

# PROCEEDINGS

of the  
San Diego Society of Natural History

Founded 1874

Number 24

1 November 1992

## The Brachyuran Crabs of the Revillagigedo Islands, Colima, Mexico, with Remarks on Insular Endemism in the Eastern Tropical Pacific

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**ABSTRACT.**—The Revillagigedo Islands occupy the same geographical position relative to Mexico as do the Galapagos Islands to Ecuador, each being several hundred miles west of mainland America. These islands were visited by the "Velero III" in January 1934, June 1934, and March 1939. Thirteen stations, yielding 11 families, 30 genera, and 32 species of brachyurans, were sampled at Socorro Island. Fifteen stations, yielding 8 families, 33 genera, and 37 species of brachyurans, were sampled at Clarion Island. Of these, only the oxystomatous and allied crabs, the new species, the families Majidae and Parthenopidae, and the family Portunidae have been reported, by Rathbun (1937), Garth (1946, 1958), and Garth and Stephenson (1966), respectively.

Preliminary findings suggest that, of the Revillagigedo Islands, Clarion alone supports endemic brachyuran species (*Tyche clarionensis*, *Mithrax clarionensis*). It also shares with Socorro and the Galapagos (or Cocos) species that do not occur on the mainland except at Cabo San Lucas (Baja California Sur), which for tropical species is an island (*Clythrocerus laminatus*, *Ebalia clarionensis*, *Xanthodius cooksoni*); for these species, the term "insular endemic" is proposed.

As compared with the Galapagos, the Revillagigedos contain proportionately fewer species with Atlantic analogues, probably owing to their greater remoteness from isthmian closure events. On the other hand, they contain Indo-West Pacific species not found in the Galapagos, such as *Pachygrapsus minutus*, because the 10° latitudinal displacement of the earth's oceanographical equator north of its geographical equator makes the east-flowing Equatorial Countercurrent a distinctly northern hemisphere phenomenon.

**RESUMEN.**—Las Islas Revillagigedo ocupan una posición similar, respecto a las costas de México, que las Islas Galápagos con respecto a Ecuador. Estas islas fueron visitadas por el "Velero III" en enero de 1934, en junio de 1934 y en marzo de 1939. Trece estaciones fueron muestreadas en Socorro y se encontraron 11 familias de Brachyura, incluyendo 30 géneros con 32 especies. Quince estaciones fueron visitadas en Clar y se colectaron 8 familias, incluyendo 33 géneros con 37 especies. De todas estas especies, hasta la fecha sólo se han reportado los Oxystomata y aliados las especies nuevas, las especies de Majidae y Parthenopidae, y las especies de Portunidae, todas por M. J. Rathbun en 1937, por J. S. Garth en 1946 y 1958, y por J. S. Garth y W. Stephenson en 1966, respectivamente.

Además del material recolectado por el "Velero III," las colecciones de la "Hancock Foundation" contienen otras pequeñas series de especímenes de las Islas Revillagigedo: de Socorro y San Benedicto recolectada por B. H. Brattstrom en marzo de 1953, y donado por Jack Littlepage; de Socorro, recolectada por Camm Swift, en febrero de 1971; de Socorro, recolectadas por Robert Lavenberg en el "R/V Searcher," en noviembre de 1978, de Socorro, recolectada por P. L. Haaker, en noviembre de 1984.

Los resultados preliminares sugieren que, entre las Islas Revillagigedo, la Isla Clarion posee unas especies endémicas propias (*Tyche clarionensis*, *Mithrax clarionensis*). También, comparte con Socorro y las Galápagos (o Cocos) algunas especies que no se encuentran en el continente, excepto en Cabo San Lucas, que en el caso de las especies tropicales es una isla (*Clythrocerus laminatus*, *Ebalia clarionensis*, *Xanthodius cooksoni*); para estas especies, se propone el término de "endémicas insulares."

