THE FRESHWATER SHRIMPS (ATYIDAE AND PALAEMONIDAE) OF JAMAICA, W. I.

With a Discussion of Their Relation to the Ancient Geography of the Western Caribbean Area

BY

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THE FRESHWATER SHRIMPS (ATYIDAE AND PALAEMONIDAE) OF JAMAICA, W. I.

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ABSTRACT.—The following freshwater shrimps are reported from Jamaica, W. I.—Family Palaemonidae: *Macrobrachium acanthurus, M. carcinus, M. crenulatum, M. faustinum,* and *M. heterochirus;* family Atyidae: *Atya occidentalis, A. scabra, Jonga serrei, Micratya poeyi, Potimirim americana, P. mexicana,* and *Xiphocaris elongata.* Detailed ecological data are given for all collecting stations, and a brief discussion of the relation of a few groups of animals to the geological history of the western Caribbean is included.

When the amount of work that has been done on other aspects of Jamaica's animal life is considered, it is surprising how little work has been done on the freshwater shrimps.

Early in 1959 I became aware of the need for a study of the Jamaican freshwater shrimps to add to the already available knowledge of the crustacea of the Caribbean region, and possibly to serve as a basis for a study of the relationships between the freshwater fauna of the Caribbean islands and their ancient geography.

In April, 1959, I visited Jamaica and, with the cooperation of the Institute of Jamaica in Kingston, was able to collect shrimps from a number of representative drainage systems. I returned to Jamaica in January, 1960,[1] and continued these collections, at that time filling in many important gaps which I had missed on the first trip.

Although the number of species dealt with here is not large, it probably represents most, if not all, of the freshwater shrimps found in Jamaica—exclusive of those which may inhabit subterranean waters.

Except where noted, all collections were made by myself, either alone or with the assistance of Dr. Thomas Farr, Mr. Ronald Bengry, or Mrs. Gloria Thomas. Where records in the literature are sufficiently detailed and reliable, they are included and the sources given. References in the literature giving locality data only as "Jamaica" are included in a separate paragraph under the pertinent species.

[1] Supported by Grant No. 2623 (Penrose Fund) from the American Philosophical Society, Philadelphia, Pennsylvania.

The collections made on these trips have been deposited in the Academy of Natural Sciences of Philadelphia (ANSP), in the Rijksmuseum van Natuurlijke Historie in Leiden, Netherlands (RMNH), and in the U. S. National Museum in Washington, D. C. (USNM). A synoptic series has been deposited in the Institute of Jamaica in Kingston (IJ).

I am most grateful to Dr. Bernard Lewis, Director of the Institute of Jamaica, for his cooperation and help in carrying out these studies. Dr. Thomas Farr, Mr. Ronald Bengry, and Mrs. Gloria Thomas, also of the Institute of Jamaica, were most generous with their time and assistance on both of my visits. I am also indebted to Dr. L. B. Holthuis of the Rijksmuseum van Natuurlijke Historie, Leiden, Netherlands; Dr. Fenner Chace of the U. S. National Museum, Washington, D. C.; and Dr. Horton Hobbs of the University of Virginia for their help. Dr. Alfred E. Smalley of Tulane University, New Orleans, La., most generously loaned me specimens of *Potimirim americana* that he collected in Jamaica in June, 1960.

COLLECTING STATIONS

Figure 1 shows the locations of collecting stations (1–42) visited in 1959 and 1960. The data corresponding to this figure (in the *first* paragraphs under the respective parishes, below) give the station numbers, the collection numbers (from which may be gathered the collecting dates—i.e., coll. no. 9-459-1 = 9 April 1959, collection no. 1), the station locations, descriptions, and altitudes. The altitudes given are those of the next map contour lines above the respective stations. The stations should, therefore, be considered to be slightly lower than the elevation given.

