



# B I S H O P M U S E U M

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June 24, 1981

Colonel Alfred Thiede  
U.S. Army Engineer District Honolulu  
Building 230  
Fort Shafter, Hawaii 96858

RE: American Samoa Freshwater  
Crustacean Identification  
Project (PODED-P-64-81)

Dear Sir:

The identification of crustacean specimens, both shrimps and crabs from freshwater streams on the island of Tutuila, American Samoa, is the result of material collected by Mr. John I. Ford as part of the American Samoa Water Resources Study (U.S. Army Corps of Engineers), between September 1979 and August 1980. Twenty-two lots were examined and with station data are summarized in Tables I and II.

This report has been prepared by staff from the Division of Invertebrate Zoology, Bernice P. Bishop Museum, Honolulu. The main purpose of this study is to provide identifications in order to allow meaningful biological information in future Army Corps reports and studies. Specific work has included:

1. identification of specimens to the species level (including author and date) with a key to these species as an aid to future workers;
2. enumeration of individuals of each species represented in each sample lot (Table I);
3. systematic information regarding each species that contains biogeography, distinguishing taxonomic characteristics, ecological data when available, reliability of the determinations and possible problems that might be encountered in these determinations; and
4. citation of literature and other sources of information pertinent to this study.

Previous records of freshwater crustaceans from Samoa include:

Atya serrata (Bouvier, 1925)

A. spinipes (Miers, 1876)

Caridina typus (Sharp, 1893)

Macrobrachium dispar = M. australe (Miers, 1880)

M. lar (Miers, 1879; Sharp, 1893; Lenz, 1901)

The three species of Uca have also been previously recorded from Samoa (vid. Crane, 1975).

The collections at Bishop Museum were consulted for comparative representatives of freshwater Samoan and other Pacific island crustaceans. Those from American Samoa included M. lar (BPBM Cat. nos. S1706 and S4535); all three species of Uca are also present in the BPBM collection.

Attempts were made to obtain field and taxonomic notes from Mr. Carl Couret at the U.S. Fish and Wildlife Service, Albuquerque, New Mexico. These were not forthcoming by the end of this report preparation; however, several examples of freshwater crustaceans collected and identified by Mr. Couret from American Samoa were loaned by the Fish and Wildlife Service, Honolulu office. Our thanks to personnel from that office for this consideration. The American Samoan species included:

Atya serrata Spence Bate

A. spinipes Newport

Macrobrachium lar Fabricius

M. sp.

Table III compares Couret's 1978 findings to those in the present study.

Bishop Museum will retain the Army Corps' collection as voucher specimens available for review upon request in the Division of Invertebrate Zoology. After five years, the Division in consultation with the Army Corps, will review the status of the collection and determine the future disposition of the material.

Details of the report begin on the following page.

## KEY TO FRESHWATER SHRIMPS OF AMERICAN SAMOA (TUTUILA) \*

- 1 Fingers of chelae with conspicuous terminal brushes of hairs (Fig. 1);  
pereiopods with or without exopods. . . . . Atyidae 2
- Fingers of chelae without terminal brushes of long hairs; pereiopods  
without exopods . . . . . Palaemonidae 7
- 2 Carpus of second pair of legs (pereiopods) very short, being shorter  
than broad and with anterior part deeply excavate (Fig. 2). . . . . Atya 3
- Carpus of second pair of legs longer than broad, generally not very  
deeply excavate anteriorly (Fig. 3) . . . . . Caridina 4
- 3 Anterior part of carapace (pterygostomian region) armed with a spine . .  
(Fig. 4, ps) . . . . . A. spinipes
- Anterior part of carapace (pterygostomian region) unarmed . . A. serrata
- 4 Upper border of rostrum unarmed (Fig. 5). . . . . C. typus
- Upper border of rostrum armed with teeth. . . . . 5
- 5 Upper border with rostral teeth extending backwards for at least half  
carapace length, thus well posterior to orbit (Fig. 6) . C. serratirostris
- Upper border with rostral teeth extending only slightly posterior to  
orbit and much less than half carapace length . . . . . 6
- 6 Rostrum bent upwards slightly and longer than antennal scale; upper  
rostral margin partially lacking teeth. . . . . C. nilotica
- Rostrum horizontally projecting or bent downwards and shorter than  
antennal scale; upper rostral margin completely toothed (Fig. 7) C. weberi

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\*See page 5b for generalized figure of caridean shrimp

- 7 Branchiostegal spine present on carapace (Fig. 8,bs) .... Palaeomon  
 Branchiostegal spine absent . . . . . Macrobrachium 8
  
- 8 Carpus of 2nd cheliped distinctly longer than the merus (Fig. 9) . . . .  
 . . . . . M. sp. aff. australe  
 Carpus approximately equal to or shorter than the merus . . . . . 9
  