Comparativamente con las Islas Galápagos, las Islas Revillagigedo contienen un número proporcionalmente inferior de especies que poseen un análogo del Atlántico, debido a su mayor alejamiento respecto a los eventos de cierre del istmo. Por otra parte, poseen especies del Indo-Pacífico oeste que no se encuentran en las Galápagos, tales como *Pachygrapsus minutus*, porque el desplazamiento latitudinal del ecuador oceanográfico, 10 grados al norte del ecuador geográfico, hace de la contracorriente ecuatorial (que se desplaza hacia el norte) un fenómeno distintamente asociado con el hemisferio norte.

### INTRODUCTION

An excellent paper on stomatopod and decapod crustaceans of Clarion Island by Hernández et al. (1986) served to remind me that, although I have treated separately the brachyuran crustacean faunas of the Galapagos (Garth 1946), Clipperton (Garth 1965), and Easter

(Garth 1973) Islands, I have yet to treat the Revillagigedo Islands, comprising Clarion, Socorro, and San Benedicto, as a faunistic unit. Rather, I have published preliminary descriptions of new species (Garth 1939, 1940) and have incorporated previously unpublished material from these islands into monographs on the Oxyrhyncha (Majidae, Parthenopidae) (Garth 1958) and the Brachyryncha

(Portunidae only) (Garth and Stephenson 1966). As monographs on the remaining brachyryhynchous families (Xanthidae, Goneplacidae, Pinnotheridae, Grapsidae, and Ocypodidae) may be long in forthcoming, I welcome the opportunity to review the published records from these islands, and to incorporate the previously unreported material in the collections of the Allan Hancock Foundation.

### THE HANCOCK CRUISES

Under the command of the late Capt. Allan Hancock, the "Velero III" explored the waters of the tropical eastern Pacific, from Mexico to Peru, including offshore islands, from 1931 to 1941. Two of the major expeditions touched at the Revillagigedo Islands: the cruise of 1934 while en route to the Galapagos Islands, and the cruise of 1939 while en route to Panama and the Caribbean. Scientists accompanying these cruises were C. McLean Fraser (coelenterates), John S. Garth (crustaceans), Harold W. Manter (trematodes), Waldo L. Schmitt (crustaceans), and Fred C. Ziesenhenné (echinoderms) in 1934, John S. Garth (crustaceans), William R. Taylor (marine botany), and Fred C. Ziesenhenné (echinoderms) in 1939. Listed as member of this cruise, Waldo L. Schmitt joined the ship at Panama and did not participate in the cruise's Pacific portion.

Islands and dates visited by the "Velero III" were Socorro Island, 2-5 January and 8-9 June 1934 and 18 March 1939; Clarion Island, 5 January and 10-11 June 1934 and 16-17 March 1939. Collecting methods included shore collecting by hand at Braithwaite Bay, Socorro Island, and at Sulphur Bay, Clarion Island, and dredging in depths of from 10 to 50 fathoms (18.2 to 91.5 m) on bottoms of sand, nullipores, coralline algae, and rock. *Pocillopora* coral was examined for commensals at both Socorro and Clarion islands.

Crabs belonging to the oxystomatous and related families collected by the "Velero III" in 1934 were taken by W. L. Schmitt directly to Washington, D.C., where they were studied and reported upon by Rathbun in a monograph then in preparation (Rathbun 1937). Included were three new species from the Revillagigedo Islands: *Clythrocerus laminatus*, *Ebalia hancocki*, and the endemic *Ebalia clarionensis*. Types of these species, as of other cruises in which Dr. Schmitt participated, were deposited in the United States National Museum.

### OTHER CRUISES

The Presidential Cruise of 1938 stopped briefly at Socorro Island en route to the Galapagos Islands. Brachyurans collected by W. L. Schmitt, naturalist aboard the U.S.S. "Houston," on 20 July 1938, included *Grapsus grapsus*, *Ozius perlatus*, *Xanthodius cooksoni*, and *Gecarcinus planatus* (Schmitt 1939). Specimens are in the U. S. National Museum.

