

Remarks: Dawson (1966) reported this species from off Grand Isle, Louisiana; Franks *et al.* (1972) obtained a single specimen from off Mississippi at 50 fm. Felder (1973a) reported specimens from Padre Island, Texas.

***Chasmocarcinus obliquus*** Rathbun, 1898 (Bull. Lab. Nat. Hist. State Univ. Iowa 4: 286)

Rathbun, 1918, p. 58, text-fig. 27, pl. 14, figs. 1-2; Chace, 1940, p. 48.

Range: southeast of Bahamas; north and south coasts of Cuba.

Depth: 177 to 503 m (97 to 275 fm).

Habitat: mud and ooze substrates.

***Eucratopsis*** Smith, 1869

***Eucratopsis crassimanus*** (Dana, 1852) (Proc. Acad. Nat. Sci. Philadelphia, for 1851, vol. 5: 248)

Rathbun, 1918, p. 52, text-fig. 22, pl. 12, fig. 3, pl. 159, figs. 1-2; Guinot, 1969a, p. 258, figs. 6, 10, 25.

Range: Florida Keys; south and west coasts of Florida; Yucatan; Jamaica; Bahia to Rio de Janeiro, Brazil.

Depth: shallow water to 14 m (to 7.5 fm).

Habitat: sand, coral, and broken shell substrates.

Remarks: Tabb and Manning (1961) collected ovigerous females in October from Oyster Bay in south Florida.

***Euphosynoplax*** Guinot, 1969

***Euphosynoplax clausa*** Guinot, 1969 (Bull. Mus. Nation. Hist. Nat. 41: 720)

Guinot, 1969a, p. 720, figs. 127, 139, pl. IV, fig. 3; Pequegnat, 1970, p. 194.

Range: Dry Tortugas; off Alabama and Mississippi; Campeche, Yucatan.

Depth: 91 to 210 m (50 to 115 fm).

***Euryplax*** Stimpson, 1859

***Euryplax nitida*** Stimpson, 1859 (Ann. Lyc. Nat. Hist. New York 7: 60)

Rathbun, 1918, p. 34, pl. 7; Rathbun, 1933, p. 78, fig. 69; Williams, 1965, p. 202, fig. 185; Guinot, 1969a, p. 512, figs. 39, 41, 47, 56-57, pl. II, fig. 1; Felder, 1973a, p. 70, pl. 10, fig. 1.

Range: off North Carolina; Bermuda; Florida Keys; south and west coasts of Florida to Texas; Puerto Rico; St. Thomas, Virgin Islands.

Depth: shallow water to 90 m (to 49 fm).

Habitat: sand, shell, rock, and coral substrates; sandy grass flats.

Remarks: Menzel (1971) listed this crab as rare at Apalachee Bay and Abele (1970) collected only a single specimen in his study of the northeastern near-shore Gulf. Range reports for the western Gulf of Mexico are scant and questionable. Rathbun (1918) listed one specimen from New Orleans and Williams (1965) indicated a range extending to Texas. Felder (1973a) cites these reports but adds no new records.

***Frevillea*** A. Milne Edwards, 1880***Frevillea barbata*** A. Milne Edwards, 1880 (Bull. Mus. Comp. Zool. 8: 15)As ***Goneplax barbata***—Rathbun, 1918, p. 26, pl. 4, figs. 1, 3, pl. 5.As ***Frevillea barbata***—Guinot, 1969a, p. 513, pl. II, fig. 2.

Range: west coast of Florida; Yucatan (Gulf); north coast of Cuba; off Grenada.

Depth: 55 to 168 m (30 to 92 fm).

Habitat: sand, broken coral bottoms.

***Frevillea hirsuta*** (Borradaile, 1916) (Brit. Antarctic Exped., 1910, Zool., vol. 3, no. 2, p. 99)As ***Goneplax hirsuta***—Rathbun, 1918, p. 28, text-fig. 7; Williams, 1965, p. 201, fig. 184.As ***Frevillea hirsuta***—Guinot, 1969a, p. 513, text-figs. 33, 40, 58–59, pl. II, fig. 3.

Range: off North Carolina; off west and northwest Florida and Alabama; north of Yucatan; off Rio de Janeiro, Brazil.

Depth: 73 to 146 m (40 to 80 fm).

Remarks: Collected by the R/V *Oregon* from the Gulf of Mexico (Chace, 1956).***Frevillea tridentata*** A. Milne Edwards, 1880.Transferred to the genus *Trapezioplax* by Guinot (1969a). *Trapezioplax tridentata*.***Glyptoplax*** Smith, 1870***Glyptoplax smithii*** A. Milne Edwards, 1880 (Crust. Rég. Mex., p. 336)

Rathbun, 1918, p. 51, pl. 13, figs. 3–4; pl. 158, figs. 7–10; Milne Edwards &amp; Bouvier, 1923, p. 328, pl. 5, fig. 5; Williams, McCloskey &amp; Gray, 1968, p. 55, fig. 11; Guinot, 1969a, p. 259.

Range: Bermuda; off North Carolina; west coast of Florida; Cape Catoche, Yucatan (Gulf coast).

Depth: 24 to 55 m (13 to 30 fm).

Habitat: sand, coral, gravel and rock bottoms.

Remarks: Guinot (1969a) believed that this species should be excluded from the genus, based on differences from the type species, *G. pugnax*, a Pacific form from Central America.***Goneplax*** Leach, 1814(All three of the recognized Gulf species of this genus have been transferred to other genera by Guinot (1969a). *Goneplax barbata* and *G. hirsuta* are referred to *Frevillea* and *G. tridentata* is referred to *Trapezioplax*.)***Neopilumnoplax*** Serene, 1969***Neopilumnoplax americana*** (Rathbun, 1898) (Bull. Lab. Nat. Hist. State Univ. Iowa 4: 283)As ***Pilumnoplax americana***—Rathbun, 1918, p. 21, text-figs. 5–6; Williams,

McCloskey & Gray, 1968, p. 52, fig. 9.

As *Neopilumnoplax americana*—Guinot, 1969a, p. 689, figs. 83–84.

Range: off North Carolina and Georgia; Florida Keys and Straits; north coast of Cuba; Guadeloupe; Espirito Santo, Brazil; Arabian Sea.

Depth: 128 to 805 m (70 to 440 fm).

Habitat: sand, shell, coral, and rocky substrates.

Remarks: Chace (1940) recovered this crab from the stomach of a smooth dogfish (*Mustelus canis*) from off Havana, Cuba. Listed from Brazil by Rodrigues da Costa (1968a) and Coelho and Ramos (1972).

### *Panoplax* Stimpson, 1871

*Panoplax depressa* Stimpson, 1871 (Bull. Mus. Comp. Zool. 2: 151)

Rathbun, 1918, p. 47, text-fig. 21, pl. 12, figs. 1–2; Rathbun, 1933, p. 80, fig. 72;

Guinot, 1969a, p. 264, figs. 3, 12, 28, ? 29; Bright & Pequegnat, 1974, p. 33.

Range: Dry Tortugas; west coast of Florida; West Flower Garden Bank, off Texas; north coast of Cuba; north coast of Yucatan; Puerto Rico.

Depth: shallow water to 101 m (to 55 fm).

Habitat: sand, coral, and broken shell bottoms.

Remarks: Listed by Chace (1956) from off the west coast of Florida and by Bright and Pequegnat (1974) from silty-sand bottoms at West Flower Garden coral reef, at 330 foot depth.

### *Pilumnoplax* Stimpson, 1858

*Pilumnoplax americana* Rathbun, 1898.

Transferred to the genus *Neopilumnoplax* by Guinot (1969a). See *Neopilumnoplax americana*.

*Pilumnoplax elata* (A. Milne Edwards, 1880) (Bull. Mus. Comp. Zool. 8: 18)

As *Eucratoplax elata*—A. Milne Edwards, 1880, p. 18 (original type description, female holotype in Paris Museum, type locality is West Florida, 13 fms.). Not Rathbun, 1898, p. 281.

As *Pilumnoplax elata*—Guinot, 1969a, p. 688. Not Rathbun, 1918, p. 23.

Range: West Florida, type locality.

Depth: 24 m (13 fm).

Remarks: Only the original description of A. Milne Edwards (1880) is valid for this species. All of the other material described by Rathbun (1918, p. 23) has been referred by Guinot (1969a, p. 688, 716–717) to other genera. The male specimen description of Rathbun (1918, p. 23) was referred to *Robertsella mystica* (Guinot, 1969a, p. 716) and the females and juveniles were referred to *Thalassoplax angusta* (Guinot, 1969a, p. 717). This leaves the original type specimen to represent this poorly known species in the Gulf of Mexico.

*Pilumnoplax nitida* Chace, 1940 (Torreia 3: 44)

Chace, 1940, p. 44, figs. 17–18; Guinot, 1969a, p. 689.

Range: north coast of Cuba.

Depth: 348 to 476 m (190 to 260 fm).

Remarks: Guinot (1969a) retained this species in the genus, but she commented on the obscurity of its relationships.

***Prionoplax*** H. Milne Edwards, 1852

***Prionoplax atlantica*** Kendall, 1891.

Referred to *Frevillea tridentata* by Guinot (1969a), who later decided that *F. tridentata* was different enough from other *Frevillea* to establish a new genus, *Trapezioplax*, for this species. See *Trapezioplax tridentata*.

***Robertsella*** Guinot, 1969

***Robertsella mystica*** Guinot, 1969 (Bull. Mus. Nation. Hist. Nat. 41: 716)

As *Pilumnoplax elata* in Rathbun (not A. Milne Edwards)—Rathbun, 1918, p. 23 (part, male description only), pl. 3 (part, male only).

As *Robertsella mystica*—Guinot, 1969a, p. 716, figs. 132–133, pl. V, fig. 4.

Range: off southeast coast of Florida, Florida Straits.

Depth: 353 m (193 fm).

Habitat: sand bottom.

Remarks: Although this species has not been recorded from the Gulf of Mexico, it is included here because of the confusing nomenclatural history of *Pilumnoplax elata*. At present, this new species and genus includes only the mature male specimen described by Rathbun (1918, p. 23 and part of pl. 3).

***Speocarcinus*** Stimpson, 1859

***Speocarcinus carolinensis*** Stimpson, 1859.

This species was reported from the Gulf of Mexico, prior to revision by Guinot (1969a, p. 710), who referred the Gulf specimens to *S. lobatus*. The Carolinean specimens described in Williams (1965) are *S. carolinensis*.

***Speocarcinus lobatus*** Guinot, 1969 (Bull. Mus. Nation, Hist. Nat. 41: 710)

As *S. carolinensis*—Rathbun, 1918, p. 39 (part, specimen from Dry Tortugas only).

As *S. lobatus*—Guinot, 1969a, p. 710, text-figs. 124–125, pl. IV, fig. 2; Felder 1973a, p. 70, pl. 10, fig. 3.

Range: Dry Tortugas; off Louisiana and Texas.

Depth: shallow water to 37 m (to 20 fm).

Habitat: probably inhabits burrows of polychaetes and crustaceans as does *S. carolinensis*.

Remarks: Dawson (1966) reported *S. carolinensis* from off Grand Isle, Louisiana and Felder (1973a) reported that specimens taken from that same area at later dates were *S. lobatus*.

***Tetraplax*** Rathbun, 1901

***Tetraplax quadridentata*** (Rathbun, 1898) ((Bull. Lab. Nat. Hist. State Univ. Iowa 4: 287)

Rathbun, 1918, p. 32, text-figs. 9–10, pl. 6, figs. 3–4; Rathbun, 1933, p. 78, fig. 68; Guinot, 1969a, p. 256, figs. 1, 14, 26.

Range: north coast of Cuba; Puerto Rico, Curaçao.

Depth: 8 to 22 m (4.5 to 12 fm).

Habitat: mud bottoms.

***Thalassoplax* Guinot, 1969**

***Thalassoplax angusta* Guinot, 1969** (Bull. Mus. Nation. Hist. Nat. 41: 717)

As *Pilumnoplax elata* in Rathbun (not A. Milne Edwards)—Rathbun, 1918, p. 23 (part, female and juveniles, includes female on pl. 3).

As *Thalassoplax angusta*—Guinot, 1969a, p. 717, figs. 131–132, pl. IV, fig. 2; Pequegnat, 1970, p. 192.

Range: east coast of Florida; off northwest Florida, Alabama and Mississippi; off east coast of Mexico; off Campeche, Yucatan.

Depth: 183 to 752 m (100 to 411 fm).

Habitat: mud, sand, broken shell bottoms.

Remarks: Pequegnat (1970) added several new records for the Gulf of Mexico and also commented on differences in morphological descriptions between the *Alaminos* specimens and that provided by Guinot (1969a, p. 717). The legends on Guinot's plates were transposed; the correct citations appear above and in Pequegnat (1970, p. 192). As previously discussed for *Robertsella mystica*, Rathbun's (1918, p. 23) description of *Pilumnoplax elata* does not conform to the type description of this species provided by A. Milne Edwards; thus all of the material included in Rathbun was transferred to new species and genera by Guinot (1969). *Thalassoplax angusta* includes the females and juveniles described by Rathbun, but not the mature male nor the original female holotype of *P. elata*.

***Trapezioplax* Guinot, 1969**

***Trapezioplax tridentata* (A. Milne Edwards, 1880)** (Bul. Mus. Comp. Zool. 8: 16)

As *Goneplax tridentata*—Rathbun, 1918, p. 29.

As *Prionoplax atlantica*—Rathbun, 1918, p. 30, text-fig. 8, pl. 6, figs. 1–2.

As *Trapezioplax tridentata*—Guinot, 1969a, p. 713, figs. 128–129, 142.

Range: Florida Keys and Dry Tortugas; west coast of Florida; Barbados.

Depth: 13 to 42 m (7 to 23 fm).

Habitat: sand, coral, shell, and mud bottoms.

Remarks: Guinot (1969a) established this new genus based on a separation of *Frevillea tridentata* from the other species of *Frevillea*. *Trapezioplax tridentata* includes the original type, *Goneplax tridentata*, and *Prionoplax atlantica*, listed as separate species by Rathbun (1918).

Family PALICIDAE Bouvier, 1898 (= CYMOPOLIDAE Faxon, 1895)

***Palicus* Philippi, 1838**

***Palicus affinis* A. Milne Edwards & Bouvier, 1899** (Bull. Mus. Hist. Nat. Paris 5: 122)

As *Cymopolia affinis*—Rathbun, 1918, p. 196, text-fig. 121, pl. 46, pl. 47, fig. 3;  
Rathbun, 1933, p. 85.

Range: southeast and west coasts of Florida; Dry Tortugas; Virgin Islands;  
Barbados; Guianas to Espirito Santo, Brazil.

Depth: 33 to 214 m (18 to 117 fm).

Habitat: sand, shell, and coral substrates.

Remarks: Listed from Brazil by Rodrigues da Costa (1968a), Coelho (1971c),  
and Coelho and Ramos (1972).

***Palicus alternatus*** Rathbun, 1897 (Proc. Biol. Soc. Washington 11: 95)

As *Cymopolia alternata*—Rathbun, 1918, p. 188, text-fig. 117, pls. 42–43.

As *Palicus alternatus*—Williams, 1965, p. 215, fig. 200.

Range: North Carolina; Florida Keys; west and northwest coasts of Florida.

Depth: 7 to 110 m (4 to 60 fm).

Habitat: sand, gravel, broken shell, coral, and sand-mud bottoms.

Remarks: Ovigerous females are known from Florida during January to  
August and from North Carolina in October (Williams, 1965).

***Palicus cursor*** (A. Milne Edwards, 1880) (Bull. Mus. Comp. Zool. 8: 29)

As *Cymopolia cursor*—Rathbun, 1918, p. 215, text-figs. 130–131, pl. 52, figs. 1–2;  
Chace, 1940, p. 50.

Range: North Carolina; Florida Keys; northwest coast of Florida; north coast  
of Cuba; St. Christopher; Dominica; Barbados.

Depth: 206 to 530 m (107 to 290 fm).

Habitat: sand ooze, sand-mud, sand, and broken shell bottoms.

Remarks: Rathbun (1918) reported ovigerous females from North Carolina  
in October, from Florida in March, and from the Antilles in January–February.

***Palicus dentatus*** (A. Milne Edwards, 1880) (Bull. Mus. Comp. Zool. 8: 28)

As *Cymopolia dentata*—Rathbun, 1918, p. 202, text-fig. 124.

As *Palicus dentatus*—Pequegnat, 1970, p. 197.

Range: Florida Keys; west coast of Florida; off Alabama; off Barbados.

Depth: 27 to 139 m (15 to 76 fm).

Habitat: coral and broken shell bottoms.

***Palicus faxoni*** Rathbun, 1897 (Proc. Biol. Soc. Washington 11: 96)

As *Cymopolia faxoni*—Rathbun, 1918, p. 194, text-fig. 120, pl. 45, 2–3.

As *Palicus faxoni*—Williams, 1965, p. 216, fig. 201.

Range: North Carolina; east coast of Florida; northeast of Yucatan (Gulf); ?  
off Cape Frio, Brazil.

Depth: 59 to 93 m (32 to 51 fm).

Habitat: sand substrates.

***Palicus gracilipes*** (A. Milne Edwards, 1880) (Bull. Mus. Comp. Zool. 8: 29)

As *Cymopolia gracilipes*—Rathbun, 1918, p. 221, text-fig. 133, pl. 52, figs. 3–4;  
Chace, 1940, p. 51.

Range: Bahamas; north of Yucatan; north coast of Cuba.

Depth: 112 to 545 m (61 to 298 fm).

Habitat: sand and shell bottoms.

***Palicus gracilis*** (Smith, 1883) (Proc. U.S. Nat. Mus. 6: 20)

As *Cymopolia gracilis*—Rathbun, 1918, p. 218, text-fig. 132, pl. 50, pl. 51, fig. 1; Chace, 1940, p. 50.

As *Palicus gracilis*—Pequegnat, 1970, p. 195, fig. 6-11.

Range: off Massachusetts; east coast of Florida; northwest Florida; Louisiana to central east coast of Mexico; north coast of Cuba; Curaçao.

Depth: 183 to 686 m (100 to 375 fm).

Habitat: fine sand and mud substrates.

Remarks: Chace (1956) reported this species in the Gulf of Mexico and Pequegnat (1970) reported ovigerous females from the same area in August and November. He further noted that this crab may be able to swim, but is probably not pelagic.

***Palicus obesus*** (A. Milne Edwards, 1880) (Bull. Mus. Comp. Zool. 8: 27)

As *Cymopolia obesa*—Rathbun, 1918, p. 205, text-fig. 125, pl. 49.

As *Palicus obesus*—Pequegnat, 1970, p. 197.

Range: off northwest Florida and Mississippi; Campeche, Mexico.

Depth: 24 to 220 m (13 to 120 fm).

Remarks: Collected by the R/V *Oregon* from the northeastern Gulf of Mexico (Chace, 1956).

***Palicus sica*** (A. Milne Edwards, 1880) (Bull. Mus. Comp. Zool. 8: 29)

As *Cymopolia sica*—Rathbun, 1918, p. 208, text-fig. 127, pl. 40, figs. 3-4; Rathbun, 1933, p. 85, fig. 78; Chace, 1940, p. 49.

As *Palicus sicus*—Milne Edwards & Bouvier, 1902, p. 56, pl. 10, figs. 7-11, pl. 11, fig. 9; Pequegnat, 1970, p. 198.

Range: Florida Keys and Straits; west coast of Florida; north coast of Cuba; Puerto Rico; Virgin Islands; Barbados; Grenada.

Depth: 27 to 348 m (15 to 190 fm).

Habitat: sand, mud, shell, and coral bottoms.

Remarks: Pequegnat (1970) reported ovigerous females from the Gulf of Mexico in mid-July. Rathbun (1918) described the colors of freshly-preserved specimens. Chace (pers. comm.) notes that the specific name *sica* is used as a noun in opposition (L. = curved dagger) and thus should not be changed due to the transfer of the species to the masculine genus *Palicus*.

Family PINNOTHERIDAE de Haan, 1833

Subfamily PINNOTHERINAE de Haan, 1833

***Dissodactylus*** Smith, 1870

***Dissodactylus alcocki*** Rathbun, 1918 (Bull. U.S. Nat. Mus. 97: 124)

Rathbun, 1918, p. 124, text-figs. 70-71, pl. 28, figs. 3-4; Schmitt, McCain & Davidson, 1973, p. 16.

Range: off delta of Mississippi River.

Depth: 64 m (35 fm).

Habitat: sand-mud bottom.

Remarks: This species is known only from a female type and a damaged male paratype.

***Dissodactylus borradailei*** Rathbun, 1918 (Bull. U.S. Nat. Mus. 97: 121)

Rathbun, 1918, p. 121, text-fig. 68, pl. 27, figs. 5–8; Schmitt, McCain & Davidson, 1973, p. 16.

Range: off southeast and southwest coasts of Florida; Jamaica.

Depth: 49 to 55 m (27 to 30 fm).

Habitat: fine white sand.

***Dissodactylus calmani*** Rathbun, 1918 (Bull. U.S. Nat. Mus. 97: 125)

Rathbun, 1918, p. 125, text-figs. 72–73, pl. 28, figs. 5–6; Schmitt, McCain & Davidson, 1973, p. 16.

Range: east coast of Florida; northwest coast of Cuba.

Depth: 4 to 7 m (2 to 4 fm).

Habitat: coral, sand, gravel, and rock bottoms; near shore.

***Dissodactylus crinitichelis*** Moreira, 1901 (Arch. Mus. Nac. Rio de Janeiro 11: 37)

As *D. encopei*—Rathbun, 1918, p. 119, text-fig. 67, pl. 27, figs. 1–4; Williams, McCloskey & Gray, 1968, p. 56, fig. 12.

As *D. crinitichelis*—Rathbun, 1933, p. 83, fig. 76; Schmitt, McCain & Davidson, 1973, p. 17.

Range: off North Carolina; northwest coast of Florida; Jamaica; Puerto Rico; Belize; Caribbean coast of Colombia; Paraiba to Rio Grande do Sul, Brazil.

Depth: shore to 52 m (to 28 fm).

Habitat: fine white sand, coral, and broken shell bottoms; on *Halodule* (sea grass); with the echinoids *Encope marginata*, *E. michelini* (sand dollars) and *Clypeaster subdepressus* (sea biscuit).

Remarks: L. H. Hyman (1955) commented on host relationships with echinoids (as *D. encopei*). Listed from Florida by Wass (1955), Abele (1970), and Menzel (1971); listed from Brazil by Coelho and Ramos (1972) and Rodrigues da Costa (1971).

***Dissodactylus encopei*** Rathbun, 1901.

A junior synonym of *D. crinitichelis* Moreira, 1901.

***Dissodactylus juvenilis*** Bouvier, 1917 (Bull. Mus. Nat. Hist. Natur. Paris 23: 397)

Milne Edwards & Bouvier, 1923, p. 349, text-figs. 11–12, pl. 9, figs. 3–4; Schmitt, McCain & Davidson, 1973, p. 17.

Range: north of Yucatan, Mexico.

***Dissodactylus mellitae*** (Rathbun, 1900) (Amer. Natural. 34: 590)

Hay & Shore, 1918, p. 444, pl. 36, fig. 1; Rathbun, 1918, p. 117, text-fig. 66, pl. 28,



figs. 7-8; Williams, 1965, p. 209, fig. 192; Williams, McCloskey & Gray, 1968, p. 57; Rogers, 1968, p. 318; Schmitt, McCain & Davidson, 1973, p. 18.

Range: Massachusetts to South Carolina; northwest coast of Florida; Texas.  
Depth: 9 to 52 m (5 to 28 fm).

Habitat: sand and broken shell bottoms; areas of scattered sponges and coral heads; with the echinoids *Mellita quinquesperforata*, *Encope michelini*, *Echin-arachnius parma*, and *Clypeaster subdepressus*.

Remarks: Larval stages have been described by O. W. Hyman (1924), Lebour (1928), Aikawa (1937) and Costlow and Bookhout (1966b). Host relationships were described by Johnson (1952), L. H. Hyman (1955), Gray (1961), Gray, McCloskey and Weihe (1968), and MacGinitie and MacGinitie (1968, p. 314). Regional lists include Florida (Wass, 1955; Abele, 1970; Menzel, 1971). Not listed by Felder (1973a) for Texas, but see Rogers (1968) for a report on this species at Galveston.

***Dissodactylus primitivus*** Bouvier, 1917 (Bull. Mus. Nat. Hist. Natur. Paris 23: 394)

Milne Edwards & Bouvier, 1923, p. 346, text-fig. 8, pl. 8, figs. 3-4, pl. 9, fig. 1; Schmitt, McCain & Davidson, 1973, p. 20.

Range: west of Tortugas, Florida.

Remarks: The above location is the only known record for this species.

***Dissodactylus stebbingi*** Rathbun, 1918 (Bull. U.S. Nat. Mus. 97: 123)

Rathbun, 1918, p. 123, text-fig. 69, pl. 28, figs. 1-2; Schmitt, McCain & Davidson, 1973, p. 20.

Range: Virginia; west and northwest coasts of Florida.

Depth: 9 to 10 m (17 fm).

Habitat: on sea biscuits, *Clypeaster subdepressus*, in an area of scattered sponges and coral heads (northwest Florida).

Remarks: Wass (1955) and Menzel (1971) provide some ecological notes on this crab.

### ***Fabia*** Dana, 1851

***Fabia byssomiae*** (Say, 1818) (J. Acad. Nat. Sci. Philadelphia 1: 451)

Rathbun, 1918, p. 105, text-fig. 56, pl. 24, figs. 6, 8; Schmitt, McCain & Davidson, 1973, p. 22.

Range: west coast of Florida; northwest coast of Cuba.

Depth: 4 to 9 m (2 to 5 fm).

Habitat: in bivalve molluscs, *Hiatella arctica*; located on beds of *Alcyonium* and between individuals of aggregating ascidians.

***Fabia tellinae*** Cobb, 1973 (Crustaceana 25: 70)

Cobb, 1973, p. 70, figs. 1-2.

Range: off northwest Florida to Alabama.

Depth: 5 to 18 m (3 to 10 fm).

Habitat: commensal in bivalves, *Tellina magna* Spengler (females in mantle cavity, males in excurrent siphon); from sandy bottoms.

***Orthoheres* Sakai, 1969**

***Orthoheres serrei*** (Rathbun, 1909) (Bull. Mus. Hist. Nat. Paris 2: 69)

As *Pinnoheres serrei*—Rathbun, 1918, p. 84, text-fig. 41, pl. 19, figs. 1–7; Rathbun, 1933, p. 82.

As *Orthoheres serrei*—Sakai, 1969, p. 275; Schmitt, McCain & Davidson, 1973, p. 27.

Range: northwest Cuba; Jamaica; Puerto Rico.

Habitat: at surface; on reef flats; in mantle cavity of *Strombus*.

***Orthoheres strombi*** (Rathbun, 1905) (Proc. Acad. Nat. Sci. Philadelphia 1905: 371)

As *Pinnoheres strombi*—Rathbun, 1918, p. 90, text-fig. 45, pl. 20, figs. 1–2.

As *Orthoheres strombi*—Sakai, 1969, p. 275; Schmitt, McCain & Davidson, 1973, p. 27.

Range: west and northwest coasts of Florida.

Habitat: commensal in the gastropods *Strombus pugilis*, *S. alatus*, and *Pleuroploca*.

Remarks: Listed from Florida by Wass (1955), Abele (1970), and Menzel (1971).

***Parapinnixa* Holmes, 1894**

***Parapinnixa bouvieri*** Rathbun, 1918 (Bull. U.S. Nat. Mus. 97: 111)

Rathbun, 1918, p. 111, text-fig. 60, pl. 25, figs. 4–10; Rathbun, 1933, p. 83, fig. 75; Williams, 1965, p. 208, fig. 191; Schmitt, McCain & Davidson, 1973, p. 31.

Range: South Carolina; northeast of Yucatan (Gulf); Puerto Rico.

Depth: 5 to 73 m (3 to 40 fm).

Habitat: coral and sand bottoms; among ventral spines of a sea urchin.

Remarks: Williams (1965) lists ovigerous females from Florida and notes the association of this crab with a sea urchin.

***Parapinnixa hendersoni*** Rathbun, 1918 (Bull. U.S. Nat. Mus. 97: 109)

Rathbun, 1918, p. 109, text-fig. 59, pl. 26, figs. 1–5; Schmitt, McCain & Davidson, 1973, p. 32.

Range: west coast of Florida; northwest Cuba; Curaçao; Maranhão to Bahia, Brazil.

Depth: 38 to 55 m (21 to 30 fm).

Habitat: free-swimming, pelagic (Cuba, in Rathbun, 1918); on sand and broken coral bottom in Florida.

Remarks: Recorded from Brazil by Righi (1967) and Coelho and Ramos (1972).

***Pinnaxodes* Heller, 1865**

***Pinnaxodes floridensis*** Wells & Wells, 1961 (Bull. Mar. Sci. Gulf Carib. 11: 267)

Wells & Wells, 1961, p. 267, figs. 1–2; Schmitt, McCain & Davidson, 1973, p. 34.

Range: west and northwest coasts of Florida.

Habitat: commensal in the cloaca and respiratory tree of the holothurian, *Theleothuria princeps* (Seleniza), which buries in sand; juvenile crabs are found in the anterior digestive tract of the host.

Remarks: Wells and Wells (1961) provided data on the natural history, ecology, and morphology of this crab and Pearce (1966) reviewed the biology and host relationships. Abele (1970) listed the angel wing mollusc, *Cyrtopleura costata*, as a host for a sexual intermediate form of this crab. Listed from north-west Florida by Menzel (1971).

***Pinnotheres* Bosc, 1801–1802**

***Pinnotheres geddesi* Miers, 1880 (J. Linn. Soc. London, Zool. 15: 86)**

Rathbun, 1918, p. 70, text-fig. 32, pl. 16, figs. 1–4; Rathbun, 1933, p. 82; Schmitt, McCain & Davidson, 1973, p. 45.

Range: Veracruz, Mexico; eastern Cuba (Atlantic); Puerto Rico; ? Jamaica.

Habitat: commensal in mangrove oysters (? *Crassostrea rhizophorae*) and *Ostrea*.

***Pinnotheres guerini* H. Milne Edwards, 1853 (Ann. Sci. Nat. Zool. Paris 20: 219)**

Rathbun, 1918, p. 101, text-fig. 52; Rathbun, 1933, p. 83; Schmitt, McCain & Davidson, 1973, p. 48.

Range: Cuba (location not specified); Puerto Rico.

Habitat: reported from oysters.

Remarks: The location of the type specimen in Cuba is unspecified, thus this species may not be present in the Gulf of Mexico.

***Pinnotheres hemphilli* Rathbun, 1918 (Bull. U.S. Nat. Mus. 97: 99)**

Rathbun, 1918, p. 99, text-fig. 51, pl. 23; Schmitt, McCain & Davidson, 1973, p. 48.

Range: Cedar Keys, Florida.

Habitat: intertidal.

Remarks: Known only from a single type specimen.

***Pinnotheres hirtimanus* H. Milne Edwards, 1853 (Ann. Sci. Nat. Zool. Paris 20: 219)**

Rathbun, 1918, p. 101; Schmitt, McCain & Davidson, 1973, p. 48.

Range: Cuba, location unspecified.

Remarks: Known only from the single type specimen.

***Pinnotheres maculatus* Say, 1818 (J. Acad. Nat. Sci. Philadelphia 1: 450)**

Common Names: Mussel Crab; Pea Crab

Hay & Shore, 1918, p. 443, pl. 35, fig. 10; Rathbun, 1918, p. 74, text-figs. 35–36, pl. 17, figs. 3–6; Rathbun, 1933, p. 82, fig. 74; Williams, 1965, p. 206, fig. 190; Felder, 1973a, p. 74, pl. 10, figs. 10–11; Schmitt, McCain & Davidson, 1973, p. 53.

Range: Massachusetts to south Florida; west coast of Florida to Texas; north-west Cuba; Jamaica; Puerto Rico; Virgin Islands; Uruguay and Argentina.

Depth: surface to 50 m (to 27 fm).

Habitat: commensal in a variety of bivalve molluscs; young of both sexes and often adult males are free-swimming; most common in the mantle cavities of mussels, *Mytilus edulis*; in tubes of the polychaetes *Arenicola* and *Chaetopterus* (*C. pergamentaceus* and *C. variopedatus*); from mud, sand, shell and gravel substrates. Other molluscan hosts include: *Atrina rigida*, *A. seminuda*, *A. serrata*, *Anomia simplex*, *Argopecten gibba*, *A. irradians*, *Cyrtopleura costata*, *Modiolus modiolus*, *M. tulipa*, *Mya arenaria*, and *Placopecten magellanica*.

Remarks: This species has a large literature, catalogued by Schmitt, McCain and Davidson (1973). Larval stages were described by O. W. Hyman (1924), Aikawa (1937) and Costlow and Bookhout (1966b). Life history data is provided in MacGinitie and MacGinitie (1968) and by Christensen and McDermott (1959). Caine (1975) studied feeding behavior and physiology and Kruczynski (1975) measured food intake and digestion. Pearce (1964) described reproductive aspects. Larval shadow responses were studied by Forward (1977) and behavior in relation to hosts was described by Sastry and Menzel (1962) and by Eidemiller (1969). The effects of this crab on the growth and biology of its scallop hosts were studied by Kruczynski (1971, 1972). Sandifer (1973) commented on larval ecology in Virginia and Fotheringham and Brunenmeister (1975) described this crab as it occurs in the Gulf of Mexico. Regional lists include Florida (Wass, 1955; Tabb and Manning, 1961; Abele, 1970; Menzel, 1971; Godcharles and Jaap, 1973) and Texas (Leary, 1967). Listed from Brazil by Rodrigues da Costa (1971) and Coelho and Ramos (1972).

***Pinnotheres moseri*** Rathbun, 1918 (Bull. U.S. Nat. Mus. 97: 94)

Rathbun, 1918, p. 94, text-fig. 47, pl. 21, figs. 3-4; Schmitt, McCain & Davidson, 1973, p. 58.

Range: west coast of Florida.

Depth: 1.5 to 5.5 m (1 to 3 fm).

Habitat: commensal in sea squirts (tunicates) and from the brachial cavity of an ascidian, *Polycarpa obtecta*; off rocky bottoms with grass and thin layers of sand and mud.

Remarks: Rathbun (1918) did not list sea squirts as commensals, only as present in the dredges in which the crabs were found. Pearce (1966) provided information on life history and Hartnoll (1964a) described a larval stage. Listed from Florida by Godcharles and Jaap (1973), including data from the collection locality.

***Pinnotheres ostreum*** Say, 1817 (J. Acad. Nat. Sci. Philadelphia 1: 67)

Common Names: Oyster Crab; Common Pea Crab

Hay & Shore, 1918, p. 543, pl. 35, fig. 9; Rathbun, 1918, p. 66, text-fig. 30, pl. 15, figs. 3-6; Williams, 1965, p. 203, figs. 187-189; Felder, 1973a, p. 75, pl. 10, figs. 12-14; Schmitt, McCain & Davidson, 1973, p. 61.

Range: Massachusetts to south Florida; Texas; northwest Cuba; Guadeloupe; Pernambuco to Santa Catarina, Brazil.