- 9 Length of carpus of 2nd cheliped more or less elongate, equal to that  
 of merus; carpus shorter than palm (Fig. 10b); rostrum often with 8  
 (sometimes 7) upper and 2 or 3 lower teeth (Fig. 10a)..... . . . M. lar  
 Length of carpus of 2nd cheliped broadly conical, shorter than (2/3)  
 length of merus; carpus equal to length of palm (Fig. 11b); rostrum  
 with 5-7 (usuall. 6) upper and 1-3 (usually 2) lower teeth (Fig. 11a)  
 ..... M. latimanus

## KEY TO FRESHWATER CRABS OF AMERICAN SAMOA \*

- 1 Frontal region of carapace at least as wide, usually wider than orbital width; a moderate gap between the third maxillipeds . . . Grapsidae 2  
 Front narrower, often much narrower than orbital width (Fig. 12); third maxilliped confluent or nearly so in midline. . . . . Ocypodidae 3
- 2 Fingers of large chelae glabrous on their outside proximally but having a brush of stiff hairs near lower tip of fixed finger . . . . .  
 . . . . . Ptychognathus riedelii  
 Fingers of large chelae with a tuft of hair on their outer surface proximally (Fig. 13) but lacking hairs near lower tip of fixed finger . . . . .  
 . . . . . P. pusillus
- 3 Frontal region between eyes two or more times the basal width of erected eyestalks (Fig. 12) and narrowest below eyestalk bases . . . . .  
 . . . . . Uca (Amphiuca) chlorophthalmus crassipes  
 Frontal region between eyes with width subequal to or rarely 1.5 times basal width of erected eyestalks and narrowest between eyestalk bases . . . 4
- 4 Dactyl (moveable finger) of major cheliped quite broad and flat; an oblique high ridge on palm (fixed finger) bearing large tubercles (Fig. 14) . . . . . Uca (Thalassuca) vocans pacificensis  
 Dactyl of major cheliped not broad and flat; oblique ridge on palm low, with tubercles small and irregular . . . . . Uca (Thalassuca) tetragonon

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\*See page 5b for generalized figure of grapsoid crab

## FIGURE CAPTIONS\*

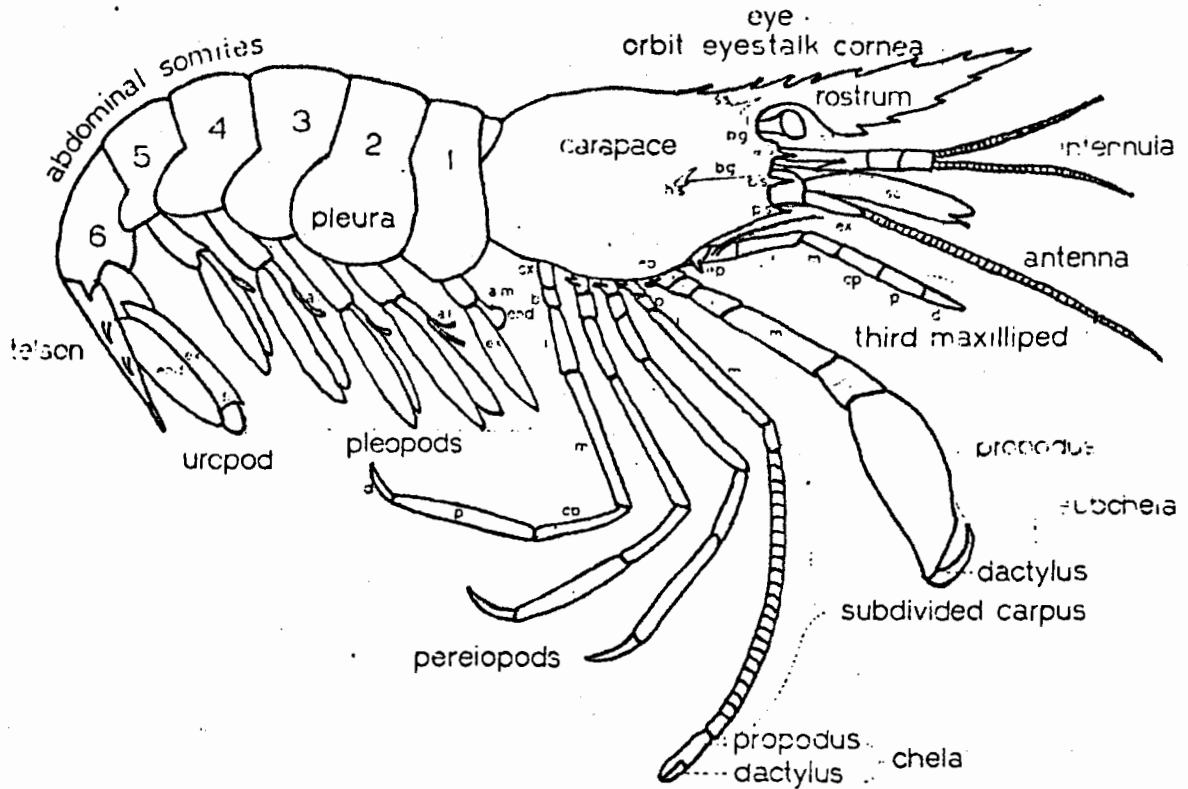
- Fig. 1 Manus (pincer) and carpus, 2nd cheliped, Caridina weberi (from Edmondson, 1935, p. 11)
- Fig. 2 Manus (pincer) and carpus, 2nd cheliped of Atya (from Edmondson 1939)
- Fig. 3 Manus (pincer) and carpus, 2nd cheliped of Caridina serratirostris (from Edmondson, 1935)
- Fig. 4 Lateral view of carapace showing antennal (upper) and pterygostomial (lower) spines of Atya moluccensis (=spinipes) (from Kubo, 1938)
- Fig. 5 Anterior lateral view of rostrum and carapace, Caridina typus (from Edmondson, 1935)
- Fig. 6 Anterior lateral view of rostrum and carapace, Caridina serratirostris (from Edmondson, 1935)
- Fig. 7 Anterior lateral view of Caridina weberi (from de Man, 1892)
- Fig. 8 Anterior lateral view of rostrum and carapace of Palaemon (as Leander) (from Barnard, 1950)
- Fig. 9 Second pereopod (cheliped) of Macrobrachium australe (from Holthuis, 1950)
- Fig. 10 (a) carapace and rostrum and (b) second pereopods of Macrobrachium lar (from de Man, 1905)
- Fig. 11 (a) carapace and rostrum and (b) second pereopods of Macrobrachium latimanus (from de Man 1892)
- Fig. 12 Frontal view of carapace of Uca (A. chlorophthalmus crassipes) (from Crane, 1975) (f = front)
- Fig. 13 Outside lateral view of chela of Ptychognathus pusillus (from de Man, 1905)
- Fig. 14 Inside lateral view of chela of Uca (Thalassuca) vocans vocans (from Crane, 1975)