In addition to material collected by the "Velero III," the Allan Hancock Foundation houses several small collections from the Revillagigedo Islands: from Socorro and San Benedicto, March 1953, B. H. Brattstrom, collector, Jack Littlepage, donor; from Socorro, February 1971, Camm Swift, collector; and from Socorro, November 1978, Robert Lavenberg, collector, R/V "Searcher" and November 1984, P. L. Haaker, collector.

### RESULTS

Brachyura collected by the Velero III at Clarion Island included 41 species belonging to 39 genera and 9 families. Brachyura collected by the "Velero III" at Socorro Island included 36 species belonging to 30 genera and 11 families. Families found at Socorro but not at Clarion were the Goneplacidae and Gecarcinidae. Genera

found at Clarion but not at Socorro were *Clythrocerus*, *Mursia*, *Acanthonyx*, *Herbstia*, *Hemus*, *Lissa*, *Maiopsis*, *Tyche*, *Thyrolambrus*, *Cataleptodius*, *Lophopanopeus*, *Ozius*, *Epixanthus*, and *Geograpsus*. Genera found at Socorro but not at Clarion were *Solenolambrus*, *Globopilumnus*, *Euryplax*, and *Gecarcinus*.

Brachyura reported by Hernandez et al. (1986) from Clarion Island included 21 species belonging to 20 genera and 4 families, including the Gecarcinidae, not found by the "Velero III." Genera found by Hernandez et al., but not by the Velero III, at Clarion were *Eucinetops*, *Platypodiella*, *Planes*, and *Percnon*. With these welcome additions, the known Clarion Island brachyuran fauna now comprises 45 species belonging to 43 genera and 10 families. Unfortunately, no similar comparison with Socorro Island is possible. The composite list for both Clarion and Socorro Islands comprises 61 species belonging to 50 genera and 13 families (See Table 1). San Benedicto and Roca Partida are insufficiently known to warrant separate listing.

By way of comparison, the Galapagos Islands support 120 species of brachyurans belonging to 91 genera and 15 families (Garth 1991). The Galapagos, however, is an archipelago comprising 11 major islands and numerous smaller ones, of which several are separated from the main island mass by deep water, as is Clarion from Socorro. Families found in the Galapagos, but not yet in the Revillagigedos, are the Dynomenidae, Atelecyclidae, and Pinnotheridae; a family found in the Revillagigedos, but not in the Galapagos, is the Gecarcinidae.

The fauna of Clipperton Island, an isolated coral atoll, comprises 34 species belonging to 26+ genera and 9 families (Garth 1965). Among its families is the Cryptochiridae (formerly Hapalocarcinidae), and among its genera is *Thalamita* (Portunidae), the sole representative of an Indo-West Pacific subfamily. That these islands and island groups, none of which has ever been connected to the mainland, nor to each other, share so many taxa is a tribute to the effectiveness of random dispersal of larval stages by ocean currents over extended periods of time.

All islands of the eastern tropical Pacific share with the Indo-West Pacific the coral-inhabiting species *Trapezia ferruginea*, *T. digitalis*, *Domestia hispida*, and *Liomera cinctimana* (see Garth 1974). These are obligatory commensals of *Pocillopora*, as is the coral-gall crab, *Hapalocarcinus marsupialis*, also shared with the Indo-West Pacific. Of independently living Indo-West Pacific species, *Pachygrapsus minutus* occurs at Clarion and at Clipperton but not in the Galapagos, while *Thalamita* occurs only at Clipperton, the only eastern Pacific coral atoll. It appears that Clipperton is more strongly under Indo-West Pacific influence than is either Clarion or Socorro, while Clarion, in turn, is more strongly so than are the Galapagos Islands. The east-flowing Equatorial Countercurrent, which follows a course well north of the geographical equator, on which the Galapagos are situated, impinges most directly on the northern hemisphere islands of Clipperton and, it seems, the Revillagigedos.

