

## Anomuran and Brachyuran crabs of Costa Rica: annotated list of species

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**Abstract:** Fifty seven species of anomuran and brachyuran crabs new for Costa Rica and deposited in the Museo de Zoología of the Universidad de Costa Rica were identified. Twenty five species of these occur on the Pacific side and 32 on the Atlantic side of the country. Four of the 24 species from the Pacific coast could be considered significant finds: *Paguristes praedator*, *P. holmesi*, *Epiplatys sulcirostris* and *Pilumnus townsendi* have until now only been reported from México and *Acanthocarpus delsolari* has been reported only from Perú. An annotated list of the 257 species reported for Costa Rica is also included.

**Key Words:** Crabs, taxonomy, distribution, Costa Rica, new records.

The lack of systematic work for identification of marine invertebrate species in Central America has been lamented in the past (Moran 1984). In Costa Rica, this situation is due to the scarcity of trained taxonomists rather than any lack of interest on the part of biology students and educators. The Zoology Museum at the University of Costa Rica's School of Biology contains an extensive collection of marine specimens, the result of over thirty years of sporadic but numerous field trips to the country's Pacific and Caribbean coasts. The purpose of this project, which began in 1984, is to systematize all existing material pertaining to the Infraorders Anomura and Brachyura and report species not previously recorded for Costa Rica.

### MATERIAL AND METHODS

The first task was to compile a list of species previously reported from Costa Rican waters. This information is presented as an annotated species list in the Appendix. The second task was to separate identified museum speci-

mens from materials new for Costa Rica. The latter were then sent to the following specialists for confirmation: Janet Haig of the Allan Hancock Foundation (Anomura); Austin Williams of the National Fisheries Service Systematics Laboratory, National Museum of Natural History, Smithsonian Institution (Brachyura); and Mary Wicksten of Texas A & M. University (Brachyura). Duplicate material was donated to the above institutions.

The classification of the families was done according to Bowman and Abele (1982).

### RESULTS

The following species have not been reported previously from Costa Rican waters. They are arranged by family, with collection data and range information. The approximate location of sites where species new to Costa Rica were collected are shown in Fig. 1. General observations are also included when appropriate.

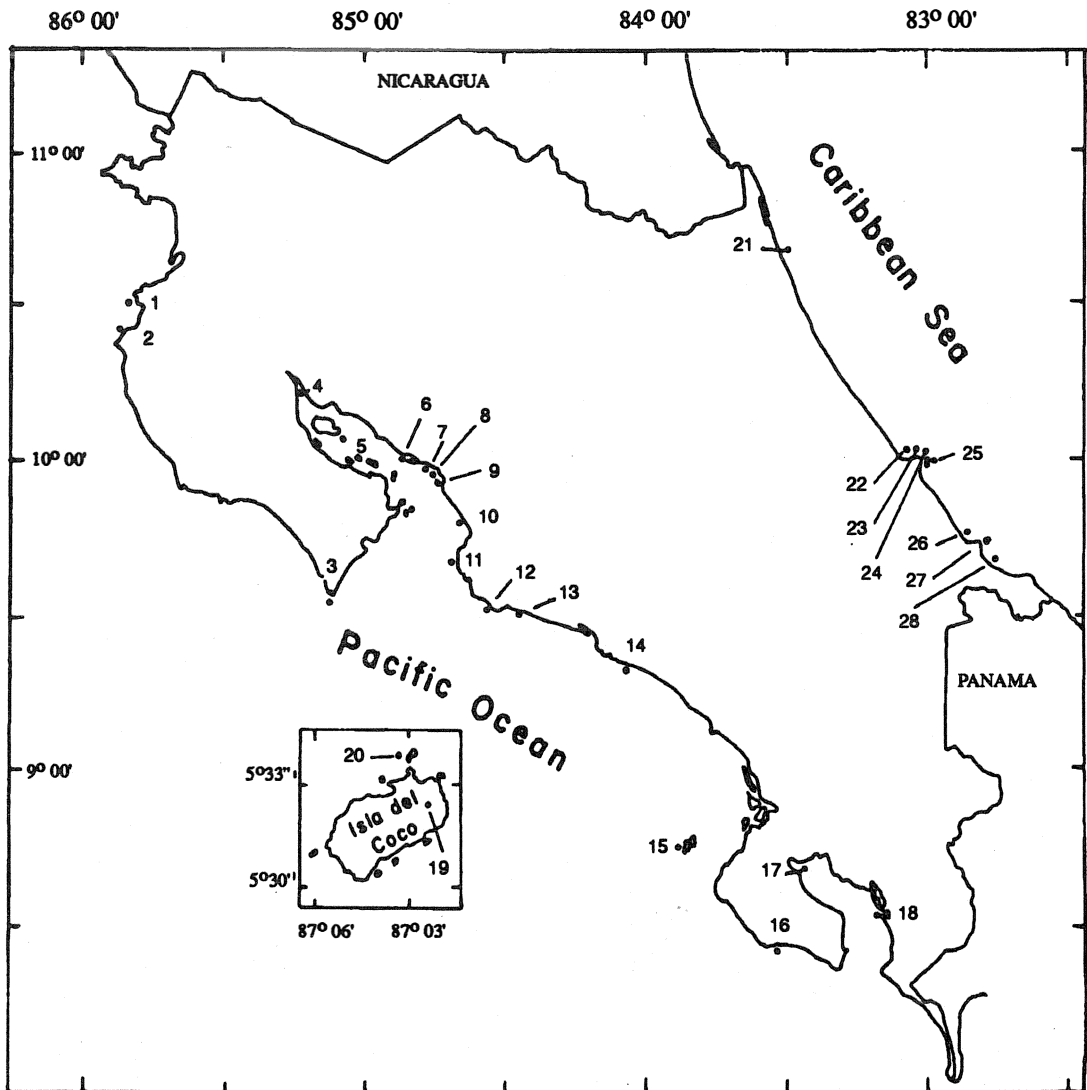


Fig. 1. Sites of collection of anomuran and brachyuran crabs new for Costa Rica: 1. Playa Potrero 2. Playa Conchal 3. Cabo Blanco 4. Cerro Nispero, Ferry Río Tempisque 5. Gulf of Nicoya 6. Puntarenas 7. Playas de Doña Ana 8. Caldera 9. Mata de Limón 10. Río Tárcoles 11. Punta Leona 12. Punta Judas 13. Playa Herradura 14. Playa Dominical 15. Isla del Caño 16. Punta La Chancha, Playa Madrigal 17. Rincón de Osa 18. Mouth Río Coto Colorado 19. Isla del Coco 20. Isla Manuelita, Isla del Coco 21. E. Río Tortuguero 22. Portete 23. Punta Piuta 24. Puerto Limón 25. Isla Uvita 26. Cahuita 27. Puerto Vargas 28. Puerto Viejo.

#### FAMILY DIOGENIDAE

##### *Clibanarius albidigitus* (Nobili, 1901)

Material: UCR 869; Playa de Doña Ana, Puntarenas; coll. October 10 1970; 2 females, 4 ovigerous females, 20 males.

Range: Los Cóbanos, El Salvador to Paita, Perú (Moran, 1984).

##### *Clibanarius panamensis* (Stimpson, 1859)

Material: UCR 853-002; 5 km off Caldera Bay, Puntarenas; coll. O. Blanco, August 1965 (?); 1 female, 1 male. UCR 870; Rincón de Osa, Puntarenas; coll. R.S.C. August 7 1969; 2 females, 2 males, 1 juvenile. UCR 871; Mata de Limón, Puntarenas; coll. August 21 1967; 1 male, 1 female. UCR 989; Mata de Limón,

Puntarenas; coll. December 3 1980; 1 specimen. UCR 1053; Punta Morales, Puntarenas; coll. O. Breedy, August 11 1983; 1 specimen. UCR 1124-002; Tempisque Ferry, 2 km E. of Cerro Nispero, Gulf of Nicoya, Puntarenas; coll. Bussing, Camacho, González, December 16 1975; 1 female.

Range: Santa Rosalía, Gulf of California, México to Isla de la Correa near Capón, Perú. North to Bahía de Santa María, Outer Baja California Peninsula (Ball & Haig, 1974).

*Paguristes holmesi* Glassell, 1937

Material: UCR 986; 2 km offshore from mouth of Tárcoles(?) River, Puntarenas; coll. C. Mata, September 8-11 1970; 5 males (2 in AHF collection).

Previous: Gulf of California (Glassell, 1937)

*Paguristes praedator* Glassell, 1937

Material: UCR 985; Gulf of Nicoya, Puntarenas; coll. P. León, December 20-27, 1967; 1 male. UCR 1277-006; Gulf of Nicoya, Puntarenas; [date?]; 2 males.

Previous Range: Off Boca de Santo Domingo, Outer Baja California to the Gulf of California, México (Haig et al. 1970).

#### FAMILY PORCELLANIDAE

*Neopisosoma mexicanum* (Streets, 1871)

Material: UCR 504; Dominical, Puntarenas; coll. C. Manen, November 9-10 1968; 1 male, 1 ovigerous female.

Range: Mazatlán, Gulf of California to Santa Elena Point, Ecuador, and Galápagos Islands (Haig, 1960).