Habitat: parasitic in oysters and present in other bivalve molluscs, including: *Crassostrea virginica*, *C. rhizophorae*, *Anomia simplex*, *Mytilus edulis*, and

*Pecten* spp.; occasionally in polychaete (*Chaetopterus*) tubes; only the first crab ("invasive") stage is free-swimming; found primarily in shallow bays and other suitable oyster habitats.

Remarks: The large literature on this species was catalogued by Schmitt, McCain and Davidson (1973). Earlier biologists thought that this crab was a commensal of oysters, but its parasitic nature was definitely established, as summarized by Stauber (1945), Flower and McDermott (1953) and Haven (1958). Information on larval stages can be found in O. W. Hyman (1924), Lebour (1928), Aikawa (1937), Costlow and Bookhout (1966b) and in Sandoz and Hopkins (1947). Natural history of this species is reviewed by Christensen and McDermott (1959) and by MacGinitie and MacGinitie (1968); Williams (1965) summarized much of the current literature. Beach (1969) studied the life history of this crab in North Carolina. Hartnoll (1971) noted modifications for swimming activity. Listed from Texas by Hedgpeth (1953), Breuer (1962) and Leary (1967).

***Pinnotheres serrei*** Rathbun, 1909.

Transferred to a new genus, *Orthotheres*, by Sakai (1969). Refer to *Orthotheres serrei*.

***Pinnotheres shoemakeri*** Rathbun, 1918 (Bull. U.S. Nat. Mus. 97: 95)

Rathbun, 1918, p. 95, text-fig. 48, pl. 22, figs. 1-4; Rathbun, 1933, p. 83; Schmitt, McCain & Davidson, 1973, p. 86.

Range: west coast of Florida; St. Thomas, Virgin Islands.

***Pinnotheres strombi*** Rathbun, 1905.

Transferred to a new genus, *Orthotheres*, by Sakai (1969). Refer to *Orthotheres strombi*.

Subfamily PINNOTHERELIINAE Alcock, 1900

***Pinnixa*** White, 1846

***Pinnixa chacei*** Wass, 1955 (Quart. J. Flor. Acad. Sci. 18: 160)

Wass, 1955, p. 160, figs. 5-9; Felder, 1973a, p. 71, pl. 10, fig. 5; Schmitt, McCain & Davidson, 1973, p. 104.

Range: northwest Florida; Louisiana and Texas.

Habitat: intertidal, commensal with burrowing shrimp, *Callinassa islagrande*, living in upper part of burrow; on sandy bottoms.

Remarks: Listed from Florida by Wass (1955) and Menzel (1971), from Louisiana by Behre (1950) as *Pinnixa* sp., and from Texas (Leary, 1967).

***Pinnixa chaetoptera*** Stimpson, 1860 (Ann. Lyc. Nat. Hist. New York 7: 235)

Hay & Shore, 1918, p. 445, pl. 36, fig. 4; Rathbun, 1918, p. 151, text-figs. 93-94, pl. 33, figs. 3-6; Williams, 1965, p. 210, fig. 194; Felder, 1973a, p. 74, pl. 10, fig. 8; Schmitt, McCain & Davidson, 1973, p. 104.

Range: Massachusetts to Florida; northwest Florida to Texas; Pernambuco to Rio Grande do Sul, Brazil.

Depth: shore to 16 m (to 9 fm).

Habitat: mud, shell, and gravel bottoms; there are two forms of this crab along the northern Gulf coast: the larger is a commensal with the polychaetes *Amphitrite ornata* and *Chaetopterus variopedatus*, living inside the tubes of the hosts; the smaller form occupies the upper portion of burrows of *Callinassa jamaicensis louisianensis*.

Remarks: Larval stages were described by O. W. Hyman (1924), Lebour (1928), and Aikawa (1937). Sandifer (1973) noted aspects of larval ecology in Virginia. Williams (1965) summarized current literature on this species and MacGinitie and MacGinitie (1968) provided a general account of its life history. Johnson (1952) described a "host factor" for this crab. Behavioral studies include Pearse (1913) and Gray (1961), including notes on symbiotic relationships. Craig (1974) measured temperature tolerances and oxygen consumption. Listed from Florida by Wass (1955), Menzel (1971), and Godcharles and Jaap (1973) and from Mississippi by Richmond (1962) and Christmas and Langley (1973). Listed from Brazil by Righi (1967), Rodrigues da Costa (1971) and Coelho and Ramos (1972).

***Pinnixa cristata*** Rathbun, 1900 (Amer. Natural. 34: 589)

Hay & Shore, 1918, p. 446, pl. 36, fig. 5; Rathbun, 1918, p. 134, text-fig. 78, pl. 29, figs. 8-9; Williams, 1965, p. 210, fig. 193; Felder, 1973a, p. 74, pl. 10, fig. 6; Schmitt, McCain & Davidson, 1973, p. 106.

Range: North and South Carolina; Louisiana and Texas.

Habitat: intertidal beaches; shallow sand and sand-mud substrates of brackish to marine waters; usually commensal with callinassid shrimps and other burrowers.

Remarks: Hedgpeth (1950) described these crab from salt flats that border the bays and intercoastal waterways of Texas. MacGinitie and MacGinitie (1968) included information on the ecology of this species. Listed from Louisiana by Behre (1950).

***Pinnixa cylindrica*** (Say, 1818) (J. Acad. Nat. Sci. Philadelphia 1: 452)

Hay & Shore, 1918, p. 446, pl. 36, fig. 3; Rathbun, 1918, p. 159, text-fig. 99, pl. 35, figs. 5, 8; Milne Edwards & Bouvier, 1923, p. 345; Williams, 1965, p. 213, fig. 197; Schmitt, McCain & Davidson, 1973, p. 106.

Range: Massachusetts to South Carolina; west and northwest coasts of Florida.

Depth: shallow water to 37 m (to 20 fm).

Habitat: commensal with *Arenicola cristata* (lugworm) in the non-tubular burrows; young crabs occur near the intertidal zone of slimy shores.

Remarks: McDermott (1962) provided a general account of this species, which is also summarized by Williams (1965). Sandifer (1973) commented on larval ecology in Virginia. Listed by Menzel (1971) from northwest Florida.

***Pinnixa floridana*** Rathbun, 1918 (Bull. U.S. Nat. Mus. 97: 138)

Rathbun, 1918, p. 138, text-fig. 82, pl. 30, figs. 4-7; Williams, McCloskey & Gray, 1968, p. 57, fig. 13; Schmitt, McCain & Davidson, 1973, p. 110.

Range: North Carolina; west and northwest coasts of Florida.

Habitat: shallow water, possibly in tubes of the polychaete, *Diopatra cuprea*; collected from a compound ascidian growing on a soft coral; from under rocks in 10 feet of water.

Remarks: Rathbun (1918) commented on morphological variation between the sexes of this species. Listed from Florida by Wass (1955) and Menzel (1971).

***Pinnixa leptosynaptae*** Wass, 1968 (Tulane Stud. Zool. 14: 137)

Wass, 1968, p. 137, figs. 1-6; Schmitt, McCain & Davidson, 1973, p. 112.

Range: west coast of Florida.

Habitat: found on the surface of the holothurian *Leptosynapta crassipatina*.

Remarks: Listed from northwest Florida by Menzel (1971).

***Pinnixa lunzi*** Glassell, 1937 (Charleston Mus. Leaflet 9: 3)

Glassell, 1937, p. 3, figs. 1-8; Williams, 1965, p. 214, figs. 198-199; Felder, 1973a, p. 71, pl. 10, fig. 4; Schmitt, McCain & Davidson, 1973, p. 114.

Range: Virginia to Georgia; Mississippi to Texas.

Depth: near shore to 22 m (to 12 fm).

Habitat: on beaches, under drift material; in burrows of echinurans (*Thalassema hartmani*) and possibly other burrowers.

Remarks: Boesch (1971) listed this crab from an echinuran burrow in Virginia. Felder (1973b) reported a specimen taken from a red snapper stomach from a reef off Texas.

***Pinnixa pearsei*** Wass, 1955 (Quart. J. Flor. Acad. Sci. 18: 164)

Wass, 1955, p. 164, figs. 10-13; Schmitt, McCain & Davidson, 1973, p. 116.

Range: northwest coast of Florida.

Habitat: commensal in tubes of the polychaete, *Diopatra*, from sand-mud beaches.

Remarks: Listed from northwest Florida by Abele (1970) and Menzel (1971). Although Menzel (1971) listed this crab as a commensal of an undetermined annelid, Abele (1970) stated that the crab does not seem to be restricted to commensal relationships where it was common in the sand-mud intertidal zone of Alligator Harbor's south shore.

***Pinnixa retinens*** Rathbun, 1918 (Bull. U.S. Nat. Mus. 97: 139)

Rathbun, 1918, p. 139, text-figs. 83-84, pl. 41, figs. 1-2; Williams, 1965, p. 212, fig. 196; Felder, 1973a, p. 74, pl. 10, fig. 7; Schmitt, McCain & Davidson, 1973, p. 118.

Range: Chesapeake Bay; west coast of Florida; Texas.

Depth: low tide mark to 37 m (to 20 fm).

Habitat: mud bottoms of estuarine and marine waters; from burrows of the callinassid shrimp, *Upogebia affinis*.

Remarks: Rathbun (1918) believed this crab to be allied with *P. floridana*. Listed from Florida by Wass (1955) and Menzel (1971). Williams (1965) included this species in the Carolina fauna, even though it hadn't yet been collected from that area. Based on the wide range of locales but paucity of specimens, it is probably a rare species.

***Pinnixa sayana*** Stimpson, 1860 (Ann. Lyc. Nat. Hist. New York 7: 236)

Hay & Shore, 1918, p. 446, pl. 36, fig. 3; Rathbun, 1918, p. 156, text-fig. 98, pl. 34, figs. 2-4; Williams, 1965, p. 212, fig. 195; Felder, 1973a, p. 74, pl. 10, fig. 9; Schmitt, McCain & Davidson, 1973, p. 119.

Range: Massachusetts to North Carolina; west coast of Florida; Louisiana; Amapá to São Paulo, Brazil.

Depth: surface to 75 m (to 41 fm).

Habitat: free-swimming; on sandy beaches in drift material; from mud bottoms; in tubes of lugworm, *Arenicola cristata*.

Remarks: Larval descriptions include O. W. Hyman (1924), Lebour (1928), and Aikawa (1929, 1937). Regional lists include Louisiana (Behre, 1950). Schmitt, McCain and Davidson (1973) note that the host record of *Arenicola* may be due to synonymy of *P. sayana* with *P. cylindrica* by Hay and Shore (1918) and so may be in error. Listed from Brazil by Righi (1967), Rodrigues da Costa (1968a), Coelho (1971a) and Coelho and Ramos (1972).

Family GRAPSIDAE, Macleay, 1838

Subfamily GRAPSINAE Macleay, 1838

***Geograpsus*** Stimpson, 1858

***Geograpsus lividus*** (H. Milne Edwards, 1837) (Hist. Nat. Crust., vol. 2. p. 85)

Rathbun, 1918, p. 234, pl. 55; Rathbun, 1933, p. 87, fig. 80; Garth, 1965a, p. 26; Forest & Guinot, 1966, p. 91; Chace & Hobbs, 1969, p. 157, figs. 48, 52a-c.

Range: Bermuda; Florida Keys, north and south coasts of Cuba; Jamaica; Puerto Rico; Virgin Islands to Barbados; Netherlands Antilles to Trinidad; Old Providence Island (Carib.); Caribbean coast of Colombia to São Paulo, Brazil; eastern Atlantic, from Senegal to Angola; Cape Verde Islands; eastern Pacific, from southern part of Baja California to northern Chile; Clipperton Island; Galapagos Islands; Hawaiian Islands.

Habitat: supralittoral, near the splash zone of rocky areas and stone beaches; from middle to upper intertidal, beneath stones.

Remarks: Hartnoll (1965b) provided ecological notes on populations in Jamaica. Chace and Hobbs (1969) commented on ecology of this crab in Dominica. Listed from Brazil by Coelho and Ramos (1972) and Fausto Filho (1974).

***Goniopsis*** de Haan, 1833

***Goniopsis cruentata*** (Latreille, 1803) (Hist. Nat. Crust., vol. 6, p. 70)

Common Names: Mangrove Crab; Tree Crab

Rathbun, 1918, p. 237, text-fig. 136, pl. 57; Rathbun, 1933, p. 87, fig. 81; Chace, 1940, p. 52; Bott, 1955a, p. 62; Holthuis, 1959, p. 235, figs. 59-60; Forest & Guinot, 1966, p. 91; Chace & Hobbs, 1969, p. 160, figs. 49, 52d-f; Felder, 1973a, p. 78, pl. 11, figs. 8-9.

Range: Bermuda; Bahamas; northwest Florida (rare); Tampico, Mexico; north and south coasts of Cuba; Jamaica; Hispaniola; Puerto Rico; Virgin Is-



lands to Barbados; Netherlands Antilles; Belize; Old Providence Island (Carib.); Surinam to Rio de Janeiro, Brazil; eastern Atlantic, from Senegal to northern Angola.

Habitat: mangrove swamps, along roots and on trunks of trees; on wet muddy marine shores, along inlets and estuaries; intertidal to supratidal.

Remarks: Leary (1967) listed this species from Texas, based on a collection by Hildebrand in 1958, but its occurrence along the Gulf coast is scattered and rare. Ecological studies include field work in Jamaica (Hartnoll, 1965b; Warner, 1969) and Dominica (Chace and Hobbs, 1969). Behavioral data is provided by Schone and Schone (1963), Schone (1968), and Warner (1970). Physiological studies include data on thoracic neurosecretion (Maynard, 1961a, 1961b; Maynard and Maynard, 1962) and coagulation (Morrison and Morrison, 1952). Listed from Brazil by Coelho and Ramos (1972).

***Grapsus* Lamarck, 1801**

***Grapsus grapsus* (Linnaeus, 1758)** (Syst. Nat., ed. 10, vol. 1, p. 630)

Common Names: Rock Crab; Cliff Crab; Sally Lightfoot

Rathbun, 1918, p. 227, text-fig. 135, pls. 53-54; Rathbun, 1933, p. 86, fig. 79; Garth, 1965, p. 25; Forest & Guinot, 1966, p. 90; Chace & Hobbs, 1969, p. 163, figs. 50, 52g-i; Felder, 1973a, p. 78, pl. 11, fig. 15.

Range: Bermuda; Bahamas; southeast and south Florida; Texas; north and south coasts of Cuba; Jamaica; Puerto Rico; Hispaniola; Virgin Islands to Barbados; Netherlands Antilles to Trinidad; Old Providence Island and Swan Island (Carib.); Colombia to northern Brazil; eastern Atlantic, from Portugal to Angola; Cape Verde Islands and Azores; St. Helena Island; Ascension Island; eastern Pacific, from central Baja California to central Chile; Galapagos Islands; Clipperton Island.

Habitat: intertidal and supratidal zones of rocky areas, stone beaches, and sea walls; within reach of splash from surf and wave action; in crevices and cracks of rock cliffs near water's edge.

Remarks: Reports of this crab in the Gulf of Mexico are confined to the north coast of Cuba and from the rock jetties of Texas, where they are rare. Listed from Texas by Leary (1967), based on collections by Hildebrand. Also recorded from Brazil by Coelho and Ramos (1972) and Fausto Filho (1974). Ecological studies include those of Hartnoll (1965b) in Jamaica, Chace and Hobbs (1969) in Dominica, and Johnson (1965) on the relation of behavior to development and ecology. Social behavior was studied by Wright (1966, 1968), Schone and Eibl-Eibesfeldt (1965), Kramer (1967), Schone (1968), and Eibl-Eibesfeldt (film, 1963). Hartnoll (1971) noted the ability of this crab to swim. Physiological and anatomical studies include work on gill anatomy (Chen, 1933), coagulation (Morrison and Morrison, 1952), thoracic neurosecretion (Maynard, 1961a, 1961b; Maynard and Maynard, 1962), and neural fine structure (Skobe and Nunnemacher, 1970).

***Pachygrapsus* Randall, 1840**

***Pachygrapsus gracilis*** (Saussure, 1858) (Mém. Soc. Phys. Hist. Nat. Genève 15: 443)

Common Name: Wharf Crab

Rathbun, 1918, p. 249, pl. 60, fig. 3, pl. 61, fig. 1; Rathbun, 1933, p. 89; Holthuis, 1959, p. 239, pl. 10, fig. 3; Forest & Guinot, 1966, p. 92; Chace & Hobbs, 1969, p. 167, figs. 51, 52j; Felder, 1973a, p. 79, pl. 11, figs. 3-4, 11.

Range: Bermuda; Bahamas; south Florida; Texas; north and south coasts of Cuba; Jamaica; Puerto Rico; Virgin Islands; Caribbean coast of Columbia; Pernambuco to Bahia, Brazil; eastern Atlantic, from Senegal to Zaire.

Habitat: mangrove roots; along river banks near the sea; on pilings, wharves, stone jetties; rocky areas, just above the water level; intertidal to near supra-tidal.

Remarks: Extensive notes on the natural history of this crab in Jamaica were provided by Hartnoll (1965b) and by Warner (1969). Felder (1973a) listed some collection localities in Texas, but it is absent from collection lists of west Florida, Mississippi, and Louisiana. Listed from Brazil by Coelho and Ramos (1972).

***Pachygrapsus transversus*** (Gibbes, 1850) (Proc. Amer. Assoc. Adv. Sci. 3: 181.

Common Name: Mottled Shore Crab

Hay & Shore, 1918, p. 447, pl. 36, fig. 9; Rathbun, 1918, p. 244, pl. 61; Rathbun, 1933, p. 88, fig. 82; Williams, 1965, p. 217, fig. 202; Forest & Guinot, 1966, p. 91; Chace & Hobbs, 1969, p. 169, fig. 52k; Felder, 1973a, p. 79, pl. 11, figs. 5, 10.

Range: North Carolina; Bermuda; Bahamas; east coast of Florida; Florida Keys and Dry Tortugas; Louisiana to east coast of Mexico; north coast of Cuba; Jamaica; Hispaniola; Puerto Rico; St. Thomas, Virgin Islands to Barbados; Trinidad; Netherlands Antilles; Bahia, Brazil to Uruguay; eastern Atlantic, from Mediterranean Sea to Angola; eastern Pacific, from central California to Peru; Galapagos Islands; Easter Island.

Habitat: mainly in rocky areas near the tideline; beneath stones and on wharves and pilings; occasionally found among mangrove roots and on sandy beaches.

Remarks: Leobur (1944) figured some of the larval stages. Ecological studies include Hartnoll (1965b) in Jamaica and Verrill (1908) in Bermuda. Listed from Louisiana (Behre, 1950) and Texas (Whitten, Rosene and Hedgpeth, 1950; Leary, 1967). Pearse (1932a) reported a protozoan from the gill cavity of this crab. Hazlett (1971) studied antennule chemosensitivity and Alves (1974) tested salinity tolerances. Listed from Brazil by Coelho and Ramos (1972) and Fausto Filho (1974).

***Planes* Bowdich, 1825**

***Planes cyaneus*** Dana, 1852 (Proc. Acad. Nat. Sci. Philadelphia 5: 250)

As *P. minutus*—Barnard, 1950, p. 120.

As *P. cyaneus*—Chace, 1951, pp. 65–103, figs. 1b, 2b, 2e, 2h, 2m–o, 3i–n; Chace 1966, p. 646; Sakai, 1965, p. 197, pl. 93, figs. 3–4; Felder, 1973a, p. 78, pl. 11, fig. 1.

Range: rare occurrence in Texas; south Atlantic, at St. Helena Island and off west coast of Africa; throughout eastern Pacific and westward to the north-western Pacific and Indian Ocean.

Habitat: pelagic, on floating objects, debris, and gulfweed; open ocean, but occasionally washed up with flotsam onto beaches.

Remarks: Chace (1951) provided a definitive taxonomic review, but this crab was considered at that time to be confined to the Pacific Ocean. In 1966, Chace reported it from St. Helena Island in the south Atlantic and noted that Barnard's (1950) citations of *P. minutus* from South Africa may have been partly or entirely records of *P. cyaneus*. Crosnier (1967) reported this crab from West Africa. Shirley (1974) found two specimens washed up on the beaches at Padre Island, Texas, in driftwood. This species should be considered extralimital for the Gulf of Mexico, although re-examination of *Planes* in collections may reveal additional specimens of this species.

#### Subfamily PLAGUSIINAE Dana, 1851

##### *Percnon* Gistel, 1848

***Percnon gibbesi*** (H. Milne Edwards, 1853) (Ann. Sci. Nat. ser. 3, Zool. 20: 146 and 180)

Common Name: Spray Crab

Rathbun, 1918, p. 337, pl. 105; Rathbun, 1933, p. 93; fig. 88; Schmitt, 1939, p. 24; Garth, 1965, p. 34; Williams, 1965, p. 224.

Range: North Carolina, Bermuda; Bahamas, south Florida; Florida Keys; north coast of Cuba; Jamaica; Puerto Rico; Colon, Panama; Brazil; eastern Atlantic, from the Azores to South Africa; eastern Pacific, from Baja California to Chile; Galapagos Islands; Clipperton Island.

Habitat: low tide zone of rocky areas; surf zone, on rock and pebble bottoms, commensal with *Diadema* in Puerto Rico.

Remarks: Rathbun (1918) questioned the inclusion of the Pacific and Atlantic populations of this crab into one species, but subsequent authors have treated them as identical. Verrill (1908) commented on this crab in Bermuda and Hartnoll (1965b) described its biology and ecology in Jamaica. Garth (1946) described it from the Galapagos Islands. Schmitt (1939) provided the key characters for the genus. The habitat and color of Brazilian specimens was provided by Fausto Filho (1974).

##### *Plagusia* Latreille, 1806

***Plagusia depressa*** (Fabricius, 1775) (Syst. entom., 1775), p. 406

Common Name: Cliff Crab

Rathbun, 1918, p. 332, text-fig. 154, pl. 101; Rathbun, 1933, p. 93, fig. 87; Monod,

1956, p. 455, figs. 614–617; Williams, 1965, p. 223, fig. 207; Forest & Guinot, 1966, p. 93; Chace & Hobbs, 1969, p. 192, figs. 62r–t, 63; Felder, 1973a, p. 75, pl. 11, fig. 13.

Range: North and South Carolina; Bermuda; Florida Keys and Dry Tortugas; Texas; Cuba; Jamaica; Hispaniola; Puerto Rico; Virgin Islands; Dominica to Barbados; Trinidad; Netherlands Antilles; Ceará to Pernambuco, Brazil; eastern Atlantic, from the Azores and Madeira and Senegal to Angola.

Habitat: in fissures and crevices of rocks; in tide pools; on jetties; intertidal.

Remarks: Chace and Hobbs (1969) provided notes on color patterns of living crabs. Haratnoll (1965b) studied the ecology of this crab in Jamaica and notes on swimming behavior were given in Hartnoll (1971). Physiological studies include Morrison and Morrison (1952) on coagulation and data on thoracic neurosecretion (Marynard, 1961a, 1961b; Marynard and Marynard, 1962). Listed from Brazil by Coelho (1971a), Coelho and Ramos (1972), and Fausto Filho (1974).

#### Subfamily SESARMINAE Dana, 1852

##### *Aratus* H. Milne Edwards, 1853

*Aratus pisonii* (H. Milne Edwards, 1837) (Hist. Nat. Crust., vol. 2: 76)

Common Names: Mangrove Crab; Tree Crab

Rathbun, 1918, p. 323, pl. 96; Rathbun, 1933, p. 92, fig. 85; Chace & Hobbs, 1969, p. 172, figs. 54, 58a.

Range: Bahamas; southeast to southwest Florida; north and south coasts of Cuba; New Providence Island (Atlantic); Jamaica; Puerto Rico; Virgin Islands to Guadeloupe; Netherlands Antilles; Belize; Rio Parahyba do Norte to São Paulo, Brazil; Nicaragua to Peru, in eastern Pacific.

Habitat: along shores of estuaries and near fresh, brackish or marine waters; on rocks, piles, and wharves; commonly in mangroves, on which this crab can easily climb.

Remarks: Warner (1968) described larval development. Hartnoll (1965b) provided extensive notes on the biology of this crab in Jamaica, including ecology, growth, feeding, behavior, and reproduction. Warner (1967, 1969, 1970) also studied this species in Jamaica. Hartnoll (1971) briefly commented on swimming activity. Listed from south Florida by Tabb and Manning (1961) and from Brazil by Coelho and Ramos (1972).

##### *Cyclograpsus* H. Milne Edwards, 1837

*Cyclograpsus integer* H. Milne Edwards, 1837 (Hist. Nat. Crust., vol. 2: 79)

Common Name: Marsh Crab

Rathbun, 1918, p. 326, pl. 97, figs. 1–2; Rathbun, 1933, p. 92, fig. 86; Monod, 1956, p. 451, figs. 609–612; Chace & Hobbs, 1969, p. 173, figs. 55, 58b–d; Felder, 1973a, p. 75, pl. 11, figs. 12, 14.

Range: Bermuda; Bahamas; south Florida; Florida Keys; Texas; Cuba; Jamaica; Hispaniola; Puerto Rico; St. Croix; Dominica; Islas Los Roques and

Caribbean coast of Colombia; Ceará to Pernambuco, Brazil; eastern Atlantic, from Senegal to Zaire.

Habitat: burrows in marshy marine areas; among rocky and stony areas of the intertidal zone and up to the high tide line.

Remarks: Felder (1973a) provided the only other specific Gulf record in addition to the previous record for the Florida Keys. Hartnoll (1965b) commented on the ecology of this crab in Jamaica. Listed from Brazil by Coelho and Ramos (1972) and Fausto Filho (1974).

*Sesarma* Say, 1817

Subgenus *Holometopus* H. Milne Edwards, 1853

*Sesarma (Holometopus) americanum* Saussure, 1858 (Mém. Soc. Hist. Nat. Genève 14: 441)

As *S. tampicense*—Rathbun, 1918, p. 307, text-fig. 151, pl. 88,

As *S. americanum*—Chace & Hobbs, 1969, p. 178, figs. 62a–f.

Range: Tampico, Mexico; St. Thomas, Virgin Islands.

Habitat: soft mud, along river banks.

Remarks: Chace and Hobbs (1969) determined that *S. tampicense* Rathbun was a junior synonym of *S. americanum* Saussure. Behre (1950) tentatively listed the species from Louisiana (as *S. tampicense*), but noted that Chace had examined the specimens and preferred not to record the species as indicated. Abele (1972b) mentions the similarities between several of the western Atlantic members of the genus; he notes the distinct differences between *S. angustipes* Dana and *S. americanum*.

*Sesarma (Holometopus) angustipes* Dana, 1852.

This species was restricted by Abele (1972b) to the specimens from Brazil and Trinidad; refer to his paper for a discussion of synonymy. Material listed under this name by Rathbun (1918, p. 331) was synonymized with *S. roberti* by Chace and Hobbs (1969, p. 184).

*Sesarma (Holometopus) benedicti* Rathbun, 1897 (Proc. Biol. Soc. Washington 11: 90)

Rathbun, 1918, p. 316, pl. 93; Holthuis, 1959, p. 248, fig. 62; Abele, 1973, p. 379, figs. 1A, 1G.

Range: Key West, Florida; Guyana and Surinam; Brazil.

Habitat: under wood and stones on banks of brackish and almost freshwater streams.

Remarks: The female specimen from Key West (MCZ 6236) listed by Rathbun (1918) is the only Gulf of Mexico record; all others are from South America. Ecological notes were provided by Holthuis (1959).

*Sesarma (Holometopus) cinereum*—(Bosc, 1802) (Hist. Nat. Crust., vol. 1, an X, p. 204)

Common Names: Square-backed Fiddler; Wharf Crab; Wood Crab; Friendly Crab

As *S. cinerea*—Hay & Short, 1918, p. 449, pl. 36, fig. 11.

As *S. cinereum*—Rathbun, 1918, p. 300, text-fig. 149, pl. 83; Williams, 1965, p. 222, fig. 206; Felder, 1973a, p. 78, pl. 11, fig. 6; Abele, 1973, p. 377, figs. 1B, 1H.

Range: Maryland to southeast Florida; southwest Florida to Vera Cruz, Mexico.

Habitat: on wharves, pilings, and other wooden objects; stone jetties and rocky areas; in *Spartina* marshes and along the edges of mangrove swamps; burrows from the high tide mark to well inland in mud and sand substrates; frequently found on boats and ships.

Remarks: Abele (1973) states that previous records of *S. cinereum* from the West Indies and elsewhere in the Caribbean were based on juvenile specimens of *S. ricordi* and *S. americanum*. Regional lists include Florida (Wass, 1955; Menzel, 1971; Subrahmanyam *et al.*, 1976), Mississippi (Richmond, 1968), Louisiana (Behre, 1950; Hoese and Valentine, 1972) and Texas (Hedgpeth, 1953; Leary, 1967). Hedgpeth (1953) presented a map, showing the ranges of *Sesarma* in the northern Gulf of Mexico. Williams (1965) listed ovigerous females from North Carolina in May to November and from the mouth of the Potomac River in January. Abele (1973) collected ovigerous females from Florida in June and from Texas in July. Sandifer (1973) commented on larval abundance in Virginia.

Larval development was studied by Costlow, Bookhout and Monroe (1960) and Costlow and Bookhout (1960b). Ecological notes were provided by Williams (1965) and by Fotheringham and Brunenmeister (1975). Physiological studies include observations on gill area (Gray, 1957), oxygen consumption (Teal, 1959), and tolerance to dilute salt water (Pearse, 1929). Observations on the behavior of this crab in captivity were made by Oler (1941) and by Duncker (1934).

***Sesarma (Holometopus) miersii*** Rathbun, 1897 (Proc. Biol. Soc. Washington 11: 91)

Rathbun, 1918, p. 303 (part), pl. 84; Chace & Hobbs, 1969, p. 180, figs. 59, 62g-i;

Abele, 1972b, p. 166, figs. 1B, 1C, 2B, 2C; Abele, 1973, p. 380, fig. 1I.

Range: Bahamas; Key West, Florida; south coast of Cuba; Swan Island (Carib.); Dominica.

Habitat: marshy tidal flats.

Remarks: Abele (1972b) reviewed the status of this crab and the confusion in nomenclature that existed from Rathbun's (1897) description of Mier's original material. Only the original specimens from the Bahamas became the type material for this species. Specimens from Brazil in Rathbun (1918) are now designated *S. angustipes* and the specimen from Uruguay is *Metasesarma rubripes*. Hartnoll (1965b) found no evidence of *S. miersii* in Jamaica and later authors agree that the observations of Andrews cited in Rathbun (1918, p. 304) refer to *S. roberti* (see Abele, 1973). The only Gulf of Mexico record is that from Key West (Abele, 1973).

***Sesarma (Holometopus) ricordi*** H. Milne Edwards, 1853 (Ann. Sci. Nat., ser. 3, Zool. 20: 183)

Common Name: Beach Crab

Rathbun, 1918, p. 309 (part), pl. 89; Rathbun, 1933, p. 91; Holthuis, 1959, p. 246, pl. 11, fig. 3; Chace and Hobbs, 1969, p. 183, fig. 62k; Abele, 1973, p. 378, fig. 1J.

Range: Bermuda; Bahamas; southeast Florida; Florida Keys; west coast of Florida; north coast of Yucatan; Cuba; Jamaica; Hispaniola; Puerto Rico; Virgin Islands to Trinidad; Curaçao; Old Providence Island (Carib.); Yucatan to Surinam.

Habitat: from intertidal zone to about 50 meters inland; in low-lying pine woods; edges of mangrove swamps; burrows in grassy areas above sandy beaches; under driftwood and among rocks, along shorelines.

Remarks: Previous records of this species from Mississippi have been identified as *S. cinereum* by Chace (in Hedgpeth, 1953) and the material from Brazil was determined to be *S. angustipes* by Abele (1972b). Abele (1973) listed ovigerous females from Florida in May, June and August and from Panama in January. Larval development was studied by Diaz and Ewald (1968). The ecology and other aspects of biology of this crab in Jamaica were reported by Hartnoll (1965b), Warner (1969), and Standing (1972).

***Sesarma (Holometopus) roberti*** H. Milne Edwards, 1853 (Ann. Sci. Nat. ser. 3, Zool. 20: 182)

Common Name: Brackish-water Crab

As *S. angustipes*—Rathbun, 1918, p. 311, pl. 90.

As *S. roberti*—Rathbun, 1918, p. 312, pl. 91; Rathbun, 1933, p. 91; Monod, 1956, p. 443, figs. 602–604; Chace & Hobbs, 1969, p. 184, figs. 60, 62l–n.

Range: Veracruz, Mexico to Nicaragua; north and south coasts of Cuba; Jamaica; Hispaniola; Puerto Rico; Virgin Islands to Trinidad; Venezuela.

Habitat: streams, rivers, and bays, including a wide range of freshwater and brackish environments; from marine shorelines to upland elevations of 1000 feet; burrows in steep muddy banks; among mangroves; on rocks in streams; among stony areas at bases of cliffs.

Remarks: Monod (1956) questioned the occurrence of *S. roberti* on Goree Island off West Africa, the indicated type-locality for this species. Hartnoll (1965b) reported on the biology of this crab in Jamaica (under the name *S. angustipes*, which he used as a senior synonym of *S. roberti*). Chace & Hobbs (1969) maintained the distinction between these two species, at least until a South American specimen with Caribbean characteristics is discovered. Abele (1972b) reviewed these reports and also regarded the two forms as separate species.

***Sesarma (Holometopus) tampicense*** Rathbun, 1914.

This name was determined by Chace & Hobbs (1969) to be a junior synonym of *S. americanum*.

Subgenus *Sesarma* Say, 1817***Sesarma (Sesarma) curacaoense*** de Man, 1892 (Notes Leyden Mus. 14: 257)

Common Name: Mangrove Crab

Rathbun, 1918, p. 293, text-fig. 147, pl. 78, figs. 1-2, pl. 160, fig. 3; Rathbun, 1933, p. 90; Holthuis, 1959, p. 242; Chace & Hobbs, 1969, p. 188, figs. 61, 62p; Abele, 1973, p. 380, figs. 1C, 1F.

Range: Key West, Florida; south and southwest Florida; north coast of Cuba; Jamaica; Puerto Rico; Curaçao; Bahia, Brazil.

Habitat: muddy banks of rivers and ditches, including brackish water; in mangrove swamps, under rocks and litter; intertidal zone, in clumps of oysters and among rocks.

Remarks: Abele (1973) commented on sexual maturity and size ranges, but he did not report ovigerous females in the Florida material he studied. Tabb and Manning (1961) listed this crab from mangroves at Whitewater Bay in south Florida. Ecology of this species in Jamaica was studied by Hartnoll (1965b) and Warner (1969). Listed from Brazil by Coelho and Ramos (1972).

***Sesarma (Sesarma) reticulatum*** (Say, 1817) (J. Acad. Nat. Sci. Philadelphia 1: 73)

Common Name: Marsh Crab

As *S. reticulata*—Hay & Shore, 1918, p. 448, pl. 36, fig. 12.

As *S. reticulatum*—Rathbun, 1918, p. 290, pl. 77; Williams, 1965, p. 221, fig. 205; Felder, 1973a, p. 78, pl. 11, fig. 7; Abele, 1973, p. 380, fig. 1D, 1E.

Range: Massachusetts to east coast of Florida; west coast of Florida to central Texas.