Table 1 summarizes the species found at Stations 1–42 so that an idea may be gained of what species are found together. It should be remembered, however, that although several species may have been taken at any

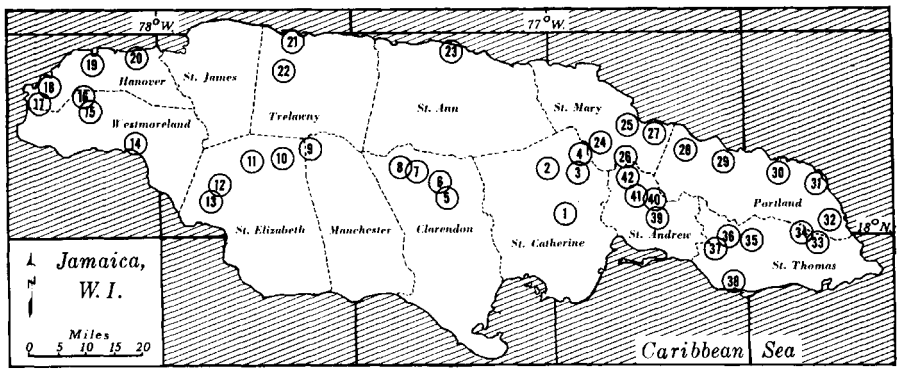


FIGURE 1.—*Map of Jamaica, W. I., showing the locations of collecting stations visited in 1959 and 1960. Table 1 summarizes the shrimp species collected at each of these stations.*

one collecting station, those species do not necessarily inhabit the same ecological niches within the bounds of the station. Table 1 corresponds to Figure 1.

Figure 2 shows the locations (A–K) of collecting stations which appear in the literature or which are the sources of other collections which I have examined. The data corresponding to this figure (included in the *second* paragraphs under the respective parishes, below) give the information that is available with these collections. An exclamation point (!) following the data indicates that I have not personally examined the specimens involved. The altitudes given are, of necessity, only reasonable guesses.

Table 2 summarizes the species found in other collections that I have examined or which appear in the literature (Stations A–K). It corresponds to Figure 2.

TABLE 1.—*Summary of shrimp species collected at Stations 1–42. (See fig. 1.)*

Shrimps	Collecting Stations 1	2	3	4	5	6	7	8	9	10	11	12	13	14
Macrobrachium acanthurus														X
Macrobrachium carcinus								X					X	
Macrobrachium faustinum	X	X	X	X	X	X	X	X		X	X	X		
Macrobrachium heterochirus														
Atya occidentalis			X						X					
Atya scabra		X				X	X							
Jonga serrei														
Micratya poeyi														
Potimirim mexicana						X						X		
Xiphocaris elongata											X	X		X

Shrimps	Collecting Stations 15	16	17	18	19	20	21	22	23	24	25	26	27	28
Macrobrachium acanthurus			X	X	X		X				X			
Macrobrachium carcinus														X
Macrobrachium faustinum	X		X		X	X	X	X	X	X	X	X	X	X
Macrobrachium heterochirus								X				X		
Atya occidentalis								X	X	X				
Atya scabra														
Jonga serrei					X		X							
Micratya poeyi	X								X	X		X	X	X
Potimirim mexicana	X													
Xiphocaris elongata	X	X	X	X	X	X	X		X	X	X	X	X	

Shrimps	Collecting Stations 29	30	31	32	33	34	35	36	37	38	39	40	41	42
Macrobrachium acanthurus														
Macrobrachium carcinus				X										
Macrobrachium faustinum		X	X	X	X		X		X	X				
Macrobrachium heterochirus					X			X	X				X	
Atya occidentalis	X					X	X	X	X		X			
Atya scabra														
Jonga serrei				X										
Micratya poeyi	X				X									
Potimirim mexicana														
Xiphocaris elongata	X	X	X	X	X	X	X			X		X	X	X

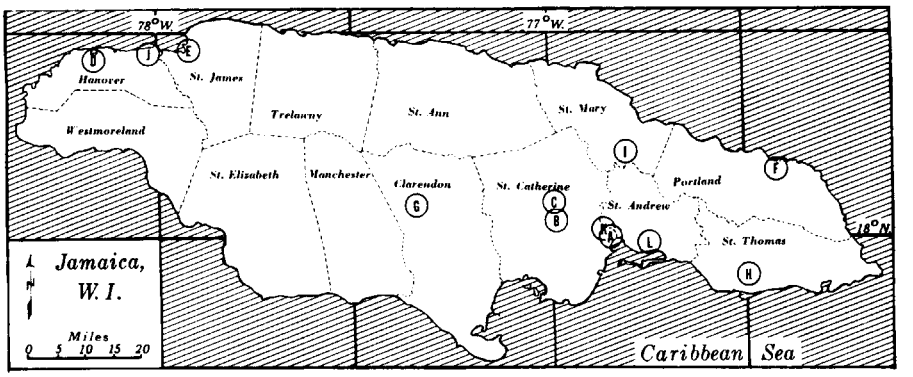


FIGURE 2.—*Map of Jamaica, W. I., showing the locations of collecting stations which appear in the literature or which are the sources of collections that I have examined. Table 2 summarizes the shrimp species collected at each of these stations.*