### ENDEMISM

Apparently only Clarion, the more isolated of the two main islands (the other being Socorro), has exclusive endemics among the Brachyura. These are *Tyche clarionensis* and *Mithrax sinensis clarionensis* (typical *sinensis* occurs at Socorro and in the Gulf of California). Shared with Socorro, and also with Cocos Island, its type locality, is *Portunus brevimanus*. Shared by Socorro and the Galapagos is *Ebalia hancocki*; shared by Clarion and the Galapagos is *Clythrocerus laminatus*.

"When it is considered that the tip of the peninsula of Baja California is effectively isolated from the opposite mainland by deep water, and that there is no approach in the littoral for Panamic

TABLE 1. Distribution of Revillagigedo Islands Brachyura.

	Endemic (Clarion)	Insular endemic	Gulf of California	Panamic	Western Atlantic	Indo- Pacific	Origin or affinity <sup>a</sup>
Raninidae							
<i>Ranilia fornicata</i> (Faxon)				X	an <sup>b</sup>		ATL
Dromiidae							
<i>Hypoconcha californiensis</i> Bouvier			X				EP
<i>Hypoconcha panamensis</i> Smith				X	an		ATL
Cyclodorippidae							
<i>Clythrocerus laminatus</i> Rathbun		X		X	an		ATL
Leucosiidae							
<i>Ebalia clarionensis</i> Rathbun	X						EP
<i>Ebalia hancocki</i> Rathbun		X					EP
Calappidae							
<i>Cycloes hairdii</i> Stimpson				X	X		ATL
<i>Mursia gaudichaudii</i> Milne Edwards				X			EP
Majidae							
<i>Acanthonyx petiverii</i> Milne Edwards			X	X	X		ATL
<i>Euclinetops rubellula</i> Rathbun			X				EP
<i>Euprognatha bifida</i> Rathbun			X	X	an		ATL
<i>Herbstia tumida</i> (Stimpson)				X	an		ATL
<i>Hemus finneganae</i> Garth			X	X			EP
<i>Lissa tuberosa</i> Rathbun			X	X	an		ATL
<i>Maiopsis panamensis</i> Faxon				X			EP
<i>Microphrys platysoma</i> (Stimpson)			X	X	an		ATL
<i>Mithrax clarionensis</i> Garth	x						EP
<i>Mithrax pygmaeus</i> Bell				X			EP
<i>Mithrax sinensis</i> Rathbun			X	X			EP
<i>Pitho sexdentata</i> Bell			X	X	an		ATL
<i>Podochela hemphillii</i> (Lockington)					an		ATL
<i>Podochela vestita</i> (Stimpson)			X	X	an		ATL
<i>Stenorhynchus debilis</i> (Smith)			X	X	an		ATL
<i>Teleophrys cristulipes</i> Stimpson			X	X	an		ATL
<i>Thoe sulcata</i> Stimpson			X	X	an		ATL
<i>Tyche clarionensis</i> Garth	X						EP
Parthenopidae							
<i>Aethra scutata</i> Smith			X			X	WP
<i>Parthenope exilipes</i> (Rathbun)			X	X	an		ATL
<i>Parthenope triangula</i> (Stimpson)		X	X				EP
<i>Solenolambrus arcuatus</i> Stimpson			X	X	an		ATL
<i>Thyrolambrus astroides</i> Rathbun					X	X	ATL/EP
<i>Thyrolambrus glasselli</i> Garth			X	X	an		ATL
Portunidae							
<i>Portunus brevimanus</i> (Faxon)		X					EP
<i>Portunus tuberculatus</i> (Stimpson)			X	X			EP
Xanthidae (sensu Rathbun)							
<i>Cataleptodius occidentalis</i> (Stimpson)			X		an		ATL
<i>Cycloxanthus vittatus</i> (Stimpson)			X	X			WP
<i>Daira americana</i> Stimpson			X	X			WP
<i>Domecia hispida</i> (Eydox & Souleyet)			X	X		X	WP
<i>Epixanthus tenuidactylus</i> (Lockington)			X	X			EP
<i>Globopilumnus xantusii</i> (Stimpson)				X			EP
<i>Liomera cinctimana</i> (White)			X	X		X	WP
<i>Lophopanopeus maculatus</i> Rathbun			X	X			EP
<i>Microcassiope xantusii</i> (Stimpson)			X	X	an		ATL
<i>Nanocassiope polita</i> (Rathbun)			X	X	an		ATL
<i>Ozium perlatus</i> Stimpson			X	X	an		ATL
<i>Panopeus latus</i> Faxon			X	X			EP
<i>Paractaea sulcata</i> (Stimpson)			X	X	an		ATL
<i>Platypodiella rotundata</i> (Stimpson)			X	X	an		ATL
<i>Trapezia digitalis</i> Latreille			X	X		X	WP
<i>Trapezia ferruginea</i> Latreille			X	X		X	WP
<i>Xanthodius cooksoni</i> (Miers)		X			an		ATL
Goneplacidae							
<i>Euryplax polita</i> Smith				X	an		ATL
Palicidae							
<i>Palicus lucasii</i> Rathbun			X		an		ATL