Habitat: *Spartina* salt marshes; burrows in soft muds and sand-mud; under rocks and litter of intertidal streams and near-marine to brackish waters.

Remarks: Larval descriptions were provided by O. W. Hyman (1924) and Costlow and Bookhout (1962). Sandifer (1973) reported on larval ecology in Virginia. Crichton (1960) gave a general account of life history as noted in Delaware marshes. Regional lists include Florida (Wass, 1955; Menzel, 1971; Subrahmanyam *et al.*, 1976), Louisiana (Behre, 1950), and Texas (Hedgpeth, 1953; Leary, 1967). The specimen listed by Tabb and Manning (1961) for this species was determined by Abele (1973) to be *S. curacaoense*. Humes (1941b) described a parasitic copepod in the gill chambers of this crab. Physiological studies include work on gill area (Gray, 1957), oxygen consumption (Teal, 1959), rhythmic activity (Palmer, 1967), antennule chemosensitivity (Hazlett, 1971), and melanophore hormones (Fingerman, Nagabhushanam and Philpott, 1961).

Subfamily VARUNINAE H. Milne Edwards, 1852

***Euchirograpsus*** H. Milne Edwards, 1853***Euchirograpsus americanus*** A. Milne Edwards, 1880 (Bull. Mus. Comp. Zool. 8: 18)

Hay & Shore, 1918, p. 448, pl. 36, fig. 7; Rathbun, 1918, p. 282, text-fig. 144, pl.



74; Chace, 1940, p. 52; Williams, 1965, p. 220, fig. 204; Türkay, 1975, p. 114, figs. 6-7, 16b, 20, 24.

Range: North and South Carolina; south Florida; north and south coasts of Cuba; St. Lucia; Barbados; Colombia to Venezuela.

Depth: 31 to 508 m (17 to 278 fm).

Habitat: rocky, coral, and sand substrates.

Remarks: Listed from off the Carolinas by Cerame-Vivas, Williams and Gray (1963) and Cerame-Vivas and Gray (1966). Williams (1965) listed ovigerous females from Florida in March to September. Recorded off the Atlantic coast of Cuba by Chace (1956). The Pacific specimens listed by Garth (1946) were referred to a new species, *E. pacificus*, and the specimen (USNM 17672) listed by Rathbun (1918) from off Yucatan was referred to a new species, *E. antillensis*, by Türkay (1975).

***Euchirograpsus antillensis*** Türkay, 1975 (Senckenbergiana Biol. 56: 112)

As *E. americanus*—Rathbun, 1918, p. 283 (part, Yucatan specimen only).

As *E. antillensis*—Türkay, 1975, p. 112, figs. 4-5, 16a, 19, 25.

Range: off Havana, Cuba; Arrowsmith Banks, between Cuba and Yucatan; south of Florida Keys; Bahamas.

Depth: 192 to 430 m (105 to 235 fm).

Remarks: Türkay (1975) compared this new species with *E. americanus* and the other species of the genus, which now number a total of six.

***Platychoirapsus*** de Man, 1896

***Platychoirapsus spectabilis*** de Man, 1896 (Zool. Anz. 19: 292)

Common Names: River Crab; Saber Crab

As *P. typicus*—Rathbun, 1918, p. 278, text-figs. 141-143, pl. 73; Bolívar y Pieltain, 1945, p. 267-270, figs. 1-5.

As *P. spectabilis*—Buitendijk, 1950, p. 280, fig. 1b; Monod, 1956, p. 426, text-figs. 584-588.

Range: Gulf coast of Mexico; west coast of Florida.

Habitat: burrows in clay banks, just above the water line, along rivers; shallow rocky areas of rivers; known from altitudes of greater than 100 feet, up to 140 miles from the sea.

Remarks: This species was described on the basis of only a few specimens, all from Tabasco, Mexico. Marchand (1946) discovered a large population of these crabs along the Hillsborough River in west Florida, which empties into the Gulf near Tampa. These crabs were found to have originated in Mexico from where they were transported on logs and in lumber for Tampa, beginning about 1915. Marchand (1946) provided notes on ecology, behavior, and feeding habits of the west Florida populations, under the name *P. typicus*. Buitendijk (1950) determined this latter name to be a junior synonym of *P. spectabilis*.

***Platychoirapsus typicus*** Rathbun, 1914.

Determined by Buitendijk (1950) to be a junior synonym of *P. spectabilis* de Man, 1896.

## Family GECARCINIDAE Macleay, 1838

*Cardisoma* Latreille, 1825

*Cardiosoma guanhumi* Latreille, 1825 (Encycl. Méth., Hist. Nat., Entom., vol. 10, p. 685)

Common Names: Great Land Crab; White Land Crab; Mulatto Land Crab; Juey; Tourlourou; Guanhumi; Guaiamu

Rathbun, 1918, p. 341, text-fig. 155, pls. 106-107; Rathbun, 1933, p. 94, fig. 89; Bright, 1966, p. 191, fig. 4-I; Forest & Guinot, 1966, p. 94; Chace & Hobbs, 1969, p. 195, figs. 64, 67a-c; Türkay, 1970, p. 345; Bright & Hogue, 1972; p. 16; Felder, 1973a, p. 79, pl. 12, figs. 1, 4.

Range: Bermuda; Bahamas; southeast Florida; Florida Keys; Louisiana and south Texas; eastern Mexico to Colombia; north and south coasts of Cuba; Jamaica; Puerto Rico; St. Thomas, Virgin Islands to Barbados; Trinidad; Netherlands Antilles; Colombia to São Paulo, Brazil.

Habitat: low-lying coastal areas, especially mangrove swamps; open fields; along rivers, streams, drainage canals and ditches; under buildings; saline soils with high water tables; primarily nocturnal, but diurnal in heavily shaded areas and on days when the sky is heavily overcast.

Remarks: This is the largest land crab in the Gulf of Mexico region. It is commercially harvested as a food item on some islands of the West Indies, especially Puerto Rico. In other areas, such as southern Florida, this crab is considered an agricultural pest because of the damage caused to fields by the large, extensive burrows and also due to the fondness of the crabs for young, growing shoots.

Regional lists include Louisiana (Behre, 1949, 1950) and Texas (Leary, 1967; Felder, 1973a). Listed from Cuba by Chace (1940) and from Brazil by Coelho and Ramos (1972). Accounts of natural history were provided by Gifford (1962b), Feliciano (1962), and Fotheringham and Brunenmeister (1975). Henning (1975a, 1975b) studied the biology of this crab in northern Columbia, including extensive observations on behavior and ecology. Wright (1968) described agonistic behavior, especially chela displays during social encounters. Herreid (1963) investigated feeding behavior and Herreid and Gifford (1963) reported on the burrow as a habitat and on ionic regulation by the crab.

Developmental stages were described by Moreira (1913) and Costlow and Bookhout (1968b). Costlow and Bookhout (1968c) studied the effects of various environmental factors on development. Physiological studies include work on calcium metabolism (Gifford and Johnson, 1962), growth and morphometrics (Herreid, 1967), various terrestrial adaptations (Bliss, 1963, 1968), aerial respiration (Cameron, 1975), respiratory pigments (Redmond, 1962), and uric acid metabolism (Gifford, 1968), osmoregulation by larval stages (Kalber and Costlow, 1968), neurobiology of autotomy and leg elevation (Moffett, 1975), pericardial organ neurosecretion (Cooke and Goldstone, 1970; Berlind and Cooke, 1970; Berlind, Cooke and Goldstone, 1970) neural control of walking (Barnes, Spirito and Evoy, 1972; Spirito, Evoy and Barnes, 1972; Evoy and Fournier,

1973; Fourtner and Evoy, 1973; Moffett, 1975) and biochemistry (Quinn and Lane, 1966, 1967).

Studies of economic and commercial impact include those of de Oliviera (1946) on the fishery and ecology of this crab in Brazil and Feliciano (1962) on the fishery in Puerto Rico. Humes (1958) described a copepod from the gill chambers of this crab.

### ***Cecarcinus* Leach, 1814**

***Cecarcinus lateralis*** (Fremenville, 1835) (Ann. Sci. Nat., ser. 2, Zool. 3: 224)

Common Names: Black Land Crab; Common Land Crab

Rathbun, 1918, p. 355, text-fig. 161, pls. 119-120; Rathbun, 1933, p. 95, fig. 91; Chace & Holthuis, 1948, p. 26; Chace & Hobbs, 1969, p. 198, figs. 65, 67e-g; Türkay, 1970, p. 337, figs. 2a-c; Bright & Hogue, 1972, p. 21; Felder, 1973a, p. 82, pl. 12, figs. 2-3; Türkay, 1973, p. 974, fig. 2.

**Range:** Bermuda; Bahamas; southeast Florida; Florida Keys; south Texas to north coast of Yucatan; north and south coasts of Cuba; Jamaica; Hispaniola; Puerto Rico; St. Thomas, Virgin Islands to Barbados; Netherlands Antilles; Honduras to Costa Rica; Caribbean coast of Columbia to Surinam.

**Habitat:** burrows in dry, sandy areas; in back dunes and on dune ridges; up to 1000 foot elevation in Dominica (Chace and Hobbs, 1969); in wooded areas of dune ridges and back dunes of eastern Florida, under logs and leaf litter; primarily nocturnal, but diel in heavily wooded habitats.

**Remarks:** The status of this species and of *G. quadratus* have been unclear for some time. Türkay (1970) listed *G. quadratus* as a subspecies of *G. lateralis*, but an examination of types in the Paris Museum led Türkay (1973) to conclude that the two are synonymous. Most other workers have listed them as distinct and separate species, yet recognizing the complex distribution pattern of *G. quadratus* on both sides of Central America. Some specimens of *G. lateralis* have also been reported from the Pacific coast. Specimens collected in Texas (Ray, 1967; Britton, 1976; personal collections) are of *G. lateralis*.

Regional lists include Texas (Ray, 1967; Britton, 1976; Felder, 1973a; Fotheringham and Brunenmeister, 1975) and Mexico (Cabrera, 1965, zoea only). Listed from Costa Rica by Bright (1966). Reports on ecology and natural history of this species include Bliss and Sprague (1958b), Weitzman (1963), Bliss (1968), Chace and Hobbs (1969), and Klaassen (1975). This crab has been used for a variety of physiological studies, especially for research on molting and regeneration (Hodge, 1956a, 1956b; Bliss, 1960a, 1960b, 1966; Bliss and Boyer, 1964; Bliss *et al.*, 1972; Skinner, 1965, 1966; Skinner and Graham, 1972; Mason, 1970; Holland and Skinner, 1976; Yamaoka and Skinner, 1976). Other physiological reports include work on osmoregulation and water balance (Bliss, 1963; Bliss, Wang and Martinez, 1966; Mantel, 1968; Copeland, 1968), aerial respiration (Cameron, 1975), lipid metabolism (O'Connor and Gilbert, 1968), coagulation (Morrison and Morrison, 1952; Stutman and Dolliver, 1968), neuroendocrinology (Hodge and Chapman, 1958; Bliss and Sprague, 1958a; Maynard, 1961a, 1961b; Maynard and Maynard, 1962; Weitzman, 1969; Mantel *et al.*, 1975),

oxygen transport in hemolymph (Redmond, 1968), saline composition for lab experiments (Skinner, Marsh and Cook, 1965), neural fine structure (Skobe and Nunnemacher, 1970), and sensitivity to substrate vibrations (Klaassen, 1973).

***Gecarcinus quadratus*** Saussure, 1853 (Rev. Mag. Zool., ser. 2, vol. 5, p. 360)

Common Names: Red Land Crab; Whitespot Crab

Rathbun, 1918, p. 358, text-fig. 162, pls. 121-122; Garth, 1948, p. 58; Bright, 1966, p. 190, fig. 4G; Türkay, 1970, p. 338, fig. 4; Bright & Hogue, 1972, p. 20; Türkay, 1973, p. 974.

Range: Veracruz, Mexico to Turbo, Columbia (Carib.); St. Croix; Jamaica; Barbados; in eastern Pacific, from Acapulco, Mexico to La Libertad, Ecuador.

Habitat: well above the high tide mark of sandy beaches; mangrove and other heavily-vegetated areas of marine shores; under debris and other litter.

Remarks: As indicated for *G. lateralis*, this species may be regarded as distinct, as a subspecies of *G. lateralis*, or as completely synonymous with the latter. Türkay (1970) published a biogeographical distribution map of the two forms which shows considerable overlap in the ranges of the two species. The two forms are listed here as separate species, but those workers accepting Türkay's (1973) synonymy of the two forms can combine the references and locality records.

***Gecarcinus ruricola*** (Linnaeus, 1758) (Syst. Nat., ed. 10, vol. 1, p. 626)

Common names: Black Crab; Mountain Crab; Blue Land Crab; Red Tourlourou

Rathbun, 1918, p. 352, text-fig. 160, pls. 117-118; Chace & Holthuis, 1948, p. 26; Chace & Hobbs, 1969, p. 200, figs. 66, 67h-j; Türkay, 1970, p. 336, fig. 1a-f; Bright & Hogue, 1972, p. 20.

Range: Bahamas; southeast Florida; north and south coasts of Cuba; Cayman Islands; Jamaica; Navassa Island (Carib.); Hispaniola; Puerto Rico; St. Croix to Barbados; Curaçao; Old Providence and Swan Islands (Carib.).

Habitat: closer to the intertidal zone than other species of this genus; on low and marshy ground and on lower slopes of island mountains, up to elevations of 500 m; in wooded dune areas of southeast Florida (rare, personal observation).

Remarks: Descriptions of ecology and behavior are found in Rathbun (1918) and Chace and Hobbs (1969); a summary is provided by Bright and Hogue (1972). Listed from the south coast of Cuba by Chace (1940). This species occurs among dense populations of *G. lateralis* in southeast Florida, but is rather rare.

Superfamily OCYPODOIDEA Rafinesque, 1815

Family OCYPODIDAE Rafinesque, 1815

Subfamily OCYPODINAE Rafinesque, 1815

***Ocypode*** Weber, 1795

***Ocypode albicans*** Bosc, 1801-1802.

Junior synonym for *Ocypode quadrata*, used by Rathbun (1918) and others prior to revision by Holthuis (1959).

***Ocypoda arenaria*** Say, 1817.

Junior synonym and invalid generic name for *Ocypode quadrata*, used by Cowles (1908) and some other early studies.

***Ocypode quadrata*** (Fabricius, 1787) (Mantissa insect . . ., vol. 1, p. 315)

Common Names: Ghost Crab; Sand Crab; Racing Crab

As *O. albicans*—Rathbun, 1918, p. 367, pls. 127–128; Rathbun, 1933, p. 96, fig. 92.

As *O. quadrata*—Holthuis, 1959, p. 259; Williams, 1965, p. 225, fig. 208; Chace & Hobbs, 1969, p. 204, figs. 68–69; Felder, 1973a, p. 82, pl. 12, figs. 5, 8.

Range: Bermuda; Bahamas; Rhode Island to south Florida; Florida Keys and Dry Tortugas; west coast of Florida, around entire Gulf coast to Yucatan; north and south coasts of Cuba, through West Indies to Barbados; from Yucatan, along east coast of Central America and the north coast of South America to Estado de Santa Catarina, Brazil; most Caribbean Islands, including Netherlands Antilles, Old Providence Island, etc. Megalops have been collected as far north as Massachusetts.

Habitat: on sandy beaches, from high water line to back dunes areas; younger crabs burrow closer to water line and among beach vegetation; along wave-exposed shores, protected harbor beaches, bays, intracoastal canals, and lagoons; juveniles are mainly diel and older adults are primarily nocturnal, depending on degree of disturbance by man and various environmental factors. Adults usually burrow well back from the waterline, but often feed at the driftline.

Remarks: Regional lists include Florida (Wass, 1955; Menzel, 1971), Mississippi (Richmond, 1962), Louisiana (Behre, 1950; Hoese and Valentine, 1972), and Texas (Whitten, Rosene and Hedgpeth, 1950; Hedgpeth, 1953; Leary, 1967; Fotheringham and Brunenmeister, 1975). Bright and Hogue (1972) include this species in their world-list of land crabs; listed from Brazil by Coelho (1971a), Coelho and Ramos (1972), and Fausto Filho (1974).

Diaz and Costlow (1972) described and illustrated larval stages raised under laboratory conditions. Haley (1969) provided data on growth and morphometrics of Texas populations; reproductive cycling, female morphometrics, and population dynamics were covered in Haley (1967, 1972). Hughes (1973) described mating behavior in the laboratory and compared the mating functions of burrows in several ghost crab species. Population densities and interactions with man were studied by Teerling (1970). Accounts of general natural history were provided by Cowles (1908) for populations in the Tortugas (as *Ocypoda arenaria*) and by Milne and Milne (1946) for New Jersey. Williams (1965) summarized many of the recent studies. Chace and Hobbs (1969) described color phases of Dominican populations. Burrow construction and ecology in Texas was reported by Hill and Hunter (1973) and predatory behavior on mole crabs was noted by Fales (1976). Schone (1968) investigated agonistic displays and these were also presented in a film (Schone and Eibl-Eibesfeldt, 1965).

Physiological studies include work on oxygen consumption (Pearse, 1929; Ayres, 1938; Vernberg, 1956; Gray, 1957), water relations and the role of the pericardial sac (Blass, 1963, 1968), ionic regulation and respiration (Flemister

and Flemister, 1951; Flemister, 1958), ionic and osmotic regulation (Gifford, 1962a), gill and "kidney" histophysiology (Flemister, 1959), biochemistry of terrestrial adaptations (Vernberg and Vernberg, 1968), thoracic neurosecretion (Maynard, 1961a, 1961b; Maynard and Maynard, 1962), and visual perception (Schone and Schone, 1961). Studies of acoustic perception and related behavior include Horch and Salmon (1969), Horch (1971), and Salmon and Horch (1972).

### *Uca* Leach, 1814

(This genus of intertidal ocypodids, along with a few other Australo-Asian genera, are commonly known as fiddler crabs. A number of subgenera have been proposed for this large and diverse genus. Bott (1973) split this genus into 10 genera and Crane (1975) also created a number of subgenera. Although Crane's (1975) monograph is a comprehensive and monumental work, taxonomic precedence must be given to Bott (1973) with regard to most of these proposed changes. For the present, and in agreement with a review by von Hagen (1976), this compilation will avoid the use of subgenera and will continue the use of *Uca*, with the species arranged alphabetically.)

#### *Uca burgersi* Holthuis, 1967 (Zool. Meded. Leiden 42: 52)

As *U. mordax*—Rathbun, 1918, p. 391 (part), not text-fig. 166, nor pl. 134, figs. 3-4; Maccagno, 1928, p. 46 (part); de Oliviera, 1939a, p. 138; Holthuis, 1959, p. 265.

As *U. burgersi*—Holthuis, 1967, p. 52; Chace & Hobbs, 1969, p. 207, figs. 70, 71a-d; Gibbs, 1974, p. 84; Crane, 1975, p. 168, figs. 26F, 31H, 54G, 66F, 100, pl. 24E-H, map 12.

Range: Bahamas; east coast of Florida; northeast (Gulf) coast of Yucatan; north and south coasts of Cuba; Jamaica; Hispaniola; Puerto Rico; St. Thomas, Virgin Islands to Trinidad; Curaçao; east coast of Yucatan to Guatamala; Caribbean coast of Panama; Venezuela to Rio de Janeiro, Brazil.

Habitat: sheltered mud flats; sloping mud banks and mud-sand areas at mouths of streams; along shores of lagoons and estuaries; often near mangroves; intertidal; above high tide mark in mangrove thickets of Florida, associated with *U. rapax*.

Remarks: Earlier references confused this species with *U. mordax*, to which it is similar in morphology, ecology, and geographical range. This species was also recorded as *U. affinis* by Holthuis (1959), when he distinguished it from *U. mordax* in Surinam. Records of this crab from west Africa are questioned by Crane (1975). Crane (1957) included data on waving displays as part of her description of *U. mordax*. Adaptation to intertidal zone habitats was reported by von Hagen (1970b) and Salmon (1967) obtained sound recordings of leg-wagging (as *U. mordax*). Gibbs (1974) investigated the ecology of this crab on Barbuda and Gibbs and Bryan (1972) studied cation composition of the exoskeleton.

***Uca leptodactyla*** Rathbun, 1898 (Ann. New York, Acad. Sci. 11: 227)

Rathbun, 1918, p. 420, pl. 156; Maccagno, 1928, p. 41 (part), not text-fig. 25; Rathbun, 1933, p. 98; de Oliviera, 1939a, p. 126, pl. 5, text-figs. 25–28, pl. 6, fig. 29, pl. 8, fig. 47, pl. 13, figs. 61–62; Chace & Hobbs, 1969, p. 212, figs. 71g–h; von Hagen, 1970a, p. 227; Crane, 1975, p. 304, text-figs. 37M, 56F, 60N–O, 69K–L, 101, map 17, pl. 41A–D.

Range: Bahamas; west coast of Florida (not recently); east coast of Yucatan; north coast of Cuba; Jamaica; Puerto Rico; St. Croix; Curaçao; Venezuela to Santa Catarina, Brazil.

Habitat: relatively sandy tidal flats of marine waters; sometimes at supratidal levels, where burrows are covered only by spring tides; occasionally in mud or clay substrates, in partial shade of mangrove trees.

Remarks: Behavioral studies include Matthews (1930), Crane (1957), and Gerlach (1958b). Ecological data were provided by Matthews (1930), de Oliviera (1939a, 1939b, 1939c), and Crane (1957). Bott (1973) lists this species under his genus *Leptuca*; Crane (1975) lists it under her subgenus *Celuca*. Listed from Brazil by Coelho (1971a) and Coelho and Ramos (1972).

***Uca longisignalis*** Salmon & Atsaiades, 1968 (Proc. Biol. Soc. Washington 81: 279)

As *U. pugnax rapax*—Rathbun, 1918, p. 397 (part), not. pl. 140.

As *U. longisignalis*—Salmon & Atsaiades, 1968b, p. 279, text-figs. 1–4, 6, 7.

As *U. rapax longisignalis*—Crane, 1975, p. 190, map 14.

Range: northwest Florida to south Texas.

Habitat: similar to that of *U. rapax*; often on exposed salt flats and algal beds; among marsh vegetation; substrates of mud, mud-sand, and sand-mud.

Remarks: Felder (1973a) comments on the distribution of *U. pugnax*, *U. virens* and *U. longisignalis* and retains the name of *U. pugnax* for all forms in the northwestern Gulf. Crane (1975) listed this form as a subspecies of *U. rapax*, which until recently was a subspecies of *U. pugnax*. In a review of Crane's (1975) monograph, von Hagen (1976) commented that an examination of Salmon's holotypes left "no doubt that *U. rapax longisignalis* is a synonym of *U. minax* (Le Conte)." The present list treats this crab as a separate species, mainly on the basis of Salmon and Atsaiades (1968b) evidence of behavioral separation and on the lack of agreement among other authorities as to which subspecies or species it is most closely allied with. Subrahmanyam *et al.* (1976) listed this crab from northwest Florida and Powers (1975) noted its occurrence in Texas. Included in the key to northwestern Gulf *Uca* by Fotheringham and Brunenmeister (1975). Abele (1970) provided habitat notes on populations at Alligator Harbor, Florida.

***Uca minax*** (Le Conte, 1855) (Proc. Acad. Nat. Sci. Philadelphia 7: 403)

Common Names: Red-Jointed Fiddler Crab; Brackish Water Fiddle Crab

Hay & Shore, 1918, p. 451, pl. 37, fig. 3; Rathbun, 1918, p. 389, pl. 137; Maccagno, 1928, p. 48, text-fig. 31; Crane, 1943a, p. 220, text-fig. 1b; Williams, 1965, p. 227, figs. 209A, 210B; Felder, 1973a, p. 85, pl. 12, fig. 12; Crane, 1975, p. 176, figs. 67D, 81K, 100, pl. 25E–H, map 12.

Range: Massachusetts to northeast Florida; northwest Florida to Louisiana, possibly Texas.

Habitat: brackish to fresh waters of estuaries, bays and streams; drainage ditches and canals; usually located some distance from marine waters, but often subject to some tidal influence, particularly along the Atlantic coast; burrows in mud banks and among marsh vegetation, often supratidal; occasionally at edges of fields or woodlands.

Remarks: Crane (1975) questioned the presence of this species from Texas, stating that records listed by Rathbun (1918) from Texas were found to be *U. rapax longisignalis* and *U. pugnax virens*; von Hagen (1976) believes that *U. (rapax) longisignalis* is a synonym of *U. minax*. If the latter is true, then the range of *U. minax* would definitely include Texas, but the form described by Salmon and Atsaiades (1968b) as *U. longisignalis* does not inhabit freshwater and brackish areas. Listed from northwest Florida by Wass (1955), Abele (1970), and Menzel (1971), from Louisiana by Behre (1950) and Felder (1973a), and from Texas by Leary (1967), but the latter is probably based on Rathbun (1918).

Gray (1942) and Miller (1965) provided descriptions of natural history and Williams (1965) summarized much of the current literature. Hyman (1920, 1922) described post-larval development and behavior, including spawning. Ecological studies include Teal (1958) in Georgia, Miller and Maurer (1973) on distribution in relation to salinity, Whiting (1972) and Whiting and Moshiri (1974) on distribution in relation to substrate, and Kerwin (1971) on distribution in relation to marsh vegetation. Salmon (1967) studied distribution in Florida. Miller (1961) compared feeding adaptations in this and other *Uca* species. Physiological studies include work on gill area (Gray, 1957), osmotic and ionic regulation (Cole, 1971), the relationship between respiration and habitat (Teal, 1959), tolerance to desiccation (Pearse, 1929), acclimation to temperature (Vernberg, 1959), tidal rhythms of color change (Fingerman, Lowe and Moberly, 1958), and radiation sensitivity (Engel, 1973). Nimmo *et al.* (1971) studied PCB absorption from sediments. Behavioral studies include descriptions of waving displays (Crane, 1943a, 1957; Salmon, 1965), sound production (Salmon, 1965), and vibration reception (Salmon and Horch, 1973).

***Uca mordax*** (Smith, 1870).

Although recorded from the Gulf of Mexico by Rathbun (1918, p. 391), these and earlier records had confused this species with *U. vocator*, *U. rapax*, and *U. burgersi*. Crane (1975, p. 173) restricts *U. mordax* to the continental coast, from Guatamala to Brazil, plus the island of Trinidad.

***Uca panacea*** Novak & Salmon, 1974 (Proc. Biol. Soc. Washington 87: 313)

Common Name: Sand Fiddler Crab

As *U. pugilator*—Rathbun, 1918, p. 400 (part), not pl. 141 and pl. 169, fig. 2; Felder, 1973a, p. 83; Crane, 1975, p. 223 (part), not pl. 29E-H, part map 16, other figs. indet.

As *U. panacea*—Novak & Salmon, 1974, p. 316, figs. 1–8.



Range: northwest Florida to south Texas.

Habitat: sandy areas of marshes and tidal flats; often supratidal, intertidal in some areas; well inland on Texas barrier islands; similar to habitats of *U. pugilator* when intertidal.

Remarks: This species is morphologically similar to *U. pugilator*, but it has been separated from the latter on the basis of biochemical (Selander, Johnson and Avise, 1971) and behavioral studies (Novak and Salmon, 1974). Color variants of "*U. pugilator*" from Florida were noted by Rao & Fingerman (1968), a species-specific character present only in living specimens. It is likely that many of the studies reported as "*U. pugilator*," when collected from the central and western Gulf coasts, actually utilized *U. panacea*. *Uca pugilator* has been collected as far west as central Texas (Carl Thurman, pers. comm.; pers. observ. of author), indicating greater geographical overlap between the two species than reported by Novak and Salmon (1974). Other authors (Felder, 1973a; Crane, 1975) regarded the two forms as one species. The southern limits of *U. panacea* have not been defined yet, but may extend into northeastern Mexico. Hedgpeth (1950) commented on the ecology of this crab on salt flats in Texas and Powers (1973) provided data on burrow densities. Ecological and behavioral data on Texas barrier island populations were presented by Powers (1975) and Powers and Cole (1976). Studies prior to 1974, using the name *U. pugilator*, may include either or both species; regional lists and references are listed under *U. pugilator*, but many of these studies are undoubtedly of *U. panacea*.

***Uca pugilator*** (Bosc, 1802) (Hist. Nat. Crust., vol. 1, an X, p. 197)

Common Name: Sand Fiddler Crab

Hay & Shore, 1918, p. 452, pl. 37, fig. 2; Rathbun, 1918, p. 400 (part), pl. 141, pl. 160, fig. 2; Maccagno, 1928, p. 44, text-fig. 28; Crane, 1943a, p. 220; Williams, 1965, p. 232, figs. 209C, 210C-D, 211; Crane, 1975, p. 223 (part), text-figs. 37K, 69F, 101, pl. 29E-H, map 16 (part).

Range: Bahamas; Massachusetts to south Florida; Florida Keys; west and northwest coasts of Florida; Mississippi to Texas; ? Santo Domingo; ? Old Providence Island (Carib.)

Habitat: sandy and sand-mud substrates; intertidal to supratidal marshes; burrows on open sand flats or among thick clumps of grasses and other vegetation.

Remarks: This species is listed by Bott (1973) in the genus *Planuca* and by Crane (1975) in the subgenus *Celuca*. The status of the Caribbean specimens needs to be re-examined with respect to *U. pugilator* and *U. panacea*. Because of the widespread use of this animal in experimental studies, the taxonomic relationships and variability of morphological, behavioral, and physiological features need to be defined and established for both of these closely-related forms. A partial listing of the large literature on *U. pugilator*, including some of *U. panacea*, follows.

Accounts of natural history include Pease (1914) in Massachusetts, Schwartz and Safir (1915) in New York, and studies by O. W. Hyman (1920, 1922) and Dembowski (1925, 1926). Developmental studies were reported by Hyman

(1920), Gray (1942) on transient prezoa, and by Hernkind (1968b). Miller (1968) investigated asymmetry during growth and Vernberg and Costlow (1966) studied handedness. Ecological studies include work on habitat preferences in Georgia (Teal, 1958), feeding efficiency (Miller, 1961), habitats in the Bahamas (Coventry, 1944), habitats in Massachusetts (Knopf, 1966), distribution in relation to thermal tolerance (Miller and Vernberg, 1968), thermal relations of crab and microhabitat (Smith and Miller, 1973), and capture-recapture methods (Hockett and Kritzler, 1972).

Sand Fiddlers have been the subjects of many behavioral studies: displays and courtships (Pease, 1914; Dembowski, 1925, 1926; Crane, 1943a, 1957), threat displays (Schone, 1968; Aspey, 1971), sound production and visual signals (Burkenroad, 1947; Salmon and Stout, 1962; Salmon, 1965, 1967; Salmon and Atsides, 1969; Salmon and Horch, 1972), burrowing activity (Teal, 1958; Coward, Gerhardt and Crockett, 1970), visual orientation (Herrnkind, 1968a, 1968c, 1972), feeding (Miller, 1961), locomotion (Baird and Burleson, 1970), and larval shadow responses (Forward, 1977).

Physiological studies include work on molting (Abramowitz and Abramowitz, 1940; Guyselman, 1953; Stewart and Green, 1969; Skinner and Graham, 1972; Fingerman and Fingerman, 1976; Weis, 1976a), regeneration (Weis, 1976b, 1976c, 1977a, 1977b; Weis and Mantel, 1976), color changes and chromatophores (Carlson, 1935, 1936; Brown and Sandeen, 1948; Brown and Webb, 1948; Brown, 1950; Guyselman, 1953; Webb, Bennett and Brown, 1954; Fingerman and Yamamoto, 1967; Barnwell, 1968a; Rao and Fingerman, 1968; Fingerman, Rao and Ring, 1969; Coohill and Fingerman, 1975), metabolism (W. B. Vernberg and Vernberg, 1972), rhythmical activity and physiology (Brown *et al.*, 1955; Fingerman, 1956, 1957; Fingerman, Lowe and Mobberly, 1958; Barnwell, 1966, 1968b), biochemistry (Eisen *et al.*, 1973), sensitivity to anemone toxin (Blanquet, 1968), reproduction and endocrinology (Darby, 1935; Brown and Jones, 1949; Sandeen, 1950; Fingerman and Fitzpatrick, 1956; Fingerman and Couch, 1967; Rao, Fingerman and Bartell, 1967; Rao and Fingerman, 1969, 1970; Fingerman, 1970, 1973; Bartell, Rao and Fingerman, 1971; Fielder, Rao and Fingerman, 1971), thermoregulation and temperature adaptations (Edwards, 1950; Orr, 1955; Demeusy, 1957; Wilkins and Fingerman, 1965; Vernberg, DeCoursey and Padgett, 1973), osmoregulation (Pease, 1929; Teal, 1958; Green *et al.*, 1959; Evans, Cooper and Bogan, 1976), toxicology (Nimmo *et al.*, 1971; DeCoursey and Vernberg, 1972; O'Hara, 1973), respiration (Gray, 1957; Teal, 1959; Wilkins and Fingerman, 1965; Smith and Miller, 1973; Silverthorn, 1975a, 1975b), sensory perception (Salmon and Atsides, 1969; Horch and Salmon, 1969; Salmon, 1971; Langdon, 1971; Avent, 1974; Hyatt, 1974, 1975; Salmon, Horch and Hyatt, 1977), neurobiology (Nunne-macher, 1965; Andrews, 1973), radiation sensitivity (Engel, 1973), and infection by bacteria (Spindler-Barth, 1976).

Regional lists include Florida (Wass, 1955; Tabb and Manning, 1961; Menzel, 1971), Louisiana (Behre, 1950; Hoese and Valentine, 1972), and Texas (Hedgpeth, 1950, 1953; Whitten, Rosene and Hedgpeth, 1950; Simmons, 1957; Leary, 1967), but the Louisiana and Texas records probably refer to *Uca panacea*.

***Uca pugnax*** (Smith, 1870).

This is another species with a history of frequent nomenclatural changes. Most older references have included this crab as a Gulf species, but Salmon and Atsaiides (1968b) referred the Gulf populations of *U. pugnax* to new species, *U. virens* and *U. longisignalis*. Crane (1975) maintained *U. virens* as a subspecies of *U. pugnax*, but she placed *U. longisignalis* as a subspecies of *U. rapax*. Until a revision by Tashian and Vernberg (1958), *U. rapax* was considered a subspecies of *U. pugnax*; thus all four forms are closely related. However, von Hagen (1976) synonymizes *U. virens* with *U. rapax* and considers *U. longisignalis* to be synonymous with *U. minax*! The present list treats each form separately, maintaining each species presented by Salmon and Atsaiides (1968b) and excluding *U. pugnax* as a Gulf species.

***Uca rapax*** (Smith, 1870) (Trans. Connecticut Acad. Arts Sci. 2: 134)

As *U. pugnax rapax*—Rathbun, 1918, p. 397 (part), pl. 140; Maccagno, 1928, p. 45, text-fig. 29; Rathbun, 1933, p. 97; de Oliveira, 1939a, p. 134.

As *U. rapax*—Tashian & Vernberg, 1958, Holthuis, 1959, p. 266, text-figs. 64d-f, 65, pl. 14, figs. 4-6, pl. 15, fig. 3; Chace & Hobbs, 1969, p. 214, figs. 73a-b; von Hagen, 1970a, p. 226; Crane, 1975, p. 190, figs. 52C-DD, 54F, 67C, 86, 91E-F, 100, pls. 27A-D, 45C-F, map 14.