## ABBREVIATIONS

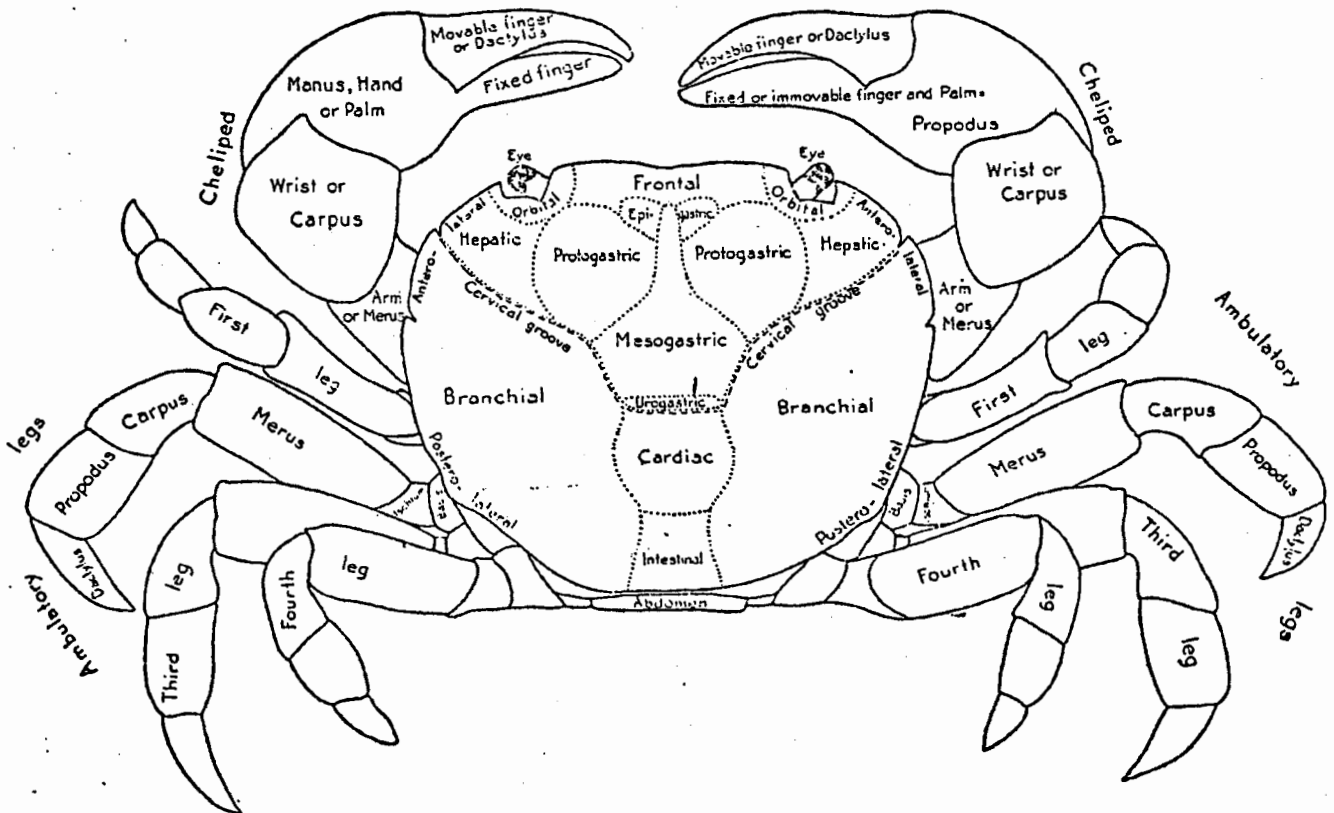
da = dactyl  
pr = propodus  
ca = carpus  
me = merus