(Continued)

TABLE 1 (Cont.).

	Endemic (Clarion)	Insular endemic	Gulf of California	Panamic	Western Atlantic	Indo- Pacific	Origin or affinity <sup>a</sup>
Grapsidae							
<i>Geograpsus lividus</i> (Milne Edwards)			X	X	X		ATL
<i>Grapsus grapsus</i> (Linnaeus)			X	X	X		ATL
<i>Pachygrapsus minutus</i> Milne Edwards						X	WP
<i>Pachygrapsus transversus</i> (Gibbes)			X	X	X		ATL
<i>Percnon gibbesi</i> (Milne Edwards)			X	X	X		ATL
<i>Percnon planissimum</i> (Herbst)						X	WP
<i>Planes cyaneus</i> Dana			X	X		X	WP
Gecarcinidae							
<i>Gecarcinus planatus</i> Stimpson		X	X	X			EP
Total	6	6	41	45	7/25 an	9	

<sup>a</sup>ATL, West Atlantic (32 = 52.5%); EP, East Pacific (19 = 31.3%); WP, West Pacific (10 = 16.4%)

<sup>b</sup>an, analogue

species except through the upper Gulf of California, which effectively filters them out, it is seen that, for warm-water, littoral species the Cape San Lucas region is an island, and like all islands, subject to random dispersal. And just as there are brachyuran species common to Clarion and Galapagos (*Ebalia hancocki*), and to Clarion and Cocos (*Portunus brevimanus*), so should we expect to find species common to insular Cape San Lucas (as distinguished from the Gulf of California in its predominantly Panamic relationship) and these island outposts."

"Once this is understood, the finding of the supposed Galapagos endemic, *Leptodius* [now *Xanthodius*] *cooksoni*, first at Clarion Island, and, more recently, in isolated colonies along the peninsular Gulf coast as far north as Puerto Escondido, becomes less surprising; while the range of *Parthenope triangula*, Cape region from Magdalena Bay to Puerto Escondido, Socorro, Clarion, and Galapagos islands, and, finally, La Plata Island, Ecuador, fits a pattern of random dispersal of the insular type. Furthermore, the fact that 11 brachyuran species common to the Cape San Lucas region and the Galapagos Islands have no Atlantic analogues is a strong indication that they have never occurred in the Bay of Panama" (Garth 1960:118-119).

Written 30 years ago, these observations are reinforced by current studies of the Revillagigedo Islands. I therefore propose that a new biogeographic category, the "insular endemic," be recognized to include species found at islands or island groups in the eastern Pacific, including the Cape San Lucas region of Baja California, but not on the adjacent Mexican mainland.