Range: Bahamas; east coast of Florida; Florida Keys; southwest coast of Florida; northeast coast of Mexico to northeast Yucatan; north and south coasts of Cuba; Jamaica; Hispaniola; Puerto Rico; St. Thomas, Virgin Islands to Trinidad and Tobago; Netherlands Antilles; east coast of Yucatan to Guatamala; Caribbean coast of Panama to Santa Catarina, Brazil.

Habitat: mud, sand-mud, and mud-sand flats; edges of mangroves; along rivers and streams on flats and banks.

Remarks: This species may also occur infrequently along the northwestern Gulf coast, but Crane (1975) attributes records of this crab to *U. rapax longisignalis*. Felder (1973a) listed *U. rapax* from the same area, but past records may be erroneous with regard to the several similar species involved. Listed from Brazil by Coelho and Ramos (1972).

Behavioral studies include observations on waving displays (Crane, 1943a, 1957), combat between males (Crane, 1957, 1967), visual and acoustical signalling (Salmon and Atsaiides, 1968a), kinaesthetic orientation (von Hagen, 1967), orientation to burrows (von Hagen, 1970b), and feeding (Miller, 1965). Warner (1969) studied the natural history of this crab in Jamaica and Holthuis (1959) provided ecological notes and populations in Surinam. Smith and Miller (1973) measured thermal adaptations. Barnwell (1963) observed motor activity and the rhythmicity of color changes in populations in Brazil. Handedness and its relationship to development was analyzed by Vernberg and Costlow (1966). Adaptations to particular tidal levels were observed by von Hagen (1970b). Salmon (1971) measured vibration receptivity and van Delft (1968) studied daily rhythms of color changes.

***Uca speciosa*** (Ives, 1891) (Proc. Nat. Acad. Sci. Philadelphia 1891: 179)

Rathbun, 1918, p. 408, pl. 145; Chace & Hobbs, 1969, p. 215, figs. 73c-d; von Hagen, 1970a, p. 227; Crane, 1975, p. 236, text-figs. 68G, 101, map 15, pl. 31A-D.

Range: southeast Florida; Florida Keys; west and northwest coasts of Florida; northeast Yucatan and northwest Cuba.

Habitat: wet, muddy substrates; mid to high intertidal zone; commonly found in mangroves.

Remarks: Specimens from Curaçao reported by Rathbun (1918) were referred to *U. cumulanta* by Chace and Hobbs (1969); Crane (1975) referred the Jamaican specimen of Chace and Hobbs (1969) to *U. cumulanta*. Crane (1957) provided some preliminary data on courtship displays and Salmon (1967) analyzed waving patterns of the crabs. Miller (1965) studied the distribution and ecology of this species. Listed from Florida by Wass (1955), Tabb and Manning (1961) and Subrahmanyam *et al.* (1976).

***Uca spinicarpa*** Rathbun, 1900 (Amer. Natural. 34: 586)

As *U. spinicarpa*—Rathbun, 1918, p. 411, pl. 148; Felder, 1973a, p. 83, pl. 12, fig. 11.

As *U. speciosa spinicarpa*—Crane, 1975, p. 239, figs. 68K, 101, pl. 31E-H, map 15.

Range: Alabama to northeastern coast of Mexico.

Habitat: muddy banks of coastal freshwater ponds and streams; muddy, brackish beaches of the Gulf; grassy mud flats off bays (after Felder, 1973a).

Remarks: This crab was considered a separate, but allied species to *U. speciosa* by Rathbun (1918) and subsequent workers. Crane (1975) placed it as a subspecies of the latter. Felder (1973a) listed several personal collections in Louisiana and Mississippi. Listed from Texas by Leary (1967) and Fotheringham and Brunenmeister (1975) comment on its presence in the northwestern Gulf, providing a key for comparison with other *Uca* species. Bott (1973) placed this species and *U. speciosa* in his genus *Leptuca*; Crane's (1975) subgenus designation is *Celuca*.

***Uca subcylindrica*** (Stimpson, 1859) (Ann. Lyc. Nat. Hist. New York 7: 63)

Rathbun, 1918, p. 419, pl. 155, pl. 160, fig. 5; Felder, 1973a, p. 83, pl. 12, fig. 10; Crane, 1975, p. 209, figs. 67, 100, pl. E-H, map 11.

Range: Texas to northeastern coast of Mexico.

Habitat: banks of freshwater streams; brackish water areas; on mud flats and algal beds, often some distance upstream from mouths of rivers and creeks.

Remarks: This species is uncommon and has a restricted range. Listed by Fotheringham and Brunenmeister (1975) for the northwestern Gulf. Very little is known about this crab's ecology, behavior, or other biological aspects.

***Uca thayeri*** Rathbun, 1900 (Proc. Washington Acad. Sci. 2: 134)

Rathbun, 1918, p. 406, text-fig. 169, pl. 144; Rathbun, 1933, p. 98; Holthuis, 1959, p. 275, text-figs. 68b-c, pl. 16; Chace & Hobbs, 1969, p. 216, text-figs. 73e-f; von Hagen, 1970a, p. 226; Crane, 1975, p. 112, figs. 46K, 56E, 60H-I, 73A-B, 81I, 82I, 99, map 11, pl. 17.

Range: east and southwest coasts of Florida; north and south coasts of Cuba;

Jamaica; Hispaniola; Puerto Rico; Guadeloupe; Trinidad; Tobago; Guatamala and Panama (Caribbean coasts) Venezuela to São Paulo, Brazil.

Habitat: deep mud on banks of streams and estuaries, among mangrove swamps; burrows are often shaded by vegetation.

Remarks: Ecological studies include Gerlach (1958a) in Brazil Warner (1969) in Jamaica, and Salmon (1967) in Florida. Crane (1957) described daily behavioral displays and Barnwell (1963) reported on daily and tidal rhythms of activity. Bott (1973) placed this species in his genus *Planuca*; Crane (1975) designated the subgenus *Bcboruca*. Listed from Brazil by Coelho and Ramos (1972).

***Uca virens*** Salmon & Atsoides, 1968 (Proc. Biol. Soc. Washington 81: 281)

As *U. pugnax*—Felder, 1973a, p. 84.

As *U. virens*—Salmon & Atsoides, 1968b, p. 281, figs. 2-3, 5-7.

As *U. pugnax virens*—Crane, 1975, p. 203, map 10.

As *U. rapax*—von Hagen, 1976, p. 224.

Range: Mississippi to Coatzacoalcos (central Gulf coast), Mexico.

Habitat: muddy sand, sand-mud, and mud substrates of salt marshes; algal flats, close to bays, estuaries and inlets; often among marsh vegetation.

Remarks: Studies that have recorded "*Uca pugnax*" from the Gulf coast may represent records of *U. virens* or *U. longisignalis*; the occasional presence of *U. rapax* along the Texas and Mexico coasts is also possible. Salmon and Atsoides (1968b) reported analyses of waving and acoustic signalling. Powers (1975) and Powers and Cole (1976) provided some data on habitats of this crab in Texas. See *Uca pugnax* and *Uca longisignalis* for a discussion of nomenclatural changes in the *pugnax-rapax* species group.

***Uca vocator*** (Herbst, 1804) (Versuch. Natur. Krabben u. Krebse, vol. 1. pl. 59, fig. 1)

As *U. mordax*—Rathbun, 1918, p. 391 (part), pl. 134, figs. 3-4.

As *U. murifecenta*—Crane, 1943b, p. 38, text-figs. 1d-f, pl. 1, figs. 1-2.

As *U. vocator*—Holthuis, 1959, p. 269, text-figs. 66-67, pl. 14, fig. 1, pl. 15, fig. 1;

Chace & Hobbs, 1969, p. 217, figs. 73g-j, 74; von Hagen, 1970a, p. 225; Crane, 1975, p. 27, figs. 66D, 100, pl. 23E-G, pl. 24A-D, map 13.

Range: Tampico, Mexico; Belize to Guyana; Puerto Rico; Santo Domingo; Guadeloupe; Dominica; Trinidad and Tobago; Paraiba to Pernambuco, Brazil; ? Santa Catarina, Brazil.

Habitat: grassy marshes; mud flats; flat banks of streams and rivers; in damp mud among mangroves.

Remarks: This species was presented by Rathbun (1918) with *U. mordax*. Ecological data includes studies by Crane (1943b) in Venezuela, by Holthuis (1959) in Surinam, by Chace and Hobbs (1969) in Dominica, and by von Hagen (1970a, 1970c), who also commented on sound production and other aspects of behavior. The only record for this species from the Gulf of Mexico is that listed by Crane (1975) for Tampico, Mexico. Listed from Brazil by Coelho and Ramos (1972) for Paraiba and Pernambuco, but Crane (1975) questions the record from Santa Catarina.

*Ucides* Rathbun, 1897*Ucides cordatus* (Linnaeus, 1763) (Amoen. Acad., vol. 6, p. 414)

Common Names: Pagurus; Kaburi

Rathbun, 1918, p. 347, text-fig. 158, pls. 110–113, pl. 159, figs. 3–4; Rathbun, 1933, p. 95, fig. 90; Bott, 1955, p. 66; Bright, 1966, p. 191; Chace & Hobbs, 1969, p. 219, figs. 75–76; Türkay, 1970, p. 351, fig. 10a–d; Bright & Hogue, 1972, p. 14.

Range: Bahamas; southeast Florida; northeast Mexico to Panama; north and south coasts of Cuba; Jamaica; Hispaniola; Puerto Rico; St. Thomas, Virgin Islands to Grenada; Colombia to Santa Catarina, Brazil.

Habitat: swampy ground, among mangrove roots; in areas of standing brackish water; on mud flats, among *Uca* and *Cardisoma* burrows.

Remarks: Chace and Hobbs (1969) transferred this genus to the Ocypodidae from the Gecarcinidae and Türkay (1970) accepted this transfer. Although the genus did not fit conveniently into any of the existing subfamilies, Chace and Hobbs (1969) felt that it was more closely allied with the Ocypodinae than with others. Türkay (1970) placed the Pacific species, *U. occidentalis*, under *U. cordatus* as a subspecies. Manning and Provenzano (1961) comment on *Ucides* in Florida. Ecological and behavioral notes were provided by Chace and Hobbs (1969) and Bright and Hogue (1972). Warner (1969) discussed the ecology of this crab in Jamaica and de Oliveira (1946) studied its biology in Brazil. Listed from Brazil by Coelho and Ramos (1972). De Souza and Caland (1968) reported on bacterial infections in this species. Ogawa *et al.* (1973a, 1973b) described commercial processing of this crab for food in Brazil. Alves (1975) studied reproductive biology of Brazilian populations.

## BIBLIOGRAPHY

- ABBOTT, W. 1967. Unusual climbing behavior by *Callinectes sapidus* Rathbun (Decapoda, Brachyura). *Crustaceana*. **13**: 128.
- ABELE, L. G. 1970. The marine decapod Crustacea of the northwestern Gulf of Mexico. Masters Thesis, Florida State University, Tallahassee. 137 pp.
- . 1971. Scanning electron photomicrographs of brachyuran genopods. *Crustaceana*. **21**: 218–220.
- . 1972a. A reevaluation of the *Neopanope texanasi* complex with notes, on *N. packardii* (Crustacea: Decapoda: Xanthidae) in the northwestern Atlantic. *Chesapeake Sci.* **13**: 263–271.
- . 1972b. The status of *Sesarma angustipes* Dana, 1852, *S. trapezium* Dana, 1852, and *S. miersii* Rathbun, 1897 (Crustacea: Decapoda: Grapsidae) in the western Atlantic. *Caribb. J. Sci.* **12**: 165–170.
- . 1973. Taxonomy, distribution and ecology of the genus *Sesarma* (Crustacea, Decapoda, Grapsidae) in eastern North America, with special reference to Florida. *Am. Midl. Nat.* **90**: 375–386.
- . 1974. Species diversity of decapod crustaceans in marine habitats. *Ecology*. **55**: 156–161.
- ABRAMOWITZ, R. K. and A. A. ABRAMOWITZ. 1940. Moulting, growth, and survival after eyestalk removal in *Uca pugnator*. *Biol. Bull.* **78**: 179–188.

- ADKINS, G. 1972a. Notes on the occurrence and distribution of the rhizocephalan parasite (*Loxothylacus texanus* Boschma) of the blue crabs (*Callinectes sapidus* Rathbun) in Louisiana estuaries. *Tech. Bull. La. Wildl. Fish. Comm.* **2**:1-13.
- . 1972b. A study of the blue crab fishery in Louisiana. *Tech. Bull. La. Wildl. Fish. Comm.* **3**: 1-57.
- AIKAWA, H. 1929. On larval forms of some Brachyura. *Rec. oceanogr. Wks. Japan.* **2**: 17-55.
- . 1937. Further notes on brachyuran larvae. *Rec. oceanogr. Wks. Japan.* **9**: 87-162.
- ALDRICH, J. C. 1974. Allometric studies on energy relationships in the spider crab *Libinia emarginata* (Leach). *Biol. Bull.* **147**: 257-273.
- . 1976. The spider crab, *Libinia emarginata* Leach, 1815 (Decapoda, Brachyura), and the starfish, an unsuitable predator but a cooperative prey. *Crustaceana.* **31**: 151-156.
- ALVES, M. I. M. 1974. Resistencia a variacoes de salinidade apresentada por *Pachygrapsus transversus* (Gibbes, 1850)—Crustacea, Grapsidae. *Arquivos de Ciencias do Mar.* **14**: 91-93.
- . 1975. Sobre a reprodução do caranguejo-Uçá, *Ucides cordatus* (Linnaeus), em mangues do estado do Ceará (Brasil). *Arquivos de Ciencias do Mar.* **15**: 85-91.
- ANDREWS, P. M. 1973. Ultrastructural study of the pericardial organ-anterior ramifications complex neurosecretory terminals. *Z. Zellforsch. mikrosk. Anat.* **144**: 309-324.
- , D. E. COPELAND and M. FINGERMAN. 1971. Ultrastructural study of the neurosecretory granules in the sinus gland of the blue-crab. *Callinectes sapidus*. *Z. Zellforsch. mikrosk. Anat.* **113**: 461-471.
- ANTIONE, J. W. 1972. Structure of the Gulf of Mexico. In: R. Rezak and V. J. Henry (eds.), *Contributions on the Geological and Geophysical Oceanography of the Gulf of Mexico*. Gulf Publishing Co.: Houston. Pp. 1-34.
- ASPEY, W. P. 1971. Inter-species sexual discrimination and approach-avoidance conflict in two species of fiddler crabs, *Uca pugnax* and *Uca pugilator*. *Anim. Behav.* **19**: 669-676.
- AVENT, R. M. 1974. The effects of hydrostatic pressure on living aquatic organisms. VIII. Behavioral and metabolic responses of *Uca pugilator* to variations in hydrostatic pressure and temperature. *Int. Revue Ges. Hydrobiol. Hydrogr.* **59**: 219-238.
- AYERS, J. C. 1938. Relationship of habitat to oxygen consumption by certain estuarine crabs. *Ecology.* **19**: 523-527.
- BAIRD, J. L., JR. and A. L. BURLESON. 1970. An analysis of locomotor behavior in the fiddler crab *Uca pugilator*. *Am. Zoologist.* **10**: 500.
- BALLARD, B. S. and W. ABBOTT. 1969. Osmotic accommodation in *Callinectes sapidus* Rathbun. *Comp. Biochem. Physiol.* **29**: 671-687.
- BALSS, H. 1957. Decapoda. In: H. G. Broun, *Klassen und Ordnungen des Tierreichs*, volume 5, Crustacea. C. F. Winter and Akademische Verlagsgesellschaft (Leipzig). Lief. 12, pp. 1505-1672, figs. 1131-1199; Lief. 13, pp. 1673-1770, figs. 1200-1212.
- BARNARD, K. H. 1950. Descriptive catalogue of South African decapod Crustacea (Crabs and Shrimps). *Ann. S. Afr. Mus.* **38**: 1-837.
- BARNES, W. J. P., C. P. SPIRITO, and W. E. EVOY. 1972. Nervous control of walking in the crab, *Cardisoma guanhumi*. II. Role of resistance reflexes in walking. *Z. vergl. Physiol.* **76**: 16-31.
- BARNWELL, F. H. 1963. Observations on daily and tidal rhythms in some fiddler crabs from equatorial Brazil. *Biol. Bull.* **125**: 399-415.
- . 1966. Daily and tidal patterns of activity in individual fiddler crabs (genus *Uca*) from the Wood's Hole region. *Biol. Bull.* **130**: 1-13.
- . 1968a. Comparative aspects of the chromatophoric responses to light and temperature in fiddler crabs of the genus *Uca*. *Biol. Bull.* **134**: 221-234.

- . 1968b. The role of rhythmic systems in the adaptation of fiddler crabs to the intertidal zone. *Am. Zoologist*. **8**: 569-583.
- BARR, L. 1971. Observations on the biology of the arrow crab, *Stenorhynchus seticornis* (Herbst) in Lameshur Bay, St. John, Virgin Islands. pp. 213-220. In: J. Miller, J. van Derwalker and R. Walkers (eds.), *Scientists-in-the-sea*. Dept. of Interior, Washington, D.C.
- . 1975. Biology and behavior of the arrow crab, *Stenorhynchus seticornis* (Herbst), in Lameshur Bay, St. John, Virgin Islands. In: Results of the Tektite Program. *Bull. Mus. Nat. Hist. Los Angeles County*. **20**: 47-56.
- BARTELL, C. K., K. RANGA RAO and M. FINGERMAN. 1971. Comparison of the melanin-dispersing fractions in extracts prepared initially in ethanol, saline, or distilled water from eyestalks of the fiddler crab, *Uca Pugilator*. *Comp. Biochem. Physiol.* **38**: 17-36.
- BEACH, N. W. 1969. The oyster crab, *Pinnotheres ostreum* Say, in the vicinity of Beaufort, North Carolina. *Crustaceana*. **17**: 187-199.
- BEHRE, E. H. 1949. Notes on the occurrence of *Cardisoma guanhumi* Latreille at Grand Isle, Louisiana. *Proc. La. Acad. Sci.* **12**: 19-22.
- . 1950. Annotated list of the fauna of the Grand Isle region. *Occas. Papers mar. Lab. La. State Univ.* **6**: 1-66.
- . 1954. Decapoda of the Gulf of Mexico. *Fishery Bull. Fish Wildl. Serv. U.S.* **55**: 451-455.
- BERLIND, A. and I. M. COOKE. 1970. Release of a neurosecretory hormone as peptide by electrical stimulation of crab pericardial organs. *J. exp. Biol.* **53**: 679-686.
- , ——— and M. W. GOLDSTONE. 1970. Do the monoamines in crab pericardial organs play a role in peptide neurosecretion? *J. exp. Biol.* **53**: 669-677.
- BINFORD, R. 1913. The germ-cells and the process of fertilization in the crab, *Menippe mercenaria*. *J. Morphol.* **24**: 147-200.
- BLAND, C. E., D. G. RUCH, B. R. SALSER and D. V. LIGHTNER. 1976. Chemical control of *Lagenidium*, a fungal pathogen of marine Crustacea. Sea Grant Publ., Univ. North Carolina, **UNC-SG-76-02**. 38 pp.
- BLANQUET, R. 1968. Properties and composition of the nematocyst toxin of the sea anemone, *Aiptasia pallida*. *Comp. Biochem. Physiol.* **25**: 893-902.
- BLISS, D. E. 1960a. Autotomy and regeneration. In: T. H. Waterman (ed.), *The Physiology of Crustacea*. Vol. I. Academic Press. Pp. 561-589.
- . 1960b. Locomotor activity of land crabs during the premolt period. *Science*. **132**: 145-147.
- . 1963. The pericardial sacs of terrestrial Brachyura. In: H. B. Whitting and W. D. I. Rolfe (eds.), *Phylogeny and Evolution of Crustacea*. Mus. Comp. Zool. Spec. Publ., Harvard Univ. pp. 59-78.
- . 1966. Introduction: relation between reproduction and growth in decapod crustaceans. *Am. Zoologist*. **6**: 231-233.
- . 1968. Transition from water to land in decapod crustaceans. *Am. Zoologist*. **8**: 355-392.
- and J. R. BOYER. 1964. Environmental regulation of growth in the decapod crustacean *Gecarcinus lateralis*. *Gen. Comp. Endocrin.* **4**: 15-41.
- , J. ROUILLON BOYER, P. M. CONNELL and S. W. SHEEHAN. 1972. Bioassaying for crustacean limb growth-controlling factors. *Am. Zoologist*. **12**: abst. 105.
- and P. C. SPRAGUE. 1958a. The level of activity in *Gecarcinus lateralis* after eyestalk removal. *Anat. Rec.* **132**: 417.



- and P. C. SPRAGUE. 1958b. Diurnal locomotor activity in *Gecarcinus lateralis*. *Anat. Rec.* **132**: 416-417.
- , S. M. E. WANG and E. A. MARTINEZ. 1966. Water balance in the land crab, *Gecarcinus lateralis*, during the intermolt cycle. *Am. Zoologist*. **6**: 197-212.
- BOESCH, D. F. 1971. On the occurrence of *Pinnixa lunzi* Glassell (Decapoda, Pinnotheridae) off Virginia, U.S.A. *Crustaceana*. **20**: 219-220.
- BOLIVAR y PIELTAIN, C. 1945. Notas sobre *Platychirograpsus typicus* Rathb. (*Dec. Graps.*). *Ciencia, Mex.* **6**: 267-270.
- BONAVENTURA, C., B. SULLIVAN, J. BONAVENTURA and S. BOURNE. 1974. CO binding by hemocyanins of *Limulus polyphemus*, *Busycon carica* and *Callinectes sapidus*. *Biochemistry*. **13**: 4784-4789.
- BOOKHOUT, C. G. and J. D. COSTLOW, JR. 1974. Larval development of *Portunus spinicarpus* reared in the laboratory. *Bull. mar. Sci.* **24**: 20-51.
- , and ———. 1976. Effects of Mirex, Methoxychlor, and Malathion on development of crabs. Report, EPA-600-3-76-007 (NTIS PB-252 007/OST). 96 pp.
- , A. J. WILSON, JR., T. W. DUKE and J. I. LOWE. 1972. Effects of mirex on the larval development of two crabs. *Water, Air, Soil Pollut.* **1**: 165-180.
- BOONE, W. R. and D. L. CLAYBROOK. 1977. The effect of low salinity on amino acid metabolism in the tissues of the common mud crab, *Panopeus herbstii* (Milne-Edwards). *Comp. Biochem. Physiol.* **57A**: 99-106.
- BOTT, R. 1955a. Dekapoden (Crustacea) aus El Salvador. 2. Litorale Dekapoden ausser *Uca*. *Senckenberg. Biol.* **36**: 45-70.
- . 1955b. Die Susswasserkrabben von Afrika (Crust., Decap.) und ihre Stammesgeschichte. *Annls Mus. r. Congo beleg Ser., Zool.* **1**: 209-352.
- . 1968. Fluss-Krabben aus dem östlichen Mittel-Amerika und von dem Grossen Antillen (Crustacea, Decapoda). *Senckenberg. Biol.* **49**: 39-49.
- . 1973. Die verwandtschaftlichen Beziehungen der *Uca*-Arten (Decapoda: Ocypodidae). *Senckenberg. Biol.* **54**: 315-325.
- BOURNE, C. C. 1922. The Raninidae: a study in charcinology. *J. Linn. Soc., Zool.* **35**: 25-79.
- BOUVIER, E. L. 1940. Décapodes marcheurs. *Faune de France* **37**: 1-404.
- BREUER, J. P. 1962. An ecological survey of the lower Laguna Madre of Texas. *Publs Inst. mar. Sci. Univ. Tex.* **8**: 151-183.
- BRIGHT, D. B. 1966. The land crabs of Costa Rica. *Revta Biol. trop.* **14**: 183-203.
- and C. L. HOGUE. 1972. A synopsis of the burrowing land crabs of the world and list of their arthropod symbionts and burrow associates. *Los Angeles County Mus. Contrib. Sci.* **220**: 1-58.
- BRIGHT, T. J. and L. H. PEQUEGNAT. 1974. *Biota of the West Flower Garden Bank*. Gulf Publ. Co.: Houston. 435 pp.
- BRITTON, J. C. 1976. Additional reports of *Gecarcinus lateralis* (Fremerville) (Gecarcinidae) from the Texas coast. *Southwestern Naturalist* **21**: 251-252.
- BROWN, F. A., JR. 1950. Studies on the physiology of *Uca* red chromatophores. *Biol. Bull.* **98**: 218-226.
- and G. M. JONES. 1949. Ovarian inhibition by a sinus gland principle in the fiddler crab. *Biol. Bull.* **96**: 228-232.
- and M. I. SANDEEN. 1948. Responses of the chromatophores of the fiddler crab, *Uca*, to light and temperature. *Physiol. Zool.* **21**: 361-371.
- and H. M. WEBB. 1948. Temperature relations of an endogenous daily rhythmicity in the fiddler crab, *Uca*. *Physiol. Zool.* **21**: 371-381.

- , ———, M. F. BENNETT and M. I. SANDEEN. 1955. Evidence for an exogenous contribution to persistent diurnal and lunar rhythmicity under so-called constant conditions. *Biol. Bull.* **109**: 238-254.
- BROWN, G. G. 1966. Ultrastructural studies of sperm morphology and sperm-egg interaction in the decapod *Callinectes sapidus*. *J. Ultrastruct. Res.* **14**: 425-440.
- BROWNELL, W. N., A. J. PROVENZANO, JR. and M. MARTINEZ. 1977. Culture of the West Indian spider crab, *Mithrax spinosissimus* at Los Roques, Venezuela. Paper presented at 5th World Mariculture Conf., Costa Rica. Pp. A2-1 to A2-14.
- BRUES, C. T. 1927. Occurrence of the marine crab, *Callinectes ornatus*, in brackish and fresh water. *Am. Nat.* **61**: 566-568.
- BUITENDIJK, A. M. 1950. Note on a collection of Decapoda Brachyura from the coasts of Mexico, including the description of a new genus and species. *Zool. Meded., Leiden* **30**: 269-282.
- and L. B. HOLTHUIS. 1949. Note on the Zuiderzee crab, *Rithropanopeus harrisi* (Gould) subspecies *tridentatus* (Maitland). *Zool. Meded., Leiden.* **30**: 95-106.
- BULLIS, H. R. and J. R. THOMPSON. 1965. Collections by the exploratory fishing vessels Oregon, Silver Bay, Combat, and Pelican made during 1956-1960 in the southwestern North Atlantic. *Spec. scient. Rep. U.S. Fish Wildl. Serv. Fisheries.* **510**: 1-130.
- BURKENROAD, M. D. 1947. Production of sound by the fiddler crab, *Uca pugilator* Bosc with remarks on its nocturnal and mating behavior. *Ecology.* **28**: 458-462.
- CABRERA, J. A. 1965. Contribuciones carcinológicas I. El primer estadio zoea en *Gecarcinus lateralis* (Fremenville) (Brachyura Gecarcinidae) procedente de Veracruz, Mexico. *An. Inst. Biol. Univ. Mex.* **36**: 173-187.
- CAINE, E. A. 1974. Feeding of *Ovalipes guadulpensis* (Saussure) (Decapoda: Brachyura: Portunidae), and morphological adaptations to a burrowing existence. *Biol. Bull.* **147**: 550-559.
- , 1975. Feeding of *Pinnotheres maculatus* Say (Brachyura: Pinnotheridae). *Forma et Functio.* **8**: 395-404.
- CAMERON, J. N. 1975. Aerial gas exchange in the terrestrial Brachyura *Gecarcinus lateralis* and *Cardisoma guanhumi*. *Comp. Biochem. Physiol.* **52A**: 129-134.
- CARGO, D. G. 1960. A megalops of the blue crab, *Callinectes sapidus*, in the Patuxent River, Maryland. *Chesapeake Sci.* **1**: 110.
- CARLREN, O. and J. W. HEDGPETH. 1952. Actiniaria, Zoantharia and Ceriantharia from shallow water in the northwestern Gulf of Mexico. *Publs Inst. mar. Sci. Univ. Tex.* **2**: 141-172.
- CARLSON S. 1935. The color changes in *Uca pugilator*. *Proc. Natin. Acad. Sci. U.S.A.* **21**: 549-551.
- CARLSON, S. P. 1936. Color changes in brachyuran crustaceans, especially in *Uca pugilator*. *K. Fysiogr. Sallsk, i Lund Forhandl.* **6**: 63-80.
- CARRIKER, M. R. 1951. Observations of the penetration of tightly closing bivalves by *Busycon* and other predators. *Ecology.* **32**: 73-83.
- CERAME-VIVAS, M. J. and I. E. GRAY. 1966. The distributional pattern of benthic invertebrates of the continental shelf off North Carolina. *Ecology.* **47**: 260-270.
- CERAME-VIVAS, J. M., A. B. WILLIAMS and I. E. GRAY. 1963. New crustacean records for the coast of North Carolina. *Crustaceana.* **5**: 157-159.
- CHACE, F. A., JR. 1939. Reports on the scientific results of the first *Atlantis* expedition to the West Indies, under the joint auspices of the University of Havana and Harvard University. Preliminary descriptions of one new genus and seventeen new species of decapod and stomatopod Crustacea. *Mems. Soc. cub. Hist. nat. 'Felipe Poey'* **13**: 31-54.

- . 1940. Reports on the scientific results of the *Atlantis* expeditions to the West Indies, under the joint auspices of the University of Havana and Harvard University. The brachyuran crabs. *Torreta*. **3**: 3-67.
- . 1951. The oceanic crabs of the genera *Planes* and *Pachygrapsus*. *Proc. U.S. natn. Mus.* **101**: 65-103.
- . 1956. In: S. Springer and H. R. Bullis, Collections by the *Oregon* in the Gulf of Mexico, *Spec. scient. Rep. U.S. Fish Wildl. Serv. Fisheries*. **196**: 1-134.
- . 1966. Decapod crustaceans from St. Helena Island, South Atlantic. *Proc. U.S. natn. Mus.* **118**: 623-661.
- and L. B. HOLTHUIS. 1948. Land and fresh water decapod Crustacea from the Leeward Group and northern South America. *Studies on the Fauna of Curacao, Aruba, Bonaire and the Venezuelan Islands*. **3**: 21-28.
- and H. H. HOBBS, JR. 1969. The freshwater and terrestrial decapod crustaceans of the West Indies with special reference to Dominica. *Bull. U.S. natn. Mus.* **292**: 1-258.
- CHAMBERLAIN, N. A. 1961. Studies on the larval development of *Neopanope texana sayi* (Smith) and other crabs of the family Xanthidae (Brachyura). *Tech. Rept. Chesapeake Bay Inst.* **22**: 1-35.
- . 1962. Ecological studies of the larval development of *Rhithropanopeus harrisi* (Xanthidae, Brachyura). *Tech. Rept. Chesapeake Bay Inst.* **28**: 1-47.
- CHEN, P. S. 1933. Zur Morphologie und Histologie der Respirations-organe von *Grapsus grapsus* L. *Jena Z. naturwiss., Neue Folge*. **61**: 31-88.
- CHEUNG, T. S. 1967. Endocrine control of growth and reproduction in the stone crab, *Menippe mercenaria* (Say). *Am. Zoologist*. **7**: 200.
- . 1969. The environmental and hormonal growth and reproduction in the adult female stone crab, *Menippe mercenaria* (Say). *Biol. Bull.* **136**: 327-346.
- . 1973. The simultaneous regeneration of claws in the aged, male stone crab, *Menippe mercenaria* (Say), with special reference to the terminal molt. *Bull. Inst. Zool., Academia Sinica*. **12**: 1-11.
- . 1976. A biostatistical study of the functional consistency in the reversed claws of the adult male stone crabs, *Menippe mercenaria* (Say). *Crustaceana* **31**: 137-144.
- CHRISTENSEN, A. M. and J. J. McDERMOTT. 1959. Life-history and biology of the oyster crab, *Pinnotheres maculatus* Say. *Biol. Bull.* **114**: 146-179.
- CHRISTIANSEN, M. E. 1969. Crustacea Decapoda Brachyura. *Mar. Invertebr. Scand.* **2**: 1-143.
- , J. D. COSTLOW, JR., and R. J. MONROE. 1977a. Effects of the juvenile hormone mimic ZR-515 (Altosid<sup>®</sup>) on larval development in the mud-crab *Rhithropanopeus harrisi* in various salinities and cyclic temperatures. *Mar. Biol.* **39**: 269-279.
- , J. D. COSTLOW, JR. and R. J. MONROE. 1977b. Effects of the juvenile hormone mimic ZR-512 (Altozar<sup>®</sup>) on larval development of the mud-crab *Rhithropanopeus harrisi* at various cyclic temperatures. *Mar. Biol.* **39**: 281-288.
- CHRISTMAS, J. Y. and W. LANGLEY. 1973. Estuarine invertebrates, Mississippi. Section 4, Pp. 255-319. In: J. Y. Christmas (ed.), *Cooperative Gulf of Mexico Estuarine Inventory and Study, Mississippi*. Gulf Coast Research Lab.
- CHURCHILL, E. P. JR. 1919. Life history of the blue crab. *Bull. Bur. Fish., Wash.* **36**: 95-128.
- COBB, S. P. 1973. *Fabia tellinae*, a new species of commensal crab (Decapoda, Pinnotheridae) from the northeastern Gulf of Mexico. *Crustaceana*. **25**: 70-74.
- COCHRAN, D. M. 1935. The skeletal musculature of the blue crab, *Callinectes sapidus* Rathbun. *Smithson. misc. Collns.* **92**: 1-76.