TABLE 2.—*Summary of shrimp species found in other collections or which appear in the literature. (See fig. 2.)*

	Collecting Stations											
Shrimps	A	B	C	D	E	F	G	H	I	J	K	L
Macrobrachium acanthurus	X				X							
Macrobrachium carcinus		X	X	X		X						
Macrobrachium crenulatum ...					X					X		
Macrobrachium faustinum					X			X		X	X	X
Macrobrachium heterochirus ...								X				
Atya scabra							X					
Potimirim americana									X			

Clarendon Parish

Station 5 (coll. no. 9-459-1)—Tributary of Thomas River at Summerfield; 25 ft. wide; 1–2 ft. deep; sand bottom; current sluggish; water turbid and containing much debris; altitude 750 ft. **Station 6** (coll. no. 9-459-2)—Thomas River, at ford 1 mi. N. of Summerfield; 30–40 ft. wide; 1–2 ft. deep; sand and rock bottom; current moderate; water clear; altitude 750 ft. **Station 7** (coll. no. 9-459-3)—Rio Minho at confluence with Pennants River; broad river bed, but stream only 25 ft. wide because of lack of rain; 2–3 ft. deep; rock and gravel bottom; current moderate to swift; water clear; altitude 750 ft. **Station 8** (coll. no. 9-459-4)—Rio Minho near Guinea Corn; 25–35 ft. wide; 1–2 ft. deep; some sand in bed, mostly of bed rock; current moderate; water clear; altitude 1,000 ft.

Station G—Rio Minho, 2 mi. S.E. of Crooked River P. O.; altitude about 1,000 ft.; coll. of *Atya scabra* by R. Proctor, in Institute of Jamaica.

Hanover Parish

Station 17 (coll. no. 11-160-2)—Small stream flowing into Great Morass, 250 ft. N. of Westmoreland-Hanover parish boundary; 3–5 ft. wide; less than 1 ft. deep; sand and mud bottom; current sluggish; water clear; altitude 50 ft. **Station 18** (coll. no. 11-160-3)—Roadside drainage ditch containing permanent water, ¼ mi. S. of Salt Spring; 3–4 ft. wide; 1–3 ft. deep; sand and mud bottom; current sluggish; water clear; altitude 50 ft. **Station 19** (coll. no. 10-459-4)—West Lucea River at Eaton, near ford; 10–50 ft. wide; 2–3 ft. deep; sand and gravel bottom; current swift; water turbid;

altitude 100 ft. **Station 20** (coll. no. 10-459-5)—Flint River near highway bridge; 25–40 ft. wide; 1–2 ft. deep; rocky bottom with some sand; current swift; water clear; altitude 100 ft.

Station D—Lucea (probably W. Lucea River); altitude, about 50 ft.; USNM collection of *Macrobrachium carcinus*. **Station J**—Flint River near Sandy Beach; altitude, about 50 ft.; USNM coll. of *M. crenulatum*.

Manchester Parish

Station 9 (coll. no. 13-160-2)—One Eye River,[2] 100 yards S. of bridge S. Auchtembeddie; 25–35 ft. wide; 1–2 ft. deep; gravel bottom interspersed with large boulders; current swift; water clear; altitude 750 ft.

[2] This river is known locally as Roaring River and Noisy River, as well as One Eye River. It may be connected underground with Hectors River.