#### FAMILY HIPPIDAE

*Hippa strigillata* (Stimpson, 1860)

Material: UCR 432-002; Isla del Caño, Puntarenas; coll. D. Robinson & R. Saenz, March 3 1970; 1 ovigerous female, 5 males. UCR 1273-001; Conchal Norte, Guanacaste; coll. Low tide [date?]; 1 male, 1 female, 1 juvenile.

Previous Range: Los Frailes & Cabo San Lucas, Gulf of California, México to north of La Libertad, El Salvador (Haig, 1980).

#### FAMILY DYNOMENIDAE

*Dynomene ursula* Stimpson, 1860

Material: UCR 352; Isla Murcielago, N. of Isla San José, Guanacaste; coll. W. Bussing et al. December 7 1969; 1 female. UCR 353; Isla del Caño, Puntarenas; coll. R.T. Nishimoto, March-April 1970; 1 male, 1 female, 1 juvenile. UCR 419; Isla del Caño, Puntarenas; coll. R. Saénz, January 25 1970; 1 male, 1 female.

Range: Espíritu Santo Island, Gulf of California, México to La Plata Island, Ecuador. Galápagos Islands (Garth, 1966).

#### FAMILY RANINIDAE

*Raninoides loevis* (Latreille, 1825)

Material: UCR 142; Puerto Limón, Limón; coll. C. Kalb & R.T. Nishimoto, March 26 1968; 1 male.

Range: Atlantic: South Cape Hatteras, 35° 03.2'N 75° 35.1'W; around the Gulf of México and southern Caribbean Sea, including Leeward Islands, to Bahía, Brazil. Pacific: Bahía Honda, Panamá to Cabita Bay, Colombia (Rathbun, 1937; Williams, 1984).

*Raninoides lamarki* Milne-Edwards & Bouvier, 1923

Material: UCR 592; E. of the Tortuguero River, Limón; coll. L. Shubel & M. Yesaki, October 12 1970; 2 males.

Previous Range: North of Puerto Rico to off Colón, Panamá (Rathbun, 1937).

#### FAMILY CALAPPIDAE

*Acanthocarpus delsolari* Garth, 1973

Material: UCR 254; between Cabo Blanco and Punta Herradura, Puntarenas; 9° 28'N 84° 51-57'W; coll. L. Monique Gauthier, May 19-21 1970; 2 males, 1 female. UCR 255; 11 miles NW of Isla del Caño, Puntarenas; 51 fathoms; coll. R.T. Nishimoto, July 15 1969; 1 male. UCR 516; Gulf of Nicoya, Puntarenas; coll. M.

Gauthier, November 11 1970; 1 female. UCR 1069; Off Cabo Blanco, Puntarenas; coll. August 11 1983; 1 female.

Previous Range: Banco de Mancora, Perú (Garth, 1973).

*Calappa cinerea* Holthius, 1958

Material: UCR 136; Punta Piuta, Limón; coll. October 14 1967; 1 female. UCR 573; Isla Uvita, Limón; coll. C. Villalobos, R. Saénz, May 1970; 1 male, 1 female.

Range: Puerto Rico, Virgin Islands, St. Martins, Margarita Islands, Venezuela, Netherlands Antilles (Williams, 1984)

*Calappa ocellata* Holthius, 1958

Material: UCR 127; Punta Cahuita, Limón; coll. R.T. Nishimoto, December 27-28 1967; 1 male. UCR 1054; between Puerto Vargas and Cahuita, Limón; 7 m, sandy substrate; coll. J. Campos August 18 1984; 1 male, 1 female.

Range: Cape Hatteras, North Carolina to Río de Janeiro, Brazil; Bermuda (Williams, 1984).

*Calappa sulcata* Rathbun, 1898

Material: UCR 126; 2 miles N of Puerto Limón, Limón; coll. R.T. Nishimoto, April 1 1968; 1 male. UCR 144; Punta Cahuita, Limón; coll. R.T. Nishimoto, December 16 1967; 1 male. UCR 532; S.E. of the Tortuguero River, Limón; coll. M. Yasaki, I. Shubel, October 12-13 1970; 1 female.

Range: Cape Hatteras, North Carolina, through Gulf of México to Sergipe, Brazil (Williams, 1984).

*Hepatus pudibundus* (Herbst, 1785)

Material: UCR 125; 2 mi. N of Puerto Limón, Limón; coll. R.T. Nishimoto, April 1 1968; 1 female. UCR 427; E of the Tortuguero River, Limón; coll. M. Yasaki, L. Shubel, October 12-13 1970; 1 female. UCR 578; 2.4 miles SE of Colorado River, Limón; coll. M. Yasaki, L. Shubel, October 1970; 1 female.

Previous Range: Georgia to Brazil; East Indies; West Africa; Cape of Good Hope west to Toro Point, Canal Zone, Panamá (Holthius, 1959).

*Mursia gaudichaudii* (Milne-Edwards, 1837)

Material: UCR 248; Puntarenas, 84° 50'W 9° 40'N; coll. L. Monique Gauthier, May 1970; 1 male. UCR 250; 10 miles SW of Isla del Caño, Puntarenas; 78 fathom; coll. R.T. Nishimoto, July 15 1969; 2 females. UCR 253; SE of Cabo Blanco, Puntarenas; 9°26-32' N 85°44-52' W; coll. L. Monique Gauthier, June 7-8 1970; 1 male. UCR 520; Gulf of Nicoya, Puntarenas, 9°28' N 84°49' W; coll. K. Koenig, May 21 1970; 1 male. UCR 1072-002; between Cabo Blanco and Herradura, Puntarenas; 250 m; coll. J. Campos, February 20 1985.

Range: Gulf of Farallones, California to Talcahuano, Chile (Garth, 1966).

*Osachila sona* Garth, 1940

Material: UCR 1609; Off Chatham Bay, Isla del Coco, Puntarenas; 0.5° 34.81 N 87°00.86 W; depth of 280-290 feet; coll. J.M. Montoya, May 2 1992; 1 male, 1 female. UCR 1610; Isla del Coco, Puntarenas; 0.5° 35.17 N 87° 01.09 W; 56 fathoms deep; tangle net; coll. J.M. Montoya, May 8 1992. UCR 1611; Off Chatham Bay, Isla del Coco, Puntarenas; 05° 34.75 N 87° 02.46 W; depth of 345 feet; tangle net; coll. J.M. Montoya, May 3 1992.

Previous Range: Bahía Honda, Panamá, 30-50 fathoms (Garth, 1940).

FAMILY LEUCOSIDAE

*Persephona orbicularis* Bell, 1855

Material: UCR 132; between San Lucas and Islas Negritos, Gulf of Nicoya, Puntarenas; 9°47'50" N 84°40'20" W; otter trawl; 30-40m deep; coll. C. Kalb, March 7-9 1967; 1 ovigerous female.

Previous Range: Perlas Islands, Panamá to Valparaiso, Chile (Rathbun, 1937).

*Uhlias ellipticus* Stimpson, 1871

Material: UCR 355; Isla del Caño, Puntarenas; coll. R.T. Nishimoto, March-April 1970; 1 male, 1 female.

Range: San José Island, Gulf of California, México to Panamá. Galápagos Islands (Garth, 1966).

## FAMILY MAJIDAE

*Chorinus heros* (Herbst, 1790)

Material: UCR 1631; Portete, Limón; Intertidal zone, underneath rocks; coll. J.A. Vargas, March 20 1992; 1 male (damaged).

Range: Florida Keys to Bahía, Brazil to a depth of 16 fathoms. Cuba (von Martens). Also Bermuda (Rathbun, 1925)

*Collodes robsonae* Garth, 1958

Material: UCR 102; Gulf of Nicoya, Puntarenas; coll. C. Kalb, March 7 & 9 1967; 1 male. UCR 781-008; Gulf of Nicoya, Puntarenas; 84° 57'40"W 9°41' 50" N; 55 m, coll. J.A. Vargas & A. Dittel, April 11 1980; 1 male. UCR 1277-004; Gulf of Nicoya, Puntarenas; [date?]; 1 male.

Range: Meanguera Island, Gulf of Fonseca, El Salvador to Venado Island, Canal Zone, Panamá (Garth, 1959).

*Eucinotops blakiana* Rathbun, 1896

Material: UCR 1534-003; Between Manzanillo and Punta Uva, Limón, 3m deep; coll. J.M. Montoya, November 12 1988; 1 ovigerous female.

Range: Bahama Banks; West Indies. (Rathbun, 1925)

*Epialtus bituberculatus* Milne-Edwards, 1834

Material: UCR 1038; Puerto Viejo, Limón; coll. D. Moran, February 12 1981; 3 males, 1 female, 1 ovigerous female.

Previous Range: Atlantic.: Indian River, Florida to Desterro, Brazil; west to Fox Bay, Panamá. Pacific.(?): Chile (Rathbun, 1925).

*Epialtus longirostris* Stimpson, 1860

Material: UCR 1057-001; Cahuita, Limón; coll. November 13 1972; 1 male. UCR 1275-002; Puerto Viejo, Limón; coll. May 19 1980 at low tide; 2 male, 1 ovigerous female.

Previous Range: Florida (Sarasota Bay and Key West), Cuba, Jamaica and Saint Thomas (Rathbun, 1925).

*Epialtus sulcirostris* Stimpson, 1860

Material: UCR 389; Isla del Caño, Puntarenas; coll. R.T. Nishimoto, J.A. Perry [date?]; 9 males, 3 females, 6 ovigerous females, 2 juveniles

Previous Range: México: Santa María Bay; San Marcos Island, Punta Palmilla, Cabeza Ballena, Gulf of California (Garth, 1958).