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#### APPENDIX. MATERIAL EXAMINED

In the following list, M = male, F = female, ov = ovigerous, y = young; 917-39 and similar configurations are R/V "Velero III" station numbers; Searcher 50 is a station number of the R/V "Searcher"; collectors' names are given only for persons collecting independently of these two vessels; Rathbun (1937) indicates previously published in U.S. National Museum Bulletin 166, "Oxystomatous and Allied Crabs of America."

#### RANINIDAE

*Ranilia fornicata* (Faxon, 1893)

Clarion: 917-39, 1 M, 1 F; 918-39, 3 M, 3 F (1 ov);

919-39, 1 F; 921-39, 4 specimens.

Socorro: 924-39, 2 M, 3 F (1 ov).

#### DROMIIDAE

*Hypoconcha californiensis* Bouvier, 1898

Clarion: 919-39, 1 F.

*Hypoconcha panamensis* Smith, 1896

Socorro: 132-34, 1 y (Rathbun, 1937), 3 y.

#### CYCLODORIPPIDAE

*Clythrocerus laminatus* Rathbun, 1935

Clarion: 135-34, 5 F (4 ov) (Rathbun, 1937); 133-34, 1 M, 5 y.

#### LEUCOSIIDAE

*Ebalia clarionensis* Rathbun, 1935

Clarion: 135-34, 1 M, holotype (Rathbun, 1937)

*Ebalia hancocki* Rathbun, 1933

Socorro: 132-34, 1 F ov (Rathbun, 1937)

## CALAPPIDAE

*Cycloes bairdii* Stimpson, 1860

Clarion: 135-34, 1 chela (Rathbun, 1937); 301-34, 1 M; 302-34, 1 M, 1 F; 304-34, 2 M; 915-39, 12 y; 917-39, 2 y; 918-39, 2 M; 921-39, 1 M, 1 F.

Socorro: 129-34, 3 y, fragment; 133-34, 1 M, 5 y; 291-34, 4 M; 293-34, 1 M; 294-34, 1 M; 295-34, 1 y; 922-39, 8 specimens; 924-39, 14 specimens; 926-39, 1 M.

*Mursia gaudichaudii* (Milne Edwards, 1837)

Clarion: 921-39, 3 y.

## MAJIDAE

*Acanthonyx petiverii* Milne Edwards, 1834

Clarion: 140-34, 1 M, 2 F.

*Euprognatha bifida* Rathbun, 1893

Clarion: 135-34, 16 M, 31 F (24 ov); 136-34, 3 M, 1 F; 301-35, 1 M, 1 F ov; 917-39, 2 M, 3 F ov; 918-39, 2 M; 921-39, 1 F ov. Socorro: 132-34, 2 M; 133-34, 5 M, 7 F (6 ov); 922-39, 1 M; 924-39, 1 F ov; 926-39, 1 M.

*Hemus finneganae* Garth, 1958

Clarion: 134-34, 1 M; 136-34, 1 F ov.

*Herbstia tumida* Stimpson, 1871

Clarion: 140-34, 1 F ov.

*Lissa tuberosa* Rathbun, 1893

Clarion: 919-39, 1 M; 304-34, 1 F ov.

*Maiopsis panamensis* Faxon, 1893

Clarion: 918-39, 1 F.

*Microphrys platysoma* (Stimpson, 1860)

Socorro: 291-34, 1 F.

*Mithrax (Mithrax) pygmaeus* Bell, 1835

Socorro: 131-34, 1 F.

*Mithrax (Mithrax) sinensis clarionensis* Garth, 1940

Clarion: 917-39, 6 M, 5 F (2 ov); 305-34, 1 M, paratype.

Socorro: 133-34, 1 y.

*Mithrax (Mithrax) sinensis sinensis* Rathbun, 1892

Socorro: 131-34, 1 F.

*Pitho sexdentata* Bell, 1835

Clarion: 915-39, 1 F.

Socorro: 291-34, 1 F; 922-39, 1 M.

*Podochela vestita* (Stimpson, 1871)

Socorro: 290-34, 1 M.