Portland Parish

Station 28 (coll. no. 8-459-2)—Buff Bay River near Charles Town; 300–400 ft. wide; 3–5 ft. deep; sand bottom with large rocks; current swift; water clear; altitude 500 ft. **Station 29** (coll. no. 8-459-3)—Tributary of Back River near Elysium; 6 ft. wide; 1–2 ft. deep; sand and gravel bottom; current rapid; water muddy; altitude 250 ft. **Station 30** (coll. no. 8-459-4)—Sandy River at Fellowship (trib. of Rio Grande); 75–100 ft. wide; 1–3 ft. deep; sand and gravel bottom; current moderate; water clear; altitude 250 ft. **Station 31** (coll. no. 8-160-2)—Priestmans River, 100 ft. upstream from highway bridge; 25–35 ft. wide; 1–3 ft. deep; sandy mud bottom with some large stones; flow back and forth, apparently affected by wave action of nearby sea; water clear and *probably* brackish; altitude, near sea level. **Station 32** (coll. no. 8-160-1)—Drivers River, at ford about 1 mi. W. of Muerton; 30–50 ft. wide; 1–5 ft. deep; sand bottom with some rocks and abundant aquatic vegetation near rt. bank; current moderate to swift; water clear; altitude 50 ft.

Station F—"Streams around Port Antonio," (Andrews, 1892: 75); altitude ca. 50 ft.; coll. of *Macrobrachium carcinus!*

St. Andrew Parish

Station 39 (coll. no. 6-459-3)—Mammee River near Maryland; 12–15 ft. wide; 1–3 ft. deep; sand bottom with large rocks; current very swift; water clear; altitude 1,250 ft. **Station 40** (coll. no. 5-160-1)—Wag Water River near its entrance into Hermitage Reservoir; 15–20 ft. wide; 1–4 ft. deep; sand bottom with large boulders; current swift; water clear; altitude 1,750 ft. **Station 41** (coll. no. 5-160-2)—Moresham River at its entrance into Hermitage Reservoir; 10–15 ft. wide; 1–2 ft. deep; steep gradient among boulders; current very rapid; water clear; altitude 1,750 ft. **Station 42** (coll. no. 8-160-3)—Tributary of Wag Water River several hundred yards N. of Coakley; 1–3 ft. deep pool in rock cleft extending into side of mountain about 30 ft.; spring fed; current only slight; water clear; altitude 1,000 ft.

Station L—Kingston, Jamaica [W. J. Fox, 1891; coll. of *Palaemon jamaicensis* (= *Macrobrachium faustinum*) in ANSP coll., no. 1001].

St. Ann Parish

Station 23 (coll. no. 10-459-7)—Great River at Llandovery; 30–50 ft. wide; 1–5 ft. deep; sand bottom; current very rapid; water turbid; altitude 100 ft.

St. Catherine Parish

Station 1 (coll. no. 7-459-2)—Rio Cobre at Raby's Corner, near Flat Bridge; 50–75 ft. wide; 2–3 ft. deep; rocky bottom; current swift; water clear; altitude 250 ft.

Station 2 (coll. no. 7-459-3)—Stream in Byndloss Gully, 1½ mi. N. of Linstead on road to Ewarton; 25–30 ft. wide; 1–2 ft. deep; current moderate; water clear; altitude 500 ft. **Station 3** (coll. no. 7-459-4)—Rio D'Oro at William's Field; 25–35 ft. wide; 1–2 ft. deep; sand bottom; current moderate; water clear; altitude 500 ft. **Station 4** (coll. no. 7-459-5)—Troja River beside road between Troja and Harewood; 4–5 ft. wide; less than 1 ft. deep; sand bottom; current moderate; water clear; altitude 750 ft.

Station A—Rio Cobre near Kingston Harbour; USNM coll. of *Macrobrachium acanthurus;* altitude about 50 ft. **Station B**—Rio Cobre near Flat Bridge; altitude 250 ft.; Institute of Jamaica coll. of *M. carcinus.* **Station C**—Rio Cobre at Bog Walk; altitude 500 ft.; Institute of Jamaica coll. of *M. carcinus.* **Station K**—Fresh River; altitude 50 ft.; USNM coll. of *M. faustinum.*

St. Elizabeth Parish

Station 10 (coll. no. 9-459-5)—Black River at Windsor Bridge; 15–20 ft. wide (flooded); ? ft. deep; current very swift; water muddy; altitude 500 ft. **Station 11** (coll. no. 9-459-6)—Tributary of Black River between Vauxhall and Maggotty; 30–40 ft. wide (flooded); ? ft. deep; current rapid; water muddy; altitude 750 ft. **Station 12** (coll. no. 9-459-7)—Ys River at Ys; 10–20 ft. wide (flooded); ? ft. deep; current very swift; water muddy; altitude 100 ft. **Station 13** (coll. no. 9-459-8)—Black River Morass at Middle Quarters; specimens bought from small boy; specimens reputedly caught in traps in Black River Morass; altitude 100 ft.

