarno & R. Serène.

Papua New Guinea. MADANG PROVINCE. Hansa Bay, Awar wreck: 1 ♂, NUS 1995.360, viii.1992, D. van den Spiegel.

Philippine Islands. LAPININ I.: 1 ♀ (cl = 11.8 mm, cw = 14.2 mm), ZMG 265, 1863-64, C. Semper.

Japan. KII PENINSULA. Kii-Nagashima, NW Owase: 1 ♀ (cl = 7.5 mm, cw = 9.8 mm), SMF 23854, T. Sakai; 4 ♂♂ (cl = 4.5-7.7 mm, cw 5.5-9.7 mm), 3 ♀♀ (cl = 4.3-10.0 mm, cw = 5.5-12.5 mm), 3 juveniles, SMF 23855, xii.1963; Minabe: 1 ♂ (cl = 7.4 mm, cw = 9.0 mm), 2 ♀♀ (cl = 5.5-10.7 mm, cw = 7.0-13.5 mm), SMF 23853, T. Sakai. Off Iwashiro, 50-650 m, on *Dendrophyllia* sp.: 1 ♀ (cl = 9.1 mm), NHS, 28.i.1998, M. Marumura.

French Polynesia. MARQUESAS ISLANDS. Eiao I., sta. CP1157, 100 m, on branching scleractinian coral: 1 ♀ (cl = 8.2 mm, cw = 9.4 mm), MNHN-B 26201, 23.viii.1997, MUSORSTOM 9; 1 ♂, MNHN-B 26148. Nuku Hiva I., sta. CP1177, 108-112 m, on branching scleractinian coral: 3 ♂♂, 7 ♀♀, 3 juv., MNHN-B 26149, 25.viii.1997, MUSORSTOM 9; sta. DW1170, 104-109 m: 1 ♂ (cl = 3.6 mm, cw = 4.0 mm), 1 ♀ (cl = 7.5 mm, cw = 7.8 mm), MNHN-B 26202, 25.viii.1997.

Maldives. ADDU ATOLL. 45 m: 1 ♀ (cl = 10.4 mm, cw = 12.9 mm), UMZ, J.S. Gardiner (holotype of *Q. bispinosa* Borradaile, 1902).

Mozambique. CHAI CHAI (= XAI-XAI): 1 ♂, SAM A10830.

Madagascar. FAUX CAP. 55 m: 2 ♂♂ (cl = 7.2, 8.0 mm, cw = 8.9, 9.7 mm), 1 ♀ (cl = 9.3 mm, cw = 11.3 mm), MNHN-B 8188, 28.x.1958, A. Crosnier.

Colour.— Borradaile (1902: 267, as *Q. bispinosa*) described his single specimen as “orange-brown.” The specimens illustrated by Sakai (1965: pl. 80 fig. 4; 1976: pl. 184 fig. 2) and Takeda (1982: fig. 574) were orange. The walking legs were light orange, with the distal portion of the merus, carpus and propodus dark orange, thus giving a banded appearance. The legs were described, however, as “banded in red” (Sakai, 1965: 164). The Indonesia specimens collected by Serène (1975: 518) from a black dendrophylliid coral were described as dark brown-violet (“brun violet foncé”) with the tip of the cheliped fingers white. The specimens had long, plumose setae. In a colour photograph that was given by Miyake (1983: pl. 47 fig. 5), the carapace and chelipeds were orange, the cheliped fingers yellow and the walking legs yellow banded with two orange bands. A short tomentum covered the body and appendages. A colour photograph of an orange individual living on an orange dendrophylliid coral from Japan was given by Nakamura (1996: 50).

Most of the preserved specimens that were examined had lost all trace of colour. A specimen from Japan (NHS) that had been preserved in alcohol for only 16 days had bright orange chelipeds, light orange carapace with small orange dots along the anterior border and light orange walking legs banded with dark orange.

Remarks.— *Q. boopsis* was described by Alcock (1898: 227; 1899: pl. 38 fig. 1) from the northeastern coast of Bay of Bengal (Arakan coast, Burma = Myanmar). The type

material is presumably lost (Serène, 1975: 516). Soon after, Borradaile (1902: 266) described *Q. bispinosa* from a single specimen that was collected from the Maldives. Sakai (1965: 163), however, placed *Q. bispinosa* as a junior synonym of *Q. boopsis*. The most significant difference between these two species is the presence in *Q. bispinosa* of an intermediate spine midway between the postorbital angle of the carapace and the epibranchial tooth (Borradaile, 1902: fig. 58). *Q. bispinosa* was considered an "abnormal form" of *Q. boopsis* by Sakai (1965: 164) since in the specimens he examined from Japan the intermediate spine was often absent and sometimes it was present only on one side (Sakai, 1965: fig. 19a).

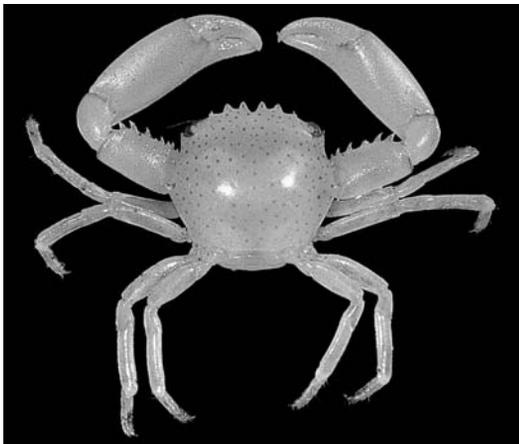


Fig. 1. *Quadrella boopsis* Alcock, 1898. Female (cl 8.2 mm, cw 9.4 mm; MNHN-B 26201), Eiao I., Marquesas Is., French Polynesia, sta. CP1157, MUSORSTOM 9, 1997.

Serène (1973: 198) initially listed *Q. bispinosa* as a distinct species. Examination of additional specimens, however, convinced him that Sakai was correct and thus placed *Q. bispinosa* as a junior synonym of *Q. boopsis* (Serène, 1975: 515; 1984: 287). Galil & Takeda (1985: 200) and Galil (1986b: 281) disagreed with Sakai and Serène and treated both as separate species, even though one of the *Q. bispinosa* specimens that were illustrated had no intermediate spines (Galil & Takeda, 1985: fig. 1A).

Examination of a large number (42) of specimens of *Q. boopsis* that show a wide variation in size has demonstrated that the presence of intermediate epibranchial spines is a variable character, which confirms observations made by Sakai and Serène. Twenty-one of the 42 specimens had two intermediate spines, one on each side of the carapace: one female from the Maldives, the holotype of *Q. bispinosa* (UMZ; cl = 10.4 mm, cw = 12.9 mm), one male and one female from Madagascar (MNHN-B 8188; cl = 7.2 mm, cw = 8.9 mm; cl = 9.3 mm, cw = 11.3 mm, respectively), one male from Maluku, Indonesia (MNHN-B 9950; cl = 8.8 mm, cw = 10.7 mm), one female from Japan (SMF 23853; cl = 5.5 mm, cw = 7.0 mm), one male from Mozambique (SAM A10830; cl = 7.7 mm, cw = 9.4 mm), and fifteen specimens from French Polynesia (MNHN-B 26202, 26148, 26149). Five additional specimens had an intermediate spine on only one side as in the specimen illustrated by Sakai (1975: fig. 19a). In three of these the spine was on the left side: a female from Maluku, Indonesia (MNHN-B 9950; cl = 10.0 mm, cw = 12.4 mm), a male from Japan (SMF 23855; cl 7.7 mm, cw = 9.7 mm) and a male from Papua New Guinea (NUS 1995.360, cw = 5.2 mm). The spine was on the right side in a male from Madagascar (MNHN-B 8188; cl = 8.0 mm, cw = 9.7 mm; Serène, 1984: pl. 41 fig. A, reversed photograph) and a male from French Polynesia (MNHN-B 26201; cl = 3.6 mm, cw = 4.0 mm). One specimen, a female from French Polynesia (MNHN-B 26201; cl = 8.2 mm, cw 9.4 mm), had two intermediate spines on the right side and one on the left. The remaining 15 specimens (36%), which ranged from juveniles to large adults, had two epibranchial spines and

no intermediate spines. The presence or absence of intermediate epibranchial spines is evidently not a function of size or sex. It appears, as Sakai (1965: 164) suggested, that the persistence of intermediate epibranchial spines in adults of *Q. boopsis* is an anomalous, not very uncommon phenomenon. An intermediate spine on each side of the carapace is a character that is sometimes found among juveniles and pre-adults of *Q. maculosa* and *Q. reticulata* (see below). Intermediate spines were also found in a small female of *Q. serenei* Galil, 1986 from French Polynesia (MNHN-B 20411) and several juveniles and a postlarva of the same species from Madagascar (MNHN-B 25243, 26139).

Galil & Takeda (1985: 200) and Galil (1986b: 281, 282) list additional differences between *Q. boopsis* and *Q. bispinosa*: the presence of spines along the posterior margin of the walking legs of *Q. boopsis* (absent in *Q. bispinosa*), a postorbital spine that “distinctly” projects outward in *Q. bispinosa* and 13 teeth along the posterior margin of the fourth walking legs in *Q. boopsis* (seven in *Q. bispinosa*). The examination of a female from the Philippine Islands (USNM 286456; cl = 9.2 mm, cw = 12.0 mm), the only specimen of *Q. boopsis* that was examined by Galil (1986b: 281, figs. 4A, B), demonstrated that the specimen clearly belonged to *Q. reticulata* not to *Q. boopsis*. Galil’s erroneous identification was confirmed by the examination of additional specimens of *Q. reticulata* from Indonesia, the South China Sea, Philippine Islands and Sri Lanka (see discussion of *Q. reticulata* below). Most of the South China Sea and Sri Lanka specimens had also been examined by Serène (1973: 199). The characters used to differentiate between *Q. boopsis* and *Q. bispinosa* by Galil & Takeda (1985:200) and Galil (1986b: 281, 282) are among those that were correctly used by Serène (1975: 519) to distinguish between *Q. boopsis* and *T. reticulata*. The real identity of Galil’s specimen is further confirmed by the very close resemblance between her illustrations of *Q. reticulata* (Galil, 1986b: figs. 7D, E) and of her “*Q. boopsis*” (Galil, 1986b: figs. 4A, B).

Q. reticulata shares with *Q. boopsis* a cheliped merus that is shorter than in the other species of *Quadrella*. In both species the merus is armed with relatively short, or serrulate, teeth along the anterior margin. Both species also share tuberculate, not spinous supraorbital angles and the presence of shallow tubercles, or granules, on the chelipeds and carapace. In both species, however, the central portions of the dorsal surface of the carapace become smoother with increasing size.

Q. boopsis can be differentiated from *Q. reticulata* by the presence of rounded teeth along the anterior margin of the carapace in contrast to the pointed teeth of *Q. reticulata* (see discussion of *Q. reticulata*). A suture (sternal suture 2/3) is present on the thoracic sternum of *Q. boopsis*, whereas it is absent or partially fused in adult *Q. reticulata*. The anterolateral borders of the carapace are slightly less rounded in *Q. boopsis* so that in *Q. reticulata* the portion immediately beyond the eyes appears constricted in relation to the remaining anterolateral portion of the carapace. The cheliped merus (measured along its posterior margin) is slightly shorter in *Q. boopsis*: 0.51 (0.36-0.60, N = 17) of carapace length in contrast to 0.69 (0.53-0.80, N = 15) in *Q. reticulata*. The anterior margin of the cheliped merus is armed with 5-7 teeth in *Q. boopsis* in contrast to 8-12 teeth in *Q. reticulata*. In addition to the terminal tooth, there are 8-11 triangular teeth along the posterior margin of the dactylus of the fourth walking legs of *Q. boopsis* in contrast to 12-13 teeth in *Q. reticulata*. These teeth are approximately of the same size in *Q. boopsis*, whereas they increase slightly in size toward the tip in *Q. reticulata*.

Spines are absent along the posterior margin of the carpus of the walking legs of *Q. boopsis* but there are small, short spines in *Q. reticulata*. The first male gonopod of *Q. boopsis* is characterized by pre-apical spines that are roughly of the same size whereas the most proximal spine is much longer than the rest in *Q. reticulata*.

Q. boopsis is best characterized by a relatively short cheliped merus. The merus is provided with 5-7 (rarely 8) relatively short teeth (Alcock, 1899: pl. 38 fig. 1; Borradaile, 1902: fig. 58, as *Q. bispinosa*; Serène, 1975: pl. 2 figs. A, F; 1984: pl. 41 fig. A; Galil & Takeda, 1985: fig. 1E, as *Q. bispinosa*). The chelipeds and carapace have shallow, scale-like tubercles or granules (Borradaile, 1902: fig. 58, as *Q. bispinosa*). The tubercles are conspicuously larger along the lower margin of the cheliped propodus. The inner margin of the cheliped carpus is armed with two tubercles that are typically acute and spine-like. The carapace, chelipeds and walking legs are usually covered by a short tomentum (Miyake, 1983: pl. 47 fig. 5; Nakamura, 1996: 50). The three specimens from Madagascar that were examined (MNHN-B 8188), however, lacked a tomentum, while one from Japan (NHS) only had a few long setae on the chelipeds. The holotype of *Q. bispinosa* and the Japanese specimens now at SMF also lacked a tomentum.