as = antennal spine  
ps = pterogostomial spine  
bs = branchiostegal spine  
f = front or frontal area of carapace

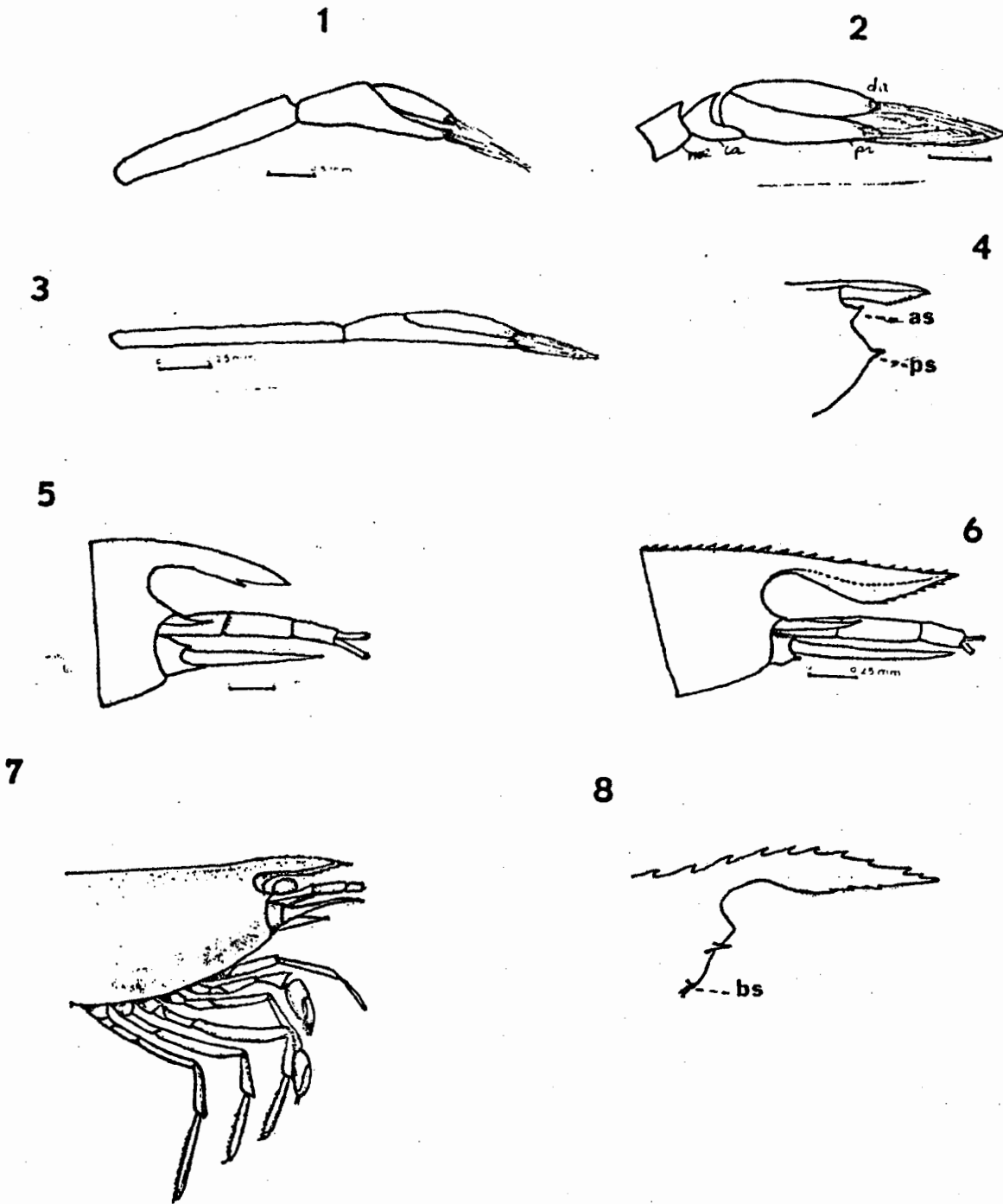
\* For figures 1-14, p. 5c-e



Schematic drawing of a shrimp in lateral view. a.i., appendix interna; a.m., appendix masculina; a.s., antennal spine; b., basis; b.g., branchiostegal groove; b.s., branchiostegal spine; ep., carpus; ex., exopod; i., ischium; m., merus; p., propodus; p.g., postorbital groove; p.s., postgostomial spine; sc., scaphocerite; s.s., supraorbital spine; st., stylocerite.