St. Mary Parish

Station 24 (coll. nos. 7-459-6 and 7-160-1)—Tributary of Trunnels River, crossing road about 4 mi. S. of Richmond; 6–10 ft. wide; less than 1 ft. deep; sandy mud bottom; current slow to moderate; water clear; altitude 750 ft. **Station 25** (coll. no. 7-459-7)—Wag Water River below bridge W. of Chovey; 20–30 ft. wide; 1–4 ft. deep; gravel and rock bottom; current moderate; water clear; altitude 50 ft. **Station 26** (coll. no. 7-459-8)—Wag Water River at Castleton Gardens; 50–75 ft. wide; 1–3 ft. deep; sand bottom with scattered large boulders; current moderate to swift; water clear; altitude 750 ft. **Station 27** (coll. no. 8-459-1)—Pencar River at Fort George, 2 mi. S. of Annotto Bay; 50–100 ft. wide; 1–4 ft. deep; sand and gravel bottom; current slow to moderate; water clear to slightly turbid; altitude 100 ft.

Station I—Tributary of Wag Water River 4 mi. N. of Castleton Gardens; altitude 750 ft.; Tulane University coll. of *Potimirim americana.*

St. James Parish

Station E—Montego Bay (probably the Montego River); altitude about 50 ft.; USNM coll. of *Macrobrachium acanthurus* and American Museum of Natural History coll. of *M. faustinum*!

St. Thomas Parish

Station 33 (coll. no. 5-459-1)—Sulphur River, ½ mi. N. of Bath Fountain Hotel; 10–20 ft. wide; 1–15 ft. deep; sand and rock bottom; current moderate; water clear; altitude 1,000 ft. **Station 34** (coll. no. 5-459-2)—Bugaboo River, ½ mi. below Corn Puss Gap; clear pool area; altitude 2,000 ft. **Station 35** (coll. no. 6-160-3)—Negro River, behind home of Misses Bartlett, 2½ mi. N.W. of Trinity Ville; 15–20 ft. wide; 1–3 ft. deep; sand and rock bottom; current rapid; water clear; altitude 1,500 ft. **Station 36** (coll. no. 6-160-2)—Banana River, about 1 mi. N.W. of Richmond Vale; 6–10 ft. wide; 1–2 ft. deep; sand, mud, and stone bottom; current rapid; water clear; altitude 1,500 ft. **Station 37** (coll. no. 6-160-1)—Yallahs River, beneath Ramble Bridge; 250–300 ft. wide; 1–3 ft. deep; sandy and rocky bottom; current rapid; water clear; altitude

750 ft. **Station 38** (coll. no. 6-160-4)—East loop of Mundicat River at Yallahs; 15–20 ft. wide; 3–4 ft. deep; sand bottom with heavy aquatic plant growth; current moderate; water clear; altitude 50 ft.

Station H—Yallahs River; ? altitude; USNM colls. of *Macrobrachium faustinum* and *M. heterochirus*.

Trelawny Parish

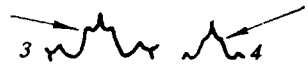
Station 21 (coll. no. 10-459-6)—Martha Brae River behind dam near Martha Brae; 50–75 ft. wide; 4–6 ft. deep; current sluggish; water dark with much organic debris; altitude 50 ft. **Station 22** (coll. no. 10-160-1)—Martha Brae River ½ mi. S. of Bunkershill; 75–100 ft. wide; 1–3 ft. deep; flowing over stone bed with some mud in crevasses; current swift; water clear; altitude 250 ft.