The anterior margin of the carapace has teeth with round tips, a character unique among *Quadrella* species (Serène, 1975: fig. 5, pl. 2 figs. B, B'). Alcock (1899: pl. 38 fig. 1), however, shows them as pointed. There is typically a U-shaped sulcus between the two submedian teeth and shallower, wider and rounded indentations between the wide lateral teeth. The median sulcus is V-shaped in the smallest specimens. The supraorbital angles are tuberculate, not spinous (Serène, 1975: pl. 2 figs. B, B'). The anterolateral borders of the carapace are straight, not globose. An intermediate epibranchial spine may be found on one or both anterolateral borders (Borradaile, 1902: fig. 58, as *Q. bispinosa*; Sakai, 1965: fig. 19a; Serène, 1975: pl. 2 fig. A; 1984: pl. 41 fig. A; Galil & Takeda, 1985: fig. 1B, as *Q. bispinosa*; Galil, 1986b: fig. 3A, as *Q. bispinosa*). The epibranchial tooth is acute and directed upwards, even in the largest specimens. A suture (sternal suture 2/3) is present between the second and third thoracic sternites.

The posterior margin of the propodus of the walking legs is smooth, not armed with spines. The posterior margin of the dactylus of the fourth pair of walking legs has between 8-11 (usually 9) triangular teeth, not counting the pointed, tooth-like distal end. Of these, only the last 5-6 distal teeth are distinct enough to be easily counted. The illustration of Sakai (1965: fig. 19b) clearly shows five distal teeth. The figure was given as 10-11 by Serène (1975: 518, fig. 6) and 5-6 distally plus "an indication of teeth on the proximal half" (Serène, 1984: 287). The number of teeth for the same species (but referred to as *Q. bispinosa*) was given as seven by Galil & Takeda (1985: 199) and Galil (1986b: 280). The illustration by Galil & Takeda (1985: fig. 1F), however, shows 11 teeth. That by Galil (1986b: fig. 3D) shows seven distinct teeth plus one that was obscured by setae and possibly one or two that may have been only feebly indicated.

The male gonopods were illustrated by Serène (1975: figs. 7-12; 1984: fig. 191) and Galil & Takeda (1985: fig. 1G, as *Q. bispinosa*). The first gonopod has short, thick pre-apical spines that are almost equal in size.

Although host records are very few, *Q. boopsis* has so far been reported mostly from dendrophylliid corals, a group of azooxanthellate (ahermatypic) scleractinian

corals (Serène, 1975: 514; Yamaguchi et al., 1987: 30; Nakamura, 1996: 50). Sakai (1965: 163) records it from a "reef-coral." The other species of *Quadrella*, in contrast, are known only as symbionts of gorgonians, antipatharians, or black corals, and alcyonaceans, or soft corals. The shorter, *Trapezia*-like cheliped merus of *Q. boopsis* is perhaps an adaptation to live, as in *Trapezia*, on rigid, solid scleractinian corals. The more elongate cheliped merus of the other species of *Quadrella* may instead offer more maneuverability on the soft or branched and flexible colonies of their hosts. However, *Q. reticulata*, which is also characterized by a relatively short cheliped merus, is known from antipatharians.

Q. boopsis is known across the Indian Ocean (from Mozambique to Indonesia) and in the western Pacific Ocean (from Japan to Papua New Guinea). It has been collected from depths that range from 10 m in Saparua, southern Maluku (Serène, 1975: 514) to 95 m in Japan (Sakai, 1976: 512). One specimen from Japan (NHS) could have been dredged from water as deep as 650 m.

Quadrella coronata Dana, 1852

For synonymy see Galil, 1986b: 282.

Material.— Indonesia. MALUKU (= MOLUCCAS). Ambon, Leitimur, Ambon Bay, Tg. Benteng, sta. RBE.05, 12 m, on alcyonacean (*Dendronephthya* sp.): 1 ♂, 4 ♀♀, RMNH D 47029, 10.xi.1990, C.H.J.M. Fransen; Hitu, Mamala, sta. RBE.21, 20 m, on pink alcyonacean: 1 ♂, 2 ♀♀, RMNH D 47030, 21.xi.1990, C.H.J.M. Fransen; on dark-red alcyonacean: 2 ♂♂, 1 ♀, RMNH D 47031.

Additional material.— Indonesia. SUMATRA. East of Segli, 125-540 m: 5 ♂♂, 7 ♀♀, ZMA De 103291, Van Nouhuys. SULAWESI (= CELEBES). Lembeh Strait, 01°28'N 125°14'E, on alcyonacean (*Dendronephthya* sp.): 1 ♂, RMNH D 46749, x.1994. BUTON STRAIT. Sta. 5641, 04°29'S 122°52'E, 39 fath: 1 ♂, 2 ♀♀, USNM 65148, 14.xii.1909, Albatross Expedition. MAKASSAR STRAIT. Sta. 206, 01°05.0'S 117°45.2'E, 79-85 m: 1 ♀, MNHN-B 17223, 30.x.1980, CORINDON II Expedition; sta. 260, 01°56.9'S 119°17.6'E, 15-50 m: 1 ♂, 1 ♀, MNHN-B 16932, 6.xi.1980; sta. 294, 02°38.3'S 117°50.4'E, 46-57 m: 1 ♂, 2 ♀♀, MNHN-B 16930, 10.xi.1980. TAKABONERATE IS. West of Tinanja I., sta. 4.227, 06°32.8'S 121°9.4'E: 2 ♂♂, 1 ♀, RMNH D 46750, 15.x.1984, Indonesian-Dutch Snellius II Expedition. MALUKU (= MOLUCCAS). Ambon: 2 ♂♂, MNHN-B 22300, 2.iii.1922, Danish Expedition.

Colour.— Live individuals were white, usually merging well with their soft-coral hosts (C.H.J.M. Fransen, personal communication).

Remarks.— *Q. coronata* was listed from southern Maluku by Serène (1973: 206), Serène et al. (1974: 24) and Galil (1986b: 282).

Quadrella maculosa Alcock, 1898

For synonymy see Galil, 1986b: 285.

Material.— Indonesia. MAKASSAR STRAIT. Sta. 206, 01°05.0'S 117°45.2'E, 85 m: 1 ♀, MNHN-B 16931, 30.x.1980, CORINDON II Expedition. WESTERN NEW GUINEA (= IRIAN JAYA). Auri I., 02°03'S 134°42'E, 20-25 fath: 1 ♀, RMNH D 47034, 21.ii.1956.

Colour.— The colour pattern of *Q. maculosa* from Taiwan is illustrated by Shih & Mok (1996: fig. 2).

Remarks.— The anterolateral margins of the carapace of the smallest specimens had tuberculate anterolateral margins. In some there was an acute intermediate epibranchial spine in the middle portion very similar to that sometimes observed in *Q. boopsis* and *Q. reticulata*.

Q. maculosa is previously known from southern Maluku (Serène, 1973: 204; Serène et al., 1974: 24; Galil, 1986b: 286) and Irian Jaya (western New Guinea) (Galil, 1986b: 286).

Quadrella reticulata Alcock, 1898

Quadrella coronata var. *reticulata* Alcock, 1898: 227; Borradaile, 1902: 266.

Quadrella coronata reticulata; Serène, 1968: 89.

Quadrella reticulata; Serène, 1973: 199, figs. 1, 7, 11-13, pl. 1; 1975: 519 (in key); 1984: 286, 287 (in keys); Galil & Takeda, 1985: 204, fig. 3; Galil, 1986b: 288, fig. 7 D, E; Galil, 1988b: 179, fig. 11; Castro, 1999a: 96.

Quadrella boopsis; Galil, 1986b: 281, figs. 4 A, B.

not *Quadrella reticulata*; Takeda & Marumura, 1996: 7, pl. 1 figs. 7, 8 (= *Quadrella serenei* Galil, 1986).

Material.— **Indonesia.** MALUKU (= MOLUCCAS). Ambon, Leitimur, Cape Nusaniwe, sta. RBE.11, 18 m, on *Antipathes* sp.: 1 ♂ (cl = 2.9 mm, cw = 4.0 mm), 3 ♀♀ (cl = 3.4-5.5 mm, cw = 4.4-7.2 mm), 9 juveniles, 2 first crab stage, RMNH D 47032, 12.xi.1990, C.H.J.M. Fransen. Ambon, Hutumuri, sta. RBE.27, 25 m, on *Antipathes* sp.: 12 ♂♂, 19 ♀♀, 8 juveniles, RMNH D 47033, 26/27.xi.1990.

South China Sea. BORNEO. Off Sarawak, Malaysia, 04°21'30"N 111°58'50"E, on cable, 82 m: 7 ♀♀ (cl = 7.6-9.8 mm, cw = 10.2-13.0), NUS 1965.11.23.41-47, 1938, R. Young.

Philippine Islands. MINDANAO. Gulf of Davao, sta. 5250, 42 m: 1 ♀ (cl = 9.3 mm, cw = 12.0 mm), USNM 286456, 18.v.1908, *Albatross* Philippine Expedition (material identified as *Q. boopsis* by B. Galil); sta. 5249: 1 ♀ (cl = 6.0 mm, cw = 7.1 mm), USNM.

Sri Lanka. COLOMBO: 1 feminized ♂ (cl = 7.1 mm, cw = 9.2 mm), 2 ♀♀ (cl = 4.7, 7.6, cw = 6.4, 9.7 mm), NUS 1970.8.7.1-2.

Colour.— The carapace and cheliped propodus of *Q. reticulata* were described as ornamented with "fine purple-brown lines which intersect to form a regular and wide meshwork" (Alcock, 1898: 227). The pattern of lines on the carapace was symmetric. Borradaile (1902: 266) described it as showing "colour in tiny purple dots" but it appears that no live specimens were examined by him. Galil (1986: 288; 1988b: 179) tentatively placed as a synonym of *T. reticulata* a variety of *Q. coronata* described by Nobili (1906a: 143; 1906b: 294) as ornamented with reddish lines. The correct identity of Nobili's specimens, however, could not be verified. The colour photographs of two small specimens from Japan identified as *Q. reticulata* by Takeda & Marumura (1996: 7, pl. 1 figs. 7, 8) belong to *Q. serenei*.

Some of the specimens collected from one colony of black coral (*Antipathes* sp.; RMNH D 47033) were photographed live. The other specimens kept their colour very well. The material consisted in part of one large heterosexual pair of adults. The dorsal surface of their carapace was purple. There was in addition two medium-size heterosexual pairs. Their colour pattern consisted of a W-shaped band that extended between the eyes across the anterior portion of the carapace. The smallest specimens exhibited a colour pattern that varied among all individuals. It typically consisted of purple bands of various shapes that extended symmetrically across the dorsal surface of the carapace; some lacked colour bands.

Remarks.— *Q. reticulata* was described from three specimens collected in the Andaman Islands and Sri Lanka (Alcock, 1898: 227). The whereabouts of the type material, supposedly at the Indian Museum, Calcutta (Serène, 1973: 199), is unknown. The species remained unrecorded until it was described in detail and illustrated for the first time by Serène (1973: 199). It was unfortunately confused with *Q. boopsis*, a close species, in the revision of *Quadrella* by Galil (1986b: 288).

Q. reticulata is characterized by a relatively short cheliped merus that is provided with 8-12 short, triangular and often unequal teeth (Serène, 1973: pl. 1 fig. A; Galil & Takeda, 1985: fig. 3D; Galil, 1986b: figs. 4A, as *Q. boopsis*, 7D). The chelipeds and carapace have shallow to obtuse tubercles. The tubercles are absent on the central portion of the carapace in the larger specimens. Large tubercles are present on the lower portion of the chelipeds, particularly the largest one (Serène, 1973: pl. 1 figs. C, D). The supraorbital angles are tuberculate, with the terminal tubercle sometimes taking an acute (but not pointed or spine-like) shape (Serène, 1973: fig. 7, pl. 1 fig. B). The anterior margin of the carapace has pointed teeth (Serène, 1973; fig. 7, pl. 1 fig. B). The anterolateral borders of the carapace are slightly globose in shape. The epibranchial tooth is acute; an acute intermediate epibranchial tooth may be found in small specimens. There is no suture between the second and third thoracic sternites (sternal suture 2/3) in adults but, as in all species of *Quadrella*, it is present in juveniles and pre-adults.

The posterior margin of the propodus of the walking legs is provided with short spines (Galil, 1986b: fig. 7E; 1988b: fig. 11B). The posterior margin of the dactylus of the fourth walking legs has 12-13 triangular teeth in addition to the terminal tooth. The teeth progressively increase slightly in size toward the tip (Serène, 1973: fig. 1; Galil & Takeda, 1985: fig. 3E; Galil, 1986b: figs. 4B, as *Q. boopsis*, 7E; Galil, 1988b: fig. 11B).

The first male gonopod is armed with short pre-apical spines, the most proximal of which is conspicuously longer than the rest of the spines (Serène, 1973: figs. 11-13).

Q. reticulata shares with *Q. boopsis* several morphological characters: a relatively short cheliped merus that is armed with short triangular teeth, tuberculate supraorbital angles and the presence of shallow tubercles on the chelipeds and carapace. Intermediate epibranchial spines, which can be present in *Q. boopsis*, were found in one small female of *Q. reticulata* (RMNH D 47032; cl = 4.5 mm, cw = 5.7 mm).

Both species, however, can be easily separated (see discussion of *Q. boopsis* above and Serène, 1975: 519). *Q. reticulata* has pointed teeth along the anterior border of the carapace (rounded in *Q. boopsis*), a sternal suture is absent in adult *Q. reticulata* (present in *Q. boopsis*), the cheliped merus is slightly longer and armed with 8-12 teeth in *Q. reticulata* (5-7 teeth in *Q. boopsis*), the posterior margin of the dactylus of the fourth walking legs is armed with 12-13 triangular teeth in *Q. reticulata* (8-11 teeth in *Q. boopsis*), the posterior margin of the carpus of the walking legs is armed with spines in *Q. reticulata* (absent in *Q. boopsis*), the first male gonopod has a proximal pre-apical spine that is larger than the remaining spines in *Q. reticulata* (all are of about the same size in *Q. boopsis*) and the anterolateral borders of the carapace are slightly more rounded in *Q. reticulata* so that the portion immediately beyond the eyes usually appears constricted in relation to the remaining anterolateral portion of the carapace.