- COELHO, P. A. 1971a. A distribuição dos crustáceos decápodos reptantes do Norte do Brasil. *Trab. Inst. Oceanogr. Univ. Fed. Pernambuco*, **7/8**: 71-90.
- . 1971b. Novas ocorrências de crustáceos decápodos em Pernambuco e Estados vizinhos (Brasil). *Trab. Inst. Oceanogr. Univ. Fed. Pernambuco*, **9/11**: 239-248.
- . 1971c. Nota prévia sobre os Majidae do norte e nordeste do Brasil. *Archos Mus. nac., Rio de J.*, **54**: 137-146.
- and M. de A. RAMOS. 1972. A constituição e a distribuição da fauna de decápodos do litoral leste da América do Sul entre as latitudes de 5°N e 39°S. *Trab. Oceanogr. Univ. Recife*, **13**: 133-236.
- COLE, T. J. 1971. Osmotic and ionic regulatory abilities of *Uca minax* in relation to its ecology. Masters Thesis, Univ. West Florida, Pensacola.
- CONNOLLY, C. J. 1925. The larval stages and megalops of *Rhithropanopeus harrisi* (Gould). *Contr. Can. Biol. Fish.* **2**: 329-334.
- CONTRERAS, F. 1930. Contribucion al conocimiento de las jaibas de Mexico. *An. Inst. Biol. Univ. Mex.* **1**: 227-241.
- COOHILL, T. P. and M. FINGERMAN. 1975. Relative effectiveness of ultraviolet and visible light in eliciting pigment dispersion in melanophores of the fiddler crab, *Uca pugilator*, through the secondary response. *Physiol. Zool.* **48**: 57-63.
- COOK, D. W. and S. R. LOFTON. 1973. Chitinoclastic bacteria associated with shell disease in *Penaeus* shrimp and the blue crab (*Callinectes sapidus*). *J. Wildl. Dis.* **9**: 154-159.
- COOKE, I. M. and M. W. GOLDSTONE. 1970. Fluorescence localization of monoamines in crab neurosecretory structures. *J. exp. Biol.* **53**: 651-668.
- COPELAND, B. J. 1965. Fauna of the Aransas Pass Inlet, Texas. I. Emigration as shown by tide trap collections. *Publs Inst. mar. Sci. Univ. Tex.* **10**: 9-21.
- and T. J. BECHTEL. 1974. Some environmental limits of six Gulf coast estuarine organisms. *Contr. mar. Sci.* **18**: 169-204.
- COPEPLAND, D. E. 1968. Fine structure of salt and water uptake in the land crab, *Gecarcinus lateralis*. *Am. Zoologist*, **8**: 417-432.
- and A. T. FITZJARRELL. 1968. The salt absorbing cells in the gills of the blue crab (*Callinectes sapidus* Rathbun) with notes on modified mitochondria. *Z. Zellforsch. Mikrosk. Anat.* **92**: 1-22.
- CORRINGTON, J. D. 1927. Commensal association of a spider crab and a medusa. *Biol. Bull.* **53**: 346-350.
- COSTLOW, J. D., JR. 1963. The effect of eyestalk extirpation on metamorphosis of megalops of the blue crab, *Callinectes sapidus* Rathbun. *Gen. Comp. Endocrinol.* **3**: 120-130.
- . 1965. Variability in larval stages of the blue crab, *Callinectes sapidus*. *Biol. Bull.* **128**: 58-66.
- . 1966. The effect of eyestalk extirpation on larval development of the mud crab, *Rhithropanopeus harrisi* (Gould). *Gen. Comp. Endocrinol.* **7**: 255-274.
- . 1967. The effect of salinity and temperature on survival and metamorphosis of the blue crab, *Callinectes sapidus*. *Helgolander wiss. Meeresunters.* **15**: 84-97.
- and C. G. BOOKHOUT. 1959. The larval development of *Callinectes sapidus* Rathbun reared in the laboratory. *Biol. Bull.* **116**: 373-396.
- and ———. 1960a. A method for developing brachyuran eggs *in vitro*. *Limnol. Oceanogr.* **5**: 212-215.
- and ———. 1960b. The complete larval development of *Sesarma cinereum* (Bosc) reared in the laboratory. *Biol. Bull.* **118**: 203-214.

- and —————. 1961a. The larval stages of *Panopeus herbstii* Milne-Edwards reared in the laboratory. *J. Elisha Mitchell Sci. Soc.* **77**: 33-42.
- and —————. 1961b. The larval development of *Eurypanopeus depressus* (Smith) under laboratory conditions. *Crustaceana*. **2**: 6-15.
- and —————. 1962. The larval development of *Sesarma reticulatum* Say reared in the laboratory. *Crustaceana*. **4**: 281-294.
- and —————. 1966a. Larval development of the crab, *Hexapanopeus angustifrons*. *Chesapeake Sci.* **7**: 148-156.
- and —————. 1966b. Larval stages of the crab, *Pinnotheres maculatus*, under laboratory conditions. *Chesapeake Sci.* **7**: 157-163.
- and —————. 1967. The larval stages of the crab, *Neopanope packardii* (Kingsley), in the laboratory. *Bull. mar. Sci.* **17**: 52-63.
- and —————. 1968a. Larval development of the crab, *Leptodius agassizii* A. Milne Edwards in the laboratory (Brachyura, Xanthidae). *Crustaceana, Suppl.* **2**: 204-213.
- and —————. 1968b. The complete larval development of *Cardisoma guanhumi* Latreille in the laboratory (Brachyura, Gecarcinidae). *Crustaceana Suppl.* **2**: 259-270.
- and —————. 1968c. The effect of environmental factors on development of the land-crab, *Cardisoma guanhumi*. *Am. Zoologist* **8**: 399-410.
- COSTLOW, J. D., JR., C. G. BOOKHOUT and R. MONROE. 1960. The effect of salinity and temperature on larval development of *Sesarma cinereum* (Bosc) reared in the laboratory. *Biol. Bull.* **118**: 183-202.
- , ————— and —————. 1962. Salinity-temperature effects on the larval development of the crab, *Panopeus herbstii* Milne-Edwards, reared in the laboratory. *Physiol. Zool.* **35**: 79-93.
- , ————— and —————. 1966. Studies on the larval development of the crab, *Rhithropanopeus harristii* (Gould). I. The Effect of salinity and temperature on larval development. *Physiol. Zool.* **39**: 81-100.
- COUCH, J. N. 1942. A new fungus on crab eggs. *J. Elisha Mitchell Sci. Soc.* **58**: 158-161.
- COVENTY, G. A. 1944. Results of the Fifth George Vanderbilt Expedition (1941) (Bahamas, Caribbean Sea, Panama, Galapagos Archipelago, and Mexican Pacific islands). The Crustacea. *Monogr. Acad. Nat. Sci. Philadelphia*, no. **6**: pp. 531-544.
- COWARD, S. J., H. C. GERHARDT and D. T. CROCKETT. 1970. Behavioral variation in natural populations of two species of fiddler crabs (*Uca*) and some preliminary observations on directed modification. *J. Biol. Psychol.* **12**: 24-31.
- COWLES, R. P. 1908. Habits, reactions and associations of *Ocypoda arenaria*. *Pap. Tortugas Lab.* **2**: 1-41.
- CRAIG, W. J. 1974. Physiological ecology of the commensal crabs, *Polyonyx gibbesi* Haig and *Pinnixa chaetoptera* Stimpson. *Oecologia*. **15**: 235-244.
- CRANE, J. 1943a. Display, breeding and relationships of fiddler crabs (Brachyura, genus *Uca*) in the northeastern United States. *Zoologica*. **28**: 217-223.
- . 1943b. Crabs of the genus *Uca* from Venezuela. *Zoologica*. **28**: 33-44.
- . 1957. Basic patterns of display in fiddler crabs (Ocypodidae, Genus *Uca*). *Zoologica*. **42**: 69-82.
- . 1967. Combat and its ritualization in fiddler crabs (Ocypodidae) with special reference to *Uca rapax* (Smith). *Zoologica*. **52**: 49-76.
- . 1975. *Fiddler Crabs of the World*. Princeton University Press. 737 pp.
- CRICHTON, O. W. 1960. Marsh crab: intertidal tunnel maker and grass-eater. *Estuarine Bull.* **5**: 3-10.

- CRONIN, L. E. 1947. Anatomy and histology of the male reproductive system of *Callinectes sapidus* Rathbun. *J. Morph.* **81**: 209-239.
- , W. A. van ENGEL, D. G. CARGO and F. J. WOJCIK. 1957. A partial bibliography of the genus *Callinectes*. *Spec. Scient. Rept. Va. Fish. Lab.* no. **8**: 21 pp.
- CROSNIER, A. 1967. Remarques sur quelques Crustacés Décapodes benthiques ouest-africains. Description de *Heteropanope ocanthocarpus* et *Medaeus rectifrons* spp. nov. *Bull. Mus. Natn. Hist. Nat., Paris.* **39**: 320-344.
- DARBY, H. H. 1935. Intersexuality in the Crustacea. *Pap. Tortugas Lab.* **29**: 145-149.
- DARNELL, R. M. 1959. Studies of the life history of the blue crab in Louisiana waters. *Trans. Am. Fish. Soc.* **88**: 294-324.
- DAUGHERTY, F. M., JR. 1952a. The blue crab investigation, 1949-1950. *Tex. J. Sci.* **4**: 77-84.
- , 1952b. Notes on *Callinectes danae* Smith in Aransas Bay, Texas, and adjacent waters. *Tex. J. Sci.* **4**: 264-267.
- DAVIS, C. C. 1965. A study of the hatching process in aquatic invertebrates: XX. The blue crab, *Callinectes sapidus*, Rathbun, XXI. The nemertean. *Carcinonemertes carcinophila* (Kolliker). *Chesapeake Sci.* **6**: 201-208.
- DAWSON, C. E. 1966. Additions to the known marine fauna of Grand Isle, Louisiana. *Proc. La Acad. Sci.* **29**: 175-180.
- DECOURSEY, P. J. and W. B. VERNBERG. 1972. Effect of mercury on survival, metabolism and behavior of larval *Uca pugilator* (Brachyura). *Oikos.* **23**: 241-247.
- van DELFT, A. M. L. 1968. The daily colour rhythm of the fiddler crab *Uca repax* on Curaçao. *Stud. Fauna Curaçao.* **25**: 58-72.
- DEMBOWSKI, J. 1925. On the "speech" of the fiddler crab, *Uca pugilator*. *Pr. Inst. M. Nenci.* **3**: 1-7.
- , 1926. Notes on the behaviour of the fiddler crab. *Biol. Bull.* **50**: 179-200.
- DEMEUSY, N. 1957. Respiratory metabolism of the fiddler crab *Uca pugilator* from two different latitudinal populations. *Biol. Bull.* **113**: 245-253.
- DIAZ, H. and J. D. COSTLOW. 1972. Larval development of *Ocypode quadrata* (Brachyura: Crustacea) under laboratory conditions. *Mar. Biol.* **15**: 120-131.
- , and J. J. EWALD. 1968. A comparison of the larval development of *Metasesarma rubripes* (Rathbun) and *Sesarma ricodi* H. Milne Edwards (Brachyura, Grapsidae) reared under similar laboratory conditions. *Crustaceana, Suppl.* **2**: 225-248.
- DRAGOVICH, A. and J. A. KELLY, JR. 1964. Ecological observations of macroinvertebrates in Tampa Bay, Florida 1961-1962. *Bull. mar. Sci. Gulf Caribb.* **14**: 74-102.
- DUNCKER, G. 1934. Gefangenschaftsbeobachtungen an *Sesarma cinerea* Milne Edw. *Zool. Jahrbuch.. Syst. Geogr. Biol. Tiere, Jena.* **66**: 285-290.
- EDMONDSON, C. H. 1962. Xanthidae of Hawaii. *Occas. Pap. Bernice P. Bishop Mus.* **22**: 215-309.
- EDWARDS, G. A. 1950. The influence of eyestalk removal on the metabolism of the fiddler crab. *Physiol. Comp. Oecol.* **2**: 34-50.
- EIBL-EIBESFELDT, I. 1963. *Grapsus grapsus* (Brachyura), Drohen. E. 599, 2½ mins. (Film)..
- EIDEMILLER, A. 1969. Entry behavior of the crab *Pinnotheres maculatus* Say. *Q. Jl. Fla. Acad. Sci.* **32**: 266-274.
- EISEN, A. Z., K. O. HENDERSON, J. J. JEFFREY and R. A. BRADSHAW. 1973. A collagenolytic protease from the hepatopancreas of the fiddler crab *Uca pugilator*: Purification and properties. *Biochemistry.* **12**: 1814-1822.

- ENGEL, D. W. 1973. The radiation sensitivities of three species of fiddler crabs (*Uca pugilator*, *U. pugnax* and *U. minax*). *Chesapeake Sci.* **14**: 289-291.
- and L. D. EGGERT. 1974. The effect of salinity and sex on the respiration rates of excised gills of the blue crab, *Callinectes sapidus*. *Comp. Biochem. Physiol.* **47A**: 1005-1011.
- van ENGEL, W. A. 1958. The blue crab and its fishery in Chesapeake Bay. I. Reproduction, early development, growth, and migration. *Comm. Fish. Rev.* **20**: 6-17.
- EPIFANIO, C. E. 1972. Effects of dieldrin-contaminated food on the development of *Leptodius floridanus* larvae. *Mar. Biol.* **13**: 292-297.
- EVANS, D. H., K. COOPER and M. B. BOGAN. 1976. Sodium extrusion by the sea-water-acclimated fiddler crab *Uca pugilator*: comparison with other marine Crustacea and marine teleost fish. *J. exp. Biol.* **64**: 203-219.
- EVOY, W. H. and C. R. FOURTNER. 1973. Nervous control of walking in the crab, *Cardisoma guanhumi*. III. Proprioceptive influences on intra- and intersegmental coordination. *J. comp. Physiol.* **83**: 303-318.
- FALES, R. R. 1976. Apparent predation on the mole crab *Emerita talpoida* (Say) by the ghost crab *Ocypode quadrata* (Fabricius). *Chesapeake Sci.* **17**: 65.
- FAUSTO FILHO, J. 1967. Sobre os Calapideos do norte e nordeste do Brasil. *Arq. Estac. Biol. Mar., Univ. Fed, Ceará.* **7**: 31-62.
- . 1974. Stomatopod and decapod crustaceans of the archipelago of Fernando de Noronha, northeast Brazil. *Arq. Ciên. Mar.* **14**: 1-35.
- FELDER, D. L. 1973a. An Annotated Key to Crabs and Lobsters (Decapoda, Reptantia) from Coastal Waters of the Northwestern Gulf of Mexico. Pub. No. **LSU-SG-73-02** of the Center for Wetland Resources, Louisiana State University, Baton Rouge. 103 pp.
- . 1973b. A record of *Pinnixa lunzi* Glassell (Decapoda, Pinnotheridae) from off the coast of Texas, U.S.A. *Crustaceana.* **24**: 148-149.
- FELICE, E. P. 1958. Invertebrates from the estuarine portion of San Francisco Bay and some factors influencing their distributions. *Wasmann J. Biol.* **16**: 159-211.
- FELICIANO, C. 1962. Notes on the importance of the land crab *Cardisoma guanhumi*, Latreille of Puerto Rico, *Spec. Contrib. Inst. Mar. Biol. Univ. Puerto Rico.* 29 pp|
- FIELDER, R. H. 1930. Solving the question of crab migration. *Fishing Gazette.* **47**: 18-21.
- FIELDER, D. R., K. RANGA RAO, and M. FINGERMAN. 1971. A female-limited lipoprotein and the diversity of hemocyanin components in the dimorphic variants of the fiddler crab, *Uca pugilator*, as revealed by disc electrophoresis. *Comp. Biochem. Physiol.* **398**: 291-297.
- FINGERMAN, M. 1956. Phase difference in the tidal rhythms of color change in two species of fiddler crabs. *Biol. Bull.* **110**: 274-290.
- . 1957. Relation between position of burrows and tidal rhythm of *Uca*. *Biol. Bull.* **112**: 7-20.
- . 1970. Circadian rhythm of distal retinal pigment migration in the fiddler crab, *Uca pugilator*, maintained in constant darkness and its endocrine control. *J. Interdiscipl. Cycle Res.* **1**: 115-121.
- . 1973. Behavior of chromatophores of the fiddler crab *Uca pugilator* and the dwarf crayfish *Cambarellus shufeldtii* in response to synthetic *Pandalus* red pigment-concentrating hormone. *Gen. Comp. Endocrin.* **20**: 589-592.
- and E. F. COUCH. 1967. Differentiation of chromatophorotropins from the prawn, *Palaeomonetes vulgaris*, and the fiddler crab, *Uca pugilator*. *J. exp. Zool.* **165**: 183-194.
- and C. FITZPATRICK. 1956. An endocrine basis for the sexual difference in melanin dispersion in *Uca pugilator*. *Biol. Bull.* **110**: 138-143.

- , M. E. LOWE and W. C. MOBBERLY, JR. 1958. Environmental factors involved in setting the phases of activity of tidal rhythm of color change in the fiddler crabs *Uca pugilator* and *Uca minax*. *Limnol. Oceanogr.* **3**: 271-282.
- , R. NAGBHUSHANAM and L. PHILPOTT. 1961. Physiology of the melanophores of the crab *Sesarma reticulatum*. *Biol. Bull.* **120**: 337-347.
- , K. RANGA RAO and G. RING. 1969. Restoration of a rhythm of melanophore pigment dispersion in eyestalkless fiddler crabs, *Uca pugilator* (Bosc), at a low temperature. *Crustaceana.* **17**: 97-105.
- and Y. YAMAMOTO. 1967. Daily rhythm of melanophoric pigment migration in eyestalkless fiddler crabs, *Uca pugilator* (Bosc). *Crustaceana.* **12**: 303-319.
- FINGERMAN, S. W. and M. FINGERMAN. 1976. Effects of time of year and limb removal on rates of ecdysis of eyed and eyestalkless fiddler crabs, *Uca pugilator*. *Mar. Biol.* **37**: 357-362.
- FINNEGAN, S. 1931. Report on the Brachyura collected in Central America, the Gorgona and Galapagos Islands, by Dr. Crossland on the 'St. George' Expedition to the Pacific, 1924-25. *J. Linn. Soc. Zool.* **37**: 607-673.
- FLEMISTER, L. J. 1958. Salt and water anatomy, constancy and regulation in related crabs from marine and terrestrial habitats. *Biol. Bull.* **115**: 180-200.
- and S. C. FLEMISTER. 1951. Chloride ion regulation and oxygen consumption in the crab, *Ocypode albicans* (Bosc). *Biol. Bull.* **101**: 259-273.
- FLEMISTER, S. C. 1959. Histophysiology of gill and kidney of the crab *Ocypode albicans*. *Biol. Bull.* **116**: 37-48.
- FLOWER, F. B. and J. J. McDERMOTT. 1953. Observations on the occurrence of the oyster crab, *Pinnotheres ostreum*, as related to the oyster damage in Delaware Bay. *Nat. Shellfish Assoc., Conv. Addresses.* **1952**: 44-46.
- FOREST, J. and D. GUINOT. 1966. Campagne de la "Calypso" dans le Golfe de Guinée et aux îles Principe, São Tomé et Annobon (1956). 16. Crustacés. Décapodes. Brachycures. In: Res. Scient. Camp. "Calypso," fasc. 7. *Annls Inst. oceanogr, Monaco.* **44**: 23-124.
- FORWARD, R. B. 1977. Occurrence of a shadow response among brachyuran larvae. *Mar. Biol.* **39**: 331-341.
- FOTHERINGHAM, N. and S. BRUNENMEISTER. 1975. *Common Marine Invertebrates of the Northwestern Gulf Coast*. Gulf Publish. Co.: Houston. 197 pp.
- FOURTNER, C. R. and W. H. EVOY. 1973. Nervous control of walking in the crab, *Cardisoma quahumi*. IV. Effects of myochordotonal organ ablation. *J. comp. Physiol.* **33**: 319-329.
- FRANKS, J. S., J. Y. CHRISTMAS, W. L. SILER, R. COMBS, R. WALLER and C. BURNS. 1972. A study of nektonic and benthic faunas of the shallow Gulf of Mexico off the state of Mississippi as related to some physical, chemical and geological factors. *Gulf Res. Rep.* **4**: 1-148.
- FURTADO-OGAWA, E. 1972. Notas bioecológicas sobre a familia Xanthidae no estado do Ceará (Crustacea: Brachyura). *Arg. Ciên. Mar.* **12**: 99-104.
- FUTCH, C. R. 1965. The blue crab in Florida. *Flor. Bd. Conserv. Mar. Lab., Salt Wat. Fish. Leaflet. Ser.* **1**: 1-17.
- . 1966. The stone crab in Florida. *Flor. Bd. Conserv. Mar. Lab., Salt Wat. Fish. Leaflet. Ser.* **2**: 1-6.
- GANZ, A. R. and J. F. HERRMANN. 1975. Investigations into the southern New England red crab fishery. *R. I. Dept. Nat. Resour. Div. Fish Wildl. Mar. Fish. Sect.* 78 pp.
- GARTH, J. S. 1946. Littoral brachyuran fauna of the Galapagos Archipelago. *Allan Hancock Pac. Exped.* **5**: 341-601.



- . 1948. The Brachyura of the "Askoy" Expedition with remarks on carcinological collecting in the Panama Bight. *Bull. Am. Mus. nat. Hist.* **92**: 1-66.
- . 1958. Brachyura of the Pacific Coast of America, Oxyrhyncha. *Allan Hancock Pac. Exped.* **21**: 1-499.
- . 1961. Eastern Pacific Expeditions of the New York Zoological Society. XLV. Non-intertidal brachygnathous crabs from the west coast of tropical America. Part 2. Brachygnatha Brachyrhyncha. *Zoologica.* **46**: 133-159.
- . 1965a. The brachyuran decapod crustaceans of Clipperton Island. *Proc. Calif. Acad. Sci., Ser. 4,* **33**: 1-46.
- . 1965b. On the oceanic transport of crab larval stages. *Proc. Symp. Crustacea, Part I,* pp. 443-448.
- . 1966. Eastern Pacific expeditions of the New York Zoological Society. XLVI. Oxytomatous and allied crabs from the west coast of tropical America. *Zoologica.* **51**: 1-16.
- and W. STEPHENSON. 1966. Brachyura of the Pacific coast of America. Brachyrhyncha: Portunidae. *Allan Hancock Monogr. Mar. Biol.* **1**: 1-154.
- GERARD, J. F. and R. GILLES. 1972. The free amino acid pool in *Callinectes sapidus* (Rathbun) tissues and its role in the intracellular osmotic regulation. *J. exp. mar. Biol. Ecol.* **10**: 125-136.
- GERLACH, S. A. 1958a. Die Mangroveregion tropischer Küsten als Lebensraum. *Z. Morph. Ökol. Tiere.* **46**:436-530.
- . 1958b. Beobachtungen über das Verhalten von Winkerkrabben (*Uca leptodactyla*). *Z. Tierpsychol.* **15**: 50-53.
- GIBBS, P. E. 1974. Notes on *Uca burgersi* Holthuis (Decapoda, Ocypodidae) from Barbuda, Leeward Islands. *Crustaceana.* **27**: 84-91.
- and G. W. BRYAN. 1972. A study of strontium, magnesium, and calcium in the environment and exoskeleton of decapod crustaceans, with special reference to *Uca burgersi* on Barbuda, West Indies. *J. exp. mar. Biol. Ecol.* **9**: 97-110.
- GIFFORD, C. A. 1962a. Some aspects of osmotic and ionic regulation in the blue crab, *Callinectes sapidus*, and the ghost crab, *Ocypode albicans*. *Publs Inst. mar. Sci. Univ. Tex.* **8**: 97-125.
- . 1962b. Some observations on the general biology of the land crab, *Cardisoma guanhumi* (Latreille), in South Florida. *Biol. Bull.* **123**: 207-223.
- . 1968. Accumulation of uric acid in the land crab, *Cardisoma guanhumi*. *Am. Zoologist* **8**: 521-528.
- and R. F. JOHNSON. 1962. Distribution of calcium in the land crab *Cardisoma guanhumi* during shell wound recalcification. *Comp. Biochem. Physiol.* **7**: 227-231.
- GILLES, R. 1970. Osmoregulation in the stenohaline crab *Libinia emarginata* Leech. *Arch. Int. Physiol. Biochem.* **78**: 91-99.
- GLAESSNER, M. F. 1969. Decapoda. In: R. C. Moore (ed.), *Treatise on Invertebrate Paleontology*. Part R. Arthropoda 4, Volume 2. pp. R399-532. Geol. Soc. Amer. and Univ. Kansas Press.
- GLASSELL, S. A. 1937. *Pinnixa lunzi*, a new commensal crab from South Carolina. *Charleston Mus. Leaflet* **9**: 3-8.
- GLEESON, R. A. and P. L. ZUBKOFF. 1977. The determination of hemolymph volume in the blue crab, *Callinectes sapidus*, utilizing <sup>14</sup>C-thiocyanate. *Comp. Biochem. Physiol.* **56A**: 411-413.
- GODCHARLES, M. F. and W. C. JAAP. 1973. Fauna and flora in hydraulic clam dredge collections from Florida west and southeast coasts. *Spec. scient. Rep. Fla. Dept. Nat. Resources.* no. **40**, 89 pp.

- GOMES CORRÊA, M. M. 1970. Crustáceos braquiuros brasileiros da familia Raninidae. *Bolm. Mus. nac. Rio de J., Zool.* **276**: 1-21.
- GORDON, I. 1950. Crustacea: Dromiacea. I. Systematic account of the Dromiacea collected by the "John Murray" Expedition. II. The morphology of the spermatheca in certain Dromiacea. *Sci. Rept. John Murray Exped. 1933-1934.* **9**: 201-253.
- . 1963. On the relationships of Dromiacea, Tymolinae and Raninidae to the Brachyura. pp. 51-57. In: H. B. Whitting and W. D. I. Rolfe (eds.), "Phylogeny and Evolution of Crustacea." *Spec. Publ., Mus. Comp. Zool. Harvard Univ.*
- GORE, R. H. 1977. Studies on decapod Crustacea from the Indian River region of Florida. VI. The identity of *Parthenope (Platylambrus) seratta* (H. Milne Edwards, 1834) and *Parthenope (Platylambrus) granulata* (Kingsley, 1879). *Proc. biol. Soc. Washington* (in press).
- and R. E. GRIZZLE. 1974. Studies on decapod Crustacea from the Indian River region of Florida. III. *Callinectes bocourti* A. Milne Edwards, 1879 (Decapoda, Portunidae) from the central east coast of Florida. *Crustaceana.* **27**: 306-308.
- GRAY, E. H. 1942. Ecological and life history aspects of the red-jointed fiddler crab, *Uca minax* (Le Conte), region of Solomon Island, Maryland. *Contrib. Chesapeake Biol. Lab., Publ. no. 51*: 3-20.
- and C. L. NEWCOMBE. 1938. The relative growth of parts in the blue crab *Callinectes sapidus* Rathbun. *Growth.* **2**: 235-246.
- GRAY, G. W., JR. 1969. Investigation of the basic life history of the red crab (*Geryon quinquedens*). R. I. Div. Conserv. P.L. 88-309, Proj. 3-46-R Completion Rept., 36 pp.
- GRAY, I. E. 1957. A comparative study of the gill area of crabs. *Biol. Bull.* **112**: 34-42.
- . 1961. Changes in the abundance of the commensal crabs of *Chaetopterus*. *Biol. Bull.* **120**: 353-359.
- , L. R. McCLOSKEY and S. C. WEIHE. 1968. The commensal crab *Dissodactylus mellitae* and its reaction to sand dollar host-factor. *J. Elisha Mitchell Sci. Soc.* **84**: 472-481.
- GREEN, J. W., M. HARSCH, L. BARR and C. L. PROSSER. 1959. The regulation of water and salt by the fiddler crabs, *Uca pugnax* and *Uca pugilator*. *Biol. Bull.* **116**: 76-87.
- GUINOT, D. 1964. Les trois especes du genre *Domecia* (Decapoda, Brachyura): *D. hispida* Eydoux & Souleyet, *D. glabra* Alcock, et *D. acanthophora* (Desbonne & Schramm). *Crustaceana.* **7**: 267-283.
- . 1966. Recherches préliminaires sur les groupements naturels chez les Crustacés Décapodes Brachyours. I. Les affinités des genres *Aethra*, *Osachila*, *Hepatus*, *Hepatella* et *Actaemorpha*. *Bull. Mus. natn. Hist. Nat. Paris.* **38**: 744-762, 828-845.
- . 1967a. Recherches préliminaires sur les groupements naturels chez les Crustacés Décapodes Brachyours. II. Les anciens genres *Micropanope* Stimpson et *Medaeus* Dana. *Bull. Mus. natn. Hist. Nat., Paris.* **39**: 345-374.
- . 1967b. Recherches préliminaires sur les groupements naturels chez les Crustacés Décapodes Brachyours. III. A propos des affinités des genres *Dairoides* Stebbing et *Daira* de Haan. *Bull. Mus. natn. Hist. Nat., Paris.* **39**: 540-563.
- . 1968a. Recherches préliminaires sur les groupements naturels chez les Crustacés Décapodes Brachyours. IV. Observations sur quelques genres de Xanthidae. *Bull. Mus. natn. Hist. Nat., Paris.* **39**: 695-727.
- . 1968b. Recherches préliminaires sur les groupements naturels chez les Crustacés Décapodes Brachyours. V. Établissement d'un caractere evolutif: l'articulation ischiomerale des chelipedes. *Bull. Mus. natn. Hist. Nat., Paris.* **40**: 149-166.
- . 1968c. Recherches préliminaires sur les groupements naturels chez les Crustacés Décapodes Brachyours. VI. Les Carpilinae. *Bull. Mus. natn. Hist. Nat., Paris.* **40**: 320-334.

- . 1969a. Recherches préliminaires sur les groupements naturels chez les Crustacés Décapodes Brachyours. VII. Les Goneplacidae. *Bull. Mus. natn. Hist. Nat., Paris*. **41**: 241-265; 507-528; 688-714.
- . 1969b. Sur divers Xanthidae, notamment sur *Actaea* de Haan et *Paractaea* gen. nov. (Crustacea Decapoda Brachyura). *Cah. Pac.* **13**: 223-285.
- . 1971. Recherches préliminaires sur les groupements naturels chez les Crustacés Décapodes Brachyours. VIII. Synthèse et bibliographie. *Bull. Mus. natn. Hist. Nat., Paris*. **42**: 1063-1090.
- GUINOT-DUMORTIER, D. 1959. Sur une collection de Crustacés (Decapoda Reptantia) de Guyane Française. I. Brachyura (Oxyrhyncha exclus). *Bull. Mus. natn. Hist. Nat., Paris*. **31**: 423-434; 510-515.
- . 1960. Sur une collection de Crustacés (Decapoda Reptantia) de Guyane Française. II. Brachyura Oxyrhyncha et Macrura. *Bull. Mus. natn. Hist. Nat. Paris*. **32**: 177-187.
- and B. DUMORTIER. 1960. La stridulation chez les crabes. *Crustaceana*. **1**: 117-155.
- and ———. 1961. Description d'un appareil striduloire dans le genre *Cycloes* de Haan (Crustacea, Brachyura, Oxystemata, Calappidae). *Bull. Mus. natn. Hist. Nat. Paris, 2e Ser.* **32**: 558-561.
- GUNTER, G. 1938. The common blue crab in fresh waters. *Science*. **8**: 87-88.
- . 1950. Seasonal population changes and distributions as related to salinity, of certain invertebrates of the Texas coast, including the commercial shrimp. *Publs. Inst. mar. Sci. Univ. Tex.* **1**: 7-87.
- . 1954. Sagacity of a crab. *Science* **120**: 188-189.
- GUTSELL, J. S. 1928. The spider crab, *Libinia dubia*, and the jelly-fish, *Stomolophus meleagris*, found associated at Beaufort, North Carolina. *Ecology*. **9**: 358-359.
- GUYSELMAN, J. B. 1953. An analysis of the molting process in the fiddler crab, *Uca pugilator*. *Biol. Bull.* **104**: 115-137.
- HAEFNER, P. A., JR. 1977. Reproductive biology of the female deep-sea red crab, *Geryon quinquedens*, from the Chesapeake Bight. *Fishery Bull. Fish Wildl. Serv. U.S.* **75**: 91-102.
- and D. GARTEN. 1974. Methods of handling and shedding blue crabs, *Callinectes sapidus*. *Mar. Resources Advis. Ser 8* (Virginia Inst. Mar. Sci.), pp. 1-14.
- and J. A. MUSICK. 1974. Observations on distribution and abundance of red crabs in Norfolk Canyon and adjacent continental slope. *Mar. Fish. Rev.* **36**: 31-34.
- and C. N. SHUSTER, JR. 1964. Length increments during terminal molt of the female blue crab, *Callinectes sapidus*, in different salinity environments. *Chesapeake Sci.* **5**: 114-118.
- von HAGEN, H.-O. 1967. Nachweis einer kinasthetischen orientierung bei *Uca rapax*. *Z. Morph. Ökol, Tiere* **58**: 301-320.
- . 1970a. Verwandtschaftliche Gruppierung und Verbreitung der Karibischen Winterkrabben (Ocypodidae, Gattung *Uca*). *Zool. Meded. Leiden* **44**: 217-235.
- . 1970b. Anpassungen an das spezielle Gezeitenzonen-Niveau bei Ocypodiden (Decapoda, Brachyura). *Forma Functio*. **2**: 361-413.
- . 1970c. Die Balz von *Uca vocator* (Herbst) als ökologisches Problem. *Forma Functio*. **2**: 238-253.
- . 1976. Review: Jocelyn Crane, Fiddler Crabs of the World. Ocypodidae: Genus *Uca*. xxiv + 737 pp., 369 photographs, 101 figures, 21 maps. ISBN 08102-6, \$75.00. Princeton University Press, Princeton, New Jersey, 1975. *Crustaceana*. **31**: 221-224.

- HALEY, S. R. 1967. Reproductive biology of the Texas ghost crab *Ocypode albicans* Bosc (Decapoda: Ocypodidae). Ph.D. Dissertation, Univ. of Texas at Austin. 135 pp.
- . 1969. Relative growth and sexual maturity of the Texas ghost crab, *Ocypode quadrata* (Fabr.) (Brachyura, Ocypodidae). *Crustaceana*. **17**: 285–297.
- . 1972. Reproductive cycling in the ghost crab, *Ocypode quadrata* (Fabr.) (Brachyura, Ocypodidae). *Crustaceana*. **23**: 1–11.
- HAMILTON, P. V. 1976. Predation on *Littorina irrorata* (Mollusca: Gastropoda) by *Callinectes sapidus* (Crustacea: Portunidae). *Bull. mar. Sci.* **26**: 403–409.
- , R. T. NISHIMOTO and J. G. HALUSKY. 1976. Cheliped laterality in *Callinectes sapidus* (Crustacea: Portunidae). *Biol. Bull.* **150**: 393–401.
- HARTNOLL, R. G. 1964a. The freshwater grapsid crabs of Jamaica. *Proc. Linn. Soc. Lond.* **175**: 145–169.
- . 1964b. The zoeal stages of the spider crab *Microphrys bicornutus* (Latr.). *Ann. Mag. nat. Hist.* **7**: 241–246.
- . 1965a. The biology of spider crabs: a comparison of British and Jamaican species. *Crustaceana*. **9**: 1–16.
- . 1965b. Notes on the marine grapsid crabs of Jamaica. *Proc. Linn. Soc. Lond.* **176**: 113–147.
- . 1969. Mating in the Brachyura. *Crustaceana*. **16**: 161–181.
- . 1970. Swimming in the dromiid crab, *Homola barbata*. *Anim. Behav.* **18**: 588–591.
- . 1971. The occurrence, methods and significance of swimming in the Brachyura. *Anim. Behav.* **19**: 34–50.
- HAVEN, D. 1958. Effects of pea crabs, *Pinnotheres ostreum*, on oysters, *Crassostrea virginica*. *Proc. natl. Shellfish Assoc.* **49**: 77–86.
- and J. D. ANDREWS. 1957. Survival and growth of *Venus mercenaria*, *Venus campechiensis* and their hybrids in suspended trays and on natural bottoms. *Proc. natl. Shellfish Assoc.* **47**: 43–49.
- HAY, W. P. 1905. The life history of the blue crab (*Callinectes sapidus*). *Rept. U.S. Bur. Fish.* **1904**: 395–413.
- and C. A. SHORE. 1918. The decapod crustaceans of Beaufort, N.C., and surrounding region. *Bull. U.S. Bur. Fish.* **35**: 369–475.
- HAZLETT, B. A. 1971. Antennule chemosensitivity in marine decapod Crustacea. *J. Anim. Morph. Physiol.* **13**: 1–10.
- . 1972a. Responses to agonistic postures by the spider crab. *Microphrys bicornutus*. *Mar. Behav. Physiol.* **1**: 85–92.
- . 1972b. Stereotypy of agonistic movements in the spider crab *Microphrys bicornutus*. *Behaviour*. **42**: 270–278.
- . 1976. Agnostic behavior of two sympatric species of xanthid crabs, *Leptodius floridanus* and *Hexapanopeus angustifrons*. *Mar. Behav. Physiol.* **4**: 107–119.
- and G. F. ESTABROOK. 1974. Examination of agonistic behavior by character analysis. I. The spider crab *Microphrys bicornutus*. *Behaviour*. **44**: 131–144.
- HAZLETT, B. and D. RITTSCHOF. 1975. Daily movements and home range in *Mithrax spinosissimus* (Majidae, Decapoda). *Mar. Behav. Physiol.* **3**: 101–118.
- HEDGPETH, J. W. 1950. Notes on the marine invertebrate fauna of salt flat areas in Aransas National Wildlife Refuge, Texas. *Publs. Inst. mar. Sci. Univ. Tex.* **1**: 103–119.
- . 1953. An introduction to the zoogeography of the northwestern Gulf of Mexico with reference to the invertebrate fauna. *Publs Inst. mar. Sci. Univ. Tex.* **3**: 107–224.