Westmoreland Parish

Station 14 (coll. no. 10-459-1)—Watercress Creek, 0.6 mi. S.E. of Ferris Cross; 6–8 ft. wide; 1–3 ft. deep; sand bottom with aquatic vegetation; current moderate; water clear; altitude 50 ft. **Station 15** (coll. no. 10-459-2)—Cabarita River at Frome; 75–100 ft. wide; 2–10 ft. deep; rock and gravel bottom with some mud; current moderate; water turbid; altitude 100 ft. **Station 16** (coll. no. 10-459-3)—Morgans Cut, ¼ mi. N.E. of Glasgow; 6–8 ft. wide; less than 1 ft. deep; sand and gravel bottom; current moderate; water clear; altitude 250 ft.

A KEY TO THE FAMILIES, GENERA, AND SPECIES OF THE JAMAICAN FRESHWATER SHRIMPS

1. —Pereiopods usually with exopods; if not, chelae with conspicuous terminal brushes of hairs ..... Atyidae ... 2
1a.—Pereiopods without exopods. Chelae without terminal brushes of hairs ..... Palaemonidae ... 8
2. —Chelae with conspicuous terminal brushes of hairs 3
2a.—Chelae without conspicuous terminal brushes of hairs ..... *Xiphocaris elongata*
3. —First pereiopods with an arthrobranch 4
3a.—First pereiopods without an arthrobranch ..... *Micratya poeyi*
4. —Carpus of second pair of legs shorter than broad; anterior part deeply excavate .. 7
4a.—Carpus of second pair of legs longer than broad; distinctly, but not deeply, excavate 5
5. —Superior orbital border with row of small teeth ..... *Jonga serrei*
5a.—Superior orbital border without row of small teeth 6
6. —Base of *appendix masculina* of 2nd pleopod of male two-thirds its height ..... *Potimirim mexicana*
6a.—*Appendix masculina* of 2nd pleopod of male disc-shaped ... *Potimirim americana*
7. —Lateral angle of rostrum forming right or acute angle with acumen (fig. 3) ..... *Atya scabra*
7a.—Lateral angle of rostrum forming obtuse angle with acumen (fig. 4) ..... *Atya occidentalis*



8. —Second chelae of adult males equal in shape; unequal in size ..... *Macrobrachium heterochirus*
8a.—Second chelae of adult males equal in shape and size 9
8b.—Second chelae unequal in size and shape 10

9. —Fingers of 2nd chelae thickly pubescent throughout entire length. Carpus of 2nd chelae in adult males 6–8 times as long as broad .. *Macrobrachium acanthurus*
9a.—Fingers of 2nd chelae not thickly pubescent throughout entire length. Carpus of 2nd chelae of adult males more than twice as long as broad .... *Macrobrachium carcinus*
10. —Carpus of second leg longer than merus ..... *Macrobrachium faustinum*
10a.—Carpus of second leg shorter than merus ..... *Macrobrachium crenulatum*

SYSTEMATIC SECTION

Class CRUSTACEA

Order DECAPODA

Supersection NATANTIA

Section CARIDEA

Superfamily PALAEMONOIDA

Family PALAEMONIDAE

Subfamily PALAEMONINAE

Macrobrachium acanthurus (Wiegmann) Fig. 5.

Description and synonymy.—Holthuis, 1952: 48–50, pl. 8, pl. 9 figs. a, b.

Type locality.—Coast of Brazil. *Distribution.*—East coast of America from Georgia to southern Brazil; West Indies. Fresh and brackish waters.

Occurrence in Jamaica.—**Hanover Parish:** Station 17—17 specimens (RMNH); Station 18—2 specimens (USNM); Station 19—1 specimen (USNM). **St. Catherine Parish:** Station A (USNM). **St. James Parish:** Station E (USNM). **St. Mary Parish:** Station 25—1 specimen (USNM). **Trelawny Parish:** Station 21—11 specimens (ANSP). **Westmoreland Parish:** Station 14—2 specimens (IJ).