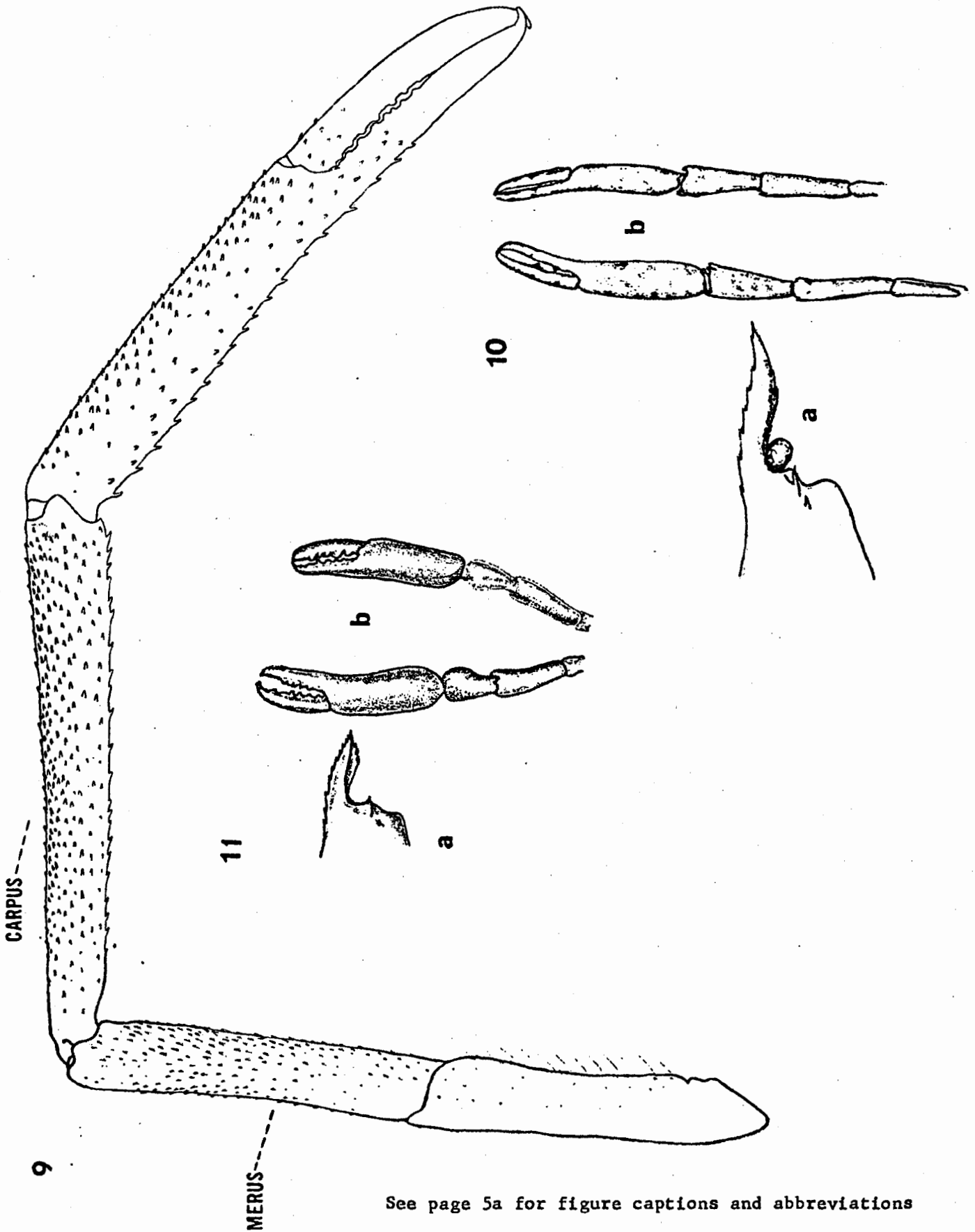
Dorsal view of a grapsoid crab showing descriptive features