*Podochela hemphillii* (Lockington, 1877)

Clarion: 921-39, 1 F ov.

*Stenorhynchus debilis* (Smith, 1871)

Clarion: 921-39, 1 M.

Socorro: 131-34, 1 M, 1 F ov.

*Teleophrys cristulipes* Stimpson, 1860

Clarion: 140-34, 4 M, 2 F (1 ov), 1 y; 298-34, 1 F ov.

Socorro: 131-34, 7 M, 8 F (4 ov), 2 y; 290-34, 1 M.

*Thoe sulcata sulcata* Stimpson, 1860

Clarion: 139-34, 1 M; 140-34, 4 M, 2 F (1 ov); 141-34, 2 M, 1 F; 298-34, 1 F ov; 916-39, 2 M, 5 F (2 ov).

Socorro: 131-34, 2 M, 3 F.

*Tyche clarionensis* Garth, 1958

Clarion: 303-34, 1 M, holotype, 1 M, 1 F, paratype; 304-34, 1 F ov; 305-34, 1 M, 1 F; 915-39, 1 F; 916-39, 1 M, 1 F.

## PARTHENOPIIDAE

*Aethra scruposa scutata* Smith, 1869

Socorro: 28 November 1984, P. L. Haaker, collector, 1 M.

*Parthenope (Platylambrus) exilipes* (Rathbun, 1893)

Socorro: 131-34, 1 M.

*Parthenope (Pseudolambrus) triangula* (Stimpson, 1860)

Clarion: 304, 34, 1 F; 305-34, 1 F.

Socorro: 129-34, 1 M, 3 y; 133-34, 7 M, 5 F; 291-34, 1 M, 1 F; 293-34, 1 M.

*Solenolambrus arcuatus* Stimpson, 1871

Socorro: 131-34, 1 F ov.

*Thyrolambrus astroides* Rathbun, 1894

Socorro: 26 November 1984, P. L. Haaker, collector, 1 M.

*Thyrolambrus glasselli* Garth, 1958

Clarion: 134-34, 1 M; 305-34, 1 F ov.

## PORTUNIDAE

*Portunus brevipennis* (Faxon, 1895)

Clarion: 135-34, 1 M, 3 y; 136-34, 1 M, 1 F; 138-34, 1 F; 299-34, 3 y; 301-34, 1 M, 2 F, 1 y; 303-34, 1 F; 304-34, 1 M, 1 F, 2 y; 305-34, 1 M y; 915-39, 2 y; 917-39, 15 specimens; 918-39, 1 F ov; 919-39, 5 y; 921-39, 19 specimens

Socorro: 129-34, 3 y; 131-34, 1 M; 132-34, 2 specimens; 133-34, 9 y; 289-34, 1 y; 291-34, 1 M; 293-34, 1 F, 1 y; 922-39, 2 y; 924-39, 10 specimens; 926-39, 1 M, 4 y.

*Portunus tuberculatus* (Stimpson, 1860)

Socorro: 128-34, 1 M; 129-34, 2 M, 1 F ov; 131-34, 2 M, 1 F, 5 y; 133-34, 1 F.

## XANTHIDAE

*Cataleptodius occidentalis* (Stimpson, 1871)

Clarion: 298-34, 2 M, 1 F; 920-39, 1 F.

*Cycloxanthops vittatus* (Stimpson, 1860)

Clarion: 298-34, 1 M.

Socorro: 128-34, 1 fragment.

*Daira americana* Stimpson, 1860

Clarion: 140-34, 4 specimens; 141-34, 2 F; 298-34, 4 M.

Socorro: 131-34, 6 specimens.

*Domecia hispida* Eyndoux & Souleyet, 1842

Clarion: 140-34, 4 M, 7 F (4 ov); 297-34, 1 M y; 298-34, 1 F ov.

Socorro: 131-34, 1 F ov.

*Epixanthus tenuidactylus* (Lockington, 1877)

Clarion: 916-39, 1 M.