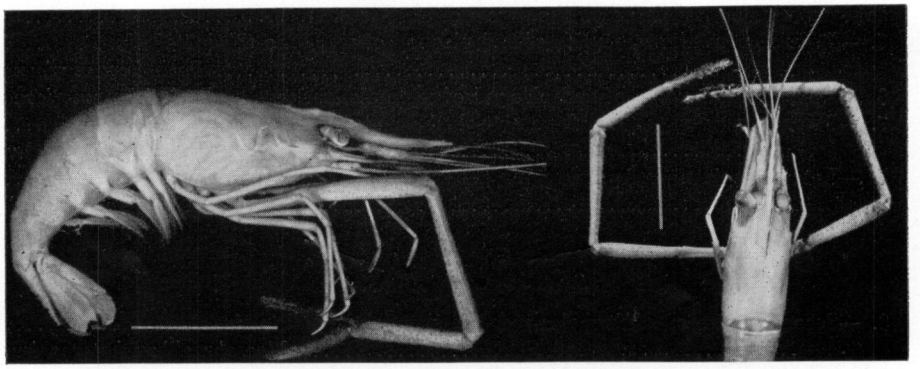


FIGURE 5.—*Lateral and dorsal views of* MACROBRACHIUM ACANTHURUS. *The horizontal and vertical lines equal one inch.*

Remarks.—This species is apparently restricted to the relatively broad low-lying areas of the island. It was found only once at an altitude greater than 50 ft.—West Lucea River at Eaton (altitude 100 ft.).

Macrobrachium carcinus (Linnaeus) Fig. 6.

Description and synonymy.—Holthuis, 1952: 119–123, pl. 30, pl. 31 figs. a–c.

Type locality.—Linnaeus's locality is given as "*in* Americae *fluviis*," but his description is generally considered to be based on the description and figure given by Sloane (1725) of *Astacus fluviatilis major, chelis aculeatis* from Jamaica, and the type, if extant, to be in the British Museum, London. Recent attempts to locate the specimen have, however, been futile. *Distribution.*—East coast of America from Florida to southern Brazil; West Indies. Fresh and brackish waters.

Occurrence in Jamaica.—**Clarendon Parish:** Station 8—1 specimen (USNM). **Hanover Parish:** Station D (USNM). **Portland Parish:** Station 28—1 specimen (USNM); Station 32—1 specimen + fragment of chela (USNM); Station F (Andrews, 1892:75)!. **St. Catherine Parish:** Station B—2 specimens, coll. by R. Bengry, 19 June 1952 (IJ); Station C—1 specimen, coll. by R. Bengry, 10 Feb. 1957 (IJ). **St. Elizabeth Parish:** Station 13—3 specimens (ANSP, USNM, RMNH).

Literature references to "Jamaica" only.—*Astacus fluviatilis major, chelis aculeatis* Sloane, 1725: 271, pl. 245, fig. 2; *Astacus* 2 Browne, 1789: 424; *Cancer* (*Astacus*) *Jamaicensis* Herbst, 1796: 57–58, pl. 27, fig. 2; *Palaemon carcinus* Leach, 1815: 92, pl. 92; *Palaemon Jamaicensis* White, 1847: 78; Gosse, 1851: 85; *Palaemon jamaicensis* Gundlach, 1887: 132–133; *Bithynis jamaicensis* Rathbun, 1897: 44.

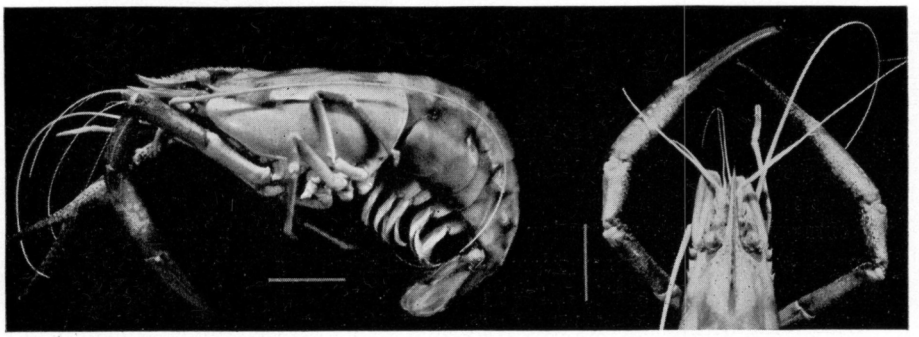


FIGURE 6.—*Lateral and dorsal views of* MACROBRACHIUM CARCINUS. *The horizontal and vertical lines equal one inch.*

Remarks.—Although I did not find this to be the most abundant freshwater shrimp in Jamaica, it is certainly the best known. This can, of course, be attributed partly to the extreme size which it attains. Specimens