*Eupleurodon trifurcatus* Stimpson, 1871

Material: UCR 442; Isla del Caño, Puntarenas; coll. R. Nishimoto, April 7 1970; 1 juvenile UCR 461; Isla del Caño, Puntarenas; coll. R. Nishimoto, 1970; 1 female.

Range: México: Cape San Lucas, Baja California; Cabeza Ballena, Gulf of California; Acapulco. Manta, Ecuador (Garth, 1958).

*Libinia ferreirae* Brito-Capello, 1871

Material: UCR 111; Cahuita, Limón; coll. R.T. Nishimoto, December 27-28 1967; 1 male, 1 female.

Previous Range: States of Río de Janeiro and São Paulo, Brazil (Rathbun, 1925).

*Macrocoeloma trispinosum nodipes* (Desbonne, 1867)

Material: UCR 857-002; Isla Uvita, Limón; coll. C. Villalobos, R. Saénz, August 5 1970; 1 male.

Previous Range: Off Cape Fear, North Carolina to Fernando Noronha Island, Brazil (Rathbun, 1925).

*Microphrys bicornatus* (Latreille, 1821)

Material: UCR 857-003; Isla Uvita, Limón; coll. C. Villalobos, R. Saénz, August 5 1970; 2 females, 3 ovigerous females, 8 males. UCR 101; Portete, Limón; coll. R. Quesada, August 21 [year?]; 1 male. UCR 1029; Puerto Viejo, Limón; coll. D. Moran, February 14 1981; in turtle grass, low tide; 1 male. UCR 1207-002; Isla Uvita, Limón; coll. C. Villalobos, R. Saénz, May 1970; 4 females.

Previous Range: Near Beaufort, North Carolina, through the Gulf of México to Florianopolis, Santa Catarina, Brazil, and Bermuda (Williams, 1984).

*Microphrys interruptus* Rathbun, 1920

Material: UCR 464; Puerto Limón; coll. W. C. McCaul, July 25 1964; 1 ovigerous female.

Previous Range: Cuba, Antigua, Barbados (Rathbun, 1925).

*Mithrax (Mithraculus) areolatus* (Lockington, 1876)

Material: UCR 1500; Isla del Caño, Puntarenas; coll. February 10 1989.

Range: San Diego, California; Gulf of California (type-locality); Pearl Islands, Bay of Panamá (Rathbun, 1925).

*Mithrax (Mithraculus) coryphe* (Herbst, 1801)

Material: UCR 857-005; Isla Uvita, Limón; coll. C. Villalobos, R. Saénz, August 5 1970; 2 females, 4 ovigerous females, 4 males. UCR 1033-001; Puerto Viejo, Limón; in algae on coral reef; coll. D. Moran, February 12 1981; 1 male.

Previous Range: Indian River region, Florida through eastern and southwestern Caribbean to São Paulo, Brazil. West to Colón, Panamá (Scotto & Gore, 1980).

*Mithrax (Mithraculus) forceps* (A. Milne Edwards, 1875)

Material: UCR 1534-008; between Manzanillo and Punta Uva, Limón; under dead coral, 3 m deep; coll. J.M. Montoya, November 12 1988; 1 ovigerous female.

Range: From Cape Hatteras, North Carolina, via Gulf of México to Río de Janeiro, Brazil. Bermuda. Shallow water to 90 m (Williams 1984).

*Mithrax (Mithrax) pilosus* Rathbun, 1892

Material: UCR 74-001; Portete, Limón; coll. September 11 1966; 1 female. UCR 103; Punta Piuta, Limón; coll. August 14 1967; 1 female. UCR 857-004; Isla Uvita, Limón; coll. C. Villalobos, R. Saénz, August 5 1970; 2 males.

Previous Range: Bahamas and Florida Keys to Venezuela and Panamá (Rathbun, 1925).

Measurements: UCR 74-001; female; carapace width 126 mm without spines, 129 mm with spines; length 121 mm without horn, 129 mm with horn.

*Mithrax (Mithrax) verrucosus* Milne-Edwards, 1832

Material: UCR 450; 300 m N. of dock, Isla Uvita, Limón; coll. W. Bussing, R. Nishimoto, October 3 1970; 1 male.

Previous Range: South Carolina to Fernando Noronha Island, Brazil (Rathbun, 1925).

*Pitho lherminieri* (Schramm, 1867)

Material: UCR 1534-007; between Manzanillo and Punta Uva, Limón; under dead coral, 3 m deep; coll. J.M. Montoya, November 12 1988; 1 male.

Range: Off Beaufort Inlet, North Carolina, to west Florida; Veracruz, México; West Indies to Islet of Sebastião, São Paulo, Brazil (Williams, 1984).

*Stenorynchus seticornis* (Herbst, 1788)

Material: UCR 124; 2 miles N of Puerto Limón, Limón; coll. R.T. Nishimoto, April 1 1968; 1 male. UCR 582; Isla Uvita, Limón; coll. W. Bussing, R.T. Nishimoto, October 4 1970; 1 male.

Range: North Carolina to Santa Catarina, Brazil; Bermuda (Williams, 1984).

## FAMILY PARTHENOPIDAE

*Leiolambrus punctatissimus* (Owen, 1839)

Material: UCR 1; Potrero, Guanacaste; coll. O. Blanco, February 23 1965; 1 male. UCR 210; 11 miles SW of Punta Judas, Guanacaste; 40 fathoms; coll. R.T. Nishimoto, July 17 1969; 1 female. UCR 494; Gulf of Nicoya, Puntarenas; coll. C. Villalobos, R.A. Cruz, June 19 1972; 1 female. UCR 779-010; Gulf of Nicoya, Puntarenas; 9°45'00" N 84°47'45" W; 28 feet deep; coll. J.A. Vargas, A. Sanchez, April 10 1980; 4 males. UCR 783-002; Gulf of Nicoya, Puntarenas; 9°46'00" N 84°40'40" W; 40 m. deep; coll. J.A. Vargas, A. Sanchez, April 12 1980; 1 male. UCR 782; Gulf of Nicoya, Puntarenas; 9°40'40" N 84°42'10" W; coll. J.A. Vargas, A. Sanchez, April 12 1980. UCR 1068-001; Puntarenas; [DATE?]; 1 male. UCR 1067; Gulf of Nicoya, Puntarenas; coll. July 1979; 1 female, 1 male. UCR 1259; Gulf of Nicoya, Puntarenas; coll. July 1979; 1 male

Range: Gulf of California, México to Esmeralda and Salango Islands, Ecuador (Garth, 1958).

*Parthenope serrata* (Milne-Edwards, 1834)

Material: UCR 151; Tortuguero, Limón; coll. K.T. Nishimoto, W. Bussing, May 30 1968; 1 male, 1 female. UCR 587; Isla Uvita, Limón; coll. W. Bussing, R.T. Nishimoto, October 4 1970; 1 female.

Range: Bermuda, Florida, Gulf of México, Central America. Cuba; Lesser Antilles; islands of N. Coast of South America; Bahía, Brazil (Gore & Scotto, 1979).

## FAMILY PORTUNIDAE

*Arenaeus cribarius* (Lamarck, 1818)

Material: UCR 977; Tortuguero River, Limón; coll. M. Miranda, December 16 1980; 1 male lost in shipment.

Previous Range: Vineyard Sound, Massachusetts to Santa Catarina, Brazil (Williams, 1984).

*Callinectes bocourti* Milne-Edwards, 1879

Material: UCR 976; Cahuita, Limón; coll. October 1972; 1 female lost in shipment.

Range: Carolina Beach, N. Carolina west through Jamaica and Belize to Santa Catarina, Brazil (Williams & Williams, 1981).

*Callinectes larvatus* Ordway, 1863

Material: UCR 528; Punta Piuta, Limón; coll. October 14 1967; 1 immature female lost in shipment.

Range: Beaufort, North Carolina through the Caribbean Sea to South Brazil off São Paulo; Bermuda (Williams, 1984).

*Cronius tumidulus* (Stimpson, 1871)

Material: UCR 19; Portete, Limón; coll. September 10 1968; 1 male lost in shipment.

Range: Bermuda; Bahamas; Florida Keys and Dry Tortugas; West Coast of Florida; North and South Coast of Cuba; Jamaica; Puerto Rico; Virgin Islands; Netherlands Antilles; Old Province Island (Caribbean); Ceará to Bahía, Brazil (Powers, 1977).

## FAMILY XANTHIDAE

*Cataleptodius floridanus* (Gibbes, 1850)

Material: UCR 857; Isla Uvita, Limón; coll. C. Villalobos, R. Saénz, August 5 1970; 2 males (another male in Smithsonian).

Previous Range: Bermudas; Bahamas and Florida Keys; Greater and Lesser Antilles; Colón, Panamá to São Paulo, Brazil (Rathbun, 1930).

*Carpilius corallinus* (Herbst, 1783)

Material: UCR 879; Puerto Limón, Limón; [date?]; 2 females, 1 male.

Previous Range: Bahamas to Pernambuco, Brazil (Rathbun, 1930).

*Chlorodiella longimana* (Milne-Edwards, 1834)

Material: UCR 857-007; Isla Uvita, Limón; Coll. C. Villalobos, R. Saénz, July 5 1970; 1 ovigerous female (1 female lost in shipment).