FIGURES 1 - 8

See page 5a for figure captions and abbreviations

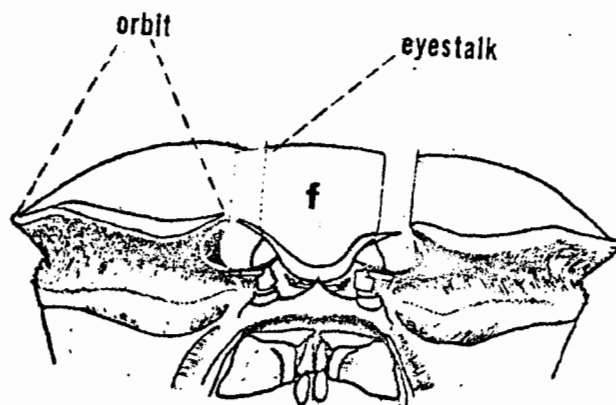
FIGURES 9 - 11



See page 5a for figure captions and abbreviations

FIGURES 12-14

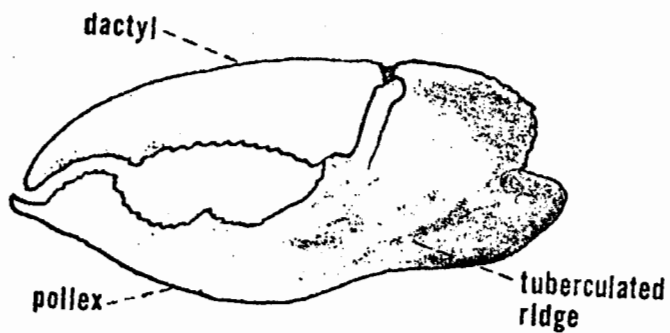
12



13



14



See page 5a for figure captions and abbreviations

## SHRIMPS REPORTED FROM AMERICAN SAMOA

Phylum Arthropoda  
Subphylum Crustacea  
Class Malacostraca  
Subclass Eumalacostraca  
Superorder Eucarida  
Order Decapoda  
Suborder Pleocyemata  
Infrorder Caridea

## FAMILY ATYIDAE

Atya serrata Bate, 1888.

This species comprises 25 percent of the shrimps examined in the Corps' collections and is represented by 200 specimens from 12 stations (Table I). Individuals vary in size from 1.8 to 4.5 mm (carapace length). The smallest ovigerous (berried) specimen is 4.0 mm.

A. serrata is reported from Liberia (West Africa), the East Indian region and large areas of the tropical Pacific. It has been recorded from the Marianas, Solomon, Fiji and Samoan Islands, as well as eastern Polynesia (Tahiti, Marquesas, Mangareva and Rapa). Edmondson (1935) considered it the sole representative of the genus in waters east of Samoa, except for Hawai'i which has an endemic species, A. bisulcata. He reported A. serrata as being found in cool mountain waters up to 1800 feet above sea level, but not at sea level. The material examined herein is from elevations ranging from 840 ft. to 20 ft. above sea level. The majority (130 specimens) are from stations 2A and 4A (840 and 280 ft. elevation, respectively).

Edmondson (1935) has shown that the absence of a pterygostomian spine from the antero-lateral part of the carapace separates A. serrata from the other recorded Samoan species, A. spinipes, as well as from the Hawaiian, A. bisulcata. Bouvier (1925) and Ortmann (1894) give a

key to species of Atya.

Rathbun (1901) established the generic name Ortmannia to include those members of the Atyidae which showed certain variations from Atya. The chief difference between the two genera was in the form of the chelipeds (vid. Edmondson, 1935, Pl. I, fig. 1c-e): in the cheliped of Ortmannia a palm is present, the dactylus (moveable finger) being shorter than the propodus; in Atya the dactylus is as long as the propodus, thereby eliminating the palm.

In rearing experiments (Edmondson, 1935), it has been shown that Ortmannia produces Atya-like individuals. Bordage (1909) considered the young like Ortmannia and the adults resembling Atya. However, among the American Samoan collections examined, the Ortmannia form was found at 7 stations numbering 100 individuals along with the Atya form of A. serrata (Table I). The Ortmannia form ranged from 1.3 to 3.5 mm in carapace length. At station 4A, while all of the 77 specimens noted as the Ortmannia form were small (c. 1. less than 2.5 mm), the three Atya form specimens also fell below this maximum size (1.3 - 2.2 mm). Thus, while we consider Atya serrata to be dimorphic, we cannot support this dimorphism on the basis of size or juvenile/adult characteristics from the limited material at hand. The name Ortmannia alluaudi Bouvier was applied to what is considered merely a morph of A. serrata (vid. Edmondson, 1935). Adamson (1935) noted O. alluaudi from the Marquesan Islands taken in company with Atya serrata.

Couret (1980) reported it from Guam in freshwater streams in the middle and upper reaches of all streams surveyed. He reported A. serrata in American Samoa (1978) from ten stations ranging in elevation from 10 ft. to 480 ft. and in being diadromous.

Atya spinipes Newport, 1847.

This large atyid comprises 7 percent of the collection of shrimps and is represented by 56 individuals from eight stations (Table I). Individuals vary in size from 2.7 mm to 11 mm (carapace length). The smallest berried specimen is 6.2 mm (c.l.).

A. spinipes ranges from the Philippines to the Marianas, Samoa and Fiji Islands. No ecological data was found for this species. Edmondson (1935) states that this species is closely related to Atya moluccensis de Haan of the East Indian area. Ortmann (1894) regards A. spinipes as a variety of A. moluccensis. There has been no recorded Ortmannia form associated with this species.