- HENNING, H. G. 1975a. Ökologische, ethologische und sinnesphysiologische Untersuchungen an der Landkrabbe *Cardisoma guanhumi* Latreille (Decapoda, Brachyura) in Nordkolumbien. *Forma Functio*. **8**: 253-304.
- . 1975b. Kampf- Fortpflanzungs- und Hautungsverhalten; Wachstum und Geschlechtsreife von *Cardisoma guanhumi* Latreille. *Forma Functio*. **8**: 463-510.
- HERREID, C. F., II. 1963. Observations on the feeding behavior of *Cardisoma guanhumi* (Latreille) in southern Florida. *Crustaceana*. **5**: 176-180.
- HERREID, C. F. 1967. Skeletal measurements and growth of the land crab, *Cardisoma guanhumi* Latreille. *Crustaceana*. **13**: 39-44.
- and C. A. GIFFORD. 1963. The burrow habitat of the land crab, *Cardisoma guanhumi* (Latreille). *Ecology*. **44**: 773-775.
- HERRNKIND, W. F., 1968a. Adaptive visually-directed orientation in *Uca pugilator*. *Am. Zoologist*. **8**: 585-598.
- . 1968b. The breeding of *Uca pugilator* (Bosc) and mass rearing of the larvae with comments on the behavior of the larval and early crab stages (Brachyura, Ocypodidae). *Crustaceana, Suppl.* **2**: 214-224.
- . 1968c. Ecological and ontogenetic aspects of visual orientation in the sand fiddler crab, *Uca pugilator* (Bosc). Ph.D. Dissertation, Univ. of Miami, Miami, Florida.
- . 1972. Orientation of shore-living arthropods, especially the sand fiddler crab. pp. 1-59. In: H. E. Winn and B. L. Olla (eds.), *Behavior of Marine Invertebrates. Vol. 1, Invertebrates*. Plenum Press.
- HERRNKIND, W., G. STANTON and E. CONKLIN. 1976. Initial characterization of the commensal complex associated with the anemone, *Lebrunia danae*, at Grand Bahama. *Bull. mar. Sci.* **26**: 65-71.
- HILDEBRAND, H. H. 1954. A study of the fauna of the brown shrimp (*Penaeus aztecus* Ives) grounds in the western Gulf of Mexico. *Publs Inst. mar. Sci. Univ. Tex.* **3**: 229-366.
- . 1955. A study of the pink shrimp (*Penaeus duorarum* Burkenroad) grounds in the Gulf of Campeche. *Publs Inst. mar. Sci. Univ. Tex.* **4**: 171-232.
- . 1957. Estudios biológicos preliminares sobre la Laguna Madre de Tamaulipas. *Ciencia (Mexico)*. **17**: 151-173.
- HILL, G. W. and R. E. HUNTER. 1973. Burrows of the ghost crab *Ocypode quadrata* (Fabricius) on the barrier islands, south-central Texas coast. *J. Sediment. Petrol.* **43**: 24-30.
- HINSCH, G. W. 1968. Reproductive behavior in the spider crab, *Libinia emarginata* L. *Biol. Bull.* **135**: 273-278.
- . 1970. Some factors controlling reproduction in the spider crab, *Libinia emarginata*. *Biol. Bull.* **139**: 410.
- . 1973. Sperm structure of Oxyrhynga. *Can. J. Zool.* **51**: 421-426.
- and M. V. CONE. 1969. Ultrastructural observation of vitellogenesis in the spider crab, *Libinia emarginata* L. *J. Cell. Biol.* **40**: 336-342.
- HOCKETT, J. C. and H. KRITZLER. 1972. Capture-recapture methods with *Uca*. *Biol. Bull.* **142**: 49-56.
- HODGE, M. H. 1956a. Autotomy and regeneration in *Gecarcinus lateralis*. *Anat. Rec.* **125**: 633.
- . 1956b. Variations on the normal pattern of limb regeneration in *Gecarcinus lateralis*. *Anat. Rec.* **125**: 635-636.
- and G. B. CHAPMAN. 1958. Some observations on the fine structure of the sinus gland of a land crab, *Gecarcinus lateralis*. *J. biophys. biochem. Cytol.* **4**: 571-574.

- HOESE, H. D. 1960. Biotic changes associated with end of a drought. *Limnol. Oceanogr.* **5**: 326-336.
- , B. J. COPELAND, F. N. MOSELEY and E. D. LANE. 1968. Fauna of the Aransas Pass Inlet, Texas. III. Diel and seasonal variations in trawlable organisms of the adjacent area. *Tex. J. Sci.* **20**: 33-60.
- and R. S. JONES. 1963. Seasonality of larger animals in a Texas turtle grass community. *Publs Inst. mar. Sci. Univ. Tex.* **9**: 37-47.
- , and J. M. VALENTINE, JR., 1972. U.S.L. studies on the Chandeleur Islands. *Research Ser. no. 10. Southwest La.:* Lafayette, La. 60 pp.
- HOLLAND, C. A. and D. M. SKINNER. 1976. Interactions between molting and regeneration in the land crab. *Biol. Bull.* **150**: 222-240.
- HOLLAND, J. S., D. V. ALDRICH and K. STRAWN. 1971. Effects of temperature and salinity on growth, food conversion, survival and temperature resistance of juvenile blue crabs, *Callinectes sapidus* Rathbun. *Texas A&M University. Sea Grant Publ. TAMU-SG-71-222.* 166 pp.
- HOLMSEN, A. A. and H. McALLISTER. 1974. Technological and economic aspects of red crab harvesting and processing. *Tech. Rept. Univ. R.I. Mar.* **28**: 1-35.
- HOLTHUIS, L. B. 1958. West Indian crabs of the genus *Calappa*, with a description of three new species. *Stud. Fauna Curaçao.* **3**: 146-186.
- . 1959. The Crustacea Decapoda of Suriname (Dutch Guiana). *Zool. Verh., Leiden.* **44**: 1-296.
- . 1961. Report on a collection of Crustacea Decapoda and Stomatopoda from Turkey and the Balkans. *Zool. Verh., Leiden.* **47**: 1-67.
- . 1967. On a new species of *Uca* from the West Indian region (Crustacea, Brachyura, Ocypodidae). *Zool. Meded., Leiden.* **42**: 51-54.
- . 1969. *Portunus binoculus*, n. sp., a new deep-water swimming crab from the Caribbean region (Crustacea, Decapoda, Brachyura). *Bull. mar. Sci.* **19**: 409-427.
- and E. GOTTLIEB. 1956. Two interesting crabs (Crustacea Decapoda, Brachyura) from Mersin Bay, S.E. Turkey. *Zool. Meded., Leiden.* **34**: 287-299.
- HOOD, M. A. 1962. Studies on the larval development of *Rhithropanopeus harrisi* (Gould) of the family Xanthidae (Brachyura). *Gulf Res. Rept.* **1**: 122-130.
- HOPKINS, S. H. 1947. The nemertean *Carcinonemertes* as an indicator of the spawning history of the host, *Callinectes sapidus*. *J. Parasitol.* **33**: 146-150.
- HORCH, K. 1971. An organ for hearing and vibration sense in the ghost crab *Ocypode*. *Z. Vergl. Physiol.* **73**: 1-21.
- HORCH, K. W. and M. SALMON. 1969. Production, perception and reception of acoustic stimuli by semiterrestrial crabs (Genus *Ocypode* and *Uca*, family Ocypodidae). *Forma et Functio.* **1**: 1-25.
- HORN, E. C. and M. S. KERR. 1963. Hemolymph protein and copper concentrations of adult blue crabs (*Callinectes sapidus* Rathbun). *Biol. Bull.* **125**: 499-507.
- and ———. 1969. The hemolymph protein of the blue crab *Callinectes sapidus*. I. Hemocyanins and certain other major protein constituents. *Comp. Biochem. Physiol.* **29**: 493-508.
- HUGHES, D. A. 1973. On mating and the "copulation burrows" of crabs of the genus *Ocypode* (Decapoda, Brachyura). *Crustaceana.* **24**: 72-76.
- HULINGS, N. C. 1961. The barnacle and decapod fauna from the near shore area of Panama City, Florida. *Q. Jl. Fla. Acad. Sci.* **24**: 215-222.
- HUMES, A. G. 1941a. Notes on *Octolasmis mulleri* Coker, a barnacle commensal on crabs. *Trans. Am. microsc. Soc.* **60**: 101-103.

- . 1941b. A new harpacticoid copepod from the gill chambers of a marsh crab. *Proc. U.S. natn. mus.* **90**: 370-386.
- . 1958. *Antillessia cardisomae*, n. gen. and sp. (Copepoda: Harpacticoida) from the gill chambers of land crabs, with observations on the related genus *Cancricola*. *J. Wash. Acad. Sci.* **48**: 77-89.
- HYATT, G. W. 1974. Behavioural evidence for light intensity discrimination by the fiddler crab *Uca pugilator* (Brachyura, Ocypodidae). *Anim. Behav.* **22**: 796-801.
- . 1975. Physiological and behavioral evidence for colour discrimination by fiddler crabs (Brachyura, Ocypodidae, genus *Uca*). In: F. J. Vernberg (ed.) *Physiological Ecology of Estuarine Organisms*. Univ. South Carolina Press.
- HYMAN, L. H. 1955. *The Invertebrates. IV. Echinodermata: The Coelomate Bilateria*. McGraw-Hill: New York. 763 pp.
- HYMAN, O. W. 1920. The development of *Gelasimus* after hatching. *J. Morph.* **33**: 485-524.
- . 1922. Adventures in the life of a fiddler crab. *Rep. Smithsonian Inst. for 1920*. Pp. 443-460.
- . 1924. Studies on larvae of crabs of the family Grapsidae. *Proc. U.S. natn. mus.* **65**: 1-8.
- . 1925. Studies on the larvae of the crabs of the family Xanthidae. *Proc. U.S. natn. mus.* **67**: 1-22.
- IVERSON, E. S. and G. L. BEARDSLEY. 1976. Shell disease in crustaceans indigenous to South Florida. *Progr. Fish-Culturist.* **38**: 195-196.
- IVES, J. E. 1891. Crustacea from the northern coast of Yucatan, the harbor of Vera Cruz, the west coast of Florida and the Bermuda Islands. *Proc. Acad. Nat. Sci. Phil.* **1891**: 176-207.
- JACHOWSKI, R. 1963. Observations on the moon jelly, *Aurelia aurita*, and the spider crab, *Libinia dubia*. *Chesapeake Sci.* **4**: 195.
- JACHOWSKI, R. L. 1974. Agonistic behavior of the blue crab, *Callinectes sapidus* Rathbun. *Behaviour.* **50**: 232-253.
- JAHROMI, S. S. and C. K. GOVIND. 1976. Ultrastructural diversity in motor units of crustacean stomach muscles. *Cell Tiss. Res.* **166**: 159-166.
- JAWORSKI, E. 1970. Biogeography of the blue crab fishery, Barataria Bay, Louisiana, Ph.D. Dissertation, Louisiana State Univ., Baton Rouge.
- JOHNSON, G. E. 1965. An ethological study of the rock crab, *Grapsus grapsus* (family Grapsidae) with emphasis on behavioral observations during ontogeny and with habitat. *Am. Zoologist.* **5**: 632.
- JOHNSON, I. S. 1952. The demonstration of a "host-factor" in commensal crabs. *Trans. Kansas Acad. Sci.* **55**: 458-464.
- JOHNSON, P. T. 1976. Gas-bubble disease in the blue crab, *Callinectes sapidus*. *J. Invert. Pathol.* **27**: 247-253.
- JONES, H. G. 1968. Preliminary studies on the brachyuran Crustacea of Barbados. II. *J. Barbados Mus.* **32**: 187-189.
- JONES, L. L. 1940. An introduction of an Atlantic crab into San Francisco Bay. *Proc. 6th Pac. Sci. Congr.* **3**: 485-486.
- . 1941. Osmotic regulation in several crabs of the Pacific coast of North America. *J. cell. comp. Physiol.* **18**: 79-92.
- KALBER, F. A., JR. and J. D. COSTLOW, JR. 1966. The ontogeny of osmoregulation and its neurosecretory control in the decapod crustacean *Rhithropanopeus harrisi* (Gould). *Am. Zoologist.* **6**: 221-229.

- KALBER, F.A. and J. D. COSTLOW, JR. 1968. Osmoregulation in larvae of the land-crab, *Cardisoma guanhumii* Latreille. *Am. Zoologist*. **3**: 411-416.
- KARANDIEVA, O and A. S. LEE. 1967. Intensidad de respiracion y osmoregulacion del cangrejo comercial *Menippe mercenaria* (Say) de las aguas Cubanas. *Inst. Oceanol. Acad. Cien. Cuba, Estudios*. **2**: 5-19.
- KEITH, D. E. and N. C. HULINGS. 1965. A quantitative study of selected nearshore infauna between Sabine Pass and Bolivar Point, Texas. *Publs Inst. mar. Sci. Univ. Tex.* **10**: 33-40.
- KERWIN, J. A. 1971. Distribution of the fiddler crab (*Uca minax*) in relation to marsh plants within a Virginia estuary. *Chesapeake Sci.* **12**: 180-183.
- KIRCHER, A. B. 1970. The zoeal stages and glaucothoe of *Hypoconcha arcuata* Stimpson (Decapoda: Dromiidae) reared in the laboratory. *Bull. mar. Sci.* **20**: 769-792.
- KLAASSEN, F. 1973. Stridulation und Kommunikation durch Substratschall bei *Gecarcinus lateralis* (Crustacea Decapoda). *J. comp. Physiol.* **83**: 73-79.
- . 1975. Ökologische und ethologische Untersuchungen zue Fortpflanzungsbiologie von *Gecarcinus lateralis* (Decapoda, Brachyura). *Forma Functio*. **8**: 101-174.
- 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.* **2**: 145-169.
- KNOPF, G. N. 1966. Observations on behavioral ecology of the fiddler crab, *Uca pugilator* (Bosc). *Crustaceana*. **11**: 302-306.
- KRAMER, P. 1967. Beobachtungen zur Biologie und zum Verhalten der Klippenkrabbe *Grapsus grapsus* L. (Brachyura Grapsidae) auf Galapagos und am ekuadorianischen Festland. *Z. Tierpsychol.* **24**: 385-402.
- KRANTZ, G. E., R. R. COLWELL and E. LOVELACE. 1969. *Vibrio parahaemolyticus* from the Blue Crab *Callinectes sapidus* in Chesapeake Bay. *Science*. **164**: 1286-1287.
- KRUCZYNSKI, W. L. 1971. Relationship of the pea crab, *Pinnotheres maculatus* (Say), with the scallops, *Argopecten irradians concentricus* (Say) and *Argopecten gibbus* (Linne). Ph.D. Dissertation, Univ. North Carolina, Chapel Hill. 120 pp.
- . 1972. The effect of the pea crab, *Pinnotheres maculatus* Say, on growth of the bay scallop, *Argopecten irradians concentricus* (Say). *Chesapeake Sci.* **13**: 218-220.
- . 1975. A radioactive tracer study of food uptake by *Pinnotheres maculatus* in molluscan hosts. *Biol. Bull.* **148**: 60-67.
- LAIRD, C. E. and P. A. HAEFNER, JR. 1976. Effects of intrinsic and environmental factors on oxygen consumption in the blue crab, *Callinectes sapidus* Rathbun. *J. exp. mar. Biol. Ecol.* **22**: 171-178.
- LANDERS, W. S. 1954. Notes on the predation of the hard clam, *Venus mercenaria* by the mud crab, *Neopanope texana*. *Ecology*. **35**: 422.
- LANGDON, J. W. 1971. Shape discrimination and learning in the fiddler crab *Uca pugilator*. Ph.D. Dissertation. Florida State University, Tallahassee.
- LEARY, S. P. 1967. Crabs of Texas. Texas Parks and Wildlife Bulletin, no. **43**, 57 pp.
- LEBOUR, M. V. 1928. Studies of the Plymouth Brachyura. II. The larval stages of *Ebalia* and *Pinnotheres*. *J. mar. Biol. Assoc. U.K.* **15**: 109-123.
- . 1944. Larval crabs from Bermuda. *Zoologica*. **29**: 113-128.
- . 1950. Notes on some larval decapods (Crustacea) from Bermuda. *Proc. Zool. Soc. London*. **120**: 369-379.
- LEFFLER, C. W. 1972. Some effects of temperature on the growth and metabolic rate of juvenile blue crab, *Callinectes sapidus*, in the laboratory. *Mar. Biol.* **14**: 104-110.



- . 1973. Metabolic rate in relation to body size and environmental oxygen concentration in two species of xanthid crabs. *Comp. Biochem. Physiol.* **44A**: 1047-1052.
- LEIPPER, D. F. 1954. Physical oceanography of the Gulf of Mexico. In: Gulf of Mexico. Its origin, waters, and marine life. *Fishery Bull. Fish Wildl. Serv. U.S.* **55**: 119-137.
- LE LOUEFF, P., A. INTES and J. C. LE GUEN. 1974. Note sur les premiers essais de capture du crabe profond *Geryon quinquedens* en Côte d'Ivoire. *Doc. Sci. Cent. Rech. Océanogr. Abidjan.* **5**: 73-84.
- LEONE, C. A. 1951. A serological analysis of the systematic relationship of the brachyuran crab *Geryon quinquedens*. *Biol. Bull.* **100**: 44-48.
- LEWIS, E. G. 1976. Epizoots associated with *Bathynectes superbus* (Decapoda: Portunidae). *Fishery Bull. Fish Wildl. Serv. U.S.* **74**: 225-227.
- LEWIS, E. G. and P. A. HAEFNER, JR. 1976. Oxygen consumption of the blue crab, *Callinectes sapidus* Rathbun, from proecdysis to postecdysis. *Comp. Biochem. Physiol.* **54A**: 55-60.
- LOBO de MESQUITA, A. L. 1972. Dados biométricos do siri canela, *Portunus spinimanus* Latreille, 1819 (Decapoda-Brachyura-Portunidae). *Arq. Ciên. Mar.* **12**: 88-90.
- LUDOLPH, C., D. PAGNANALLI and M. I. MOTE. 1973. Neural control of migration of proximal screening pigment by reticular cells of the swimming crab *Callinectes sapidus*. *Biol. Bull.* **145**: 159-170.
- LUNZ, G. R., JR. 1937. Xanthidae (mud crabs) of the Carolinas. *The Charleston Mus., Leaflet.* **9**: 9-27.
- . 1939. New crustacean records for the Carolinas and Florida. *J. Elisha Mitchell Sci. Soc.* **55**: 335-338.
- . 1947. *Callinectes* versus *Ostrea*. *J. Elisha Mitchell Sci. Soc.* **63**: 81.
- LYNCH, M. P., K. L. WEBB and W. A. van ENGEL. 1973. Variation in serum constituents of the blue crab *Callinectes sapidus*: chloride and osmotic concentration. *Comp. Biochem. Physiol.* **44A**: 719-734.
- LYNCH, S. A. 1954. Geology of the Gulf of Mexico. In: Gulf of Mexico. Its origin, waters, and marine life. *Fishery Bull. Fish Wildl. Serv. U.S.* **55**: 67-86.
- LYONS, W. G., S. P. COBB, D. K. CAMP, J. A. MOUNTAIN, T. SAVAGE, L. LYONS and E. A. JOYCE. 1971. Preliminary inventory of marine invertebrates collected near the electrical generating plant, Crystal River, Florida, in 1969. *Prof. Pap. Fla. Dept. Nat. Res.* **14**.
- MACCAGNO, T. 1928. Crostacei decapodi. Le specie del genere *Uca* Leach conservate nel Regio Museo Zoologico di Torino. *Boll. Musei Zool. Anat. comp. R. Univ. Torino.* **41**: 1-52.
- MACGINITIE, G. E. and N. MACGINITIE. 1968. *Natural History of Marine Animals*. 2d Ed. McGraw-Hill: New York. 523 pp.
- MAHOOD, R., M. MCKENZIE, D. MIDDAGH, S. BOLLAR, J. DAVIS and D. SPITSBERGEN. 1970. A report on the cooperative blue crab study—South Atlantic states. *Georgia Game & Fish Comm., Coastal Fish. Div. Contrib. Ser.* **19**: 1-32.
- MANGUM, C. P. and L. M. AMENDE. 1972. Blood osmotic concentration of blue crabs (*Callinectes sapidus* Rathbun) found in fresh water. *Chesapeake Sci.* **13**: 318-320.
- , S. U. SILVERTHORN, J. L. HARRIS, D. W. TOWNE and A. R. KRALL. 1976. The relationship between blood pH, ammonia excretion and adaptation to low salinity in the blue crab *Callinectes sapidus*. *J. exp. Zool.* **195**: 129-136.
- MANGUM, C. and D. TOWLE. 1977. Physiological adaptation to unstable environments. *Am. Scient.* **65**: 67-75.
- MANGUM, C. P. and A. L. WEILAND. 1975. The function of hemocyanin in respiration of the blue crab *Callinectes sapidus*. *J. Exp. Zool.* **193**: 257-264.

- MANNING, R. B. 1961. Some growth changes in the stone crab, *Menippe mercenaria* (Say). *Q. Jl. Fla. Acad. Sci.* **23**: 273-277.
- . 1975. The identity of *Raninoides fossor* A. Milne Edwards & Bouvier, 1923 (Decapoda). *Crustaceana.* **29**: 297-298.
- and A. J. PROVENZANO, JR. 1961. The occurrence of *Ucides cordatus* (Linnaeus 1763) (Decapoda) in the United States. *Crustaceana.* **2**: 158-159.
- MANTEL, L. H. 1967. Asymmetry potentials, metabolism and sodium fluxes in gills of the blue crab, *Callinectes sapidus*. *Comp. Biochem. Physiol.* **20**: 743-753.
- . 1968. The foregut of *Gecarcinus lateralis* as an organ of salt and water balance. *Am. Zoologist.* **8**: 433-442.
- , D. E. BLISS, S. W. SHEEHAN and E. A. MARTINEZ. 1975. Physiology of hemolymph, gut fluid, and hepatopancreas of the land crab *Gecarcinus lateralis*. (Freminville) in various neuroendocrine states. *Comp. Biochem. Physiol.* **15A**: 663-671.
- MARCHAND, L. J. 1946. The saber crab, *Platychirograpsus typicus* Rathbun, in Florida: a case of accidental dispersal. *Q. Jl. Fla. Acad. Sci.* **9**: 93-100.
- MASON, C. A. 1970. Function of the pericardial sacs during the molt cycle in the land crab *Gecarcinus lateralis*. *J. exp. Zool.* **174**: 381-390.
- MATTHEWS, L. H. 1930. Notes on the fiddler-crab, *Uca leptodactyla*, Rathbun. *Ann. Mag. nat. Hist.* (ser. 10) **5**: 659-663.
- MAYNARD, D. M. 1961a. Thoracic neurosecretory structures in Brachyura. I. Gross anatomy. *Biol. Bull.* **121**: 316-329.
- . 1961b. Thoracic neurosecretory structures in Brachyura. II. Secretory neurons. *Gen. Comp. Endocrinol.* **1**: 237-263.
- and M. R. DANDO. 1974. The structure of the stomatogastric neuromuscular system in *Callinectes sapidus*, *Homarus americanus* and *Panulirus argus* (Decapoda Crustacea). *Phil. Trans. R. Soc. ser. B.* **263**: 161-220.
- and E. A. MAYNARD. 1962. Thoracic neurosecretory structures in Brachyura. III. Microanatomy of peripheral structures. *Gen. Comp. Endocrinol.* **2**: 12-28.
- McDERMOTT, J. J. 1960. The predation of oysters and barnacles by crabs of the family Xanthidae. *Proc. Pa. Acad. Sci.* **34**: 199-211.
- . 1962. The occurrence of *Pinnixa cylindrica* (Crustacea, Pinnotheridae) in the tubes of the lugworm, *Arenicola cristata*. *Proc. Penn. Acad. Sci.* **36**: 53-57.
- and F. B. FLOWER. 1953. Preliminary studies of the common mud crabs on oyster beds of Delaware Bay. *Nat. Shellfish. Assoc. 1952 Conv. Addr.* pp. 87-50.
- McMAHAN, M. R. 1967. The larval development of *Neopanope texana texana* (Stimpson) (Xanthidae). *Leaflet. Ser. Florida Bd. Conserv., Div. Salt Water Fish., Mar. Lab.*, no. **2**: pt. 1:1-16.
- McRAE, E. D. 1961. Red crab explorations off the northeastern coast of the United States. *Commer. Fish. Rev.* **23**(5): 5-10.
- MEADE, T. L. and G. W. GRAY, JR. 1973. The red crab. *Tech. Rept. Univ. R.I. Mar.* **11**: 1-21.
- MENDELSON, M. 1963. Some factors in the activation of crab movement receptors. *J. exp. Biol.* **40**: 157-169.
- . 1966. The site of impulse initiation in bipolar receptor neurons of *Callinectes sapidus* L. *J. exp. Biol.* **45**: 411-420.
- MENZEL, R. W. (ed.) 1971. Checklist of the marine fauna and flora of the Apalachee Bay and the St. George's Sound area. 3d edit. Dept. Oceanogr. Florida State Univ.: Tallahassee.

- MENZEL, R. and S. H. HOPKINS. 1956. Crabs as predators of oysters in Louisiana. *Proc. Nat. Shell Fish. Assoc.* **46**: 177-184.
- MENZEL, R. W. and F. W. NICHY. 1958. Studies of the distribution and feeding habits of some oyster predators in Alligator Harbor, Fla. *Bull. Mar. Sci. Gulf Carib.* **8**: 125-145.
- MENZIES, R. J. 1948. A revision of the brachyuran genus *Lophopanopeus*. *Occas. Pap. Allan Hancock.* **4**: 1-42.
- MILLER, D. C. 1961. The feeding mechanism of fiddler crabs, with ecological considerations of feeding adaptations. *Zoologica.* **46**: 89-100.
- . 1965. Studies of the systematics, ecology and geographical distribution of certain fiddler crabs. Doctoral Dissertation, Duke University. 240 pp.
- . 1968. Growth in *Uca*. 1. Ontogeny of asymmetry in *Uca pugnator* (Bosc) (Decapoda, Ocypodidae). *Crustaceana.* **24**: 119-131.
- and F. J. VERNBERG. 1968. Some thermal requirements of fiddler crabs of the temperature and tropical zones and their influence on geographic distribution. *Am. Zoologist.* **8**: 459-469.
- MILLER, K. G. and D. MAUER. 1973. Distribution of the fiddler crabs, *Uca pugnax* and *Uca minax*, in relation to salinity in Delaware rivers. *Chesapeake Sci.* **14**: 219-221.
- MILLER, R. E., S. D. SULKIN and R. L. LIPPSON. 1975. Composition and seasonal abundance of the blue crab, *Callinectes sapidus* Rathbun, in the Chesapeake and Delaware Canal and adjacent waters. *Chesapeake Sci.* **16**: 27-31.
- MILNE, L. J. and M. J. MILNE. 1946. Notes on the behavior of the ghost crab. *Am. Nat.* **80**: 362-380.
- MILNE EDWARDS, A. 1880. Reports on the results of dredging under supervision of Alexander Agassiz in the Gulf of Mexico, and in the Caribbean Sea, 1877, '78, '79, by the U.S. Coast Survey Steamer "Blake". VIII Études préliminaires sur les Crustacés. *Bull. Mus. Comp. Zool.* **8**: 1-68.
- and E. L. BOUVIER. 1902. Reports on the results of dredging, under the supervision of Alexander Agassiz, in the Gulf of Mexico (1877-78), in the Caribbean Sea (1878-79), and along the Atlantic coast of the United States (1880), by the U.S. Coast Survey Steamer "Blake". XXXIX. Les Dromiaces et Oxystomes. *Mem. Mus. Comp. Zool.* **27**: 1-127.
- and ———. 1923. Reports on the results of dredging under the supervision of Alexander Agassiz in the Gulf of Mexico (1877-78), in the Caribbean Sea (1878-79), and along the Atlantic coast of the United States (1880), by the U.S. Coast Survey Steamer Blake. . . . XLVII. Les Porcellanides et des Brachyures. *Mem. Mus. Comp. Zool.* **47**: 283-395.
- MOFFETT, S. 1975. Motor patterns and structural interactions of basi-ischiopodite levator muscles in routine limb elevation and production of autotomy in the land crab, *Cardisoma guanhumi*. *J. comp. Physiol.* **96**: 285-305.
- MONOD, TH. 1956. Hippidea et Brachyura ouest-africains. *Mem. Inst. Franc. Afr. No.* **45**: 1-674.
- MOORE, D. J. 1971. The uptake and concentration of fluoride by the blue crab, *Callinectes sapidus*. *Chesapeake Sci.* **12**: 1-13.
- MOOTZ, C. A. and C. E. EPIFANIO. 1974. An energy budget for *Menippe mercenaria* larvae fed *Artemia* nauplii. *Biol. Bull.* **146**: 44-55.
- MORE, W. R. 1969. A contribution to the biology of the blue crab, (*Callinectes sapidus* Rathbun) in Texas, with a description of the fishery. *Technical Ser. Texas Parks and Wildl. Dept.* **1**: 31 pp.
- MOREIRA, C. 1913. Embryologie de *Cardisoma guanhumi*, Latr. *Mem. Soc. Zool. France.* **25**: 155-161.

- MORRISON, P. R. and K. C. MORRISON. 1952. Bleeding and coagulation in some Bermudan Crustacea. *Biol. Bull.* **103**: 395-406.
- MURINA, V. V., V. D. CHUJCHIN, O. GOMEZ, and G. SUAREZ. 1969. Distribucion cuantitativa de la macrofauna bentonica del sublitoral superior de la plataforma cubana (region noroccidental). *Acad. Cienc. Cuba. Ser. Oceanol.* **6**: 1-14.
- MUSICK, J. A. and J. D. McEACHRAN. 1972. Autumn and winter occurrence of decapod crustaceans in Chesapeake Bight, U.S.A. *Crustaceana.* **22**: 190-200.
- NAYLOR, E. and M. J. ISAAC. 1973. Behavioural significance of pressure responses in megalopa larvae of *Callinectes sapidus* and *Macropipus* sp. *Mar. Behav. Physiol.* **1**: 341-350.
- NEWCOMBE, C. L. and M. R. ROGERS. 1947. Studies of a fungus parasite that infects blue crab eggs. *Turtlex News.* **25**: 180-186.
- NIMMO, D. R., P. D. WILSON, R. R. BLACKMAN and A. J. WILSON, JR. 1971. Polychlorinated biphenyl absorbed from sediments by fiddler crabs and pink shrimp. *Nature.* **231**: 50-53.
- NOMURA, H. and J. FAUSTO FILHO. 1966. Alguns dados biométricos de dois crustáceos marinhos do nordeste Brasileiro. *Arq. Est. Biol. Mar. Univ. Fed. Ceará.* **6**: 119-121.
- NORSE, E. A. 1972. Preliminary study of six Jamaican blue crabs, genus *Callinectes* (Decapods: Portunidae). In: Marine studies on the north coast of Jamaica (ed. G. J. Bakus). *Atoll Res. Bull.* **152**: 5.
- NOVAK, A. and M. SALMON. 1974. *Uca panacea*, a new species of fiddler crab from the Gulf coast of the United States. *Proc. Biol. Soc. Wash.* **87**: 313-326.
- NUNNEMACHER, R. F. 1965. The fine structure of the optic tracts of Decapoda. In: "Proceedings of the International Symposium on the functional organization of the compound eye, 25-27 October, 1965, Stockholm, Sweden. Symp. Publ. Div., Pergamon Press. Vol. 7. pp. 363-375.
- O'CONNOR, J. D. and L. I. GILBERT. 1968. Aspects of lipid metabolism in crustaceans. *Am. Zoologist.* **8**: 529-539.
- OGAWA, M., T. T. ALVES, M. da C. CALAND-NORONHA, C. A. E. ARARIPE, and E. L. MAIA. 1973. Industrialização do caranguejo uçá, *Ucides cordatus* (Linnaeus). I.—Técnicas para o processamento da carne. *Arq. Ciên. Mar.* **13**: 31-37.
- , T. T. ALVES, R. B. FILHO, A. S. RODRIGUES and E. L. LIMA. 1973. Industrialização do caranguejo uçá, *Ucides cordatus* (Linnaeus). II.—Aproveitamento dos resíduos e carapaça. *Arq. Ciên. Mar.* **13**: 83-90.
- O'HARA, J. 1973. The influence of temperature and salinity on the toxicity of cadmium to the fiddler crab, *Uca pugilator*. *Fishery Bull. Fish Wildl. Serv. U.S.* **71**: 149-153.
- OLER, T. M. 1941. Some notes on the occurrence of a small land crab (*Sesarma cinereum* Bosc) on the Magorothy River, Md. *Bull. nat. Hist. Soc. Md.* **11**: 51-53.
- de OLIVEIRA, L. P. H. 1939a. Contribuição ao conhecimento dos crustáceos do Rio de Janeiro. Gênero *Uca* (Decapoda: Ocypodidae). *Mems. Inst. Oswaldo Cruz.* **34**: 115-148.
- . 1939b. Observações sobre a biologia dos adultos do gênero *Uca* Leach 1814. *Liv. Hom. Profs. A. e M. Ozorio de Almeida Rio de Janeiro*, pp. 490-497.
- . 1939c. Alguns fatores que limitam o habitat de varias espécies de carangueiros do gênero *Uca* Leach. *Mems. Inst. Oswaldo Cruz.* **34**: 519-526.
- . 1940. Observações preliminares sobre a biologia dos crustáceos do gênero *Panopeus* Milne Edwards, 1834. *Mems. Inst. Oswaldo Cruz.* **35**: 153-171.
- . 1946. Ecological studies on the edible crabs *Uca* and *Guaianu*, *Cardisoma guanhumi*, and *Ucides cordatus*. *Mems. Inst. Oswaldo Cruz* **44**: 295-322.