Previous Range: Florida reefs; Bahamas; West Indies; Curaçao; Saint Thomas Island (Rathbun, 1930).

*Ozius reticulatus* (Desbonne & Schramm, 1867)

Material: UCR 32; Portete, Limón; coll. L. Murillo, September 10 1966; 1 male lost in shipment.

Previous Range: Bahamas; West Indies; Colón, Panamá to Saganilla, Colombia (Rathbun, 1930).

*Pilumnus townsendi* Rathbun, 1923

Material: UCR 1027; Punta La Chancha Pelona, 3 km south of Playa Madrigal, Puntarenas; shrimp trawl 288 m deep; coll. C. Gamboa, A. Cruz, August 15 1983; 1 male (other specimen lost in shipment). UCR 1082-001; Punta Leona, Puntarenas; on artificial reef; col. 1984; 1 female.

Previous Range: Off Magdalena Bay, Baja California to Manzanillo, México. Questionable record from Galápagos, reported as *Eriphides hispida* by Boone, 1927 (Rathbun, 1930).

*Platypodia rotundata* (Stimpson, 1860)

Material: UCR 1257-001; Conchal, Guanacaste; coll. January 5 1973; 1 male.

Range: La Paz, Baja California, México to Santa Elena Point, Ecuador (Rathbun, 1930).

*Quadrella nitida* Smith, 1869

Material: UCR 1618; Bajo Alcyone, Isla del Coco, Puntarenas; 34 m deep; coll. J.M. Montoya, May 4 1992. UCR 1626; Outer side of Playa Pitahaya, Guanacaste; 20-30 m. depth; coll. J. Cortés, June 15 1991.

Range: Lower California, México to Panamá, 6 to 31 fathoms (Rathbun, 1930).

*Xantodius hebes* Stimpson, 1860

Material: UCR 1256; Punta Sabana, Bahía Conchal, Guanacaste; coll. May 1975; 1 male.

Range: West coast of México from Magdalena Bay on the ocean side, and Mulege Bay on the gulf side of Lower California southward to María Isabel Island (Rathbun, 1930).

#### FAMILY GECARCINIDAE

?*Gecarcinus planatus* Stimpson, 1898

Materials: UCR 622; Isla del Coco, Puntarenas; coll. C. Villalobos & D. Robinson, August 13 1973; 2 males. UCR 623; Isla Manuelita, Isla del Coco, Puntarenas; coll. N. Scott, August 14 1973; 3 males, 1 female.

Range: Baja California, México to Malpelo Island, Colombia and Bay of Panamá (Rathbun, 1918).

#### FAMILY GRAPSIDAE

*Glyptograpsus impressus* Smith, 1870

Materials: UCR 1146; Río Sábalo, S.E. side of Boca del Río Coto Colorado, Golfo Dulce, Puntarenas; coll. Bussing, Crocker, Rojas & Mata, December 15 1979; 1 female.

Range: Acapulco, México; Acajutla, Salvador; Panamá (Rathbun, 1918).



*Armases roberti* (Milne-Edwards, 1853)

Materials: UCR 863; 50 m before the entrance to the dock, on a building, Puerto Limón, Limón; coll. C. Villalobos & R. Saénz, September 5 1970; 1 male.

Previous Range: West Indies (Cuba, Jamaica, Hispaniola, St. Lucía, Barbados, Tobago, Trinidad) (Abele, 1992).

*Plagusia depressa* (Fabricius, 1775)

Materials: UCR 26; Puerto Limón, Limón; coll. McCaul, July 25 1964; 1 male. UCR 342; Punta Piuta, Limón; coll. October 15 1967; 1 female. UCR 470; Isla Uvita, Limón; coll. C. Villalobos & R. Saénz, May 1970; 2 males, 1 female. UCR 588; Isla Uvita, Limón; coll. W. Bussing & R. Nishimoto, October 15 1967; 1 female. UCR 852-004; Isla Uvita, Limón; coll. C. Villalobos, October 3 1970; 2 females, 4 males. UCR 862; [location, date?]; 3 males, 1 ovigerous female. UCR 1036; Puerto Viejo, Limón; high tide line, sandy beach; coll. D. Moran, February 16 1981; 1 male. UCR 1051; between Cahuita & Puerto Vargas, Limón; coll. February 10 1984; 1 male. UCR 1057-003; Puerto Limón, Limón; coll. November 13 1972; 1 male. UCR 1089-002; Puerto Vargas, Limón; coll. October 7 1984; 1 juvenile, 1 megalopa(?).

Range: Bermuda & North Carolina to Pernambuco, Brazil. Azores, Madeira and West Africa from Senegal to the Gold Coast (Wilson & Gore, 1980).

## FAMILY OCYPODIDAE

*Ocypode quadrata* (Fabricius, 1787)

Material: UCR 18; Portete, Limón; coll. L. Murillo, September 10 1966; 1 female.

Range: Woods Hole, Massachusetts, throughout the Caribbean to Brazil (Rathbun, 1918).

## FAMILY PALICIDAE

*Palicus tuberculatus* (Faxon, 1893)

Material: UCR 519; Gulf of Nicoya, Puntarenas; 9°28' N 84°49' W; coll. K. Koenig, May 21 1970; 1 female. UCR 1052; 4 km off Herradura Beach, Puntarenas; shrimp trawl; 105 fathoms; coll. B. Burgos A. Cruz, May 23-24 1984. UCR 1070; 10 km off the beach of Cabo Blanco, Puntarenas; shrimp trawl; 280 m; coll. C. Gamboa A. Cruz, August 15 1983; 1 female.

Previous Range: Bay of Panamá, Panamá (Rathbun, 1918).

## FAMILY CRYTOCHIRIDAE

*Opecarcinus crescentus* (Edmondson, 1925)

Material: UCR 1646; Platanillo, Isla del Caño, Puntarenas, living on *Pavona gigantea*; 6m deep; coll. J. Cortés, June 3 1992; 4 females, 2 males.

Range: Vietnam to Baja California (Kropp, 1989).

## DISCUSSION

Two hundred and fifty-seven species of marine crabs have been reported from Costa Rican waters, including 11 species from off Isla del Coco, 500 km from the mainland. Here we report 57 additional species - 25 from the Pacific and 32 from the Atlantic - increasing the total number of known Costa Rican crab species to 314.

Seven of the 25 Pacific species represent range extensions, 4 of which could be considered significant finds. *Paguristes praedator*, *P. holmesi*, *Epialtus sulcirostris* and *Pilumnus townsendi* have until now been reported only from México, although there is a questionable record of *P. townsendi* from the Galápagos Islands (Boone 1927). In addition, *Acanthocarpus delsolari* has been reported only from Peru.

Most of the 18 Atlantic range extensions reported in this paper represent slight westward extensions from Panamá or the Lesser Antilles. However, *Libinia ferreirae* has been reported only from Brazil. Two specimens of the UCR collection sent to specialists turned out to be new species and were reported in separate papers as *Pinnixa costaricana* Wicksten (1982) and *Odontoplax chacei* Garth (1986).

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## RESUMEN

En este trabajo se identificaron cincuenta y siete especies de cangrejos (anomuros y brachiuros) nuevas para Costa Rica y depositadas en el Museo de Zoología de la Universidad de Costa Rica. Veinte y cinco de las especies son del Pacífico y 32 del Caribe. La extensión de la distribución de 4 de las 25 especies del Pacífico se puede considerar significativa. *Paguristes praedator*, *P. holmesi*, *Epialtus sulcirostris* y *Pilumnus townsendi* hasta ahora solo han sido informadas de México y *Acanthocarpus del-solari* únicamente de Perú. Se incluye además una lista de las 257 especies informadas para Costa Rica.