Q. reticulata is known from the Red Sea (Galil, 1988b: 179) to the western Pacific

Ocean (Japan to Indonesia). It has been collected from depths of 18 m in the Rumphius Biohistorical Expedition material from Ambon to 82 m in the South China Sea (Serène, 1973: 199).

In the large group of specimens collected from a single host (RMNH D 47033), only the largest female was ovigerous. Females were slightly larger than their male partner in all the three likely heterosexual pairs.

Tetralia cinctipes Paulson, 1875

For synonymy see Castro, 1997a: 64.

Material.— **Indonesia.** SUMATRA. Pulo Boenta, sta. 93, 05°33'N 95°09'E, 0-0.9 m: 1 ♀, USNM 260827, 20.xi.1963, *Te Vega*, IIOE cruise 2. SUMBA. Melolo, sta. 4.048, 09°54'S 120°42.5'E, on *Acropora* sp.: 3 ♂♂, 3 ♀♀, 1 juvenile, RMNH D 47036, 13.ix.1984, Indonesian-Dutch Snellius II Expedition. MALUKU (= MOLUCCAS). Obilatu: 3 ♂♂, 2 ♀♀, RMNH D 47037, 23-27.iv.1930, Snellius Expedition. TIMOR. Kupang Bay, Kera I: 2 ♂♂, 3 ♀♀, RMNH D 47038, 11-13.xi.1929, Snellius Expedition; 2 ♂♂, 3 ♀♀, RMNH D 47039.

Arafura Sea. 1 ♂, BMNH 92.4.18.86.

Remarks.— Specimens of *T. cinctipes* collected from southern Maluku and Timor by the Snellius Expedition were previously recorded by Galil (1986a).

Colour.— Live individuals from French Polynesia, Okinawa, Guam and Réunion showed a light-blue band across the anterior margin of the carapace (Castro, 1997b: 111, pl. 1 fig. A; also see Jones & Morgan, 1994: 179, as *T. glaberrima*). The eyes were also light blue. The walking legs were banded brown and the segments of the chelipeds showed dark-brown reticulations. The brown colour of the appendages, particularly of the chelipeds, remains visible in preserved specimens but the light-blue colour of the carapace and eyes quickly disappears in alcohol.

Tetralia fulva Serène, 1984

For synonymy see Castro, 1997a: 65.

Material.— **Indonesia.** MALUKU (= MOLUCCAS). Ambon, Leitimur, Ambon Bay, Batumerah, sta. RBE.O3, 3 m: 4 ♂♂, 3 ♀♀, RMNH D 47040, 7.xi.1990, C.H.J.M. Fransen; 2 ♂♂, 1 ♀, RMNH D 47041, 8.xi.1990, C.H.J.M. Fransen. Pombo I., lagoon, sta. RBE.16, 2-4 m, on *Acropora* sp.: 1 ♀, RMNH D 47042, 15.xi.1990, J. van Egmond. Hitu, Mamala, sta. RBE.21, 0.5 m: 1 ♀, RMNH D 47043, 21.xi.1990, F. de Jong & H.L. Strack. Hitu, Ambon Bay, Rumahtiga, sta. RBE.34, 3-5 m: 1 ♂, 1 ♀, RMNH D 47044, 5.xii.1990, C.H.J.M. Fransen. Hitu, Ambon Bay, Tg. Martafons, sta. RBE.35: 1 ♂, RMNH D 47045, 4.xii.1990, F. de Jong.

Additional material.— **Indonesia.** RIAU IS.. Bintan: 2 ♂♂, 2 ♀♀, NUS, v.1993. JAVA. Thousand Is., Edam (= Damar Besar) I.: 2 ♂♂, ZMG 279, i-iv.1885, J. Brock. SUMBA. Melolo, sta. 4.048, 09°54'S 120°42.5'E, on *Acropora* sp.: 2 ♂♂, 5 ♀♀, RMNH D 47046, 13.ix.1984, Indonesian-Dutch Snellius II Expedition. Northeast coast, sta. 4.064, 09°058'S 120°50'E, on *Acropora* sp.: 1 ♀, RMNH D 47047, 10.ix.1984, Indonesian-Dutch Snellius II Expedition. TAKABONERATE IS. Northeast of Tarupa Besar, sta. 4.145, 06°27'S 121°8'E: 1 ♀, RMNH D 47048, 26.ix.1984, Indonesian-Dutch Snellius II Expedition. MALUKU (= MOLUCCAS). Ternate: 2 ♂♂, 2 ♀♀, SMF 4084, 1894, W. Kükenthal. Ambon: 1 ♂, host to sacculinid and epicarid parasites, RMNH D 35015, 2.v.1930, Snellius Expedition. H. Boschma. Morela, Kampung Sawahtehusta, 03°32'S 128°12.3'E, sta. Mo 1: 1 ♂, MNHN-B 9960, 8.i.1973,

Rumphius I Expedition. 1 ♀, BMNH 92.4.18.18, P.W. Bassett-Smith.

Arafura Sea. 2 ♂♂, 2 ♀♀, BMNH 92.4.18.86.

Colour.— The carapace and chelipeds of live individuals from the Coral Sea (Castro, 1997a: 67, pl. 1 fig. C) varied from orange-brown to light pink-brown. The anterior margin of the carapace had a thin, orange to red-orange line. The anterior and distal margins of the cheliped merus and carpus were also orange to red orange.

Remarks.— *T. fulva* was listed by Galil (1988a: 62) from Maluku, Timor and Irian Jaya (western New Guinea), and by de Man (1888: 321, as *T. glaberrima*) from Java. Previous records for *T. glaberrima* (Herbst, 1790) from Java (Kastoro et al., 1980: 48), Maluku (de Man, 1902: 641; Zehntner, 1894: 157; Gordon, 1934: 60; Monod & Serène, 1976: 26; Serène et al., 1976: 19; Kastoro et al., 1980: 61) and Irian Jaya (western New Guinea) (Gordon, 1934: 60) could have belonged to *T. fulva* or to any of the other species of *Tetralia* originally grouped under this species.

Tetralia nigrolineata Serène & Dat, 1957

For synonymy see Castro, 1997a: 68.

Material.— **Indonesia.** MALUKU (= MOLUCCAS). Ambon, Leitimur, Ambon Bay, Batumerah, sta. RBE.03, 3 m, on *Acropora* sp.: 4 ♂♂, 2 ♀♀, 2 juveniles, RMNH D 47050, 7.xi.1990, C.H.J.M. Fransen.

Additional material.— **Indonesia.** RIAU IS. Bintan: 10 ♂♂, 10 ♀♀, NUS, v.1993; 3 ♂♂, 4 ♀♀, 2 juv., NUS, 12.v.1993; Pasir Merah: 4 ♂♂, 4 ♀♀, NUS, v.1993. JAVA. Jakarta Bay, Nyamuk I., on *Acropora* sp.: 1 ♂, 1 ♀, RMNH D 46857, 5-6.vi.1928, J. Verwey. Thousand Is., Edam (= Damar Besar) I.: 5 ♂♂, 11 ♀♀, ZMG 843, i-iv.1885, J. Brock. SUMBA. Melolo, sta. 4.048, 09°54'S 120°42.5'E, on *Acropora* sp.: 1 ♀, RMNH D 47049, 13.ix.1984, Indonesian-Dutch Snellius II Expedition. MALUKU (= MOLUCCAS). Ambon, Morela, Kampung Sawahtehusta, 03°32'S 128°12.3'E, sta. Mo 1: 1 ♂, MNHN-B 9961, 8.i.1973, Rumphius I Expedition.

Colour.— Live individuals from the Coral Sea had a carapace that varied from orange-brown to light pink-brown (Castro, 1997a: 69, pl. 1 fig. D; also see Miyake, 1983: pl. 47 fig. 4, as *T. glaberrima*). The anterior margin of the carapace was lined with a thin, orange-brown to red-orange line that was followed by a broad black band and a thin, blue-green band. Both coloured bands were repeated along the anterolateral margins of the carapace.

Remarks.— *T. nigrolineata* was recorded from Maluku and Timor by Galil (1988a: 63) and from Java by de Man (1888: 316, as *T. glaberrima*).

Tetralia rubridactyla Garth, 1971

Tetralia glaberrima; Rathbun, 1911: 235 (part); Barnard, 1950: 280, figs. 52 c, d; Garth, 1964: 140, 142 (part); 1984: 108, 109, 110, 111, 112, 114 (part); 1989: 481, 482, 483 (part); Kalk, 1995: 228, fig. 8.10b.

Tetralia glaberrima forma *rubridactyla*; Patton, 1966: 287.

Tetralia glaberrima rubridactyla Garth, 1971: 185.

Tetralia glaberrima laevisima; Serène, 1984: 282, fig. 188, pl. 40 figs. A, B.

Tetralia glaberrima fulva Serène, 1984: 282, pl. 40 fig. D (part) (not *Tetralia fulva* Serène).

Tetralia heterodactyla fusca; Serène, 1984: 283 (part) (not *Tetraloides heterodactyla* (Heller)).

Tetralia rubridactyla; Galil, 1988a: 65, figs. 1d, 2g, 2h; Patton, 1994: 195; Castro, 1997a: 70, pl. 1 fig. E; Castro, 1997b: 113; Castro, 1999a: 102.

Tetralia innamorata Galil & Clark, 1988: 138, figs. 1B, 2A, 3B, 4B, 4G, 6B.

Trapezia cymodoce; Branch et al., 1994: fig. 46.5 (not *Trapezia cymodoce* (Herbst)).

Material.— **Indonesia.** SUMATRA. Poelau Tikoes (= Pulau Tikus), 03°50'S 102°11'E: 2 ♂♂, 2 ♀♀, USNM, xi.1925, H.C. Kellers; 2 ♂♂, 3 ♀♀, USNM 75881, 19.xii.1925, H.C. Kellers. SUMBA. Melolo, sta. 4.048, 09°54'S 120°42.5'E, on *Acropora* sp.: 1 ♂, RMNH D 47051, 13.ix.1984, Indonesian-Dutch Snelius II Expedition.

Arafura Sea. 2 ♂♂, 1 ♀, BMNH 92.4.18.86.

Additional material.— **Japan.** KII PENINSULA. Shionomisaki, on *A. hyacinthus*: 1 ♂, 1 ♀, CBM ZC 1014, 3.ii.1995, K. Nomura. OSUMI IS., Yakushima I., Kurio: 1 ♂, 1 ♀, CBM ZC 2615, 4.vi.1996, T. Komai. OKINAWA. Near Onna, 26°30'N 127°50.9'E: 2 ♂♂, 3 ♀♀, USNM, 11.xi.1980, R.F. Bolland.

Taiwan. KENTING. 3 m: 1 ♂, 1 ♀, ASIZ, 2.ii.1986, M.-J. Jeng; 6 m: 1 ♂, 3 ♀♀, ASIZ, ii.1986. 1 ♀, CHCD 1147-1149, 17.iv.1996.

Saipan. 1 ♂, 1 ♀, USNM, 1945, A.H. Banner.

Guam. TUMON BAY: 1 ♂, USNM, 10.vii.1945, R.H. Baker. Pago Bay, 2-4 m, on *Acropora* spp.: 2 ♂♂, 1 ♀, SMF, 10-11.ix.1997, P. Castro & E. Santiago.

Federated States of Micronesia. IFALUK (= IFALIK): 1 ♀, USNM, F.M. Bayer; 1 ♂, 1 ♀, USNM; 2 ♂♂, 1 ♀, USNM, collected by natives (material identified as *T. glaberrima* by J.S. Garth).

Marshall Islands. ENEWETAK. Enjebi I., 1.5-9 m: 1 ♂, 2 ♀♀, USNM 189438, 2.x.1969, C.A. Child. Rigili I., 13-20m: 1 ♂, 1 ♀, USNM 189418, 26.x.1969, C.A. Child; 3 ♂♂, 4 ♀♀, USNM 189419; 1.5-3 m, 2 ♂♂, 4 ♀♀, USNM 189426 (material identified in part as *T. glaberrima* by J.S. Garth). Reef knoll north of Enewetak I., 10 m: 1 ♂, 1 ♀, USNM 189398, 1969, C.A. Child. Enewetak I.: 1 ♂, 1 ♀, LACM, 1.iv.1964, E.S. Reese (material identified as *T. glaberrima* by J.S. Garth). BIKINI. Bikini I., sta. 5, outer reef: 1 ♂, 1 ♀, USNM, 22.vii.1947, F.M. Bayer; 1 ♂, 1 ♀, USNM, 24.vii.1947; 1 ♂, USNM; 2 ♂♂, 2 ♀♀, USNM; 1 ♂, 1 ♀, USNM, 26.vii.1947; on *A. digitifera*: 2 ♀♀, USNM; on *A. digitifera*: 1 ♂, 1 ♀, USNM 228268, 3.viii.1947; 1 ♂, 1 ♀, USNM; 1 ♂, USNM; on *Acropora* sp.: 1 ♂, 2 ♀♀, USNM (material identified in part as *T. glaberrima* by J.S. Garth and *T. rubridactyla* by B. Galil). Prayer I., outer reef, on *Acropora* sp.: 1 ♂, 1 ♀, USNM 228271, 17.vii.1947, F.M. Bayer; 1 ♂, 1 ♀, USNM; on *Acropora* sp.: 2 ♂♂, 1 ♀, USNM, 18.vii.1947; 1 ♀, USNM, 19.vii.1947; 1 ♂, 1 ♀, USNM; 1 ♀, USNM 228269 (material identified in part as *T. glaberrima* by J.S. Garth). Enar I., sta. 4, outer reef, on *Acropora* sp.: 1 ♀, USNM 228270, 21.vii.1947, F.M. Bayer; 1 ♂, 1 ♀, USNM (material identified as *T. glaberrima* by J.S. Garth). Enyu I., 14 m: 1 ♂, 1 ♀, USNM 22872, 15.vii.1946, Emery; 1 ♂, USNM, 16.iii.1946, J.P.E. Morrison (material identified as *T. glaberrima* by J.S. Garth). ARNO: 4 ♂♂, 1 ♀, USNM, R.W. Hiatt (material identified as *T. glaberrima* by J.S. Garth).