- ONG, K.-S. and J. D. COSTDOW, JR. 1970. The effect of salinity and temperature on the larval development of the stone crab, *Menippe mercenaria* (Say), reared in the laboratory. *Chesapeake Sci.* **11**: 16-29.
- ORR, P. R. 1955. Heat death. 1. Time temperature relationship in marine animals. *Physiol. Zool.* **28**: 290-293.
- OTT, F. S. and R. B. FORWARD, JR. 1976. The effect of temperature on phototaxis and geotaxis by larvae of the crab *Rhithropanopeus harrisi* (Gould). *J. exp. mar. Biol. Ecol.* **23**: 97-107.
- OVERSTREET, R. and H. M. PERRY. 1972. A new microphallid trematode from the blue crab in the northern Gulf of Mexico. *Trans. Am. Mic. Soc.* **91**: 436-440.
- PALMER, J. D. 1967. Daily and tidal components in the persistent rhythmic activity of the crab, *Sesarma*. *Nature.* **215**: 64-66.
- PARK, J. R. 1969. A preliminary study of portunid crabs in Biscayne Bay. *Q. Jl. Fla. Acad. Sci.* **32**: 12-20.
- PARKER, R. H. 1959. Macro-invertebrate assemblages of central Texas coastal bays and Laguna Madre. *Bull. Am. Ass. Petrol. Geol.* **43**: 2100-2166.
- PATTON, W. K. 1967. Studies on *Domecia acanthophora*, a commensal crab from Puerto Rico, with particular reference to modifications of the coral host and feeding habits. *Biol. Bull.* **132**: 56-67.
- PAULEY, G. B., M. W. NEWMAN and E. GOULD. 1975. Serum changes in the blue crab, *Callinectes sapidus*, associated with *Paramoeba pernicioso*, the causative agent of Gray Crab Disease. *Mar. Fish. Rev.* **37**: 34-38.
- PAYEN, G., J. D. COSTLOW, JR. and H. CHARNIAUX-COTTON. 1971. Etude comparative de l'ultrastructure des glandes androgènes de Crabes normaux et pédonulectomisés pendant le vie larvaire ou apres la puberté chez les espèces: *Rhithropanopeus harrisi* (Gould) et *Callinectes sapidus* Rathbun. *Gen. comp. Endocrin.* **17**: 526-542.
- PEARCE, J. B. 1964. On reproduction in *Pinnotheres maculatus* (Decapoda: Pinnotheridae). *Biol. Bull.* **127**: 384.
- . 1966. On *Pinnixa faba* and *Pinnixa littoralis* (Decapoda: Pinnotheridae) symbiotic with the clam, *Tresus capax* (Pelecypoda: Mactridae). Pp. 565-589. In: Barnes, H. ed.), *Some Contemporary Studies in Marine Science*. Allen & Unwin, Ltd.
- PEARSE, A. S. 1913. On the habits of the crustaceans found in *Chaetopterus* tubes at Woods Hole, Mass. *Biol. Bull.* **24**: 102-114.
- . 1914. On the habits of *Uca pugnax* (Smith) and *U. pugilator* (Bosc). *Trans. Wisc. Acad. Sci.* **17**: 791-802.
- . 1929. The ecology of certain estuarine crabs at Beaufort, N. C. *J. Elisha Mitchell Scient. Soc.* **44**: 230-237.
- . 1932a. Observations on the parasites and commensals found associated with crustaceans of fishes at Dry Tortugas, Fla. *Pap. Tortugas Lab.* **28**: 103-115.
- . 1932b. Freezing points of bloods of certain littoral and estuarine animals. *Pap. Tortugas Lab.* **28**: 93-102.
- . 1934. Inhabitants of certain sponges at Dry Tortugas. *Pap. Tortugas Lab.* **28**: 117-124.
- . 1949. Observations on flatworms and nemertean collected at Beaufort, N.C. *Proc. U.S. natn mus.* **100**: 25-38.
- . 1952. Parasitic Crustacea from the Texas coast. *Publs Inst. mar. Sci. Univ. Tex.* **2**: 5-42.
- and L. G. WILLIAMS. 1951. The biota of the reefs off the Carolinas. *J. Elisha Mitchell Sci. Soc.* **67**: 133-161.

- PEQUEGNAT, L. H. and J. P. RAY. 1974. Crustacea and other arthropods. Pp. 232-288. In: T. J. Bright and L. H. Pequegnat (eds.), *Biota of the West Flower Garden Bank*. Gulf Publ. Co.: Houston.
- PEQUEGNAT, W. E. 1970. Deep-water brachyuran crabs. P. 171-204. In: F. A. Chace, Jr. and W. E. Pequegnat, eds. Texas A&M Univ. Oceanogr. Stud., I. *Contributions on the Biology of the Gulf of Mexico*. Gulf Publishing Co.: Houston.
- PERKINS, F. O. 1975. Fine structure of *Minichinia* sp. (Haplosporida) sporulation in the mud crab, *Panopeus herbstii*. *Mar. Fish. Rev.* **37**:46-60.
- PERRET, W. S. 1967. Occurrence, abundance and size distribution of the blue crab *Callinectes sapidus* taken with otter trawl in Vermillion Bay, Louisiana. *Proc. La Acad. Sci.* **30**: 63-69.
- PERRY, H. M. 1973. The occurrence of *Callinectes bocourti* (A. Milne Edwards, 1879) (Decapoda, Portunidae) in Biloxi Bay, Mississippi, U.S.A. *Crustaceana*. **25**: 110.
- . 1975. The blue crab fishery in Mississippi. *Gulf Res. Rept.* **5**: 39-57.
- PORTER, H. J. 1960. Zoal stages of the stone crab, *Menippe mercenaria* Say. *Chesapeake Sci.* **1**: 168-177.
- POWELL, E. H., JR. and G. GUNTER. 1968. Observations on the stone crab, *Menippe mercenaria* Say, in the vicinity of Port Aransas, Texas. *Gulf Res. Rep.* **2**: 285-299.
- POWERS, L.W. 1973. Ecological aspects of burrows and fiddler crab behavior. *Am. Zoologist.* **13**: 1271.
- . 1975. Fiddler crabs in a nontidal environment. *Contrib. mar. Sci.* **19**: 67-78.
- and J. F. COLE. 1976. Temperature variation in fiddler crab microhabitats. *J. exp. mar. Biol. Ecol.* **21**: 141-158.
- PRETZMANN, G. 1965. Verläufiger Bericht über die Familie Pseudothelphusidae. *Anz. öst. Akad. Wiss.* **1965**: 1-10.
- PROVENZANO, A. J. 1961. A North American record for *Callinectes boucourti* (A. Milne Edwards, 1879) (Decapoda, Portunidae). *Crustaceana*. **3**: 167.
- PYLE, R. and E. CRONIN. 1950. The general anatomy of the blue crab. *Publ. Ches. Biol. Lab.* **87**: 38 pp.
- QUINN, D. J. and C. E. LANE. 1966. Ionic regulation and Na<sup>+</sup>-K<sup>+</sup>-stimulated ATPase activity in the land crab, *Cardisoma guanhumii*. *Comp. Biochem. Physiol.* **19**: 533-543.
- and C. E. LANE. 1967. Na<sup>+</sup>- and K<sup>+</sup>-stimulated respiration in the excised gill of the land crab *Cardisoma guanhumii*. *Biol. Bull.* **133**: 245-254.
- RAO, K. RANGA and M. FINGERMAN. 1968. Dimorphic variants of the fiddler crab *Uca pugilator* and their chromatophore responses. *Proc. La. Acad. Sci.* **31**: 27-38.
- and ———. 1969. The influence of size on the response of melanophores in the fiddler crab, *Uca pugilator*, to eyestalk extracts. *Z. vergl. Physiol.* **62**: 86-96.
- and ———. 1970. Action of biogenic amines on crustacean chromatophores. II. Analysis of the responses of erythrophores in the fiddler crab, *Uca pugilator*, to indolealkylamines and an eyestalk hormone. *Comp. Gen. Pharmacol.* **1**: 117-126.
- , ——— and C. K. BARTELL. 1967. Physiology of the white chromatophores in the fiddler crab, *Uca pugilator*. *Biol. Bull.* **133**: 606-617.
- RATHBUN, M. J. 1894. Notes on crabs of the family Inachidae in the U.S. National Museum. *Proc. U.S. natn. mus.* **17**: 43-75.
- . 1897. List of the decapod Crustacea of Jamaica. *Ann. Inst. Jamaica, Kingston.* **1**: 1-46.
- . 1898. The Brachyura of the biological expedition to the Florida Keys and the Bahamas in 1893. *Bull. Lab. Nat. Hist. State Univ. Iowa.* **4**: 250-294.

- . 1901. The Brachyura and Macrura of Porto Rico. *Bull. U.S. Fish Comm.* **20**: 1-127.
- . 1918. The grapsoid crabs of America. *Bull. U.S. natn. mus.* **97**: 1-461.
- . 1920. New species of spider crabs from the Straits of Florida and Caribbean Sea. *Proc. Biol. Soc. Washington.* **33**: 23-24.
- . 1925. The spider crabs of America. *Bull. U.S. natn. mus.* **129**: 1-613.
- . 1930. The Cancroid crabs of America of the families Euryalidae, Portunidae, Atelecyclidae, Cancridae and Xanthidae. *Bull. U.S. natn. mus.* **152**: 1-609.
- . 1931a. New crabs from the Gulf of Mexico. *J. Wash. Acad. Sci.* **21**: 125-129.
- . 1931b. Two new crabs from the Gulf of Mexico. *Proc. Biol. Soc. Wash.* **44**: 71-72.
- . 1933. Brachyuran crabs of Porto Rico and the Virgin Islands. In: *Scient. Surv. P. Rico.* **15(1)**: 1-121, fig. 1-107. New York Acad. Sciences.
- . 1937. The oxystomatous and allied crabs of America. *Bull. U.S. natn. mus.* **166**: 1-278.
- RAY, C. 1967. *Gecarcinus lateralis* Fremenville in Texas. *Texas J. Sci.* **19**: 109.
- RADMOND, J. R. 1962. Oxygen-hemocyanin relationships in the land crab, *Cardisoma guanhumi*. *Biol. Bull.* **122**: 252-262.
- . 1968. Transport of oxygen by the blood of the land crab, *Gecarcinus lateralis*. *Am. Zoologist.* **8**: 471-479.
- REED, C. T. 1941. *Marine Life in Texas Waters*. Pp. i-xii, 1-88, Texas Academy of Science, Publ. Nat. Hist.
- REINGOLD, S. C. 1975. Temperature effects on axonal conduction in *Callinectes sapidus* (Rathbun) and *Carcinus maenas* (L.). *Comp Biochem. Physiol.* **51A**: 195-199.
- REINHARD, E. G. 1950a. An analysis of the effects of a sacculinid parasite on the external morphology of *Callinectes sapidus* Rathbun. *Biol. Bull.* **98**: 277-288.
- . 1950b. The morphology of *Loxothylacus texanus* Boschma, a sacculinid parasite of the blue crab. *Tex. J. Sci.* **2**: 360-365.
- RICE, A. L. 1964. The metamorphosis of a species of *Homola* (Crustacea, Decapoda: Dromiacea). *Bull. mar. Sci. Gulf. Caribb.* **14**: 221-238.
- and A. J. PROVENZANO. 1966. The larval development of the West Indian sponge crab *Dromidia antillensis*. *J. Zool., Lond.* **149**: 297-319.
- and A. J. PROVENZANO, JR. 1970. The larval stages of *Homola barbata* (Fabricius) (Crustacea, Decapoda, Homolidae) reared in the laboratory. *Bull. mar. Sci.* **20**: 446-471.
- RICHMOND, E. A. 1962. The fauna and flora of Horn Island, Mississippi. *Gulf Res. Rept.* **1**: 59-106.
- . 1968. A supplement to the fauna and flora of Horn Island, Mississippi. *Gulf Res. Rept.* **2**: 213-254.
- RICKETTS, E. F. and J. CALVIN. 1968. *Between Pacific Tides*. 4th ed., rev. by J. W. Hedgpeth. Stanford Univ. Press. 614 pp.
- RIGHI, G. 1967. Sobre alguns Decápoda do Brasil (Crustacea, Brachyura: Pinnotheridae e Parthenopidae). *Pap. Dep. Zool. S. Paulo* **20**: 99-116.
- RIOJA, E. 1952. Descripción de un nuevo genero de potamonidos cavernícolas y ciegos de la cueva del Tío Ticho, Comitan, Chis. *An. Inst. Biol. Univ. Mex.* **23**: 217-225.
- ROBERT, M. and I. GRAY. 1972. Enzymatic mechanisms during temperature acclimation of the blue crab *Callinectes sapidus*. *Comp. Biochem. Physiol.* **42B**: 377-401.

- ROBERTS, M. H. JR. 1969. Larval development of *Bathynectes superba* (Costa) reared in the laboratory. *Biol. Bull.* **137**: 338-351.
- RODRIGUES DA COSTA, H. 1968a. Crustacea Brachyura récoltés par les draguages de la "Calypso" sur les cotes brésiliennes (1962). *Recl. Trav. Stn. mar. Endoume.* **43**: 333-343.
- . 1968b. Ocorrência do gênero "Cycloes" de Haan, 1837 no Brasil. Descrição de formas jovens de "Cycloes bairdii" Stimpson encontradas no litoral brasileiro (Brachyura, Oxystomata, Calappidae). *Atas Soc. Biol. Rio de J.* **12**: 29-30.
- . 1971. As espécies brasileiras da família Pinnotheridae (Crustacea, Reptantia) com descrição de uma nova espécie (*Fabia sebastianensis*). *Trab. Inst. Oceanogr. Univ. Fed. Pernambuco.* **9/11**: 255-264.
- ROGERS, B. G. 1968. An extension of the range of the pinnotherid crab, *Dissodactylus melittae* Rathbun. *Crustaceana.* **14**: 318.
- ROGERS-TALBERT, R. 1948. The fungus *Lagenidium callinectes* Couch (1942) on eggs of the blue crab in Chesapeake Bay. *Biol. Bull.* **95**: 214-228.
- ROSENBERG, R. and J. D. COSTLOW, JR. 1976. Synergistic effects of cadmium and salinity combined with constant and cycling temperatures on the larval development of two estuarine crab species. *Mar. Biol.* **38**: 291-303.
- ROUSE, W. L. 1970. Littoral Crustacea from southwest Florida. *Q. Jl. Fla. Acad. Sci.* **32**: 127-152.
- RUST, J. D. and F. CARLSON. 1960. Some observations on rearing blue crab larvae. *Chesapeake Sci.* **1**: 196-197.
- RYAN, E. P. 1956. Observations on the life histories and the distribution of the Xanthidae (mud crabs) of Chesapeake Bay. *Amer. Midl. Nat.* **56**: 138-162.
- SAKAI, T. 1939. *Studies on the crabs of Japan.* IV. Brachygnatha, Brachyrhyncha. Yokendo, Tokyo. pp. 365-741.
- . 1965. *The Crabs of Sagami Bay Collected by His Majesty The Emperor of Japan.* East-West Center Press: Honolulu. Text in English and Japanese, 100 color pl. + map.
- . 1969. Two new genera and twenty-two new species of crabs from Japan. *Proc. Biol. Soc. Wash.* **82**: 243-280.
- . 1976a. Notes from the carcinological fauna of Japan (VI). The occurrence of *Callinectes sapidus* Rathbun in Japan. *Res. Crust.* **7**: 29-30.
- . 1976b. *Crabs of Japan and the Adjacent Seas.* 3 vols. Kodansha Ltd., Tokyo. 773 pp., English text.
- SALMON, M. 1965. Waving display and sound production in the courtship behavior of *Uca pugilator*, with comparisons to *U. minax* and *U. pugnax*. *Zoologica.* **50**: 123-150.
- . 1967. Coastal distribution, display and sound production by Florida fiddler crabs (genus *Uca*). *Anim. Behav.* **15**: 449-459.
- . 1971. Signal characteristics and acoustic detection by the fiddler crabs, *Uca rapax* and *Uca pugilator*. *Physiol. Zool.* **44**: 210-224.
- and S. P. ATSAIDES. 1968a. Visual and acoustical signalling during courtship by fiddler crabs (genus *Uca*). *Am. Zoologist.* **8**: 623-639.
- and ———. 1968b. Behavioral, morphological and ecological evidence for two species of fiddler crabs (genus *Uca*) from the Gulf coast of the United States. *Proc. Biol. Soc. Wash.* **81**: 275-290.
- and ———. 1969. Sensitivity to substrate vibration in the fiddler crab, *Uca pugilator* Bosc. *Anim. Behav.* **17**: 68-76.
- and K. W. HORCH. 1972. Acoustic signalling and detection by semiterrestrial crabs of the family Ocypodidae. pp. 60-96. In: H. E. Winn and B. L. Olla (ed.), *Behavior of Marine Animals. Vol. 1—Invertebrates.* Plenum Press.



- and —————. 1973. Vibration reception by the fiddler crab, *Uca minax*. *Comp. Biochem. Physiol.* **44A**: 527-541.
- , ————— and G. W. HYATT. 1977. Barth's myochordotonal organ as a receptor for auditory and vibrational stimuli in fiddler crabs (*Uca pugilator* and *U. minax*). *Mar. Behav. Physiol.* **4**: 187-194.
- and J. F. STOUT. 1962. Sexual discrimination and sound production in *Uca pugilator* Bosc. *Zoologica.* **47**: 15-21.
- SANDEEN, M. I. 1950. Chromatophoretropins in the central nervous system of *Uca pugilator*, with special reference to their origins and actions. *Physiol. Zool.* **23**: 337-352.
- SANDIFER, P. A. 1973. Distribution and abundance of decapod crustacean larvae in the York River Estuary and adjacent Lower Chesapeake Bay, Virginia, 1968-1969. *Chesapeake Sci.* **14**: 235-257.
- . 1974. Larval stages of the crab, *Pilumnus dasypodus* Kingsley (Crustacea, Brachyura, Xanthidae), obtained in the laboratory. *Bull. mar. Sci.* **24**: 378-391.
- and W. A. van ENGEL. 1971. Larval development of the spider crab, *Libinia dubia* H. Milne Edwards (Brachyura, Majidae, Pisinae), reared in laboratory culture. *Chesapeake Sci.* **12**: 18-25.
- and —————. 1972. Larval stages of the spider crab, *Anasimus latus* Rathbun, 1894 (Brachyura, Majidae, Inachinae) obtained in the laboratory. *Crustaceana.* **23**: 141-151.
- SANDOZ, M. and S. H. HOPKINS. 1947. Early life-history of the oyster crab, *Pinnotheres ostreum* Say. *Biol. Bull.* **93**: 250-258.
- and R. ROGERS. 1944. The effect of environmental factors on hatching, moulting, and survival of zoea larvae of the blue crab, *Callinectes sapidus* Rathbun. *Ecology.* **25**: 216-228.
- SARAIVA da COSTA, R. 1968. Estudo preliminar sôbre a biologia e a pesca do caranguejo *Carpilius corallinus* (Herbst), no estado do Ceará. *Arq. Estac. Biol. Mar. Univ. Ceará.* **3**: 211-219.
- SASTRY, A. N. and R. W. MENZEL. 1962. Influence of hosts on the behavior of the commensal crab *Pinnotheres maculatus* Say. *Biol. Bull.* **123**: 388-395.
- SAVAGE, T. 1971a. Effect of maintenance parameters on growth of the stone crab, *Menippe mercenaria* (Say). *Spec. Sci. Rept. Fla. Dept. Nat. Resources.* **28**: 1-19.
- . 1971b. Mating of the stone crab, *Menippe mercenaria* (Say) (Decapoda, Brachyura). *Crustaceana.* **20**: 315-316.
- and M. R. McCAHAN. 1968. Growth of early juvenile stone crabs, *Menippe mercenaria* (Say, 1819). *Spec. Sci. Rept. Fla. Bd. Conserv.* **21**: 1-17.
- , J. R. SULLIVAN and C. E. KALMAN. 1974. Claw extraction during molting of a stone crab, *Menippe mercenaria* (Decapoda, Brachyura, Xanthidae). *Florida Mar. Res. Publ.* **4**: 1-5.
- , ————— and —————. 1975. An analysis of stone crab (*Menippe mercenaria*) landings on Florida's west coast, with a brief synopsis of the fishery. *Florida Mar. Res. Publ.* **13**: 1-37.
- SAWYER, T. K. 1969. Preliminary study of the epizootiology and host-parasite relationship of *Paramoeba* sp. in the blue crab, *Callinectes sapidus*. *Proc. Natl. Shellfish Assoc.* **59**: 60-64.
- , R. COX and M. HIGGINBOTTOM. 1970. Hemocyte values in healthy blue crabs, *Callinectes sapidus*, and crabs infected with the amoeba, *Paramoeba perniciosa*. *J. Invert. Pathol.* **15**: 440-446.
- SCHMITT, W. L. 1931. Some carcinological results of the deeper water trawlings of the *Anton Dohrn*, including description of two new species of Crustacea. *Carnegie Inst. Year Book* **30**: 389-394.

- . 1939. Decapod and other Crustacea collected on the Presidential Cruise of 1938 (with introduction and station data). *Smithson. Misc. Collect.* **98**: 1–29.
- , J. C. McCAIN and E. S. DAVIDSON. 1973. Crustaceorum Catalogus. Decapoda. Brachyura. Fam. Pinnotheridae. (ed. by H.-E. Grunner and L. B. Holthuis). Junk: Haag, Netherlands. 160 pp.
- SCHÖNE, H. 1968. Agonistic and sexual display in aquatic and semi-terrestrial brachyuran crabs. *Am. Zoologist*, **8**: 641–654.
- and I. EIBL-EIBESFELDT. 1965. *Grapsus grapsus* (Brachyura) Drohen. Encyclopaedia Cinematographica. *Publ. Wissenschaft. Film.* **1A**: 391–396.
- and H. SCHÖNE. 1961. Eyestalk movements induced by polarized light in the ghost crab, *Ocypode quadrata*. *Science*, **134**: 675–676.
- and ———. 1963. Balz und andere Verhaltensweisen der Mangrovekrabbe *Goniopsis cruentata* Latr. und das Winkverhalten der eulitoralen Brachyuren. *Z. Tierpsychol.* **20**: 642–656.
- SCHROEDER, W. C. 1959. The lobster, *Homarus americanus*, and the red crab, *Geryon quinquedens*, in the offshore waters of the western North Atlantic. *Deep-Sea Res.* **5**: 266–282.
- SCHWARTZ, B. and S. R. SAFIR. 1915. Habit formation in the fiddler crabs. *J. Anim. Behav.* **5**: 226–239.
- SCHWARTZ, F. J. and D. G. CARGO. 1960. Recent records of the xanthid crab, *Panopeus herbsti*, from Maryland and Virginia waters. *Chesapeake Sci.* **1**: 201–203.
- SELANDER, R. K., W. E. JOHNSON and J. C. AVISE. 1971. Biochemical population genetics of fiddler crabs (*Uca*). *Biol. Bull.* **141**: 402.
- SERENE, R. 1966. Note sur la taxonomie et la distribution géographique des Hapalocarcinidae (Decapoda—Brachyura). *Proc. Symp. Crustacea Ser. 2.* **1**: 395–398.
- SHERIDAN, P. F. 1975. Uptake, metabolism, and distribution of DDT in organs of the blue crab, *Callinectes sapidus*. *Chesapeake Sci.* **16**: 20–26.
- SHIRLEY, T. C. 1974. *Planes cyaneus* Dana, 1852 (Decapoda, Grapsidae) from Padre Island, Texas: a new record for the Gulf of Mexico and the North Atlantic. *Crustaceana*, **26**: 107–108.
- SHOUP, J. B. 1968. Shell opening by crabs of the genus *Calappa*. *Science*, **160**: 887–888.
- SILVERTHORN, S. U. 1975a. Hormonal involvement in thermal acclimation in the fiddler crab *Uca pugilator* (Bosc)—1. Effect of eyestalk extracts on whole animal respiration. *Comp. Biochem. Physiol.* **50A**: 281–283.
- . 1975b. Hormonal involvement in thermal acclimation in the fiddler crab *Uca pugilator* (Bosc)—2. Effects of extracts on tissue respiration. *Comp. Biochem. Physiol.* **50A**: 285–290.
- SIMMONS, E. G. 1957. An ecological survey of the Upper Laguna Madre of Texas. *Publ. Inst. mar. Sci. Univ. Tex.* **4**: 134–155.
- SIMS, H. W., JR. and E. A. JOYCE, JR. 1966. Partial albinism in a blue crab. *Q. Jl. Fla. Acad. Sci.* **28**: 373–374.
- SKINNER, D. M. 1965. Amino acid incorporation into protein during the molt cycle of the land crab, *Gecarcinus lateralis*. *J. exp. Zool.* **160**: 225–234.
- . 1966. Breakdown and reformation of somatic muscle during the molt cycle of the land crab, *Gecarcinus lateralis*. *J. exp. Zool.* **163**: 115–123.
- , and D. E. GRAHAM. 1972. Loss of limbs as a stimulus to ecdysis in Brachyura (true crabs). *Biol. Bull.* **143**: 222–233.
- , D. J. MARSH and J. S. COOK. 1965. Physiological salt solution for the land crab, *Gecarcinus lateralis*. *Biol. Bull.* **129**: 355–365.

- SKOBE, Z. and R. F. NUNNEMACHER. 1970. The fine structure of the circumesophageal nerve in several decapod crustaceans. *J. comp. Neurol.* **139**: 81-92.
- SKORKOWSKI, E. F. 1972. Separation of three chromatophorotropic hormones from the eyestalk of the crab *Rhithropanopeus harrisi* (Gould). *Gen. comp. Endocrin.* **18**: 329-334.
- SMALLEY, A. E. 1970. A new genus of freshwater crabs from Guatemala, with a key to the middle American genera (Crustacea Decapoda, Pseudothelphusidae). *Am. Midl. Nat.* **83**: 96-106.
- SMITH, R. I. 1967. Osmotic regulation and adaptive reduction of water permeability in a brackish water crab, *Rhithropanopeus harrisi* (Brachyura, Xanthidae). *Biol. Bull.* **133**: 643-658.
- SMITH, W. K. and P. C. MILLER. 1973. The thermal ecology of two south Florida fiddler crabs: *Uca rapax* Smith and *U. pugilator* Bosc. *Physiol. Zool.* **46**: 186-207.
- de SOUZA, T. T. and M. da C. CALAND. 1968. Estudo preliminar sobre a bacteriologia do caranguejo *Ucides cordatus* (Linnaeus). *Arq. Estac. Biol. Mar. Univ. Fed. Ceará.* **3**: 107-108.
- SPINDLER-BARTH, M. 1976. A bacterial infection in the common shore crab *Carcinus maenas* and the fiddler crab *Uca pugilator*. *Mar. Biol.* **36**: 1-4.
- SPIRITO, C. P. 1972. An analysis of swimming behavior in the portunid crab *Callinectes sapidus*. *Mar. Behav. Physiol.* **1**: 261-276.
- , W. R. EVOY and W. J. P. BARNES. 1972. Nervous control of walking in the crab, *Cardisoma guanhumi*. I. Characteristics of resistance reflexes. *Z. vergl. Physiol.* **76**: 1-15.
- SPRAGUE, V. 1965. *Nosema* sp. (Microsporida, Nosematidae) in the musculature of the crab, *Callinectes sapidus*. *J. Protozool.* **12**: 66-70.
- . 1966. Two new species of *Plistophora* (Microsporida, Nosematidae) in decapods, with particular reference to one in the blue crab. *J. Protozool.* **13**: 196-199.
- and R. BECKETT. 1966. A disease of blue crabs (*Callinectes sapidus*) in Maryland and Virginia. *J. Invert. Pathol.* **8**: 287-289.
- , R. L. BECKETT and T. K. SAWYER. 1969. A new species of *Paramoeba* (Amoebida, Paramoebidae) parasitic in the crab *Callinectes sapidus*. *J. Invert. Pathol.* **14**: 167-174.
- SPRINGER, S. and H. R. BULLIS. 1956. Collections by the Oregon in the Gulf of Mexico. *Spec. Scient. Rep. U.S. Fish Wildl. Serv.* **196**: 1-134.
- STANDING, J. D. 1972. Larval salinity acclimatization in the tropical shore crab, *Sesarma ricordi*. In: Marine studies on the north coast of Jamaica (ed., G. J. Bakus). *Atoll Res. Bull.* **152**: 6.
- STAUBER, L. A. 1945. *Pinnoheres ostreum*, parasitic on the American oyster, *Ostrea (Gryphea) virginica*. *Biol. Bull.* **88**: 269-291.
- STEINACKER, A. 1975. Perfusion of the central nervous system of decapod crustaceans. *Comp. Biochem. Physiol.* **52A**: 103-104.
- STEPHENSON, W. and M. REES. 1967. Some portunid crabs from the Pacific and Indian Oceans in the collections of the Smithsonian Institution. *Proc. U.S. natn. mus.* **120**: 1-114.
- and ———. 1968. A revision of the genus *Ovalipes* Rathbun, 1898 (Crustacea, Decapoda, Portunidae). *Rec. Aust. Mus.* **27**: 213-261.
- , W. T. WILLIAMS and G. N. LANCE. 1968. Numerical approaches to the relationships of certain American swimming crabs (Crustacea: Portunidae). *Proc. U.S. natn. mus.* **124**: 1-25.
- ŠTAVČIĆ, Z. 1971a. The pathways of brachyuran evolution. *Proc. 1st Symp. Biosyst. Yugoslav.* pp. 187-193.
- . 1971b. The main features of brachyuran evolution. *Sys. Zool.* **20**: 331-340.

- . 1973. The systematic position of the family Raninidae. *Syst. Zool.* **22**: 625–632.
- STEWART, J. R. and J. P. GREEN. 1969. Ecdysone mediated events in the molting of the fiddler crab, *Uca pugilator*. *Am. Zoologist.* **9**: 579.
- STUTMAN, L. J. and M. DOLLIVER. 1968. Mechanism of coagulation in *Gecarcinus lateralis*. *Am. Zoologist.* **8**: 481–489.
- SUBRAHMANYAM, C. B., W. L. KRUCZYNSKI and S. H. DRAKE. 1976. Studies on the animal communities in two North Florida salt marshes. Part II. Macroinvertebrate communities. *Bull. mar. Sci.* **26**: 172–195.
- SUCHENIA, L. M. and R. CLARO MADRUGA. 1967. Datos cuantitativos de la alimentacion del cangrejo comercial *Menippe mercenaria* (Say) y su relacion con el balance energetico del mismo. *Inst. Oceanogr. Acad. Cien. Cuba, Estudios.* **2**: 75–97.
- SULKIN, S. D. 1973. Depth regulation of crab larvae in the absence of light. *J. exp. mar. Biol. Ecol.* **13**: 73–82.
- and C. E. EPIFANIO. 1975. Comparison of rotifers and other diets for rearing early larvae of the blue crab, *Callinectes sapidus* Rathbun. *Estuarine Coastal mar. Sci.* **3**: 109–113.
- TABB, D. C. and R. B. MANNING. 1961. A checklist of the flora and fauna of northern Florida Bay and adjacent brackish water of the Florida mainland collected during the period July, 1957 through September, 1960. *Bull. mar. Sci.* **11**: 552–649.
- TAGATZ, M. E. 1967. Noncommercial crabs of the genus *Callinectes* in St. Johns River, Florida. *Chesapeake Sci.* **8**: 202–203.
- . 1969a. Some relations of temperature acclimation and salinity to thermal tolerances of the blue crab (*Callinectes sapidus*). *Trans. Am. Fish. Soc.* **98**: 713–716.
- . 1969b. Growth of juvenile blue crabs, *Callinectes sapidus* Rathbun, in the St. Johns River, Florida. *Fishery Bull. Fish Wildl. Serv. U.S.* **67**: 281–288.
- . 1971. Osmoregulatory ability of blue crabs in different temperature-salinity combinations. *Chesapeake Sci.* **12**: 14–17.
- and A. B. HALL. 1971. Annotated bibliography on the fishing industry and biology of the blue crab, *Callinectes sapidus*. *NOAA Tech Rept. MMFS SSRF-640*, 94 pp.
- TAN, E. C. and W. A. van ENGEL. 1966. Osmoregulation in the adult blue crab, *Callinectes sapidus* Rathbun. *Chesapeake Sci.* **7**: 30–35.
- TASHIAN, R. E. and F. J. VERNBERG. 1958. The specific distinctness of the fiddler crabs *Uca pugnax* (Smith) and *Uca rapax* (Smith) at their zone of overlap in northeastern Florida. *Zoologica.* **43**: 89–92.
- TEAL, J. M. 1958. Distribution of fiddler crabs in Georgia salt marshes. *Ecology.* **39**: 185–193.
- . 1959. Respiration of crabs in Georgia salt marshes and its relation to their ecology. *Physiol. Zool.* **32**: 1–14.
- TEERLING, J. 1970. The incidence of the ghost crab *Ocypode quadrata* on the forebeach of Padre Island and some of its responses to man. Master's Thesis, Texas A&I Univ., Kingsville. 71 pp.
- TEYTAUD, A. R. 1971. Laboratory studies of sex recognition in the blue crab *Callinectes sapidus* Rathbun. *Sea Grant Tech. Bull.* **15**, Univ. Miami.
- TOWLES, D. W., G. E. PALMER and J. L. HARRIS. 1976. Role of gill Na<sup>+</sup> + K<sup>+</sup>-dependent ATPase in acclimation of blue crabs (*Callinectes sapidus*) to low salinity. *J. exp. Zool.* **196**: 315–321.
- TRENT, L., E. J. PULLEN and R. PROCTOR. 1976. Abundance of macrocrustaceans in a natural marsh and a marsh altered by dredging, bulkheading, and filling. *Fish. Bull.* **74**: 195–200.