## REFERENCES

- Abele, L.G. 1992. A review of the grapsid crab genus *Sesarma* (Crustacea:Decapoda:Grapsidae) in America, with the description of a new genus. *Smithson. Contrib. Zool.* 527:1-60.
- Abele, L.G. & W. Kim. 1989. The decapod crustaceans of the Panama Canal. *Smithson. Contrib. Zool.* 482: 1-50.
- Ball, E.E. & J. Haig. 1974. Hermit crabs from the tropical Eastern Pacific. I. Distribution, color and natural history of some common shallow-water species. *Bull. So. Cal. Acad. Sci.* 73: 95-104.
- Boone, L. 1926. A new family of Crustacea. Preliminary technical description. *Zool. Soc. Bull.* 29: 73.
- Boone, L. 1927. The littoral crustacean fauna of the Galápagos Islands. Part I: Brachyura. *Zoologica* 8: 127-288.
- Boone, L. 1930a. Scientific results of the cruises of the yachts "Eagle" and "Ara", 1921-1928, William K. Vanderbilt, commanding. Crustacea: Stomatopoda and Brachyura. *Bull. Vanderbilt Mar. Mus.* 2: 1-228, pl. 1-74.
- Boone, L. 1930b. Scientific results of the cruises of the yachts "Eagle" and "Ara", 1921-1928, William K. Vanderbilt, commanding. Crustacea: Anomura, Macrura, Schizopoda, Isopoda, Amphipoda, Mysidacea, Cirripedia and Copepoda. *Bull. Vanderbilt Mar. Mus.* 3:1-221.
- Boone, L. 1932. The littoral crustacean fauna of the Galápagos Islands. Part II. Anomura. *Zoologica* 14: 1-62.
- Bowman, T.E. & L.G. Abele. 1982. The classification of the recent Crustacea. In E. Bliss (ed.), *The Biology of Crustacea*. Vol. 1, xx+ 319p. Academic, New York.
- Bright, D.B. 1966. The land crabs of Costa Rica. *Rev. Biol. Trop.* 14: 183-203.
- Chace, F. and H.H. Hobbs. 1969. The freshwater and terrestrial decapod crustaceans of the West Indies with special reference to Dominica. *U.S. Nat. Mus. Bull.* 292: v + 1-258 p.
- Childress, J.R. 1972. Behavioral ecology and fitness theory in a tropical hermit crab. *Ecology* 53: 960-964.
- Crane, J. 1947. Eastern Pacific Expeditions of the New York Zoological Society. XXXVIII. Intertidal brachygnathous crabs from the west coast of tropical America with special reference to ecology. *Zoologica* 32: 69-93.
- Crane, J. 1975. Fiddler crabs of the world. *Ocypodidae: genus Uca*. Princeton University Press, Princeton N.J.: XXIV + 736 pages, 50 plates, 21 maps.
- Efford, I.E. 1971. The species of sand crabs in the genus *Lepidopa* (Decapoda: Albuneidae). *Zool. Anz.* 186: 59-102.
- Efford, I.E. 1976. Distribution of the sand crabs in the genus *Emerita* (Decapoda, Hippidae). *Crustaceana* 30: 169-183.
- Faxon, W. 1893. Preliminary descriptions of new species of Crustacea. *Bull. Mus. Comp. Zool.* 24: 149-220.
- Faxon, W. 1895. Reports on an exploration off the west coast of México, Central and South America, and off the Galápagos Islands...by the U.S. Fish Commission Steamer "Albatross," during 1891...XV. The stalk-eyed Crustacea. *Mem. Mus. Com. Zool.* 18: 1-292.
- Garth, J.S. 1940. Some new species of brachyuran crabs from México and the Central and South American mainland. *Allan Hancock Pacific Exped.* 1: 53-95.
- Garth, J.S. 1948. The Brachyura of the "Askoy" Expedition with remarks on carcinological collecting in Panamá Bight. *Bull. Amer. Mus. Nat. Hist.* 92:1-66.

- Garth, J.S. 1958. Brachyura of the Pacific coast of America. *Oxyrhyncha*. Allan Hancock Pacific Exped. 21:xiii + 854 p.
- Garth, J.S. 1959. Eastern Pacific Expeditions of the New York Zoological Society. XLIV. Non-intertidal brachygnathous crabs from the west coast of tropical America. Part 1: *Brachygnatha Oxyrhyncha*. *Zoologica* 44: 105-124.
- Garth, J.S. 1961. Non-intertidal brachygnathous crabs from the west coast of tropical America. Part 2: *Brachygnatha Brachyrhyncha*. *Zoologica* 46: 133-158.
- Garth, J.S. 1966. Eastern Pacific Expeditions of the New York Zoological Society. XLVI. *Oxystomatus* and Allied Crabs from the West Coast of tropical America. *Zoologica* 51:1-14.
- Garth J.S. & W. Stephenson. 1966. Brachyura of the Pacific Coast of America. *Brachyrhyncha: Portunidae*. Allan Hancock Monographs in Marine Biology. Allan Hancock Foundation, University of Southern California, Los Angeles, California. 154 p.
- Garth, J.S. 1973. New taxa of brachyuran crabs from deep water off western Perú and Costa Rica. *Bull. So. Cal. Acad. Sci.* 72: 1-12.
- Garth, J.S. 1974. On the occurrence in the eastern tropical Pacific of Indo-West Pacific decapod crustaceans commensal with reef-building corals. In: P. Mather, (ed.). *Proceedings of the Second International Coral Reef Symposium 2: 397-404*. Great Barrier Reef Committee, Brisbane, Australia.
- Garth, J.S. 1986. A new genus and species of goneplacid crab (Decapoda: Brachyura) from the west coast of South and Central America. *J. Crustacean Biol.* 6: 543-546.
- Glassell, S.A. 1937. The Templeton Crocker Expedition. XI. Hermit crabs from the Gulf of California and the west coast of Lower California. *Zoologica* 22:241-263.
- Gordon, I. 1938. A comparison of the two genera *Albunea* and *Lepidopa* (Crustacea, Anomura) with description of a new species from Singapore. *Bull. Raffles Mus.* 14:186-197.
- Gore, R.H. 1974. On a small collection of porcellanid crabs from the Caribbean sea (Crustacea, Decapoda, Anomura). *Bull. Mar. Sci.* 24: 700-721.
- Gore, R.H. 1982. Porcellanid crabs from the coasts of México and Central America (Crustacea: Decapoda: Anomura). *Smithson. Contrib. Zool.* 363: 1-34.
- Gore, R.H. & L. E. Scotto. 1979. Crabs of the family Parthenopidae (Crustacea: Brachyura: Oxyrhyncha) with notes on specimens from the Indian River region of Florida. *Mem. Hourglass Cruises* 3: 1-97.
- Green, T.M. 1985. *Pinnotheres jamesi* synonymized with *P. reticulatus* (Decapoda:Brachyura). *Proc. Biol. Soc. Wash.* 98: 611-614.
- Guinot, D. 1968. Recherches préliminaires sur les groupements naturels chez les Crustacés Décapodes Brachyours. IV. Observations sur quelques genres de Xanthidae. *Bull. Mus. Nat. D'Hist. Natur. Paris, ser. 2,* 39(1967):695-727.
- Guinot, D. 1969. Sur divers Xanthidae notamment sur *Actaea* de Haan et *Paractaea* gen nov. (Crustacea Decapoda Brachyura). *Cahiers du Pacifique* 3: 223-267.
- Guinot, D. 1971. Recherches préliminaires sur les groupements naturels chez les Crustacés Décapodes Brachyours. VIII. Synthèse et Bibliographie. *Bull. Mus. Nat. D'Hist. Natur. Paris, ser. 2,* 42(1970): 1063-1090.
- Haig, J. 1956. The Galatheidae (Crustacea; Anomura) of the Allan Hancock Atlantic Expedition with a review of the Porcellanidae of the western North Atlantic. *Allan Hancock Atl. Exped.* 8:1-44.
- Haig, J. 1960. The Porcellanidae (Crustacea; Anomura) of the Eastern Pacific. *Allan Hancock Pac. Exped.* 24: 1-440.
- Haig, J. 1962. Papers from Dr. Th. Mortensen's Pacific Expedition 1914-1916. LXXIX. Porcellanid crabs from eastern and western America. *Vidensk. Medd. fra Dansk Naturh. Foren.* 124:171-192.
- Haig, J. 1968. Eastern Pacific expeditions of the New York Zoological Society. Porcellanid crabs (Crustacea: Anomura) from the west coast of tropical America. *Zoologica* 53: 57-74.
- Haig, J. 1980. Arthropoda: Crustacea. Superfamily Hippoidea: Families Hippidae and Albuneidae (mole and sand crabs). p. 286-291. In R. C. Brusca, (ed.). *Common intertidal invertebrates of the Gulf of California*. University of Arizona, Tucson.
- Haig, J. & A.J. Provenzano. 1965. A new genus and two new species of diogenid hermit crabs (Decapoda, Anomura). *Crustaceana* 9: 199-207.
- Haig, J., T.S. Hopkins & T.B. Scanland. 1970. The shallow water anomuran fauna of southwestern Baja California, México. *Trans. San Diego Soc. Nat. Hist.* 16: 13-32.
- Holthius, L.B. 1959. The Crustacea Decapoda of the Suriname (Dutch Guiana). *Zoologische Verhandelingen, Rijksmuseum van Natuurlijke Historie, Leiden,* 44, 296 p. 16 plates.
- Holthius, L.B. & E. Gottlieb. 1958. An annotated list of the decapod Crustacea of the Mediterranean coast of Israel, with an appendix listing the Decapoda of the eastern Mediterranean. *Bull. Res. Council Israel* 7B:1-126.
- Knight, M.D. 1968. The larval development of *Raninoides benedicti* Rathbun (Brachyura, Raninidae), with notes on the Pacific records of *Raninoides laevis* (Latreille). *Crustaceana Suppl. II:* 10-169. pl.I-IV.