Kiribati. ONOTOA: 1 ♀, USNM, 29.vii.1951, PE. Cloud; 1 ♂, 1 ♀, USNM, 30.vii.1951; 5 ♂♂, 6 ♀♀, USNM, 20.viii.1951; 1 ♂, 1 ♀, USNM, 23.viii.1951 (material identified as *T. glaberrima* by J.S. Garth).

HULL (= ORONA): 1 ♀, USNM, 15.vii.1939, L.P. Shultz.

Papua New Guinea. PORT MORESBY: 1 ♂, 1 ♀, ZMMU Ma 2223, 5.v.1958, *Vitiaz*, cruise 27.

Australia. QUEENSLAND. Heron I., 23°26'S 151°55'E: 1 ♂, 1 ♀, MNHN-B 8162, 23.IV.1971, W.K. Patton; 1 ♂, 1 ♀, MNHN-B 8163, 24.IV.1971, W.K. Patton; 1 ♂, 1 ♀, MNHN-B 8174, 27.IV.1971, W.K. Patton.

Chesterfield Is. Sta. DW92, 19°03'S 158°53.93'E, 8 m: 3 ♂♂, 1 ♀, MNHN-B 25182, 26.viii.1988, ORSTOM Corail 2 Expedition.

Fiji. VITI LEVU. Suva: 1 ♀, LACM, 4.x.1971, R. Kanter & R. Emerson.

French Polynesia. MOOREA. East of pass to Papetoai Bay, 21 m: 1 ♀, USNM 228274, 15.v.1957, Bredin Expedition, J.E. Randall.

TAHITI. Sta. T2, 21-27 m: 1 ♂, 1 ♀, USNM, 7.ix.1967, Marquesas National Geographic Smithsonian Bishop Museum Expedition.

Somalia. GESIRA: 1 ♂, 1 ♀, BMNH 1987.76, 1981, M. Vannini (paratypes of *Tetralia innamorata* Galil).

Kenya. MOMBASA I. Sta. 114, 4°04.5'S 39°40.4'E: 1 ♂, BMNH 1987.23, 29.iii.1971, A.J. Bruce (holotype of *T. innamorata*); 1 ♀, BMNH 1987.24 (paratype of *T. innamorata*); 2 ♂♂, 1 ♀, MNHN-B 12795, 14.iii.1972, A.J. Bruce (material identified as *T. rubridactyla* by B. Galil). LAMU CHANNEL: 1 ♂, 1 ♀,

MNHN-B 8159, 10.i.1972, A.J. Bruce; 1 ♂, 1 ♀, MNHN-B 13345, A.J. Bruce (material identified as *T. glaberrima laevis* by R. Serène). Tiwi. 4°14'S 38°36'E: 1 ♀, BMNH, 28.ii.1971, A.J. Bruce.

Seychelles. Sta. 27, 04°55.6'S 54°58.5'E, 52 m: 1 ♀, MNHN-B 12810, 8.ix.1980, ORSTOM Reves 2 Expedition (material identified as *T. rubridactyla* by B. Galil). 1 ♂, ZMMU Ma-4488, 21-24.xii.1983, *Akademik Petrovsky*, B. Mezhev. BIRD I. Sta. 723, 03°42'S 55°12'E, 8-12 m: 1 ♂, RMNH D 47230, 21.xii.1992, NIOP-E Tyro Expedition. ARIDE I. Sta. 711, 04°13'S 55°40'E: 1 ♂, RMNH D 47228, 18/19.xii.1992, NIOP-E Tyro Expedition. Northeast of Aride I., sta. 714, 04°10'S 55°44'E, 55 m: 1 ♂, RMNH D 47229, 19.xii.1992, NIOP-E Tyro Expedition. PRASLIN I. Baie Ste. Anne: 1 ♂, 1 ♀, MNHN-B 25383, 19.ii.1972, A.J. Bruce (material identified as *T. glaberrima fulva* by R. Serène; *T. rubridactyla* by B. Galil). MAHÉ I. Port Victoria: 1 ♀, MNHN-B 8203, 15.ii.1972, A.J. Bruce. North East Point, sta. 604, 04°35'S 55°28'E, reef flat and slope, 2-4 m: 2 ♂♂, 3 ♀♀, RMNH D 47226, 8.xii.1992, NIOP-E Tyro Expedition, C.H.J.M. Fransen; 2 ♂♂, 3 ♀♀, RMNH D 47226; 1 ♀, RMNH D 47220. Anse Nord d'Est, sta. 601, 04°34'S 55°28'E, reef flat, 3 m: 1 ♂, 1 ♀, RMNH D 47225, 5.xii.1992, NIOP-E Tyro Expedition, C.H.J.M. Fransen. Cap Maçons/Anse de Forbans, sta. 612, 04°46'S 55°31'E, reef flat and slope to 5 m: 1 ♂, 1 ♀, RMNH D 47227, 12.xii.1992, NIOP-E Tyro Expedition, C.H.J.M. Fransen; 1 ♀, RMNH D 47221. ST. JOSEPH ATOLL. Sta. 759, 05°27'S 53°21'E, 10 m: 1 ♂, 1 ♀, RMNH D 47231, 28.xii.1992, NIOP-E Tyro Expedition. POIVRE ATOLL. Sta. 767, 05°44'S 53°18'E, 10 m: 1 ♂, 1 ♀, RMNH D 47222, 29/31.xii.1992, NIOP-E Tyro Expedition. REMIRE REEF. Sta. 15: 1 ♂, 1 ♀, MNHN-B 12799, 12.ii.1972, A.J. Bruce (material identified as *T. rubridactyla* by B. Galil); 1 ♂, 1 ♀, MNHN-B 13343; 1 ♀, MNHN-B 13347. COETIVY I: 1 ♂, 2 ♀♀, USNM, Percy Sladen Trust Expedition (material identified as *T. glaberrima* by M. Rathbun).

Aldabra. Comp Reef, 12 m: 2 ♂♂, 2 ♀♀, MNHN-B 14027, 15.v.1954, *Calypso*; 20 m: 1 ♂, 1 ♀, MNHN-B 14026, 16.V.1954; 1 ♂, 1 ♀, MNHN-B 14037. Main Channel: 3 ♂♂, 1 ♀, BMNH, 10.xii.1967, Royal Society Expedition to Aldabra, J.D. Taylor.

Farquhar Is. Sta. 60: 1 ♂, 1 ♀, MNHN-B 12796, 26.ii.1972, A.J. Bruce (material identified as *T. rubridactyla* by B. Galil).

Mozambique. DELAGOA (= LOURENÇO MARQUES) BAY: 1 ♂, SAM A8209 (material identified as *T. glaberrima* by K.H. Barnard). INHACA I. Santa Maria: 1 ♂, SAM A15437, vi.1971.

Comoro Islands. MAYOTTE: 1 ♂, 1 ♀, MNHN-B 13913, M. Marie.

Madagascar. BANC DU GEYSER: 1 ♂, 1 ♀, MNHN-B 8160, 14.iii.1972, A.J. Bruce; 1 ♂, 1 ♀, MNHN-B 8161, 14.iii.1972, A.J. Bruce (material identified as *T. glaberrima laevis* by R. Serène). BANC DU LEVEN: 1 ♀, MNHN-B 13342, 13.vii.1971, A.J. Bruce (material identified as *T. glaberrima laevis* by R. Serène).

Réunion. LA SALINE. Outer reef slope, 20 m: 1 ♂, 1 ♀, MNHN-B 8178, S. Ribes; 1 ♂, MNHN-B 8181, S. Ribes (material identified as *T. glaberrima laevis* by R. Serène); outer reef slope, 20 m: 2 ♂♂, 2 ♀♀, MHN-B 58, 7.ix.1996, P. Castro & S. Ribes; outer reef slope, 20 m: 1 ♂, 1 ♀, MHN-B 59, 7.ix.1996, P. Castro & S. Ribes; outer reef slope, 20 m, on *A. humilis*: 1 ♂, 1 ♀, MHN-B 60, 8.ix.1996, P. Castro & S. Ribes; reef flat, 1 m, 1 ♀, MHN-B 61, 7.ix.1996, P. Castro & S. Ribes; reef flat, 1 m, on *A. humilis*: 1 ♂, 1 ♀, MHN-B 62, 9.ix.1996, P. Castro & S. Ribes. ST. LEU. On *Tubipora*: 1 ♂, 1 ♀, SMF, 26.i.1989, H.G. Müller.

Mauritius. 1 ♂, 1 ♀, MNHN-B 25686, 1913, P. Carié. PORT LOUIS: 1 ♂, MNHN-B 13938. LE CHALAND: 1 ♂, MNHN-B 13911.

Saya de Malha Bank. Sta. 2811, 20 m: 1 ♂, 1 ♀, ZMMU Ma 4496, *Vitiaz II*, M.V. Heptner.

Maldives. KAAFU ATOLL: 1 ♀, YU, 22.i.1991, P. Hogarth; 1 ♂, 1 ♀, YU. VAAVU ATOLL. 12-14 m: 1 ♀, YU, 17.iv.1996. C. Anderson.

Colour.— The carapace of live individuals from the Coral Sea, Okinawa and Guam was bordered anteriorly by a thin, dark-brown line followed by a broad pink-purple to lavender band (see Castro, 1997a: 71, pl. 1 fig. E). The extension of the pink-purple colour on the carapace and the colour of the remaining portion of the carapace varied considerably, even among heterosexual members of a pair. The chelipeds were light brown, the dorsal portion of the dactylus orange-red to red-brown and the distal

margins of the merus and carpus and the proximal margin of the propodus dark red-brown to dark brown. The distinctive colour pattern of the chelipeds remains conspicuous in specimens preserved for decades.

Live specimens from the western Indian Ocean (Réunion and Sodwana Bay, South Africa) differed from those in the Coral Sea and the western Indian Ocean in some aspects of their colour pattern (see below).

Remarks.— Although described from Queensland, Australia by Patton (1966: 287), *T. rubridactyla* takes the authorship of Garth (1971: 185), who first used the valid name of the species in a list from the Maldives in the central Indian Ocean (see Castro, 1997a: 71).

Serène (1984: 282) concluded that western Indian Ocean populations were identical to specimens collected from the type locality in eastern Australia. Serène, however, referred to the species as *T. glaberrima laevisissima* Stimpson, 1858. Stimpson's material, which was collected in southern Japan (Ousima = Amami O-Shima, Amami Islands), is no longer extant. The illustration of *T. laevisissima* (Stimpson, 1907: pl. 9, figs. 4 and 4a), however, clearly shows that it lacked the prominent crest on the cheliped merus that is characteristic of *T. rubridactyla*. It is impossible to correctly identify Stimpson's species from his description and illustration.

Galil & Clark (1988: 138) used preserved material from the western Indian Ocean and the Indian Ocean coast of Sumatra to describe a new species, *T. innamorata* Galil & Clark, 1988. It was regarded as "closely related" to *T. rubridactyla* but distinguished from it by three characters: "front, [which is] discontinuous from distinct supraorbital angle, uniformly coloured pereopods and tawny dactylus of the cheliped" (Galil & Clark, 1988: 146).

Examination of the holotype and some of the paratypes of *T. innamorata*, preserved specimens from the Indian Ocean coast of Sumatra (some of which were examined by Galil & Clark (1988: 145) as part of their description of *T. innamorata*), additional preserved material from other locations across the Indo-West Pacific region and live specimens from South Africa and Réunion in the western Indian Ocean and from Okinawa and Guam in the western Pacific Ocean, has shown that the only apparent difference between *T. innamorata* and *T. rubridactyla* is in some details of the colour pattern.

The only morphological character used by Galil & Clark to differentiate between the two species, a distinct and discontinuous supraorbital angle in *T. innamorata*, is clearly a variable character among Indian and Pacific oceans populations. The supraorbital margin of the holotype of *T. innamorata* (BMNH 1987:23) is clearly continuous with the rest of the anterior margin of the carapace, a condition actually indicated in its description (Galil & Clark, 1988: 145). Several of the specimens examined here had in fact a continuous supraorbital margin on one side but discontinuous on the opposite.

The other two characteristics used by Galil & Clark (1988: 146) to separate *T. innamorata* from *T. rubridactyla* are in their colour patterns. Although in *T. innamorata* the cheliped dactylus was described as "tawny" (conventionally used for orange brown or yellow brown) as in the cheliped propodus (in contrast to orange red in *T. rubridactyla*), a clearly reddish spot remained visible even in specimens preserved for more than two decades. A darker region that matches the location of the orange red

spot was visible on the dactylus of the largest cheliped of the paratype of *T. innamorata* that is shown in the black-and-white photograph of Galil & Clark (1988: fig. 6B).

The only valid difference that remains between the Pacific and Indian oceans populations of the species is the colour of the walking legs. Live individuals from the Coral Sea (Castro, 1997a: pl. 1 fig. E) and the western Pacific Ocean had a pink-purple line along the dorsal margin and a red spot at the distal end of the carpus, propodus and dactylus of the walking legs. Live individuals from Réunion and South Africa had a red line along the dorsal margin of the legs and only one red spot near the distal end of the dactylus. A violet dot, however, was also observed at the distal end of the carpus in one individual from Réunion.