In A. spinipes the rostrum is deep, entire, curved downward and abruptly pointed, its lower border toothed. There is a pterygostomial spine on the anterior part of the carapace. A. spinipes generally is larger than A. serrata and the heavily tuberculated merus of the third walking leg is stout and in the male bears a strong spine at the distal extremity of the lower border (Edmondson, 1935).

Couret (1978) reported A. spinipes from American Samoa from 10 stations ranging in altitude from 10 ft. to 480 ft.

Caridina serratirostris de Man, 1892.\*

This species was the least common atyid encountered, comprising 2 percent of the total shrimps examined and represented by only 18 individuals from four stations (Table I ). The specimens were approximately the same size, averaging 1.8 mm in carapace length. This species has been recorded from Queensland, Australia (Roux, 1926) and from Fiji, Indonesia and the Seychelles (Edmondson, 1935). Couret (1978) identified C. serratirostris from seven stations on Tutuila, American Samoa at elevations from 10 ft. to 140 ft. This species was also recorded by Couret (1980) as uncommon in the upper and middle portions of two streams at Guam.

Three morphological characters separate this species from other Samoan representatives of the genus: (1) the rostral teeth of the upper border extend back on the carapace for nearly half its length; (2) the chelipeds are very slender; and (3) the stylocerite is longer than the first antennular peduncle (Edmondson, 1935).

Caridina weberi de Man, 1892.\*

This species comprised 25 percent of the shrimp examined and consisted of 203 specimens from twelve stations (Table I ). The species ranges from Indonesia to Fiji, Tahiti, and the Marquesas (Edmondson, 1935; Adamson, 1935). Couret (1978) recorded C. weberi as the most prevalent atyid and present in all but one of twelve freshwater streams sampled at elevations from 10 ft. to 480 ft.

C. weberi is characterized by having: (1) dorsal rostral teeth only anterior to the orbit; (2) rostrum shorter than antennal scale;

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\* Specimens of these two species of Caridina examined resemble the forma typica de Man 1892, as described and illustrated by Edmondson (1935).

(3) the carpus of the second pereopod longer than palm (propodal area posterior to moveable finger); and (4) carpus of first pereopod distinctly longer than broad (Edmondson, 1935).

Two other species of Caridina, although not found in the present material examined, have been included in the key since they have been recorded from American Samoa previously: C. nilotica de Man, 1892, and C. typus Milne-Edwards, 1837. Couret (1978) found these two species at American Samoa: C. nilotica was found in two streams at two stations below 10 ft. elevation. In contrast, Couret (1980) found this species common in the upper but uncommon in the lower reaches of several streams at Guam. Couret (1978) found C. typus in one Samoan station at an elevation of 100 ft.; he lists this species as uncommon from the upper reaches of four streams at Guam (Couret, 1980).

C. nilotica is characterized by having many teeth proximally on the upturned rostrum (which is longer than the antennal scale). In these rostral features, C. nilotica resembles Palaemon debilis. However, in contrast to that species, a branchiostegal spine is absent on C. nilotica.

C. typus is distinguished from other members of the genus by the absence of teeth on the gradually curved-down rostrum and the carpus of the first pereopod being but slightly longer than broad. The species does resemble an Atya in that the first pereopod has the carpus deeply excavate.

## FAMILY PALAEMONIDAE

Three species of Macrobrachium are represented in the material examined. Determinations are based to a large extent on a key to species provided by Holthuis (1950). This key, however, uses characteristics found on adult male specimens. For non-adult males, females, and juveniles, similarities in rostral shape and rostral tooth count were correlated with length ratios of segments (propodus, carpus, merus) of the second chelipeds to make species identifications.

However, Holthuis (1950) stated that difficulty in identifying species of Macrobrachium is encountered due to such variability in characters as the shape and number of teeth on the rostrum and shape and size of various parts of the second cheliped. Furthermore, young males and females (of which the present collection has a number of examples) often do not provide the same characteristics as the adult male and go through allometric growth changes. For young specimens of the three species encountered in this study, Holthuis (1950) described a "dionyx stage" for specimens less than 50 mm. in total length. Specimens in this stage have: (1) a supra-orbital tubercle on each side of carapace; (2) a relatively longer and more slender rostrum; (3) no dentition on the cutting edge of fingers of chelipeds; (4) the last three pairs of pereiopods with dactylus biunguiculate. Finally, the lack of pereiopods attached to specimens also hampered verification of some specimens.

Couret (1978) recorded Palaemon sp. and P. debilis from American Samoan streams. None of this material was available and no examples of these taxa were noted in the samples herein examined.

Macrobrachium lar (Fabricius, 1798).

This species comprises 21 percent of the shrimp collection and is represented by 169 individuals from 18 stations. This species has a very wide distribution in the Indo-West Pacific region, from E. and S. Africa to the S. China Sea, Ryukyu Islands, and the Malay Archipelago to the Marquesas Islands (Holthuis, 1950).