- Kropp, R.K. 1989. A revision of the Pacific species of gall crabs, genus *Opecarcinus* (Crustacea, Cryptochiridae). *Bull. Mar. Sci.* 45:98-129.
- Lemaitre, R. 1989. Revision of the genus *Parapagurus* (Anomura:Paguridae), including redescrptions of the western Atlantic species. *Zoologische Verh.* 253:106 pp.
- Longhurst, A.R. & D.L.R. Seibert. 1971. Breeding in an oceanic population of *Pleuroncodes planipes* (Crustacea, Galatheididae). *Pac. Sci.* 25: 426-428.
- Macpherson, E. 1988. Revision of the family Lithodidae Samouelle, 1819 (Crustacea, Decapoda, Anomura) in the Atlantic Ocean. *Monogr. de Zool. Marina* 2:9-153 (Instituto de Ciencias del Mar, Barcelona).
- Maurer, D., C.E. Epifanio, H. Dean, S. Howe, J. Vargas, A. Dittel & M. Murillo. 1984. Benthic invertebrates of a tropical estuary: Gulf of Nicoya, Costa Rica. *J. Nat. Hist.* 18: 47-61.
- McLaughlin, P.A. 1981a. Revision of *Pylopagurus* and *Tomopagurus* (Crustacea: Decapoda: Paguridae), with the descriptions of new genera and species: Part I. Ten new genera of the Paguridae and a redescription of *Tomopagurus* A. Milne Edwards and Bouvier. *Bull. Mar. Sci.* 3: 1-30.
- McLaughlin, P.A. 1981b. Revision of *Pylopagurus* and *Tomopagurus* (Crustacea: Decapoda: Paguridae), with the descriptions of new genera and species: Part II. *Rhodochirus* McLaughlin and *Phimochirus* McLaughlin. *Bull. Mar. Sci.* 31: 329-365.
- McLaughlin, P.A. 1982. Revision of *Pylopagurus* and *Tomopagurus* (Crustacea: Decapoda: Paguridae), with the descriptions of new genera and species: Part III. *Agaricochirus* McLaughlin, and *Enallopaguropsis* McLaughlin. *Bull. Mar. Sci.* 32: 823-855.
- Moran, D.A. 1984. Additions to the known anomuran fauna of El Salvador, Central America (Crustacea: Decapoda). *J. Crust. Biol.* 4:72-84.
- Pesta, O. 1931. Ergebnisse der Osterreichischen biologischen Costa Rica Expedition 1930. I. Teil. Crustacea Decapoda aus Costa Rica. *Ann. Naturhist. Mus. Wien* 45: 173-181.
- Powers, L.W. 1977. A catalogue and bibliography to the crabs (Brachyura) of the Gulf of México. *Contr. Mar. Sci., Suppl.* to 20:1-190
- Rathbun, M.J. 1906. The Brachyura and Macrura of the Hawaiian Islands. *Bull. U.S. Fish Comm.* 23: 827-930.
- Rathbun, M.J. 1918. The Grapsoid Crabs of America. *Bull. U. S. Nat. Mus.* 97:1-461.
- Rathbun, M.J. 1925. The spider crabs of America. *Bull. U. S. Nat. Mus.* 129: 1-613.
- Rathbun, M.J. 1930. The cancrivora crabs of America of the families Euryalidae, Portunidae, Atelecyclidae, Cancridae and Xanthidae. *Bull. U. S. Nat. Mus.* 152: 1-593.
- Rathbun, M.J. 1931. New Costa Rican crabs. *J. Wash. Acad. Sci.* 21: 262-263.
- Rathbun, M.J. 1937. The oxystomatous and allied crabs of America. *Bull. U. S. Nat. Mus.* 166: 1-272.
- Scotto, L.E. & R.H. Gore. 1980. Larval development under laboratory conditions of the tropical spider crab *Mithrax (Mithraculus) coryphe* (Herbst, 1801) (Brachyura:Majidae). *Proc. Biol. Soc. Wash.* 93:551-562.
- Wicksten, M.K. 1982. *Pinnixa costaricana*, a new species of crab from Central America (Brachyura: Pinnotheridae). *Proc. Biol. Soc. Wash.* 95: 579-582.
- Williams, A.B. 1974. The swimming crabs of the genus *Callinectes* (Decapoda: Portunidae). *Fish. Bull. U.S. Fish Wildl. Serv.* 72:685-798.
- Williams, A.B. 1984. Shrimps, lobsters and crabs of the Atlantic Coast of the Eastern United States, Maine to Florida. Smithsonian Institution, xviii + 550 p. 380 figs.
- Williams, A.B. & D. McN. Williams. 1981. Carolinian records for lobster, *Homarus americanus*, and tropical swimming crab, *Callinectes bocourti*. Postulated means of dispersal. *Fish. Bull.* 79: 192-198.
- Wilson, K.A., & R. H. Gore. 1980. Studies on decapod Crustacea from the Indian River region of Florida. XVII. Larval stages of *Plagusia depressa* (Fabricius, 1775) cultured under laboratory conditions (Brachyura:Grapsidae). *Bull. Mar. Sci.* 30: 776-789.
- Wolff, T. 1961. Animal life from a single abyssal trawling. *Galathea Report* 5: 129-162.

## APPENDIX

## Annotated list of crab species reported from Costa Rica

Taxa	Distribution	Reference
<b>COENOBITIDAE</b>		
<i>Coenobita clypeatus</i> (Herbst, 1791)	A	Bright, 1966
<i>C. compressus</i> Milne-Edwards, 1837	P	Pesta, 1931
<b>DIOGENIDAE</b>		
<i>Allodardanus rugosus</i> Haig & Provenzano, 1965	I.C.	Haig & Provenzano, 1965
<i>Aniculus elegans</i> Stimpson, 1859	P	Ball & Haig, 1974
<i>Calcinus explorator</i> Boone, 1930	I.C.	Boone, 1932
<i>C. obscurus</i> Stimpson, 1859	P	Childress, 1972
<i>Cancellus tanneri</i> Faxon, 1893	I.C.	Faxon, 1893
<i>Clibanarius albidigitus</i> Nobili, 1901	P	Childress, 1972
<i>C. panamensis</i> Stimpson, 1859	P	Childress, 1972
<i>Dardanus sinistripes</i> (Stimpson, 1858)	P	Ball & Haig, 1974
<i>Isocheles</i> sp. Ball & Haig, 1974		
<i>Paguristes fecundus</i> Faxon, 1893	I.C.	Faxon, 1893
<i>Petrochirus californiensis</i> Bouvier, 1895	P	Ball & Haig, 1974
<i>Trizopagurus magnificus</i> (Bouvier, 1895)	P	Ball & Haig, 1974
<b>LITHODIDAE</b>		
<sup>1</sup> <i>Neolithodes diomedea</i> (Benedict, 1894)	I.C.	Macpherson, 1988
<i>Paralomis longipes</i> Faxon, 1893	I.C.	Faxon, 1893
<b>PAGURIDAE</b>		
<i>Enallopaguroopsis janetae</i> McLaughlin, 1982	I.C.	McLaughlin, 1982 (I.C.)
<sup>2</sup> <i>Iridopagurus occidentalis</i> (Faxon, 1893)	I.C.	Faxon, 1893
<sup>3</sup> <i>Manucomplanus longimanus</i> (Faxon, 1893)	I.C.	Faxon, 1893
<i>Pagurus albus</i> (Benedict, 1892)	Q.R.	Boone, 1930(b)
<i>P. gladius</i> (Benedict, 1892)	P	Maurer et al., 1983
<i>Phimochirus californiensis</i> (Benedict, 1892)	P	Faxon, 1895
<i>P. roseus</i> Benedict, 1892	P	McLaughlin, 1981b
<i>P. venustus</i> (Bouvier, 1898)	P	McLaughlin, 1981b
<i>Rhodochirus hirtimanus</i> (Faxon, 1893)	I.C.	Faxon, 1893
<i>Tomopagurus merimaculosus</i> (Glassell, 1937)	P	McLaughlin, 1981a
<b>PARAPAGURIDAE</b>		
<sup>4</sup> <i>Parapagurus holtuisi</i> Lemaitre, 1989	P	Lemaitre, 1989
<i>Probeebai mirabilis</i> Boone, 1926	I.C.	Boone, 1926
<b>GALATHEIDAE</b>		
<sup>5</sup> <i>Munida perlata</i> Benedict, 1902	I.C.	Faxon, 1893
<i>M. refulgens</i> Faxon, 1893	I.C.	Faxon, 1893

(Binomen, original description, Costa Rican record)

Abbreviations: I.C.-collected off Isla del Coco

P-Pacific coast

A-Atlantic coast

Q.R.-questionable record

<sup>6</sup> <i>Munidopsis albatrossae</i> Pequegnat & Pequegnat, 1973	P	Wolff, 1961
<i>M. antonii?</i> Wolff, 1961	P	Wolff, 1961
<i>M. aspera</i> (Henderson, 1885)	I.C.	Faxon, 1893
<i>M. ciliata</i> Wood-Mason, 1891	I.C.	Faxon, 1895
<sup>7</sup> <i>M. diomedea</i> (Faxon, 1893)	I.C.	Faxon, 1893
<i>Pleuroncodes monodon</i> (Milne-Edwards 1837)	P	Longhurst & Seibert 1971