Besides the walking legs, the colour of live individuals from the Coral Sea and western Pacific was similar to those from the western Indian Ocean. The carapace of live individuals from South Africa and Réunion varied from light to dark orange-brown (see Branch et al., 1994: fig. 46.5). Ventrally, the anterior half of the carapace and third maxillipeds were lavender to light blue. Variations in the colour intensity of the carapace were common, even among individuals collected from the same location on the Réunion reefs, a situation previously observed in live *T. nigrolineata* from the Coral Sea (Castro, 1997a: pl. 1 fig. D). In smaller individuals, colour tended to be lighter, the anterolateral borders of the carapace were dark red-brown and the anterior third of the dorsal surface of the carapace was sometimes purplish. The chelipeds were light to dark orange-brown, darker along the dorsal border. The outer border of the dactylus was red; the distal borders of the merus and carpus and the proximal border of the propodus were dark red to red brown. The walking legs were orange to brown orange, with the distal edge of the dactyli red. Smaller specimens had minute dark-brown dots throughout the segments.

Differences have also been observed between the live colour patterns of western Indian Ocean populations of some species of *Tetralia* and *Trapezia* and the western and south Pacific populations of the same species (Castro, 1999b). These differences may signal genetic differences among geographically isolated but morphologically identical populations, as in the case of species of *Trapezia* (Huber, 1985) and particularly *T. formosa* (Castro, 1998: 177).

T. rubridactyla can be differentiated from other species of *Tetralia* not only by its colour pattern but by the relatively prominent crest on the cheliped merus and the rectangular and symmetric endopod of its first maxilliped (Galil, 1988a: fig. 2g). The anterior margin of the endopod is straight but it can be slightly concave in the largest specimens.

It has been recorded from locations across the Indo-West Pacific region, from the western Indian Ocean (Serène, 1984: 282) to French Polynesia (Castro, 1997b: 113). It has been previously reported from Indonesia (Maluku and Timor) by Galil (1988a: 65).

Tetraloides heterodactyla (Heller, 1861)

For synonymy see Castro, 1987b: 115.

Material.— **Indonesia.** MALUKU (= MOLUCCAS). Obilatu: 2 ♂♂, 2 ♀♀, RMNH D 47052, 23-27.iv.1930, Snellius Expedition.

Colour.— The carapace and chelipeds of live individuals from Okinawa varied from light red-brown to brown. Red-brown and iridescent, light-blue dots covered in varying degrees the dorsal surface of the carapace. The walking legs were ornamented with large iridescent blue spots and smaller brown dots. The iridescent colour eventually precipitated as a black pigment in dead individuals. Freshly preserved specimens from French Polynesia showed a similar colour pattern. The iridescent spots on the walking legs were replaced by dark-brown to black spots (Castro, 1997b: 115, pl. 1 fig. B).

Remarks.— This is the first time *T. heterodactyla* is recorded from Indonesia. It is known throughout the Indo-West Pacific region (Castro, 1997b: 115).

Trapezia cymodoce (Herbst, 1801)

For synonymy see Galil & Clark, 1990: 378.

Material.— **Indonesia.** MALUKU (= MOLUCCAS). Ambon, Leitimur, Ambon Bay, Batumerah, sta. RBE.O3, 1-3 m: 1 ♂, RMNH D 47053, 7.xi.1990; 1 juvenile, RMNH D 47054. Leitimur, Ambon Bay, Wainitu, sta. RBE.O4, dead coral: 3 ♂♂, 5 ♀♀, 1 juvenile, RMNH D 47055, 7.xi.1990, H.L. Strack. Leitimur, Ambon Bay, Tg. Benteng, sta. RBE.O5: 2 ♂♂, 2 ♀♀, RMNH D 47056, 9.xi.1990, C.H.J.M. Fransen; 12 m, on alcyonacean (*Dendronephthya* sp.): 1 ♂, RMNH D 47057, 10.xi.1990, C.H.J.M. Fransen. Pombo I., lagoon, sta. RBE.16, 2-4 m: 3 ♂♂, 4 ♀♀, RMNH D 47058, 15.xi.1990, J. van Egmond. Hitu, Ambon Bay, Laha, sta. RBE.18: 1 ♀, RMNH D 47059, 24.xi.1990; 2-3 m: 1 ♂, 1 ♀, RMNH D 47060, J. van Egmond. Hitu, Mamala, sta. RBE.21, 0.5 m: 2 ♂♂, 1 ♀, RMNH D 47061, 21.xi.1990, F. de Jong & H.L. Strack; 7 ♂♂, 8 ♀♀, 2 juveniles, RMNH D 47062, J. van Egmond. Hitu, Ambon Bay, Rumahtiga, sta. RBE.34, 3-5 m: 1 ♂, 2 ♀♀, RMNH D 47063, 5.xii.1990, C.H.J.M. Fransen. Hitu, Ambon Bay, Tg. Martafons, sta. RBE.35: 2 ♀♀, RMNH D 47064, 4.xii.1990, F. de Jong; 1 ♂, RMNH D 47065, J. van Egmond. Hitu, Ambon Bay, Poka, sta. RBE.43, 4-6 m: 1 ♂, 1 ♀, RMNH D 47066, 11.xii.1990.

Additional material.— **Indonesia.** RIAU IS. Hantu, sta. 65, 01°13'N 103°45'E: 1 ♂, 1 ♀, USNM 260828, 18.x.1965, *Te Vega*, IIOE cruise 2. Tanjungtandang, Bintan: 1 ♂, NUS, vii.1995. SIMEULUE: Sinabang, 02°27'N 96°24'E: 1 ♂, 2 ♀♀, RMNH D 2101, iii.1913, E. Jacobson. BATU IS. Pulo Bai, sta. 101, 0°1'S 98°31'E: 1 ♂, USNM 260829, 25.xi.1965, *Te Vega*, IIOE cruise 2. JAVA: 1 ♀, RMNH D 46101-46102, 1820-1823, H. Kuhl & J.C. van Hasselt. Batavia (= Jakarta) Bay: 3 ♀♀, ZMA De 203889; 5 ♂♂, 3 ♀♀, RMNH D 47300, 1927, W.C. van Heurn. Thousand Is., Edam (= Damar Besar) I., 6 ♂♂, 6 ♀♀, ZMG 273, i-iv.1885, J. Brock. Pasuruan, 1-4 m: 1 ♂, ZMMU Ma 2186, 23.xii.1962, *Vitiaz*, cruise 35. KALIMANTAN (= BORNEO). Maratua I., 02°15'N 118°36'E: 9 ♂♂, 9 ♀♀, RMNH D 47067, 14-18.viii.1929, Snellius Expedition. PATERNOSTER (= TENGAH) IS. Aloang I., 07°24'S 117°49'E: 1 ♂, 1 ♀, RMNH D 47068, 8.ii.1930, Snellius Expedition. KOMODO. Slawi Bay, sta. 4.069, 08°36'S 119°31.2'E: 1 ♂, RMNH D 47069, 17.ix.1984, Indonesian-Dutch Snellius II Expedition. SULAWESI (= CELEBES). Manado: 1 ♀, RMNH D 47070, 25.ix.1930, Snellius Expedition. Amurang, 1.5 m: 1 ♂, ZMMU Ma 2194, 21.xii.1962, *Vitiaz*, cruise 35; 1 ♀, ZMMU Ma 2190, 22.xii.1962; 1 ♂, ZMMU Ma 2195, 22.xii.1962. Talisei I., sta. M-120, 01°51.2'N 125°5.7'E, 2-11 m: 1 ♀, USNM 260830, 16.vii.1979, *Alpha Helix* Moro Expedition, G. Hendler. TUKANGBESI IS. Binongko I., sta. 4.030, 05°55'S 123°59'E: 1 ♀, RMNH D 47071, 10.ix.1984, Indonesian-Dutch Snellius II Expedition; 05°58'S 124°00'E, 3 m: 1 ♂, RMNH D 47072, 7-10.iii.1930, Snellius Expedition. SPERMONDE ARCHIPELAGO. Bonetambung I., 05°03'S 119°17'E, 6-7 m: 1 ♀, RMNH D 47073, 2.iii.1930, Snellius Expedition; 1 ♀, RMNH D 47074. PASITELU IS. Tanahjampea I., 07°04'S 120°39'E, 2-3 m: 1 ♂, RMNH D 47075, 21.ii.1930, Snellius Expedition. SUMBA. Melolo, sta. 4.048, 09°54'S 120°42.5'E: 1 ♂, RMNH D 47076, 13.ix.1984, Indonesian-Dutch Snellius II Expedition. MALUKU (= MOLUCCAS): 1 ♂, 1 ♀, RMNH D 46097, iv-ix.1821, C.G.C. Reinwardt. Halmahera, Kau Bay, Akeselaka: 2 ♂♂, 1 ♀, RMNH D 47690, 28.v.1930. Ternate: 11 ♂♂, 7 ♀♀, SMF 4045, W. Kükenthal, 1894. 1 ♂, 1 ♀, MNHN-B 16901, 1902, W. Kükenthal; 2 ♀♀, RMNH D 47077, 1.iv.1930, Snellius

Expedition. Batjan (= Bacan) I.: 1 ♀, SMF 4047, 1984, W. Küenthal. Obilatu: 24 ♂♂, 33 ♀♀, RMNH D 47078, 23-27.iv.1930, Snellius Expedition. Ambon: 1 ♂, 2 ♀♀, RMNH D 529, E.W.A. Ludeking; 1 ♂, 1 ♀, RMNH D 517, 1879, C.W. Schoorel; 1 ♂, BMNH 80.6, E. Gerrard Jr; 1 ♀, BMNH 92.4.18.78.85, P.W. Bassett-Smith. 0-2 m: 1 ♂, RMNH D 47079, 6.v.1930, Snellius Expedition; 2 ♂♂, 1 ♀, RMNH D 47080, 14-19.x.1930; Ambon Bay, near Seilale, sta. 4.003, 03°46'S 128°7'E, 0-5 m: 1 ♀, RMNH D 47081, 23.viii.1984, Indonesian-Dutch Snellius II Expedition. Ambon Bay, near Poka, sta. 4.004c, 03°39'S 128°12'E, 3-9 m: 1 ♀, RMNH D 47082, 4.ix.1984, Indonesian-Dutch Snellius II Expedition. Leitimur, Ambon Bay, Batumerah: 5 ♂♂, 4 ♀♀, RMNH D 47083, 15.x.1930; Hitu, Ambon Bay, Rumatiga: 1 ♂, 1 ♀, RMNH D 47084, 17.x.1930. Ambon: 2 ♂♂, 2 ♀♀, SMF 4115, W. Küenthal, 1894. TIMOR. Kupang Bay, Kera I.: 8 ♂♂, 5 ♀♀, RMNH D 47085, 11-13.xi.1929, Snellius Expedition; 15 ♂♂, 20 ♀♀, RMNH D 47086; 10-15 m: 1 ♀, RMNH D 47087, 2.xii.1929; 3 ♀♀, RMNH D 47088, 11-13, 15-16.xi.1929. WESTERN NEW GUINEA (= IRIAN JAYA). Boo Is., 01°12'S 129°24'E: 2 ♂♂, 2 ♀♀, RMNH D 47308, 5.x.1930, Snellius Expedition. Manokwari Bay: 1 ♂, RMNH D 47089, 14.iii.1955. Biak, west of Sorido: 1 ♂, 1 ♀, RMNH D 47090, i.1955; *Seriatopora* sp.: 11 ♂♂, 4 ♀♀, 1 juvenile, RMNH D 47091, 23.iii.1955; 1 ♀, RMNH D 47092, 22-23.iii.1955. Hollandia (= Jayapura): 10 ♂♂, 10 ♀♀, RMNH D 47093, 12.vi.1955, Visserij Onderzoek.

Arafura Sea. 10 ♂♂, 10 ♀♀, BMNH 92.4.18.86.

Philippine Islands. SULU ARCHIPELAGO. Sibutu Is., Sipankot I., 3-6 m: 1 ♂, 2 ♀♀, RMNH D 47094, 10-14.ix.1929, Snellius Expedition.

Colour.— The carapace of live individuals from Okinawa, Guam, Belau (Palau) and the Coral Sea varied from purplish blue to light violet; a row of orange-red dots was present across the upper half of the carapace (Castro, 1997a: 75, pl. 2 fig. A, pl. 3 fig. A; also see Miyake, 1983: pl. 47 fig. 1). Chelipeds and walking legs were orange.

Remarks.— *T. cymodoce* was recorded from Ambon and other locations in Maluku by de Man (1880: 177; 1888: 316; 1902: 640), Miers (1880: 328; 1884: 536), Ortmann, 1894: 54, as *T. cymodoce* var. *typica*, Zehntner (1894: 156), Nobili (1899: 260), Gordon (1934: 59), Serène et al. (1974: 24; 1976: 19), Monod & Serène (1976: 26) and Kastoro et al. (1980: 61). It is also known from Java (de Man, 1888: 316; Kastoro et al., 1980: 45, 48), Kalimantan (Borneo) (de Man, 1895: 555), Sulawesi (Celebes) (de Man, 1880: 177), Flores and Timor (Thallwitz, 1892: 53) and Irian Jaya (western New Guinea) (Gordon, 1934: 59). Some of these records most probably included *T. lutea*. *T. dentata* Dana, 1852, which is listed from the southern Maluku by Kastoro et al. (1980: 61), has often been used for *T. cymodoce*.

T. cymodoce is listed as also associated with crinoids in southern Maluku (Monod & Serène, 1976: 27), most probably the result of mixing samples during collection.

Trapezia digitalis Latreille, 1828

For synonymy see Serène, 1984: 277.

Material.— **Indonesia.** MALUKU (= MOLUCCAS). Ambon, Hitu, Baguala Bay, 0.5 km from Tial, sta. RBE.15: 1 ♂, RMNH D 47095, 13.xi.1990, J. van Egmond. Leitimur, Hutumuri, sta. RBE.27: 1 ♂, 3 ♀♀, RMNH D 47096, 26/27.xi.1990, M. Lavaleye.