- TRUITT, R. V. 1939. The blue crab. In: Our Water Resources and their Conservation. *Contr. Chesapeake Biol. Lab.* **27**: 10-38.
- TÜRKAY, M. 1968. Dekapoden von den Margarita-Inseln (Venezuela), *Senckenberg. Biol.* **49**: 249-257.
- . 1970. Die Gecarcinidae Amerikas. Mit einem Anhang über *Ucides* Rathbun. *Senckenberg. Biol.* **51**: 333-354.
- . 1971. Die Portunidae des Naturhistorischen Museums Genf, mit einem Anhang über die Typen von *Ovalipes ocellatus floridanus* Hay and Shore, 1918 (Crustacea, Decapoda). *Archs. Sci., Genève.* **24**: 111-143.
- . 1973. Bemerkungen zu einigen Landkrabben (Crustacea, Decapoda). *Bull. Mus. natn. Hist. Nat., Paris, Zool.* **106**: 969-979.
- . 1975. Zur Kenntnis der Gattung *Euchirograpsus* mit Bemerkungen zu *Brachygrapsus* und *Litocheira* (Crustacea: Decapoda). *Senckenberg. Biol.* **56**: 103-132.
- TYLER, A. V. and D. G. CARGO. 1963. Size relations of two instars of the blue crab, *Callinectes sapidus*. *Chesapeake Sci.* **4**: 52-54.
- VERNBERG, F. J. 1956. Study of the oxygen consumption of excised tissues of certain marine decapod Crustacea in relation to habitat. *Physiol. Zool.* **29**: 227-234.
- . 1959. Studies on the physiological variation between tropical and temperate zone fiddler crabs of the genus *Uca*, II. Oxygen consumption of whole organisms. *Biol. Bull.* **117**: 163-184.
- and J. D. COSTLOW, JR. 1966. Handedness in fiddler crabs. *Crustaceana.* **11**: 61-64.
- VERNBERG, W. B., P. J. DECOURSEY and W. J. PADGETT. 1973. Synergistic effects of environmental variables on larvae of *Uca pugilator*. *Mar. Biol.* **22**: 307-312.
- and F. J. VERNBERG. 1968. Physiological diversity in metabolism in marine and terrestrial Crustacea. *Am. Zoologist.* **8**: 449-458.
- and ———. 1972. The synergistic effects of temperature, salinity and mercury on survival and metabolism of the adult fiddler crab, *Uca pugilator*. *Fishery Bull. Fish Wildl. Serv. U.S.* **70**: 415-420.
- VERRILL, A. E. 1908. Brachyura and Anomura. Their distribution, variations, and habits. Decapod Crustacea of Bermuda I. *Trans. Conn. Acad. Arts Sci.* **13**: 299-474.
- VERWAY, J. 1957. A plea for the study of temperature influence on osmotic regulation. *L'Annee Biol.* **33**: 129-149.
- WARNER, G. F. 1967. The life history of the mangrove tree crab, *Aratus pisoni*. *J. Zool., London.* **153**: 321-335.
- . 1968. The larval development of the mangrove tree crab, *Aratus pisonii* (H. Milne Edwards), reared in the laboratory (Brachyura, Grapsidae). *Crustaceana, Suppl.* **2**: 249-258.
- . 1969. The occurrence and distribution of crabs in a Jamaican mangrove swamp. *J. Anim. Ecol.* **38**: 379-389.
- . 1970. Behaviour of two species of grapsid crab during intraspecific encounters. *Behaviour.* **36**: 9-19.
- WASS, M. L. 1955. The decapod crustaceans of Alligator Harbor and adjacent inshore areas of northwestern Florida. *Q. Jl. Fla. Acad. Sci.* **18**: 129-176.
- . 1968. A new pinnixed commensal with a holothurian (Crustacea: Decapoda). *Tulane Stud. Zool.* **14**: 137-139.
- WEBB, H. M., M. F. BENNETT and F. A. BROWN, JR. 1954. A persistent diurnal rhythm of chromatophoric response in eyestalkless *Uca pugilator*. *Biol. Bull.* **106**: 371-377.

- WEILAND, A. L. and C. P. MANGUM. 1975. The influence of environmental salinity on hemocyanin function in the blue crab, *Callinectes sapidus*. *J. exp. Zool.* **193**: 265-274.
- WEIS, J. S. 1976a. Effects of environmental factors on regeneration and molting in fiddler crabs. *Biol. Bull.* **150**: 152-162.
- . 1976b. Effects of mercury, cadmium, and lead salts on regeneration and ecdysis in the fiddler crab, *Uca pugilator*. *Fishery Bull. Fish Wildl. Serv. U.S.* **74**: 464-467.
- . 1976c. Regeneration in the fiddler crab, *Uca pugilator*, after injury or removal of limb buds. *J. exp. Zool.* **197**: 21-30.
- . 1977a. Limb regeneration in fiddler crabs: species differences and effects of methylmercury. *Biol. Bull.* **152**: 263-274.
- . 1977b. Regeneration of limbs autotomized at different times in the fiddler crab, *Uca pugilator*. *Can. J. Zool.* **55**: 656-660.
- and L. H. MANTEL. 1976. DDT as an accelerator of limb regeneration and molting in the fiddler crabs. *Estuarine Coastal mar. Sci.* **4**: 461-466.
- WEITZMAN, M. C. 1963. The biology of the tropical land crab, *Gecarcinus lateralis* (Fremerville). Ph.D. thesis, Albert Einstein College of Medicine, Yeshiva University.
- WEITZMAN, M. 1969. Ultrastructural study on the release of neurosecretory material from the sinus gland of the land crab, *Gecarcinus lateralis*. *Z. Zellforsch. Mikrosk. Anat.* **94**: 147-154.
- WELLS, H. and M. WELLS. 1961. Observations on *Pinnaxodes floridensis*, a new species of pinnotherid crustacean commensal in holothurians. *Bull. mar. Sci. Gulf Caribb.* **11**: 267-279.
- WHITE, A. Q. and C. P. SPIRITO. 1973. Anatomy and physiology of the swimming leg musculature in the blue crab, *Callinectes sapidus*. *Mar. Behav. Physiol.* **2**: 141-153.
- WHITING, N. H. 1972. The effect of substrate on the distribution of *Uca minax* (Crustacea: Decapoda). M. S. Thesis, Univ. West Florida, Pensacola.
- and G. A. MOSHIRI. 1974. Certain organism-substrate relationships affecting the distribution of *Uca minax*. *Hydrobiologia.* **44**: 481-493.
- WHITNEY, J. O. 1969. Absence of sterol synthesis in larvae of the mud crab *Rhithropanopeus harrisi* and of the spider crab *Libinia emarginata*. *Mar. Biol.* **3**: 134-135.
- WHITTEN, H. L., H. F. ROSENE and J. W. HEDGPETH. 1950. The invertebrate fauna of Texas coast jetties: a preliminary survey. *Publ. Inst. mar. Sci. Univ. Tex.* **1**: 53-87.
- WIGLEY, R. L. and J. L. MESSERSMITH. 1976. *Benthochascon schmitti* Rathbun (Decapoda, Brachyura) off southern New England. *Crustaceana.* **31**: 111-112.
- , R. B. THEROUX and H. E. MURRAY. 1975. Deep-sea red crab, *Geryon quinquegens*, survey off northeastern United States. *Mar. Fish. Rev.* **37**: 1-21.
- WILKINS, J. L. and M. FINGERMAN. 1965. Heat tolerance and temperature relationships of the fiddler crab, *Uca pugilator*, with reference to body coloration. *Biol. Bull.* **128**: 133-141.
- WILLIAMS, A. B. 1962. A re-examination of *Ovalipes* sp. in the Carolinas (Decapoda, Portunidae). *Crustaceana.* **4**: 39-41.
- . 1965. Marine decapod crustaceans of the Carolinas. *Fish. Bull.* **65**: 1-298.
- , 1966. The Western Atlantic swimming crabs *Callinectes ornatus*, *C. danae*, and a new, related species (Decapoda, Portunidae). *Tulane Stud. Zool.* **13**: 83-93.
- . 1974a. The swimming crabs of the genus *Callinectes* (Decapoda: Portunidae). *Fish. Bull.* **72**: 685-798.
- . 1974b. A new species of *Hypsophrys* (Decapoda: Homolidae) from the Straits of Florida, with notes on related crabs. *Proc. Biol. Soc. Wash.* **87**: 485-492.

- . 1976. Distinction between a Gulf of Mexico and a Carolinian Atlantic species of the swimming crab *Ovalipes* (Decapoda: Portunidae). *Proc. Biol. Soc. Wash.* **89**: 205-214.
- , L. R. McCLOSKEY and I. E. GRAY. 1968. New records of brachyuran decapod crustaceans from the continental shelf off North Carolina, U.S.A. *Crustaceana*. **15**: 41-66.
- and H. J. PORTER. 1964. An unusually large turtle barnacle (*Chelonibia p. patula*) on a blue crab from Delaware Bay. *Chesapeake Sci.* **5**: 150-151.
- WOLFF, T. 1954. Occurrence of two East American species of crabs in European waters. *Nature*. **174**: 188-189.
- WRIGHT, H. O. 1966. Comparative studies of social behavior in grapsoid crabs. Ph.D. Dissertation, Univ. Calif., Berkeley. 227 pp. (*Dissert. Abstr.* **27**: 4184-B).
- . 1968. Visual displays in brachyuran crabs: field and laboratory studies. *Am. Zoologist*. **8**: 655-665.
- YAMAOKA, L. H. and D. M. SKINNER. 1976. Free amino acid pools in muscle and hemolymph during the molt cycle of the land crab, *Gecarcinus lateralis*. *Comp. Biochem. Physiol.* **55A**: 129-134.
- YANG, W. T. 1967. A study of zoeal, megalopal, and early crab stages of some oxyrhynchous crabs (Crustacea, Decapoda). Doctoral Dissert. Univ. Miami, Coral Gables, Florida.
- . 1968. The zoeae, megalopa and first crab of *Epiplatys dilatatus* (Brachyura, Majidae) reared in the laboratory. *Crustaceana, Suppl.* **2**: 181-202.
- . 1976. Studies on the western Atlantic arrow crab genus *Stenorhynchus* (Decapoda Brachyura, Majidae). 1. Larval characters of two species and comparison with other larvae of Inachinae. *Crustaceana*. **31**: 157-177.
- ZELENY, C. 1908. Some internal factors concerned with the regeneration of the Gulf-weed crab (*Portunus sayi*). *Pap. Tortugas Lab.* **2**: 103-138.

## INDEX

- Acanthocarpus* 29  
   *A. alexandri* 29  
   *A. bispinosus* 30  
 Acanthonychinae 41  
*Acanthonyx* 41  
   *A. petiverii* 41  
*Actaea* 87, 104  
   *A. acantha* 87  
   *A. bifrons* 88  
   *A. palmeri* 88  
   *A. rufopunctata nodosa* 88, 103  
   *A. setigera* 88, 107  
*Acteomorpha* 33  
*Aepinus* 43  
   *A. septemspinus* 43  
*Aethra* 33  
*Aethrinae* 33  
*Anasimus* 43  
   *A. latus* 43  
*Anomalothir* 43  
   *A. frontalis* 43  
   *A. furcillatus* 43  
*Arachnopsis* 44  
   *A. filipes* 44  
 araña del mar 49  
*Aratus* 132  
   *A. pisonii* 132  
*Arenaeus* 74, 82  
   *A. cribrarius* 74  
 arrow crab 49  
 assemblages, faunal 13–14  
 ATELECYCLIDAE 9, 11–13, 71, 72  
*Atelecyclinae* 71  
  
*Bathynectes* 72  
   *B. superba* 72  
*Bathyplax* 111, 112  
   *B. typhla* 112  
*Batrachonotus* 44  
   *B. fragosus* 44  
 beach crab 135  
*Benthochascon* 73  
   *B. schmitti* 73  
 black crab 140  
 black land crab 139  
 blue crab 78–81, 96  
 blue land crab 140  
*Boboruca* 149  
   box crab 30  
 BRACHYRHYNCHA 8, 9, 72  
 brackish-water crab 135  
 brackish-water fiddler crab 143  
  
*Cabouca* 58  
*Calappa* 30  
   *C. angusta* 30  
   *C. flammea* 30, 31  
   *C. gallus* 31  
   *C. ocellata* 31  
   *C. springeri* 32  
   *C. sulcata* 32  
 CALAPPIDAE 9, 11–13, 29  
 Calappinae 29  
 CALAPPOIDEA 9, 29  
 Calico crab 33, 90  
*Callidactylus* 37  
   *C. asper* 37  
*Callinectes* 18, 75, 82  
   *C. bocourti* 75  
   *C. danae* 75, 76, 77, 81  
   *C. exasperatus* 76  
   *C. marginatus* 77  
   *C. ornatus* 75, 77–78, 81  
   *C. rathbunae* 75, 78  
   *C. sapidus* 75, 78–81, 96  
   *C. sapidus acutidens* 78, 79  
   *C. similis* 75, 76, 77, 78, 81  
*Cancer* 71  
   *C. borealis* 71  
   *C. irroratus* 72  
 CANCRIDAE 9, 11–13, 71, 72  
 CANCRIDEA 9, 71, 72  
 Cancrinae 71  
 cancrivora crabs 72  
 CANCROIDAE 9, 71  
 cangrejo de la Santa Virgen 58  
 Carcinoplacinae 111  
*Cardisoma* 138, 150  
   *C. guanhumi* 138  
 Carolinean Province 11, 13–14, 73  
*Carpilius* 88  
   *C. convexus* 88  
   *C. corallinus* 88  
*Carpoporus* 89  
   *C. papulosus* 89  
*Cataleptodius* 89  
   *C. floridanus* 89, 95  
  
 Catametopa 72  
*Celuca* 143, 145, 148  
*Chacellus* 112  
   *C. filiformis* 112  
*Chasmocarcinus* 112  
   *C. cylindricus* 112  
   *C. mississippiensis* 112  
   *C. obliquus* 113  
*Chlorodiella* 89  
   *C. longimana* 89  
*Chorinus* 62  
   *C. heros* 62  
 cliff crab 129, 131  
*Clythrocerus* 26  
   *C. nitidus* 26  
   *C. stimpsoni* 26  
*Coelocerus* 50  
   *C. spinosus* 50  
*Collodes* 44  
   *C. armatus* 44  
   *C. leptocheles* 44  
   *C. trispinosus* 45  
 common edible crab 78  
 common land crab 139  
 common mud crab 102  
 common pea crab 124  
 common spider crab 64  
 coral crab 56, 88  
*Corycodus* 26  
   *C. bullatus* 26  
 Corystidae 9  
*Cronius* 81  
   *C. ruber* 81  
   *C. tumidulus* 82  
*Cryptochirus* 40  
   *C. corallicola* 40  
*Cryptopodia* 67  
   *C. concava* 67  
*Cyclodorippe* 26  
   *C. antennaria* 26  
   *C. bowieri* 26  
   *C. ornata* 27  
*Cycloes* 32  
   *C. bairdii* 32  
*Cyclograpsus* 132  
   *C. integer* 132  
 Cyclometopa 72  
*Cycloxanthops* 110  
*Cymonomus* 27  
   *C. caecus* 27



- C. cubensis* 27  
*C. quadratus* 27  
*C. rostratus* 27  
*Cymopolia* 27  
*C. affinis* 118  
*C. alternata* 118  
*C. cursor* 118  
*C. dentata* 118  
*C. faxoni* 118  
*C. gracilipes* 118  
*C. gracilis* 119  
*C. obesa* 119  
*C. sica* 119  
 CYMOPOLIDAE 117  
*Cymopolus* 27  
*C. agassizi* 27  
  
 decorator crab 52, 58  
 deep sea red crab 111  
*Dicranodromia* 21  
*D. ovata* 21  
 dirty decorator crab 54  
 disjunct distribution 14, 18  
*Dissodactylus* 119  
*D. alcocki* 119  
*D. borradalei* 120  
*D. calmani* 120  
*D. crinitichelis* 120  
*D. encopei* 120  
*D. juvenilis* 120  
*D. mellitae* 120  
*D. primitivus* 121  
*D. stebbingi* 121  
 Dolly Varden crab 33  
*Domecia* 89  
*D. acanthophora acanthophora* 89–90  
*D. hispida* 89–90  
 DORIPPIDAE 9, 11–13, 26  
 DORIPPOIDEA 9, 26  
*Dromia* 19  
*D. erythropus* 19  
 DROMIACEA 9, 19, 22  
*Dromidia* 19  
*D. antillensis* 19  
 DROMIIDAE 9, 11–13, 19  
 DROMIOIDEA 9, 19  
 Dynomenidae 9, 10  
  
*Ebalia* 35  
*E. cariosa* 35  
*E. simpsoni* 35  
 Ebalinae 35  
  
 edible crab 78  
 endemic species 11, 14  
*Epialtus* 41  
*E. bituberculatus* 41  
*E. dilatatus* 42  
*E. dilatatus forma elongata* 42  
*E. longirostris* 42  
*Eriphia* 90  
*E. gonagra* 90  
*Ethusa* 28  
*E. lata* 28  
*E. mascarone americana* 28  
*E. microphthalmia* 28  
*E. tenuipes* 28  
*E. truncata* 29  
*Ethusina* 29  
*E. abyssicola* 29  
*E. favonii* 29  
*Etisus* 90, 104  
*E. maculatus* 90  
*Euchirograpsus* 136  
*E. americanus* 136, 137  
*E. antillensis* 137  
*E. pacificus* 137  
*Eucratodes* 91  
*E. agassizii* 91  
*Eucratopsis* 113  
*E. crassimanus* 113  
*Euphrosynoplax* 113  
*E. clausa* 113  
*Euprognatha* 45  
*E. gracilipes* 45  
*E. rastellifera acuta* 45  
*E. rastellifera marthae* 45  
*Eurypanopeus* 91, 103  
*E. abbreviatus abbreviatus* 91  
*E. abbreviatus ater* 91  
*E. crenatus* 91  
*E. depressus* 91  
*E. dissimilis* 92  
*E. turgidus* 92, 103  
*Euryplax* 113  
*E. nitida* 113  
*Eurytium* 92  
*E. limosum* 92  
  
*Fabia* 121  
*F. byssomiae* 121  
*F. tellinae* 121  
 fiddler crab (see *Uca*)  
 flame-streaked box crab 30  
 freshwater crab 87  
  
*Frevillea* 114  
*F. barbata* 114  
*F. hirsuta* 114  
*F. tridentata* 114, 116, 117  
 friendly crab 133  
 frog crab 25  
  
 GECARCINIDAE 9, 11–13, 138  
*Gecarcinus* 139  
*G. lateralis* 139, 140  
*G. quadratus* 139, 140  
*G. ruricola* 140  
*Geograpsus* 128  
*G. lividus* 128  
*Geryon* 111, 112  
*G. affinis* 111  
*G. quinquedens* 111  
 GERYONIDAE 9, 11–13, 110, 112  
 ghost crab 141  
*Glyptoplax* 114  
*G. pugnax* 114  
*G. smithii* 114  
*Glyptoxanthus* 93  
*G. erosus* 93  
 GONEPLACIDAE 9, 11–13, 72, 100, 110, 111  
*Goneplax* 114  
*G. barbata* 114  
*G. hirsuta* 114  
*G. tridentata* 117  
*Goniopsis* 128  
*G. cruentata* 128  
 GRAPSIDAE 9, 72, 128  
 Grapsinae 128  
 grapsoid crabs 72  
*Grapsus* 129  
*G. grapsus* 129  
 grass crab 52  
 great land crab 138  
 guaiamu 138  
 guanhumí 138  
 Gymnopleura 23  
  
 hairy crab 107  
 HAPALOCARCINIDAE 8, 9, 11–13, 40  
 HAPALOCARCINIDEA 9, 40  
 HAPALOCARCINOIDEA 9, 40  
*Hemus* 50  
*H. cristulipes* 50  
*Hepatus* 32, 33  
*H. epheliticus* 33

- H. princeps* 33, 34  
*H. pudibundus* 33, 34  
*Heteractaea* 93  
*H. ceratopus* 93  
*Heterocrypta* 67  
*H. granulata* 67  
*Hexapanopeus* 93, 96  
*H. angustifrons* 93  
*H. hemphillii* 94  
*H. lobipes* 94, 96  
*H. paulensis* 94, 95  
*H. quinquedentatus* 94  
*H. sinaloensis* 95  
*Holometopus* 133  
*Holoplites* 63  
*H. armata* 63  
*Homola* 22  
*H. barbata* 22  
*H. vigil* 22  
HOMOLIDAE 9, 10, 11–13, 21, 23  
*Homolodromia* 21  
*H. paradoxa* 21  
*Homolodromiinae* 10, 21  
*Homologenus* 22  
*H. rostratus* 22  
HOMOLOIDEA 9, 21  
*Hypoconcha* 20  
*H. arcuata* 20  
*H. sabulosa* 20  
*H. spinosissima* 21  
*Hypsophrys* 22–23  
*H. noar* 22  
  
*Iliacantha* 37  
*I. intermedia* 37  
*I. liodactylus* 37  
*I. sparsa* 38  
*I. subglobosa* 38  
*Inachinae* 42  
*Inachoides* 45  
*I. forceps* 45, 46  
*I. laevis* 45, 46  
isozyme patterns 18  
  
jonah crab 71  
juey 138  
  
kaburi 150  
  
lady crab 74  
land crab 138, 139, 140, 150  
*Latreillia* 10, 23  
  
*L. elegans* 23  
LATREILLIDAE 10, 11–13, 23  
*Latreillopsis* 23  
lazy crab 58  
*Leiolambrus* 68  
*L. nitidus* 68  
LEUCOSIIDAE 9, 11–13, 33, 35  
Leucosiinae 36  
leopard crab 33  
*Leptodius* 95  
*L. agassizii* 95, 108  
*L. floridanus* 89, 95  
*L. parvulus* 95  
*Leptuca* 143, 148  
lesser blue crab 81  
*Iibinia* 50, 63  
*L. dubia* 63, 64, 65  
*L. emarginata* 63, 64  
*L. erinacea* 65  
*L. rhomboidea* 65  
*Lithadia* 35  
*L. cadaverosa* 35  
*Lobopilumnus* 95  
*L. agassizii* 95  
loop currents 15  
*Lophopanopeus* 94, 96  
*L. distinctus* 96, 98  
*L. lobipes* 94, 96  
*Lupella* 82  
*L. forceps* 82  
*Lyreidus* 23  
*L. bairdii* 23  
  
macca crab 58  
*Macrocoeloma* 50  
*M. camptocerum* 50  
*M. diplacanthum* 51  
*M. eutheca* 51  
*M. intermedium* 51  
*M. laevigatum* 51  
*M. septemspinatum* 52  
*M. subparallelum* 52  
*M. trispinosum trispinosum* 52  
*M. trispinosum nodipes* 52, 53  
*M. trispinosum* variety Rathbun 53  
Macrocoelominae 50  
Macropipinae 72  
*Macropipus* 73  
MAJIDAE 9, 11–13, 41  
Majinae 49, 50  
mangrove crab 128, 132, 136  
marsh crab 132, 136  
*Matuta* 33  
Matutinae 32, 33  
*Melybia* 96  
*M. thalamita* 96  
*Menippe* 96  
*M. mercenaria* 93, 96–97  
*M. nodifrons* 97  
*Mesorhoea* 68  
*M. sexspinosa* 68  
*Metasesarma rubripes* 134  
*Metoporphaphis* 46  
*M. calcarata* 46  
*Micropanope* 96, 97  
*M. barbadiensis* 97  
*M. distincta* 96, 98  
*M. lobifrons* 98  
*M. nuttingi* 98  
*M. pusilla* 98  
*M. sculptipes* 97, 98, 99  
*M. spinipes* 99  
*M. truncatifrons* 99  
*M. urinator* 99  
*M. xanthiformis* 99, 100  
*Microphrys* 53  
*M. antillensis* 53  
*M. bicornutus* 54  
*M. platysoma* 53, 54  
Mithracinae 50  
*Mithraculus* 54  
*Mithrax* 54, 56  
*M. (Mithraculus) cinctimanus* 54  
*M. (Mithraculus) coryphe* 55  
*M. (Mithraculus) forceps* 55, 57  
*M. (Mithraculus) ruber* 55  
*M. (Mithraculus) sculptus* 56  
*M. (Mithrax) acuticornis* 56  
*M. (Mithrax) cornutus* 56  
*M. (Mithrax) depressus* 57  
*M. (Mithrax) hispidus* 56  
*M. (Mithrax) holderi* 57  
*M. (Mithrax) pilosus* 57  
*M. (Mithrax) pleuracanthus* 57  
*M. (Mithrax) spinosissimus* 56, 58  
*M. (Mithrax) verrucosus* 58  
*Mocosoa* 42

- M. crebripunctata* 42  
 mottled shore crab 130  
 mountain crab 140  
 mud crab 102  
 mulatto land crab 138  
 mussel crab 123  
*Myropsis* 38  
   *M. quinquespinosa* 38  
  
*Nanocassiope* 99  
   *N. melanodactylus* 99  
*Nanoplax* 99, 100  
   *N. xanthiformis* 99, 100  
*Neodoclea* 50  
*Neopanope* 100  
   *N. packardii* 100, 101  
   *N. sayi* 100, 101  
   *N. texana* 100  
   *N. texana sayi* 101  
*Neopilumnoplax* 114, 115  
   *N. americana* 114, 115  
*Nibilia* 65  
   *N. antilocapra* 65  
 northern crab 71  
*Notosceles chummonis* 25  
  
*Ocypode* 140  
   *O. albicans* 140  
   *O. arenaria* 141  
   *O. quadrata* 140, 141  
 OCYPODIDAE 9, 10, 11–13, 140  
 OCYPODOIDEA 9, 140  
 Ocypodinae 140  
 Ophthalmiinae 60  
*Orthotheres* 122, 125  
   *O. serrei* 122, 125  
   *O. strombi* 122, 125  
*Osachila* 32, 33, 34  
   *O. antillensis* 34  
   *O. semilevis* 34  
   *O. tuberosa* 34  
*Ovalipes* 13, 18, 72, 73  
   *O. floridanus* 74  
   *O. guadulpensis* 73, 74  
   *O. ocellatus* 73  
   *O. stephensoni* 74  
 OXYRHYNCHA 9, 41  
 OXYSTOMATA 8, 9, 23  
 oyster crab 124  
  
*Pachygrapsus* 130  
   *P. gracilis* 130  
  
*P. transversus* 130  
 pagurus 150  
 PALICIDAE 8, 9, 11–13, 27, 72, 117  
*Palicus* 27, 117  
   *P. affinis* 117  
   *P. alternatus* 118  
   *P. cursor* 118  
   *P. dentatus* 118  
   *P. faxoni* 118  
   *P. gracilipes* 118  
   *P. gracilis* 119  
   *P. obesus* 119  
   *P. sica* 119  
*Panopeus* 101  
   *P. americanus* 101  
   *P. bermudensis* 101  
   *P. hartii* 101  
   *P. herbstii* 93, 102  
   *P. occidentalis* 103  
   *P. rugosus* 103  
   *P. turgidus* 92, 103  
*Panoplax* 115  
   *P. depressa* 115  
*Paractaea* 88, 103  
   *P. rufopunctata nodosa* 88, 103  
*Paraliomera* 104  
   *P. dispar* 104  
   *P. longimana* 104  
*Parapinnixa* 122  
   *P. bouvieri* 122  
   *P. hendersoni* 122  
 parrot crab 32  
*Parthenope* 68  
   *P. (Parthenope) agonus* 68  
   *(Platylambrus) fraterculus* 68  
   *P. (Platylambrus) pourtalesii* 69  
   *P. (Platylambrus) serrata* 69  
 PARTHENOPIDAE 9, 11–13, 33, 67  
 Parthenopinae 67  
 pea crab 123, 124  
*Pelia* 65  
   *P. mutica* 65  
 pentagon crab 67  
*Percnon* 131  
   *P. gibbesi* 131  
 Periceroida 50  
*Persephona* 39  
   *P. aquilonaris* 39  
   *P. crinita* 39  
   *P. mediterranea* 37, 39  
   *P. punctata* 39  
   *P. punctata aquilonaris* 39, 40  
 Philyrinae 38  
*Phyfodius* 90, 104  
   *P. maculatus* 90, 104  
*Picroceroides* 60  
   *P. tubularis* 60  
*Pilumnoides* 104  
   *P. nudifrons* 104  
*Pilumnoplax* 115  
   *P. americana* 114, 115  
   *P. elata* 115, 116, 117  
   *P. nitida* 115  
*Pilumnus* 105  
   *P. caribaeus* 105  
   *P. dasyopodus* 105  
   *P. diomedea* 105  
   *P. floridanus* 105  
   *P. gemmatus* 106  
   *P. holosericus* 106  
   *P. lacteus* 106  
   *P. longleyi* 106  
   *P. marshi* 106, 107  
   *P. pannosus* 106  
   *P. sayi* 106, 107  
   *P. spinosissimus* 107  
*Pinnaxodes* 122  
   *P. floridensis* 122  
*Pinnixa* 125  
   *P. chacei* 125  
   *P. chaopterana* 125  
   *P. cristata* 126  
   *P. cylindrica* 126, 128  
   *P. floridana* 126, 127  
   *P. leptosynaptae* 127  
   *P. lunzi* 127  
   *P. pearsei* 127  
   *P. retinens* 127  
   *P. sayana* 128  
 Pinnothereliinae 125  
*Pinnotheres* 123  
   *P. geddesi* 123  
   *P. guerini* 123  
   *P. hemphilli* 123  
   *P. hirtimanus* 123  
   *P. maculatus* 123  
   *P. mosei* 124  
   *P. ostreum* 124  
   *P. serrei* 122, 125  
   *P. shoemakeri* 125  
   *P. strombi* 122, 125

- PINNOTHERIDAE 9, 10, 11–13, 119  
 Pinnotherinae 119  
 Pisinae 50, 62  
*Pitho* 61  
*P. aculeata* 61  
*P. anisodon* 61  
*P. laevigata* 61  
*P. lherminieri* 61  
*P. mirabilis* 62  
 Plagusiinae 131  
*Plagusia* 131  
*P. depressa* 131  
*Planes* 130  
*P. cyaneus* 130–131  
*P. minutus* 130, 131  
*Planuca* 145, 149  
*Platyactaea* 88, 107  
*P. setigera* 88, 107  
*Platychirograpsus* 137  
*P. spectabilis* 137  
*P. typicus* 137  
*Platylambrus* 68  
*Platypodia* 108  
*P. spectabilis* 108  
*Platypodiella* 108  
*P. spectabilis* 108  
*Podocheila* 46  
*P. curvirostris* 46  
*P. gracilipes* 47  
*P. lamelligera* 47  
*P. macrodera* 47  
*P. riisei* 47  
*P. sidneyi* 48  
 Polybiinae 72  
 PORTUNIDAE 9, 11–13, 72  
 Portuninae 74  
 PORTUNOIDEA 9, 72  
*Portunus* 82  
*P. anceps* 82  
*P. binoculus* 83  
*P. depressifrons* 83  
*P. floridanus* 83  
*P. gibbesii* 83, 86  
*P. ordwayi* 84  
*P. sayi* 77, 84  
*P. sebae* 85  
*P. spinicarpus* 83, 85  
*P. spinimanus* 84, 85  
*P. ventralis* 86  
*P. vocans* 86  
 POTAMIDAE 8, 11–13, 72, 86  
*Potamocarcinus* 87  
*Potamon* 87  
 Potamonidae 87  
*Prinoplax* 116  
*P. atlantica* 116, 117  
 PROSOPIDAE 8, 9, 11–13, 21  
*Pseudomedeus* 108  
*P. agassizii* 95, 108  
 Pseudothelphusidae 8, 87  
 purse crab 39  
*Pyromaia* 48  
*P. arachna* 48  
*P. cuspidata* 48  
 queen crab 88  
 racing crab 141  
*Ranilia* 24  
*R. constricta* 24  
*R. muricata* 24  
 RANINIDAE 9, 11–13, 23  
 RANINOIDEA 9, 23  
*Raninoides* 24  
*R. benedicti* 25  
*R. fossor* 24  
*R. lamarcki* 24  
*R. loevis* 25  
*R. louisianensis* 25  
 red crab, deep-sea 111  
 red-jointed fiddler crab 143  
 red land crab 140  
 red spider crab 56  
 red tourlourou 140  
 Retroplumidae 9, 10  
*Rhithropanopeus* 108  
*R. harrisi* 108  
*R. harrissi tridentatus* 109  
 river crab 137  
*Robertella* 116  
*R. mystica* 115, 116, 117  
*Rochinia* 66  
*R. crassa* 66  
*R. hystrix* 66  
*R. tanneri* 66  
*R. umbonata* 67  
 rock crab 129  
 saber crab 137  
 sally lightfoot 129  
 sand crab 74, 141  
 sand fiddler crab 144, 145  
 sargassum crab 84  
*Sesarma* 18, 133  
*S. (Holometopus) ameri-*  
*canum* 133, 134, 135  
*S. (Holometopus) angustipes*  
 133, 134, 135  
*S. (Holometopus) benedicti*  
 133  
*S. (Holometopus) miersii* 134  
*S. (Holometopus) cinereum*  
 18, 133–134, 135  
*S. (Holometopus) miersii* 134  
*S. (Holometopus) ricordi* 18,  
 134, 135  
*S. (Holometopus) roberti*  
 133, 134, 135  
*S. (Holometopus) tampi-*  
*cense* 133, 135  
*S. (Sesarma) curacaoense* 136  
*S. (Sesarma) reticulatum*  
 18, 136  
 Sesarminae 132  
 shame-faced crab 30, 32  
 shore crab 130  
*Solenolambrus* 70  
*S. decemspinus* 70  
*S. tenellus* 70  
*S. typicus* 70  
 speckled crab 74  
*Speloeophorus* 36  
*S. elevatus* 36  
*S. nodosus* 36  
*S. pontifer* 36  
*Speocarcinus* 116  
*S. carolinensis* 116  
*S. lobatus* 116  
 spider crab (see MAJIDAE)  
 sponge crab 52  
 spray crab 131  
 square-backed fiddler crab 133  
*Stenocionops* 50, 58  
*S. furcata coelata* 59  
*S. furcata furcata* 58  
*S. spinimana* 59  
*S. spinosissima* 59  
*Stenorhynchus* 49  
*S. lanceolatus* 49  
*S. seticornis* 49  
 stone crab 96  
 swimming crab (see  
 PORTUNIDAE)  
*Symethis* 25  
*S. variolosa* 25  
*Telephrys* 60  
*T. ornatus* 60  
*Temnonotus* 49

- T. granulatus* 49–50  
*T. simplex* 49, 50  
*Tetraplax* 116  
*T. quadridentata* 116  
*Tetrazanthus* 109  
*T. bidentatus* 109, 110  
*T. rugosus* 109, 110  
*T. rathbunae* 109  
*Thalassoplex* 117  
*T. angusta* 115, 117  
*Thelxiope* 22  
*T. barbata* 22  
*T. vigil* 22  
*Thoe* 60  
*T. puella* 60  
*Thyrolambrus* 70  
*T. astroides* 70  
 tourlourou 138  
*Trachycarcinus* 71  
*T. spinulifer* 71  
*Trapezioplax* 114, 116, 117  
*T. tridentata* 114, 116, 117  
 tree crab 128, 132  
 Trichodactylidae 8, 87  
*Trichopeltarion* 71  
*T. nobile* 71  
*Troglocarcinus* 41  
*T. balssi* 41  
*T. corallicola* 41  
*Tutankhamen* 71  
*T. cristatipes* 71  
*Tyche* 62  
*T. emarginata* 62  
*T. lamellifrons* 62  
*Typhlopseudothelphusa* 87  
*Uca* 10, 13, 18, 142, 150  
*U. affinis* 142  
*U. burgersi* 142, 144  
*U. cumulanta* 148  
*U. leptodactyla* 143  
*U. longisignalis* 18, 143, 147, 149  
*U. minax* 143, 144, 147  
*U. mordax* 142, 144, 149  
*U. murifecenta* 149  
*U. panacea* 18, 144, 145  
*U. pugilator* 18, 144, 145–146  
*U. pugnax* 18, 143, 147, 149  
*U. pugnax repax* 143, 144, 147  
*U. pugnax virens* 144, 149  
*U. rapax* 142, 143, 147, 149  
*U. rapax longisignalis* 143, 144, 147  
*U. speciosa* 148  
*U. speciosa spinicarpa* 148  
*U. spinicarpa* 148  
*U. subcylindrica* 18, 148  
*U. thayeri* 148  
*U. virens* 18, 143, 147, 149  
*U. vocator* 144, 149  
*Ucides* 150  
*U. cordatus* 150  
*U. occidentalis* 150  
*Uhlias* 36  
*U. limbatus* 36  
 Varuninae 136  
 Virginian Province 11  
 wharf crab 130, 133  
 white land crab 138  
 whitespot crab 140  
 wood crab 133  
 XANTHIDAE 9, 10, 11–13, 72, 87, 111, 112  
*Xantho* 110  
*X. denticulata* 110  
*Xanthodes bidentatus* 110  
*Xanthodius* 110  
*X. denticulatus* 110  
*X. simpsoni* 110  
 XANTHOIDEA 8, 9, 72, 86  
 yellow box crab 31, 32