## PORCELLANIDAE

<i>Euceramus panatelus</i> Glassell, 1938	P	Haig, 1960
<i>E. transversilineatus</i> (Lockington, 1878)	P	Haig, 1960
<i>Megalobrachium garthi</i> Haig, 1957	P	Haig, 1968
<sup>8</sup> <i>M. pacificum</i> (Gore & Abele, 1973)	P	Haig, 1956
<i>Megalobrachium tuberculipes</i> (Lockington, 1878)	P	Haig, 1968
<i>Minyocerus angustus</i> (Diana, 1852)	A	Gore, 1974
<i>Orthochela pumila</i> Glassell, 1936	P	Haig, 1960
<i>Pachycheles biocellatus</i> (Lockington 1878)	P	Haig, 1960
<i>P. calculosus</i> Haig, 1960	P	Haig, 1960
<i>P. chacei</i> Haig, 1956	P	Haig, 1956
<i>P. panamensis</i> Faxon, 1893	P	Haig, 1962
<i>P. spinidactylus</i> Haig, 1957	P	Haig, 1960
<i>P. subsetosus</i> Haig, 1960	P	Haig, 1960
<i>P. vicarius</i> Nobili, 1901	P	Haig, 1960
<i>Petrolisthes agassizii</i> Faxon, 1893	P	Haig, 1960
<i>P. armatus</i> (Gibbes, 1850)	P	Haig, 1960
<i>P. artifrons</i> Haig, 1960	P	Haig, 1960
<i>P. cocoensis</i> Haig, 1960	P	Haig, 1960
<i>P. edwardsii</i> (Saussure, 1853)	P	Haig, 1960
<i>P. galapagensis</i> Haig, 1960	P	Haig, 1968
<i>P. galathinus</i> (Bosc, 1801)	P	Haig, 1960
<i>P. glasselli</i> Haig, 1957a	P	Haig, 1960
<i>P. haigae</i> Chace, 1962	P	Gore, 1982
<i>P. hians</i> Nobili, 1901	P	Haig, 1960
<i>P. holotrichus</i> Nobili, 1901	P	Haig, 1960
<i>P. lewisi austrinus</i> Haig, 1960	P	Haig, 1960
<i>P. nobili</i> Haig, 1960	P	Haig, 1960
<i>P. ortmanni</i> Nobili, 1901	P	Haig, 1960
<i>P. platymerus</i> Haig, 1960	P	Haig, 1960
<i>P. polymitus</i> Glassell, 1937	P	Haig, 1960
<i>P. tonsorius</i> Haig, 1960	P	Haig, 1960
<i>P. tridentatus</i> Stimpson, 1858	P	Haig, 1960
<i>P. zaca</i> Haig, 1968	P	Haig, 1968
<i>Pisidia magdalenensis</i> (Glassell, 1936)	P	Haig, 1960
<i>Porcellana cancrisocialis</i> Glassell, 1936,	P	Haig, 1960
<i>P. paguriconviva</i> Glassell, 1936	P	Haig, 1960

## ALBUNEIDAE

<i>Lepidopa deamae</i> Benedict, 1903	P	Gordon, 1938
<i>L. mearnsi</i> Benedict, 1904?	P	Efford, 1971
<i>L. mexicana</i> Efford, 1971	P	Efford, 1971

## HIPPIDAE

<i>Emerita rathbunae</i> Schmitt, 1935	P	Efford, 1976
<sup>9</sup> <i>Hippa pacifica</i> (Dana, 1852)	P	Boone, 1930b

## DROMIIDAE

*Hypoconcha panamensis* Smith, 1869 P Garth, 1966

## RANINIDAE

*Raninoides benedicti* Rathbun ? P Knight, 1968

## DORIPPIDAE

*Ethusa ciliatifrons* Faxon, 1893 P Garth, 1966

*E. lata* Rathbun, 1893 P Garth, 1966

*E. panamensis* Finnegan, 1931 P Garth, 1966

## CALAPPIDAE

*Calappa convexa* Saussure, 1853 P Garth, 1966

*C. saussurei* Rathbun, 1898 P Garth, 1966

*Cycloes bairdii* Stimpson, 1860 P Garth, 1966

*Hepatus kossmanni* Neumann, 1878 P Garth, 1966

## LEUCOSIIDAE

*Ebalia magdalensis* Rathbun, 1933 P Garth, 1966

*Iliacantha hancocki* Rathbun, 1935 P Garth, 1966

*I. Schmitti* Rathbun, 1935 P Garth, 1966

*Leucosilia jurinei* (Saussure, 1853) P Garth, 1966

*Lithadia cumingii* Bell, 1855 P Garth, 1966

*Persephona townsendi* (Rathbun, 1893) P Garth, 1966

*Randallia agaricias* Rathbun, 1898 P Garth, 1966

*R. minuta* Rathbun, 1935 P Garth, 1966

## MAJIDAE

*Acanthonyx petiverii* Milne-Edwards, 1834 P Crane, 1947

<sup>10</sup>*Ala cornuta* (Stimpson, 1860) P Crane, 1947

*Collodes granosus* Stimpson, 1860 P Garth, 1958

*C. tenuirostris* Rathbun, 1893 P Garth, 1958

*Eucinetops panamensis* Rathbun, 1923 P Crane, 1947

*Euprognatha bifida* Rathbun, 1893 P Garth, 1958

*E. granulata* Faxon, 1893 I.C. Faxon, 1893

*Hemus finneganae* Garth, 1958 P Garth, 1958

*Herbstia pubescens* Stimpson, 1871 P Garth, 1958

*H. tumida* (Stimpson, 1871) P Garth, 1958

*Inachoides laevis* Stimpson, 1860 P Garth, 1958

*Lissa aurivilliusi?* Rathbun, 1898 P Garth, 1958

*L. tuberosa* Rathbun, 1898 P Garth, 1958

*Macrocoeloma maccullochae* Garth, 1940 P Garth, 1940

*Microphrys branchialis* Rathbun, 1892 P Garth, 1958

*M. platysoma* (Stimpson, 1860) P Crane, 1947

*Mithrax (Mithrax) armatus* Saussure, 1853 P Garth, 1958

*M. denticulatus* Bell, 1835 P Crane, 1947

*M. (M.) pygmaeus* Bell, 1835 P Crane, 1947

*M. (M.) spinipes* (Bell, 1853) P Garth, 1958

*M. (M.) tuberculatus* Stimpson, 1860 P Garth, 1958

*Notolopas lamellatus* Stimpson, 1871 P Rathbun, 1925

*Paradasygius depressus* (Bell, 1835) P Garth, 1958

*Pelia pacifica* Milne-Edwards, 1857 P Crane, 1947

*Pitho picteti* (Saussure, 1853) P Garth, 1958

<i>P. quinquedentata</i> Bell, 1835	P	Garth, 1959
<i>P. sexdentata</i> Bell, 1835	P	Crane, 1947
<i>Podocheila angulata</i> Finnegan, 1931	P	Garth, 1958
<i>P. hemphilli</i> (Lockington, 1877)	P	Garth, 1958
<i>P. veleronis</i> Garth, 1948	P	Garth, 1958
<i>P. ziesenhennei</i> Garth, 1940	P	Garth, 1958
<i>Pyromaia tuberculata</i> (Lockington, 1877)	P	Garth, 1959
<i>Sphenocarcinus agassizi</i> Rathbun, 1893	P	Faxon ?
<i>Stenocionops angusta</i> (Lockington, 1877)	P	Garth, 1958
<i>S. ovata</i> (Bell, 1835)	P	Garth, 1958
<i>Stenorynchus debilis</i> (Smith, 1871)	P	Garth, 1958
<i>Teleophyrus cristulipes</i> Stimpson, 1860	P	Crane, 1947
<i>Thoe sulcata panamensis</i> Nobili, 1901	P	Crane, 1947
<i>Tyche lamellifrons</i> Bell, 1835	P	Garth, 1958

## PARTHENOPIDAE

<i>Cryptopodia hassleri</i> Rathbun, 1925	P	Garth, 1958
<i>Daldorfia garthi</i> Glassell, 1940	P	Garth 1940
<i>Heterocrypta colombiana</i> Garth, 1940	P	Garth 1940
<i>H. macrobrachia</i> Stimpson, 1871	P	Garth 1958
<i>Leiolambrus punctatissimus</i> (Owen, 1839)	P	Garth, 1959
<i>Mesorhoea belli</i> (Milne-Edwards, 1878)	P	Garth, 1959
<i>Parthenope depressiuscula</i> (Stimpson, 1871)	P	Garth, 1958
<i>P. exilipes</i> (Rathbun, 1893)	I.C.	Faxon, 1893
<i>P. hyponca</i> (Stimpson, 1871)	P	Garth, 1958
<i>P. simpsoni</i> Garth, 1958	P	Garth, 1958
<i>Solenolambrus arcuatus</i> Stimpson, 1871	P	Garth, 1958
<i>Thyrolambrus glasselli</i> (Rathbun, 1898)	P	Garth, 1958

## PORTUNIDAE

<i>Arenaeus mexicanus</i> (Gerstaecker, 1856)	P	Garth and Stephenson, 1966
<i>Callinectes arcuatus</i> Ordway, 1863	P	Williams, 1974
<i>C. sapidus</i> Rathbun, 1896	A	Williams, 1974
<i>C. toxotes</i> Ordway, 1863	P	Williams, 1974
<i>Cronius ruber</i> (Lamarck, 1818)	A,P	Williams, 1984
<i>Euphylax dovii</i> Stimpson, 1860	P	Garth and Stephenson, 1966
<i>E. robustus</i> Milne-Edwards, 1874	P	Garth and Stephenson, 1966
<i>Portunus acuminatus</i> Stimpson, 1871	P	Garth and Stephenson, 1966
<sup>11</sup> <i>P. xantusii affinis</i> (Faxon, 1893)	P	Garth and Stephenson, 1966
<sup>12</sup> <i>P. asper</i> (Milne-Edwards, 1861)	P	Garth and Stephenson, 1966
<i>P. brevipennis</i> (Faxon, 1895)	P	Garth and Stephenson, 1966
<i>P. iridescens</i> (Rathbun, 1893)	P	Garth and Stephenson, 1966
<i>P. panamensis</i> Stimpson, 1871	P	Garth, 1961
<i>P. tuberculatus</i> (Stimpson, 1860)	P	Garth and Stephenson, 1966