Additional material.— **Indonesia.** PATERNOSTER (= TENGAH) IS. Aloang I., 07°24'S 117°49'E: 1 ♀, RMNH D 47097, 8.ii.1930, Snellius Expedition. SULAWESI (= CELEBES). Amurang: 1 ♀, ZMMU Na 2202, 22.xii.1962, *Vitiaz*, cruise 35. MALUKU (= MOLUCCAS). Obilatu: 2 ♀♀, RMNH D 34937, 23-27.iv.1930, Snellius Expedition, H. Boschma; 1 ♂, 2 ♀♀, RMNH D 47098; 1 ♂, 5 ♀♀, RMNH D 47099. TIMOR. Kupang Bay, Kera I.: 2 ♂♂, 3 ♀♀, RMNH D 47100, 11-13.xi.1929, Snellius Expedition; 1 ♂, RMNH D 47101. WESTERN NEW GUINEA (= IRIAN JAYA). Hollandia (= Jayapura): 1 ♀, RMNH D 47102, 1954, L.D. Brongersma, M. Boeseman & L.B. Holthuis.

Colour.— The carapace and chelipeds are dark brown throughout the Indo-West Pacific and eastern Pacific populations (Castro, 1996: 538). An orange-white tubercle is present at the base of the cheliped dactylus.

Remarks.— *T. digitalis* has been previously recorded from southern Maluku (Serène et al., 1974: 24; 1976: 19; Monod & Serène, 1976: 26; Kastoro et al., 1980: 61).

Trapezia ferruginea Latreille, 1828

For synonymy see Serène, 1984: 273 and Galil, 1988b: 164.

Material.— **Indonesia.** MALUKU (= MOLUCCAS). Ambon, Leitimur, Hutumuri, sta. RBE.27: 4 ♂♂, 3 ♀♀, RMNH D 47103, 26/27.xi.1990, M. Lavaleye.

Additional material.— **Indonesia.** JAVA. 1 ♀, RMNH D 46103, 1820-23, H. Kuhl & J.C. van Hasselt. SULAWESI (= CELEBES). Amurang: 1 ♀, ZMMU Na 2207, 22.xii.1962, *Vitiaz*, cruise 35. Talisei I., sta. M-120, 01°51.2'N 125°5.7'E, 2-11 m: 1 ♂, USNM 260831, 16.vii.1979, *Alpha Helix* Moro Expedition, G. Hendler.

Colour.— The carapace and appendages of live individuals from the eastern Pacific (Castro, 1996: 542) and French Polynesia (Castro, 1997b: 121) are orange to brown-orange. Live specimens from Enewetak, Marshall Islands and Guam are lighter in colour. In all populations, the distal margin of the propodus of the walking legs is orange-red to red-brown. The colour pattern of the walking legs remains visible in preserved specimens.

Remarks.— *T. ferruginea* was listed from southern Maluku by Gordon (1934: 59), Serène et al. (1976: 19) and Kastoro et al. (1980: 61). Kastoro et al. (1980: 48) also identified it from Java and Gordon (1934: 59) from Irian Jaya (western New Guinea).

Trapezia flavopunctata Eydoux & Souleyet, 1842

For synonymy see Galil & Lewinsohn, 1985a: 210.

Material.— **Indonesia.** WESTERN NEW GUINEA (= IRIAN JAYA). Hollandia (= Jayapura): 1 ♂, RMNH D 47104, iv.1955, G. van Hout and G.T. Haneveld.

Colour.— The carapace and appendages of live specimens have large yellow spots on a red background (Castro, 1997b: 122).

Remarks.— This is the first time *T. flavopunctata* is recorded from Indonesia.

Trapezia formosa Smith, 1869

For synonymy see Castro, 1998a: 178.

Material.— **Indonesia.** MALUKU (= MOLUCCAS). Ambon, Hitu, Larike, sta. RBE.39, 0.5 m: 1 ♀, RMNH D 47108, 8.vii.1990, M. Lavaleye. Leitimur, Hutumuri, sta. RBE.27: 1 ♂, RMNH D 47105, 26/27.xi.1990; 2 ♀♀, RMNH D 47106.

Colour.— The carapace and chelipeds are bright orange. Walking legs are ornamented with a network of thin, red lines (Castro, 1998a: 180, figs. 1, 2).

Remarks.— *T. formosa* was first recorded from Ambon and Indonesia by Castro (1998a: 178).

Trapezia garthi Galil, 1983
(fig. 2)

Trapezia sp.; Sakai, 1976: 509, pl. 181 fig. 5; Miyake, 1983: 235.

Trapezia garthi Galil, 1983: 126, figs. 5-8, 9B; Chang et al., 1987: 216.

Material.— **Indonesia.** MALUKU (= MOLUCCAS). Ambon. Leitimur, Hutumuri, sta. RBE.27: 1 ♂ (cl 4.3 mm, cw 5.1 mm), RMNH D 47800, 26/27.xi.1990, Rumphius Biohistorical Expedition.

Additional material.— **Japan.** AMAMI IS. Yoron I, Nama: 8 ♂♂ (cl 2.4-4.4 mm, cw 3.0-5.1 mm), 6 ♀♀ (cl 2.7-4.3 mm, cw 3.4-4.3 mm), SMF 23876, 1.viii.1966, T. Sakai (?); 2 ♂♂ (cl 4.3, 6.1 mm, cw 5.2, 7.2 mm), 1 ♀ (4.5, 5.3 mm), SMF 23877, 22.vii.1967, T. Sakai (?).

Taiwan. LAN-YU (ORCHID) I. On *Pocillopora damicornis*: 1 ♂ holotype, 1 ♀ paratype, ASIZ 70071, 9.v.1982, Y.-S. Chen; 1 ♂ (cl 4.8 mm, cw 5.6 mm), 2 ♀♀ (cl 3.8-5.8 mm, cw 4.6-7.8 mm), CHCD 1052, 21/22.iii.1996.

Guam. Pago Bay, 2-4 m, on *P. verrucosa* & *P. elegans*: 2 ♂♂ (cl 4.0, 5.0 mm, cw 4.9, 5.9 mm), 3 ♀♀ (cl 4.0-5.0 mm, cw 5.2-6.6 mm), MNHN-B 26132, 10-11.ix.1997, P. Castro & E. Santiago; 1 ♂ (cl 4.8 mm, cw 5.9 mm), 1 ♀ (cl 5.3 mm, cw 7.3 mm), MNHN-B 26133.

Niue. Hikutavake, on *Pocillopora* & *Acropora* spp.: 1 ♀ (cl 5.8 mm, cw 7.5 mm), MNHN-B 26134, 15.x.1991, G. Paulay.

Spratly (Nansha) Is. Taiping I., 10°23'N 114°22'E, on *P. damicornis*: 3 ♂♂ (cl 3.5-5.8 mm, cw 4.3-6.4 mm), 1 ♀ (cl 5.5 mm, cw 7.4 mm), ASIZ 70667, 20.iv.1994, M.-S. Jeng.

Colour.— The carapace and chelipeds of specimens that had been preserved in glycerin and sugar were described by Galil (1983: 129, fig. 9B) as having light-orange spots, or "areolae," surrounded by magenta-red lines. The upper portion of the cheliped propodus had dark purple lines and the finger and lower portion of the propodus was deep yellow. A red spot was located at the base of the dactylus.

In live specimens collected in Guam (MNHN-B 26132, 26133), the dorsal surface of the carapace was dark reddish purple (magenta) with orange-white (cream) to light-orange spots. The spots were round to slightly irregular in shape, especially along the anterior half of the carapace. The anterior margins of the carapace were slightly lighter in colour. Most of the posterior half of the carapace was orange-white to light orange in the smallest individuals, as in the specimen collected in Ambon (RMNH D 47800; fig. 1). The carapace was completely covered by round and irregular spots in larger individuals (Galil, 1983: fig. 9B). The size of the spots varied widely, even among individuals living together on the same coral colony as heterosexual pairs. In most of the largest specimens (MNHN-B 26133, 26134), the spots on the posterior portion of the carapace became diffuse, so that the surface was dominated by irregular, wavy reddish purple lines.

Dark-purple lines formed square reticulations on the carpus and dorsal margin of the cheliped propodus. The lower margin of the propodus was yellow-orange; the fingers brown. A flat tubercle at the base of the dactylus was purple-red. The spotted pattern on the dorsal surface of the carapace was repeated across the anterior portion of the ventral side of the carapace, including the third maxillipeds. The eyes were gray.

The dorsal surface of the carapace turns red-orange with yellow-orange spots in preserved specimens (fig. 1).

Remarks.— *T. garthi* was described from specimens collected in Taiwan. The material examined during this study, which was collected from locations extending from Ambon to Niue (central Pacific) and Japan, agrees well with the description.

Sakai (1976: 509) considered his *Trapezia* sp. as “probably identical to *T. areolata*,” a common synonym for *T. septata*. In *T. septata*, however, thin, red-brown lines are interconnected in a honeycomb-like pattern on a pink to light-orange background (see below). The anterolateral margins of the authentic *T. areolata* Dana, 1852, however, are conspicuously parallel to each other unlike *T. garthi* and the specimen shown in Sakai’s figure. *T. areolata* appears to be restricted to southeastern Polynesia (Castro, 1997b: 117). The colour of *T. garthi* was described by Sakai (1976: 509, pl. 181 fig. 5) as “pinc [sic] with pale whitish mottles” but his colour figure shows irregular orange-white spots on an orange-brown background, similar to those observed in preserved specimens of *T. garthi*.

T. garthi is morphologically very close to a group of species distinguished by a carapace with rounded anterolateral margins, an epibranchial tooth that, if present, is replaced by a notch with increasing carapace size (ultimately disappearing in the largest specimens), thick chelipeds and a relatively small body size. This group includes *T. bella* Dana, 1852, *T. cheni* Galil, 1983, *T. formosa*, *T. globosa* Castro, 1997 and *T. speciosa* Dana, 1852. An epibranchial tooth or notch is actually absent in *T. cheni*, described from Taiwan, and *T. globosa*, so far known only from French Polynesia (Castro, 1997b: 124). *T. bella* is known only from southeastern Polynesia (Castro, 1997b: 118) and the Line Islands. All of these species can be distinguished from *T. garthi* by the colour pattern of their carapace: small, red-brown dots in *T. bella* (Dana, 1855: pl. 15 fig. 2) and the absence of spots in *T. cheni* (Galil, 1983: fig. 9A), *T. formosa* (Castro, 1996: fig. 4; 1998a: figs. ???) and *T. globosa* (Castro, 1997b: 122, pl. 1 fig. D).

T. garthi is particularly close to *T. speciosa*, which is known from French Polynesia, its type locality, to the western Indian Ocean. In the carapace and chelipeds of *T. speciosa*, thin red lines form a sinuous, almost symmetric pattern, with a series of U-shaped curves along the anterior margin of the carapace, on a light-orange or pink background (Dana, 1855: pl. 15 fig. 1; Richters, 1880: pl. 16 figs. 9-11; Galil, 1984: fig. 9B; Serène, 1984: pl. 38 fig. E; Castro, 1997b: 130, pl. 1 fig. F). Two specimens from Viet Nam illustrated by Serène (1959: pl. 2), however, do not conform to the typical colour pattern of *T. speciosa*.

Some variation exists in the colour pattern of both *T. garthi* and *T. speciosa*. Among the three largest specimens of *T. garthi* that were examined (MNHN-B 26133, 26134), the spots were smaller and therefore more numerous and the red-purple lines became



Fig. 2. *Trapezia garthi* Galil, 1983. Male (cl 4.3 mm, cw 5.1 mm; RMNH D 47800), Ambon, Indonesia, sta. RBE.27, Rumphius Biohistorical Expedition, 1990.

sinuous on the posterior portion of the carapace, thus resembling the sinuous lines of *T. speciosa*. Conversely, on a small specimen of *T. speciosa* from Moruroa, French Polynesia (included in MNHN-B 25713), the sinuous lines bordered irregular spots that are close to those of *T. garthi*. In the rest of the 148 specimens of *T. speciosa* from French Polynesia (MNHN-B 9749-9751, 16823, 16921, 23006-23016, 25318, 25319, 25458-25467, 25713, 25972-25988) and 65 specimens from the western Indian Ocean (MNHN-B 8326-8328, 16093, 23048, 25301-25311, 25348; MHNR-B 27-32) that were examined, sinuous lines, not spots, were always present, even in juveniles. Aside from the colour pattern, both species are morphologically identical. As in *T. speciosa*, a fine tomentum often covers the posterior portion of the cheliped merus and carpus and sometimes the walking legs of *T. garthi*. The presence, amount and extension of the tomentum, however, is a variable character in both species. It is not related to body size. Galil (1983: 129) distinguished the two species on account of the wider carapace, less prominent anterior margin and larger orbits of *T. garthi*. These differences, however, were found to be insignificant when specimens of a wide range of sizes was examined.

T. garthi may be also confused with *T. septata*, where the carapace and chelipeds are ornamented with red-brown lines interconnected in a honeycomb pattern on a pink to orange-white background (Castro, 1997a: pl. 2 fig. E, pl. 6). It is very possible that some of the records of *T. septata* and *T. speciosa* in the literature actually belong to *T. garthi*.

This is the first record of *T. garthi* from Indonesia. It was previously known from Taiwan, the type locality (Galil, 1983: 126; Chang et al., 1987: 216) and Japan (Sakai, 1976: 509; Miyake, 1983: 235, both as *Trapezia* sp.).

In Guam, *T. garthi* was found only in small, thick-branched colonies of *Pocillopora verrucosa* and *P. elegans*. The colonies were collected from shallow water in fringing reefs exposed to heavy wave action.

Trapezia guttata Rüppell, 1830

For synonymy see Galil & Clark, 1990: 381.