*Globopilumnus xantusii* (Stimpson, 1860)

Socorro: 131-34, 3 M, 5 F.

*Liomera cinctimana* (White, 1847)

Clarion: 140-34, 2 F; 298-34, 2 M.

Socorro: 131-34, 7 M, 4 F.

*Lophopanopeus maculatus* Rathbun, 1898

Clarion: 305-34, 2 y.

*Microcassiope xantusii* (Stimpson, 1871)

Clarion: 140-34, 49 specimens; 141-34, 1 F; 298-34, 9 M, 2 F ov, 5 fragments; 916-39, 1 M.

Socorro: 131-34, 43 specimens.

*Nanocassiope polita* (Rathbun, 1893)

Clarion: 137-34, 1 specimen; 305-34, 2 M; 917-39, 20 specimens; 918-39, 1 F ov; 921-39, 1 M.

Socorro: 132-34, 1 M, 3 F, 7 y; 924-39, 1 M, 1 F.

*Ozium perlatus* Stimpson, 1860

Clarion: 139-34, 1 F.

*Panopeus latus* Faxon, 1893

Socorro: 925-39, 1 M.

*Paractaea sulcata* (Stimpson, 1860)

Clarion: 298-34, 2 M.

Socorro: 131-34, 1 F.

*Trapezia digitalis* Latreille, 1825

Clarion: 140-34, 20 specimen; 298-34, 7 M, 7 F (6 ov).

Socorro: 128-34, 5 F (3 ov); 131-34, 1 M, 1 F; 922-39, 1 F ov.

*Trapezia ferruginea* Latreille, 1825

Clarion: 140-34, 86 specimens; 141-34, 5 specimen; 298-34, 90 specimens.

Socorro: 128-34, 7 specimens; 131-34, 123 specimens; 290-34, 1 specimen; 297-34, 3 M, 5 F, 4 y.

*Xanthodius cooksoni* (Miers, 1877)

Clarion: 139-34, 6 specimens; 140-34, 1 specimen; 141-34, 6 specimens; 298-34, 4 M, 2 F; 916-39, 1 M, 2 F; 920-39, 4 M, 2 F.

Socorro: 128-34, 23 specimens; 130-34, 2 specimens.

#### GONEPLACIDAE

*Euryplax polita* Smith, 1870

Socorro: 131-34, 1 y.

#### PALICIDAE

*Palicus lucasii* Rathbun, 1898

Clarion: 134-34, 1 M; 136-34, 2 F; 137-34, 2 M, 1 F; 305-34, 1 F ov; 921-39, 1 y.

Socorro: 132-34, 1 M.

#### GRAPSIDAE

*Geograpsus lividus* (Milne Edwards, 1837)

Clarion: 139-34, 5 M, 4 F, 1 y.

*Grapsus grapsus* (Linnaeus, 1758)

Clarion: 139-34, 1 M, 1 F.

Socorro: 131-34, 1 M, 1 F; Searcher 50, 1 M, 1 F; Sánchez 50,

1 M, 1 F, Searcher 302, 1 M.

*Pachygrapsus minutus* Milne Edwards

Clarion: 140-34, 4 M, 5 F (1 ov), 10 y; 298-34, 2 y; 916-39, 2 M, 2 y; 916-39, 2 M, 1 F, 2 y.

Socorro: 128-34, 11 y; 131-34, 3 M, 4 F (1 ov); Searcher, 8 y.

*Pachygrapsus transversus* (Gibbes, 1850)

Clarion: 139-34, 1 M, 1 F.

*Percnon gibbesi* (Milne Edwards, 1853)

Socorro: 128-34, 1 y; 130-34, 1 y; 131-34, 1 My.

#### GECARCINIDAE

*Gecarcinus planatus* Stimpson, 1860

San Benedicto, Littlepage, 1 M, 2 F; 1953, 2 M.

Socorro: 128-34, fragment; June 1934, 1 M; Searcher 51-53, 1971, 2 specimens; Searcher 53, 1971, 6 specimens.