## GONEPLACIDAE

<i>Chasmocarcinus latipes</i> Rathbun, 1898	P	Garth, 1961
<i>Glyptoplax pugnax</i> Smith, 1870	P	Guinot, 1971
<i>Odontoplax chacei</i> Garth, 1986	P	Garth, 1986



<i>Pseudorhombilia xanthiformis</i> Garth, 1940	P	Garth, 1961
<i>Speocarcinus californiensis</i> (Lockington, 1877)	P	Guinot, 1971
<i>S. granulimanus</i> Rathbun, 1893	P	Maurer et al., 1983
<b>XANTHIDAE</b>		
<sup>13</sup> <i>Platyactea dovii</i> (Stimpson, 1871)	P	Guinot, 1968
<sup>14</sup> <i>Bractaea sulcata</i> (Stimpson, 1860)	P	Guinot, 1968
<i>Carpilodes cinctimanus</i> (White, 1847)	P	Boone, 1927
<sup>15</sup> <i>Cataleptodius taboganus</i> (Rathbun, 1912)	P	Guinot, 1968
<i>Cycloxanthops vittatus</i> (Stimpson, 1860)	P	Guinot, 1968
<i>Daira americana</i> Stimpson, 1860	P	Guinot, 1968
<i>Domecia hispida</i> Eydoux & Souleyet, 1842	P	Crane, 1947
<i>Eriphia granulosa</i> Milne-Edwards, 1880	I.C.	Rathbun, 1930
<i>E. squamata</i> Stimpson, 1859	P	Rathbun, 1930
<i>Eriphides hispida</i> (Stimpson, 1860)	P	Rathbun, 1930
<i>Eurypanopeus planus</i> (Smith, 1869)	P	Crane, 1947
<i>E. transversus</i> (Stimpson, 1860)	P	Rathbun, 1930
<i>Eurytium tristani</i> Rathbun, 1906	P	Garth, 1961
<i>Heteractaea lunata</i> (Milne-Edwards & Lucas, 1843)	P	Guinot, 1968
<i>Hexapanopeus costaricensis</i> Garth, 1940	P	Garth, 1940
<i>H. orcutti</i> Rathbun, 1930	P	Garth, 1961
<i>H. sinoaloensis</i> Rathbun, 1930	P	Garth, 1961
<i>Lophoxanthus lamellipes</i> (Stimpson, 1860)	P	Crane, 1947
<i>Maldivia galapagensis</i> Garth, 1939	P	Garth, 1974
<i>Medaeus lobipes</i> Rathbun, 1898	P	Garth, 1961
<i>M. spinulifer</i> (Rathbun, 1898)	P	Crane, 1947
<i>Menippe obtusa</i> Stimpson, 1859	P	Rathbun, 1930
<i>Metapocarcinus concavatus</i> Crane, 1947	P	Crane, 1947
<i>Micropanope maculatus</i> (Rathbun, 1898)	P	Garth, 1961
<i>M. polita</i> Rathbun, 1893	I.C.	Faxon, 1893
<i>M. xantusii</i> (Stimpson, 1871)	P	Crane, 1947
<i>Ozius agassizii</i> Milne-Edwards, 1880	P	Rathbun, 1930
<i>O. perlatus</i> Stimpson, 1860	P	Crane, 1947
<i>O. tenuidactylus</i> (Lockington, 1877)	P	Crane, 1947
<i>O. verreauxii</i> Saussure, 1853	P	Crane, 1947
<i>P. Panopeus bermudensis</i> Benedict & Rathbun, 1891	A,P	Rathbun, 1930
<i>P. chilensis</i> Milne-Edwards & Lucas, 1844	P	Rathbun, 1930
<i>P. purpureus</i> Lockington, 1877	P	Abele and Kim, 1989
<i>Pilumnus fernandezii</i> Garth, 1973	P	Garth, 1973
<i>P. pygmaeus</i> Boone, 1927	P	Crane, 1947
<i>P. stimpsonii</i> Miers, 1871	P	Garth, 1961
<i>P. xantusii</i> Stimpson, 1860	P	Crane, 1947
<i>Trapezia cymodoce ferruginea</i> Latreille, 1825	P	Boone, 1927
<i>T. digitalis</i> Latreille, 1825	P	Crane, 1947
<i>Xanthodius sternberghii</i> Stimpson, 1859	P	Guinot, 1968
<i>X. stimpsoni</i> (Milne-Edwards, 1879)	P	Garth, 1948
<b>GECARCINIDAE</b>		
<i>Cardisoma crassum</i> Smith, 1870	P	Bright, 1966
<i>C. quanhum</i> Latreille, 1825	A	Bright, 1966
<i>Gecarcinus lateralis</i> (Freminville, 1835)	A	Bright 1966
<i>G. quadratus</i> Saussure, 1853	P	Bright, 1966

## GRAPSIDAE

<i>Aratus pisonii</i> (Milne-Edwards, 1837)	P	Rathbun, 1918
<i>Geograpsus lividus</i> (Milne-Edwards, 1837)	P	Crane, 1947
<i>Goniopsis pulchra</i> (Lockington, 1876)	P	Rathbun, 1918
<i>Grapsus grapsus</i> (Linnaeus, 1758)	P	Crane, 1947
<i>Pachygrapsus transversus</i> (Gibbes, 1850)	A,P	Rathbun, 1918
<i>Plagusia immaculata</i> Lamarck, 1818	P	Rathbun, 1918
16 <i>Armases angustum</i> (Smith, 1870)	A,P	Abele, 1992
17 <i>A. biolleyi</i> Rathbun, 1906	P	Abele, 1992
<i>Sesarma rhizophorae</i> Rathbun, 1906	P	Rathbun, 1906
<i>S. sulcatum</i> Smith, 1870	P	Rathbun, 1918

## PINNOTHERIDAE

<i>Pinnixa costaricana</i> Wicksten, 1982	P	Wicksten, 1982
<i>P. valerii</i> Rathbun, 1931	P	Rathbun, 1931
<i>Pinnotheres reticulatus</i> Rathbun, 1918	P	Green, 1985

## OCYPODIDAE

<i>Ocypode gaudichaudii</i> Milne-Edwards & Lucas, 1843	P	Rathbun, 1918
<i>O. occidentalis</i> Stimpson, 1860	P	Rathbun, 1918
<i>Uca argillicola</i> Crane, 1941	P	Crane, 1975
<i>U. batuenta</i> Crane, 1941	P	Crane, 1975
<i>U. beebii</i> Crane, 1941	P	Crane, 1975
<i>U. brevifrons</i> (Stimpson, 1860)	P	Crane, 1975
<i>U. deichmanni</i> Rathbun, 1935	P	Crane, 1975
<i>U. galapagensis herradurensis</i> Bott, 1954	P	Crane, 1975
<i>U. heteropleura</i> (Smith, 1870)	P	Crane, 1975
<i>U. inaequalis</i> Rathbun, 1935	P	Crane, 1975
18 <i>U. maracoani insignis</i> (Milne-Edwards, 1852)	P	Crane, 1975
<i>U. latimanus</i> (Rathbun, 1893)	P	Crane, 1975
<i>U. limicola</i> Crane, 1941	A	Crane, 1975
<i>U. mordax</i> (Smith, 1870)	A	Crane, 1975
<i>U. oerstedii</i> (Rathbun, 1904)	P	Crane, 1975
<i>U. ornata</i> (Smith, 1870)	P	Crane, 1975
<i>U. panamensis</i> (Stimpson, 1859)	P	Crane, 1975
<i>U. princeps princeps</i> (Smith, 1870)	P	Crane, 1975
<i>U. pygmaea</i> Crane, 1941	P	Crane, 1975
<i>U. salitianta</i> Crane, 1941	P	Crane, 1975
<i>U. stenodactylus</i> (Milne-Edwards & Lucas, 1847)	P	Crane, 1975
<i>U. stylifera</i> (Milne-Edwards, 1852)	P	Crane, 1975
<i>U. tenuipedis</i> Crane, 1941	P	Crane, 1975
19 <i>U. musica terpsichores</i> Crane, 1941	P	Crane, 1975
<i>U. tomentosa</i> Crane, 1941	P	Crane, 1975
<i>U. umbratila</i> Crane, 1941	P	Crane, 1975
<i>U. vocator ecuadoriensis</i> Maccagno, 1928	P	Crane, 1975
<i>U. zacaе</i> Crane, 1941	P	Crane, 1975
<i>Ucides cordatus</i> (Linnaeus, 1763)	A,P	Bright, 1966
<i>U. occidentalis</i> (Ortman, 1897)	P	Chace and Hobbs, 1969

## PALICIDAE

<i>Palicus fragilis</i> Rathbun, 1893	P	Holthius and Gottlieb 1958
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The following are the names under which the above numbered taxa were reported for Costa Rica

1. as *Lithodes* sp.
2. as *Spiropagurus*
3. as *Pylopagurus* l.
4. as *P. pilosimanus abyssorum* Henderson, 1888
5. as *M. microphthalma*
6. as *M.* new sp.
7. as *Galacantha* d.
8. as *M. poeyi*
9. as *Emerita analoga*
10. as *Anaptychus cornutus*
11. as *P. affinis*
12. as *P. panamensis*
13. previously in the genus *Actaea*
14. previously in the genus *Actaea*
15. previously in the genus *Leptodius*
16. previously in the genus *Sesarma*
17. as *Sesarma biolleyi*
18. as *U. insignis*
19. as *U. terpsichores*