Material.— **Indonesia.** MALUKU (= MOLUCCAS). Ambon, Hitu, Mamala, sta. RBE.21: 4 ♂♂, 4 ♀♀, 1 juvenile, RMNH D 47112, 21.xi.1990, J. van Egmond. Hitu, Ambon Bay, Rumahtiga, sta. RBE.34, 3-5 m: 1 ♀, RMNH D 47114, 5.xii.1990, C.H.J.M Fransen. Hitu, Ambon Bay, Laha, sta. RBE.37, 1-3 m: 1 ♀, RMNH D 47113, 6.xii.1990, M. Lavaleye.

Additional material.— **Indonesia.** SIMEULUE. Sinabang, 02°27'N 96°24'E: 1 ♂, 1 ♀, RMNH D 2101, iii.1913, E. Jacobson; 1 ♀, RMNH D 47172. BATU IS. Pulo Bai I., sta. 101, 0°1'S 98°31'E: 1 ♀, USNM 260832, 25.xi.1963, *Te Vega*, IIOE cruise 2. SUMATRA. Padang : 1 ♂, 1 ♀, MNHN-B 13289, viii.1963. KALIMANTAN (= BORNEO). Maratua I., 02°15'N 118°36'E: 15 ♂♂, 12 ♀♀, RMNH D 47116, 14-18.viii.1929, Snellius Expedition. KOMODO. Slawi Bay, sta. 4.069, 08°36'S 119°31.2'E: 1 ♀, RMNH D 47117, 17.ix.1984, Indonesian-Dutch Snellius II Expedition. SULAWESI (= CELEBES). Amurang: 1 ♀, ZMMU Na 2209, 22.xii.1962, *Vitiaz*, cruise 35; 1 ♀, ZMMU Na 2213. Talisei I., sta. M-120, 01°51.2'N 125°5.7'E, 2-11 m: 1 ♂, 2 ♀♀, USNM 260833, 16.vii.1979, *Alpha Helix* Moro Expedition, G. Hendler. TALAUD IS. Karakelong I., Beo, 04°15'N 126°50'E, 6-10 m: 28 ♂♂, 43 ♀♀, 2 feminized ♂♂, RMNH D 47118, 14-21.vi.1930, Snellius Expedition; 3 ♂♂, 6 ♀♀, 1 feminized ♂, RMNH D 47119; 1 ♀, RMNH D 47120. MALUKU (= MOLUCCAS). Obilatu: 16 ♂♂, 11 ♀♀, RMNH D 47121, 23-27.iv.1930, Snellius Expedition; 1 ♀, RMNH D 47122; 1 ♂, RMNH 47123. Ambon: 1 ♂, 1 ♀, RMNH D 47124, 14-19.x.1930,

Snellius Expedition; Leitimur, Ambon Bay, Batumerah: 5 ♂♂, 9 ♀♀, RMNH D 47125, 15.x.1930. TIMOR. Kupang Bay, Kera I.: 4 ♂♂, RMNH D 47126, 11-13.xi.1929, Snellius Expedition. WESTERN NEW GUINEA (= IRIAN JAYA). Manokwari Bay: 1 ♂, RMNH D 47127, 14.iii.1955. Biak, west of Sorido, *Seriatopora* sp.: 4 ♂♂, 10 ♀♀, RMNH D 47128, 23.iii.1955. Hollandia (= Jayapura): 8 ♂♂, 4 ♀♀, RMNH D 47129, 12.vi.1955, Visserij Onderzoek.

Arafura Sea. 7 ♂♂, 16 ♀♀, BMNH 92.4.18.86.

Colour.— The anterior margin of the carapace of live individuals is red-brown while the rest of the carapace is white to orange-white (Miyake, 1983: pl. 47 fig. 2; Castro, 1997a: 83, pl. 2 fig. B, pl. 4). The walking legs are ornamented with brown-red spots.

Remarks.— *T. guttata* was recorded from several locations in Maluku by de Man (1902: 640), Gordon (1934: 59), Serène et al. (1974: 24; 1976: 19) and Kastoro et al. (1980: 61). The record by Serène et al. (1976) is also listed as *T. davaoensis* Ward, 1941, a junior synonym of *T. guttata*; that of Kastoro et al. (1980) as *T. miersi* Ward, 1941, another junior synonym of *T. guttata*.

Trapezia lutea Castro, 1997

Trapezia lutea Castro, 1997a: 84, figs. 2C, 2D, 3A-C; pl. 2 fig. C; pl. 5 fig. A; Castro, 1999a: 111.

Material.— **Indonesia.** MALUKU (= MOLUCCAS). Ambon, Leitimur, Ambon Bay, Tg. Benteng, sta. RBE.05: 1 ♂, 2 ♀♀, RMNH D 47130, 9.xi.1990, C.H.J.M Fransen. Hitu, Baguala Bay, 0.5 km from Tial, sta. RBE.15: 1 ♂, 2 ♀♀, RMNH D 47131, 13.xi.1990, J. van Egmond. Pombo I., lagoon, sta. RBE.16, 2-4 m: 1 ♀, RMNH D 47132, 15.xi.1990, J. van Egmond. Hitu, Mamala, sta. RBE.21, 0.5 m: 1 ♀, RMNH D 47133, 21.xi.1990, F. de Jong & H.L. Strack; 2 ♀♀, RMNH D 47134, J. van Egmond. Leitimur, Hutumuri, sta. RBE.27: 1 ♂, 4 ♀♀, 1 juvenile, RMNH D 47135, 26/27.xi.1990, M. Lavaleye. Hitu, Ambon Bay, Rumahtiga, sta. RBE.34, 3-5 m: 1 ♀, RMNH D 47136, 5.xii.1990, C.H.J.M Fransen. Hitu, Ambon Bay, Tg. Martafons, sta. RBE.35: 1 ♂, RMNH D 47137, 4.xii.1990, F. de Jong.

Additional material.— **Indonesia.** KALIMANTAN (= BORNEO). Maratua I., 02°15'N 118°36'E: 1 ♂, 1 ♀, RMNH D 47138, 14-18.viii.1929, Snellius Expedition. PATERNOSTER (= TENGAH) IS. Aloang I., 07°24'S 117°49'E: 1 ♂, 2 ♀♀, RMNH D 47139, 8.ii.1930, Snellius Expedition. KOMODO. Slawi Bay, sta. 4.069, 08°36'S 119°31.2'E: 1 ♀, RMNH D 47140, 17.ix.1984, Indonesian-Dutch Snellius II Expedition. SULAWESI (= CELEBES). Amurang: 2 ♀♀, ZMMU Ma 2191, 22.xii.1962, *Vitiaz*, cruise 35; 1 ♀, ZMMU Na 2182. Talisei I., sta. M-120, 01°51.2'N 125°5.7'E, 2-11 m: 1 ♂, 1 ♀, USNM 260834, 16.vii.1979, *Alpha Helix* Moro Expedition, G. Hendler. Paleleh, 01°05'N 121°59'E, 3-5m: 1 ♂, RMNH D 47141, 22.viii.1929, Snellius Expedition. Lembeh Strait, sta. 7, 01°31'N 125°15'E: 2 ♂♂, 2 ♀♀, RMNH D 47142, 16-25.x.1994, Sulawesi Expedition, J.C. den Hartog. Minahassa Peninsula, Tangkoko National Park: 1 ♂, BMNH 1986.65, 3.x.1985, B.R. Pittkin. TUKANGBESI IS. Binongko I., southwest of Taipabu, sta. 4.044b, 05°56'S 123°58.4'E: 1 ♀, RMNH D 47143, 11.ix.1984, Indonesian-Dutch Snellius II Expedition. SUMBA. Melolo, sta. 4.048, 09°54'S 120°42.5'E: 2 ♂♂, RMNH D 47144, 13.ix.1984, Indonesian-Dutch Snellius II Expedition. TALAUD IS. Karakelong I., Beo, 04°15'N 126°50'E: 1 ♀, host to sacculinid parasite, RMNH D 34935, 14-21.vi.1930, Snellius Expedition; 6-10 m: 2 ♂♂, 6 ♀♀, RMNH D 47145; 1 ♂, 1 ♀, RMNH D 7146. MALUKU (= MOLUCCAS). Ternate: 1 ♂, 2 ♀♀, SMF 23857, 1894, W. Kükenthal. Tidore, 0°40'N 127°25'E: 1 ♂, 1 ♀, RMNH D 47147, 24-29.ix.1929, Snellius Expedition. Obilatu: 10 ♂♂, 14 ♀♀, RMNH D 47148, 23-27.iv.1930, Snellius Expedition. Ambon: 1 ♂, 2 ♀♀, RMNH D 47149, 14-19.x.1930, Snellius Expedition. Ambon Bay, near Seilale, sta. 4.003, 03°46'S 128°7'E, 0-5 m: 2 ♀♀, RMNH D 47150, 23.viii.1984, Indonesian-Dutch Snellius II Expedition. TIMOR. Kupang Bay, Kera I.: 2 ♂♂, 4 ♀♀, RMNH D 47151, 11-13.xi.1929, Snellius Expedition; 10 ♂♂, 16 ♀♀, RMNH D 47152; 2 ♂♂, 1 ♀, RMNH D 47153, 11-13,15-16.xi.1929. WESTERN NEW GUINEA (= IRIAN JAYA). Boo Is., 01°12'S 129°24'E: 1 ♂, RMNH D 47154, 5.x.1930, Snellius Expedition. Manokwari Bay: 1 ♀,

RMNH D 47155, 14.iii.1955. Biak, west of Sorido: 1 ♀, RMNH D 47156, i.1955; 1 ♀, RMNH D 47157, 22-23.iii.1955. Hollandia (= Jayapura): 5 ♀♀, RMNH D 47158, iv.1955, G. van Hout and G.T. Han-eveld; 7 ♂♂, 6 ♀♀, RMNH D 47159, 12.vi.1955, Visserij Onderzoek.
Arafura Sea. 4 ♂♂, 7 ♀♀, BMNH 92.4.18.86.

Colour.— Live individuals from Okinawa, Guam and the Coral Sea had orange carapace and appendages (Castro, 1997a: 86, pl. 2 fig. C, pl. 5 fig. A; also see Jones & Morgan, 1994: 178-179, as *T. cymodoce*). Small specimens from Indonesia showed an accumulation of dark pigment along the anterior, dorsal surface of the carapace, eye-stalks and chelipeds, as observed in two small specimens supposedly collected from French Polynesia (Castro, 1997b: 126).

Remarks.— This is the first record of *T. lutea* from Indonesia. It has been confused with *T. cymodoce* since both species share a conspicuous tomentum on the chelipeds. The material from Ternate, Maluku originally identified by de Man (1902: 640) as *T. cymodoce*, for instance, was found to include specimens of *T. lutea* (SMF 27857).

Trapezia punctipes Castro, 1997

Trapezia punctipes Castro, 1997a: 87, figs. 4 A-C, pl. 2 fig. D; Castro, 1999a: 112.

Material.— **Indonesia.** MALUKU (= MOLUCCAS). Ambon, Hitu, Mamala, sta. RBE.21: 1 ♂ (cl 5.1 mm, cw 6.0 mm), 1 ♀ (cl 4.3 mm, cw 5.1 mm), RMNH D 47160, 21.xi.1990, J. van Egmond.

Additional material.— **Indonesia.** SULAWESI (= CELEBES). Talisei I., sta. M-128, 01°51.2'N 125°5.7'E, 2-11 m: 3 ♂♂, 4 ♀♀, USNM, 16.vii.1979, *Alpha Helix* Moro Expedition, G. Hendler.

Thailand. PHUKET I., Makham Bay & Cape Phanwa, 1-2 m: 3 ♂♂, 3 ♀♀, color photographs, 25-26.viii.1980, P. Castro.

Saipan. 1 ♂, 1 ♀, USNM 260835, W.A. Bartos.

Belau. 1 ♂, 1 ♀, USNM 15614, F.M. Bayer.

Fiji. VITI LEVU. 6m: 1 ♂, 1 ♀, LACM 68-463.1, Beveridge, Schuier & Srinivasan, 21.viii.1968.

Australia. QUEENSLAND. Lizard I., on *Pocillopora damicornis*: 1 ♂, 1 ♀, LACM 79-229.1, W.K. Patton, 5.viii.1974 (material identified as "orange, blue eyes *T. ferruginea*" by W.K. Patton).

Colour.— The carapace and chelipeds are light orange, while the walking legs are marked by orange-red spots (Castro, 1997a: 88, pl. 2 fig. D). The eyes are gray-green.

Remarks.— This is the first time *T. punctipes* is identified outside its type locality in Queensland, northeastern Australia. The additional material provides a more extensive size range than the type material, which permits the addition of some diagnostic features to the original description.

The lower margin of the chelipeds is armed with shallow, teeth-like tubercles that are more obvious in the largest specimens. These tubercles, however, are not as pronounced as in *T. flavopunctata* and *T. rufopunctata*. The exognath of the third maxillipeds is covered with small, shallow granules similar to the cluster of granules previously described on the distal inner margin of the ischium of the endognath (Castro, 1997a: fig. 4B).

The two specimens from Ambon were smaller than any of the specimens in the type material (Castro, 1997a: 87), but they share with the smallest paratypes acute epibranchial teeth, an acute tooth on the upper margin of each cheliped propodus, anterolateral sides of the carapace that are almost parallel to each other and a com-

plete suture between the second and third thoracic sternites. They differ from the type material in having short, sparse setae along the outer margin of the cheliped propodus. Similar setae formed a short, red-brown tomentum in some of the smallest specimens collected live from the Andaman Sea coast of Thailand.

Trapezia rufopunctata (Herbst, 1799)

For synonymy see Galil & Lewinsohn, 1985a: 209.

Material.— **Indonesia.** MALUKU (= MOLUCCAS). Ambon, Leitimur, Ambon Bay, Tg. Benteg, sta. RBE.05, 3 m: 1 ♂, 1 ♀, RMNH D 47162, 9.xi.1990, C.H.J.M Fransen. Pombo I., outer reef, sta. 17, 2-4 m: 1 ♀, RMNH D 47163, 16.xi.1990, J. van Egmond. Hitu, Mamala, sta. RBE.21: 1 ♂, RMNH D 47164, 21.xi.1990, J. van Egmond.

Additional material.— **Indonesia.** TALAUD IS. Karakelong I., Beo, 04°15'N 126°50'E, 6-10 m: 1 ♂, RMNH D 47161, 14-21.vi.1930, Snellius Expedition; 1 ♂, 1 ♀, RMNH D 47166, 21.vi.1930; 1 ♂, RMNH D 47165; 1 ♀, RMNH D 34936, 14-21.vi.1930, H. Boschma. SULAWESI (= CELEBES). Amurang: 1 ♂, ZMMU Na 2215, 22.xii.1962, *Vitiaz*, cruise 35. Talisei I., sta. M-120, 01°51.2'N 125°5.7'E, 2-11 m: 3 ♂♂, 4 ♀♀, USNM 260836, 16.vii.1979, *Alpha Helix* Moro Expedition, G. Hendler. Lembah Strait, 01°27'N 125°13'E: 2 ♂♂, 21.vi.1929, A.W. Herre. MALUKU (= MOLUCCAS). Obilatu: 6 ♂♂, 4 ♀♀, RMNH D 47167, 23-27.iv.1930, Snellius Expedition. Ambon: 6 ♂♂, RMNH D 47168, 14-19.x.1930, Snellius Expedition. TIMOR. Kupang Bay, Kera I.: 1 ♂, RMNH D 47169, 5.xi.1929, Snellius Expedition; 6 ♂♂, 7 ♀♀, RMNH D 47170, 11-13.xi.1929; 1 ♂, 1 ♀, RMNH D 47171, 11-13/15-16.xi.1929.

Colour.— The carapace and appendages of live individuals have small to large red spots on a light-orange to orange-white background (Allen & Steene, 1994: 159; Jones & Morgan, 1994: 179; Castro, 1997b: 128).

Remarks.— *T. rufopunctata* was recorded from Ambon and southern Maluku by Ortmann (1894: 54), Zehntner (1894: 157), Gordon (1934: 60), Serène et al. (1974: 24; 1976: 19), Monod & Serène (1976: 26), Kastoro et al. (1980: 61) and Galil & Lewinsohn (1985a: 210). It is also known from Java (de Man, 1888: 316; Kastoro et al., 1980: 48) and Bali (Galil & Lewinsohn, 1985a: 210).

Trapezia septata Dana, 1852

For synonymy see Galil & Lewinsohn, 1985b: 288.

Material.— **Indonesia.** MALUKU (= MOLUCCAS). Ambon, Hitu, Baguala Bay, 0.5 km from Tial, sta. RBE.15: 1 ♂, 1 ♀, RMNH D 47173, 13.xi.1990, J. van Egmond. Leitimur, Hutumuri, sta. RBE.27: 2 ♂♂, 3 ♀♀, 2 juveniles, RMNH D 47174, 26/27.xi.1990, M. Lavaleye. Hitu, Ambon Bay, Rumahtiga, sta. RBE.34, 3-5 m: 1 ♂, 1 ♀, RMNH D 47175, 5.xii.1990, C.H.J.M Fransen.

Additional material.— **Indonesia.** JAVA. Thousand Is., Edam (= Damar Besar) I.: 1 ♂, 1 ♀, RMNH D 47176, v.1921, H. Boschma; 1 ♂, ZMA De 203886. Batavia (= Jakarta) Bay : 2 ♂♂, 2 ♀♀, RMNH D 47177, 1927, W.C. van Heurn. KALIMANTAN (= BORNEO). Borneo Bank, 03°24'S 117°30'E, sta. 78, 34 m: 1 ♂, 2 ♀♀, ZMA De 203887, 10-11.i.1900, Siboga Expedition. PATERNOSTER (= TENGAH) IS. Aloang I., 07°24'S 117°49'E: 1 ♀, RMNH D 47178, 8.ii.1930, Snellius Expedition. SULAWESI (= CELEBES). Amurang: 1 ♂, 2 ♀♀, ZMMU Ma 2185, 22.xii.1962, *Vitiaz*, cruise 35; 1 juv., ZMMU Ma 2198; 1 ♂, ZMMU Na 2212. Lembah Strait, sta. 7, 01°31'N 125°15'E: 1 ♂, 1 ♀, RMNH D 47179, 16-25.x.1994, Sulawesi Expedition, J.C. den Hartog; sta. 8, 01°30'N 125°15'E: 1 ♂, RMNH D 47180, 16-25.x.1994, J.C. den Hartog. Mamuju, 02°41'S 118°55'E: 3 ♂♂, 5 ♀♀, RMNH D 47181, 4-5.viii.1929, Snellius Expedition; 1 ♂, 1 ♀, RMNH D 47182. TUKANGBESI IS. Binongko I., 05°58'S 124°00'E, 3 m: 1

♂, 1 ♀, RMNH D 47183, 7-10.iii.1930, Snellius Expedition; 2 ♀♀, RMNH D 47183. TALAUD IS. Karakelong I., Beo, 04°15'N 126°50'E, 6-10 m: 2 ♀♀, RMNH D 47184, 14-21.vi.1930, Snellius Expedition. MALUKU (= MOLUCCAS). Obilatu: 9 ♂♂, 12 ♀♀, RMNH D 47185, 21-23.iv.1930, Snellius Expedition. Ambon: 1 ♂, SMF 11739, 1984, W. Kükenthal; 1 ♂, 1 ♀, RMNH D 47186, 6.v.1930, Snellius Expedition. TIMOR. Kupang Bay, Kera I.: 8 ♂♂, 11 ♀♀, RMNH D 47187, 11-13.xi.1929, Snellius Expedition; 3 ♂♂, 2 ♀♀, RMNH D 47188. Kupang: 1 ♂, RMNH D 47189, 18-20.xi.1929; 1 ♀, RMNH D 47190, xii.1929. WESTERN NEW GUINEA (= IRIAN JAYA). Manokwari Bay: 1 ♂, 1 ♀, RMNH D 47191, 14.iii.1955. Biak, west of Sorido: 1 ♂, 1 ♀, RMNH D 47192, 22-23.iii.1955. Hollandia (= Jayapura): 1 ♂, RMNH D 47193, 12.vi.1955, Visserij Onderzoek; 4 ♂♂, 5 ♀♀, RMNH D 47194. **Arafura Sea.** 1 ♂, 4 ♀♀, BMNH 92.4.18.86.

Colour.— The carapace and chelipeds are pink to orange-white with many red-brown interconnected lines that form a honeycomb-like pattern (Miyake, 1983: pl. 47 fig. 3, as *T. areolata*; Jones & Morgan, 1994: 180; Castro, 1997a: 92, pl. 2 fig. E, pl. 6). The juveniles show the same honeycomb pattern of adults but the polygons are larger and made of dark pigment granules.

Remarks.— *T. septata* was recorded as *T. areolata* from Ambon and Maluku by Zehntner (1894: 157), de Man (1902: 640), Gordon (1934: 59), Serène et al. (1974: 24; 1976: 19), Monod & Serène (1976: 26) and Kastoro et al. (1980: 61). Kastoro et al. (1980: 61) listed it (as *T. reticulata* Stimpson, 1858) from southern Maluku; Galil & Lewinsohn (1985a: 288, as *T. septata*) from Ambon. It is also listed (as *T. areolata*) from Java (de Man, 1888: 316; Kastoro et al., 1980: 48), Sulawesi (Celebes) (de Man, 1895: 556) and Irian Jaya (western New Guinea) (Gordon, 1934: 59).

Trapezia serenei Odinetz, 1984

For synonymy see Castro, 1997b: 128.

Material.— **Indonesia.** MALUKU (= MOLUCCAS). Ambon, Leitimur, Hutumuri, sta. RBE.27: 1 ♀, RMNH D 47195, 26/27.xi.1990, M. Lavaleye.

Additional material.— **Indonesia.** KALIMANTAN (= BORNEO). Maratua I., 02°15'N 118°36'E: 1 ♂, 3 ♀♀, RMNH D 47196, 14-18.viii.1929, Snellius Expedition. PASITELU IS. Tanahjampea I., 07°04'S 120°39'E, 2-3 m: 1 ♀, RMNH D 47197, 21-22.ii.1930, Snellius Expedition. MALUKU (= MOLUCCAS). Ambon, Leitimur, Ambon Bay, Batumerah: 1 ♂, 1 ♀, RMNH D 47198, 15.x.1930, Snellius Expedition. TENIMBAR IS. Wotap I., 07°23'S 131°17'E: 1 ♀, RMNH D 47199, 20-23.x.1929, Snellius Expedition.

Colour.— The carapace and chelipeds of live individuals are orange-pink with pink or light-purple margins (Allen & Steene, 1994: 159; Jones & Morgan, 1994: 178, as *T. ferruginea*; Castro, 1997a: 92, pl. 2 fig. F).

Remarks.— This is the first time *T. serenei* is recorded from Indonesia. It is known from Okinawa and Guam to Australia and French Polynesia (Castro, 1997a: 92; 1997b: 128). Its presence in Indonesia possibly remained unrecorded since it can be easily confused with *T. ferruginea*.

Trapezia tigrina Eydoux & Souleyet, 1842

For synonymy see Galil & Lewinsohn, 1984: 166.

Material.— **Indonesia.** MALUKU (= MOLUCCAS). Ambon, 0-2 m: 1 ♂, RMNH D 47200, 6.v.1930,

Snellius Expedition. WESTERN NEW GUINEA (= IRIAN JAYA). Hollandia (= Jayapura): 1 ♂, 1 ♀, RMNH D 47201, iv.1955, G. van Hout and G.T. Haneveld.

Arafura Sea. 1 ♂, BMNH 92.4.18.86.

Colour.— The carapace and appendages of live individuals are light orange or orange-white with red dots (Castro, 1997b: 131). The size of the red dots varies through its geographic distribution of the species.

Remarks.— *T. tigrina* was recorded as *T. wardi* Serène, 1971 from southern Maluku by Serène et al. (1976: 19) and Monod & Serène (1976: 26) and, as *T. danai* Ward, 1939, by Kastoro et al. (1980: 61).

Biogeographical Considerations

In addition to the sixteen species of trapeziids collected by the Rumphius Biohistorical Expedition, eight other species are being recorded from Ambon, the other islands of Maluku (Moluccas) and the rest of Indonesia, a total of 24 species. Eight of these species are new to Indonesia: *Quadrella reticulata*, *Tetraloides heterodactyla*, *Trapezia flavopunctata*, *T. formosa*, *T. garthi*, *T. lutea*, *T. punctipes* and *T. serenei*.

Not included in the list is a yet unidentified species represented by one juvenile specimen (RMNH D47799) and *Trapezia intermedia* Miers, 1886, which was listed from southern Maluku by Serène et al. (1974: 24). This record is most probably a misidentification or for an unknown species since *T. intermedia* is only known from the Hawaiian Islands and the north-central Pacific (Castro, 1998b: 74).

Three additional species, *Tetralia vanninii* Galil & Clark, 1988, *Tetraloides nigrifrons* (Dana, 1852) and *Trapezia speciosa* should also occur in Indonesia since these species have been collected from the western Indian Ocean to French Polynesia (see Castro, 1997b). Another species that is most probably found in Indonesia is *Quadrella serenei*, which is known from the western Indian Ocean to French Polynesia (Castro, 1999a).

Four species sometimes placed in the Trapeziidae but probably belonging to other families of Xanthoidea are also known from Indonesia. *Calocarcinus africanus* Calman, 1909 was collected from coral dredged from the Kai Is., southern Maluku (05°28'S 132°36'E; Serène, 1984: 291), *Domecia glabra* Alcock, 1899 from the Banda Is., southern Maluku (Serène, 1984: 294), *D. hispida* Eydoux & Souleyet, 1842 from southern Maluku (Serène et al., 1974: 23; Serène et al., 1976: 18) and *Sphenomerides trapezoides* (Wood-Mason, 1891) dredged not associated with any particular hosts off Haruku I., southern Maluku (03°36'S 128°24'E; Serène, 1973: 207).

Of the 22 species of *Trapezia* known so far, 13 are found in Indonesia. Of the remaining nine species, seven are known only from mostly isolated areas: four from southeastern Polynesia (*T. areolata*, *T. bella*, *T. globosa* and *T. punctimanus* Odinetz, 1984), one from the eastern Pacific (*T. corallina* Gerstaecker, 1857), one from Taiwan (*T. cheni*) and one from the Hawaiian Islands, Wake and the Marshall Islands (*T. intermedia*). Only two widely distributed species remain to be recorded from Indonesia: *T. richtersi* Galil & Lewinshohn, 1983 and *T. speciosa*. *T. richtersi* is known from throughout the western and central Indian Ocean as far east as the Andaman Sea but it may be present on northern Sumatra or the Indian Ocean coast of Indonesia. *T. speciosa* has a wide Indo-West Pacific distribution but it has actually been recorded from relative-

ly few locations from the western Indian Ocean to French Polynesia (Castro, 1997b: 131).

The high species of diversity of trapeziids in Indonesia nevertheless does not warrant the region to be considered a center of diversification for the group (see Briggs, 1974: 13; Castro, 1999b). The southeastern Pacific, for instance, has the same number of species of *Quadrella*, *Tetralia*, *Tetraloides* and *Trapezia* as Indonesia. Five of the southeastern Pacific species are peripheral endemics not present in Indonesia (Castro, 1997b: 131).

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