This species has several distinguishing characteristics based on the adult male: (1) rostrum wide, compressed and with two teeth behind the orbit; (2) rostral count of 7-8 dorsal and 2-3 ventral teeth with few setae between the teeth; (3) one or two large teeth on proximal portion of fingers of the second pereopod of the chelipeds; and (4) carpus of second pereopod as long as the merus, the latter elongate and distinctly shorter than the palm.

Kubota (1972) reported that M. lar preferred shady, sheltered habitats up to 600 feet in elevation in Hawai'i and tended to stay in pools as opposed to riffle areas. He considered M. lar an omnivorous bottom scavenger. In the present study, M. lar was found at all but 4 stations, which extended in elevation to 840 ft. It was the most prevalent species of Macrobrachium found in the samples examined. Similarly, Couret (1978) reported M. lar from all American Samoan streams he examined with 90 percent occurrence at elevations from 5 ft. to 480 ft. Holthuis (1950) recorded M. lar from an altitude up to 600 m. (1968 ft.) in Indonesia.

Macrobrachium latimanus (Von Martens, 1868).

This species was identified at one station (4A) based on a single

specimen. This is an Indo-Pacific species reported from the Ryukyu Islands, the Philippines, Malay Archipelago, India, Indonesia, Fiji, Marquesas, Samoa and Tahiti (Holthuis, 1950).

Distinguishing taxonomic characteristics include: (1) rostrum short, not reaching beyond the antennular peduncle; (2) rostral formula: 6 dorsal/2 ventral teeth; (3) second pereopods with carpus  $\frac{2}{3}$  the length of the merus and deeply conical, and palm two times as long as the carpus; and (4) fingers of second chelae are compressed, broad, shorter, almost equal to or somewhat longer than palm.

According to Adamson (1935), this freshwater prawn lives chiefly in rapid water streams, often at considerable altitudes in the Marquesas. According to Holthuis (1950), very young specimens may be found at sea level and it is considered diadromous. Tiwari (1961) reported M. latimanus from India and Ceylon, ranging in altitude from 762 m. to 915 m (2286-2745 ft.) and Holthuis (1950) recorded it from 500 m. (1640 ft.) in W. Sumatra. Couret (1978) reported M. latimanus from five American Samoan stream stations ranging in altitude from ten to 100 ft. His material has not been available for comparison. Station 4A in the present study was at an elevation of 280 ft.

Macrobrachium sp. aff. australe (Meneville, 1838).

Eighteen percent of the shrimps in the collection examined, represented by 142 specimens from 15 stations (Table I), have been determined as possibly representing M. australe. However, additional complete specimens and more time is required before final verification is possible. General taxonomic characteristics of M. australe that fit

with many of the specimens examined include: (1) long, slender, distally forked rostrum reaching beyond the antennal scale; (2) four-five dorsal rostral teeth situated behind the orbit; (3) rostral tooth count of 10-11 dorsal and 3-4 ventral; (4) second pereopod with carpus longer than merus, the latter longer than the palm; and (5) fingers of large chelae with more than 10 denticles on cutting edges, and fingers distinctly shorter than palm.

Holthuis (1950) states that the distribution of M. australe is in the Indo-West Pacific region from the Seychelles and Madagascar to the Malay Archipelago and Oceania. Couret (1978) reported M. sp. from 12 stream stations on Tutuila at elevations from five to 140 ft. The only comparative American Samoan M. sp. material available (Fish & Wildlife Service, Honolulu) was a series of about 30 small (ca. 17 mm. c.l.) specimens determined by Couret and mixed with 10 specimens of M. lar collected from Aua Stream. The M. sp. specimens compare well with what is considered in the present study as M. sp. aff. australe.

M. australe has been recorded previously from Samoa by Miers, 1880.

## CRABS REPORTED FROM AMERICAN SAMOA

Phylum Arthropoda  
 Subphylum Crustacea  
 Class Malacostraca  
 Subclass Eumalacostraca  
 Superorder Eucarida  
 Order Decapoda  
 Suborder Pleocyemata  
 Infraorder Brachyura  
 Section Brachygnatha  
 Infrasection Brachyrhyncha

Five species of brachyuran crabs belonging to two families and two genera were identified from the Corps' American Samoa material. Only a few specimens are available, with two percent of the total crustacean collection examined being brachyurans.

## FAMILY GRAPSIDAE

Ptychognathus pusillus Heller, 1865.

This species comprises 0.6 percent of the crustacean collection and is represented by five individuals at two stations (Table I) from low elevations (Table II). The specimens range from 4.2 mm to 6.6 mm carapace length; all are males.

De Man (1905) described this species as a rare freshwater crab. It differs from other members of the genus by having (1) a granular carapace; (2) anterior margin of the carapace (frontal region) with a double row of granules; (3) exognath of third maxilliped not as broad as the ischium; and (4) tuft of hair at base of fingers on its outer surface.

Tesch (1918) stated the distribution of this grapsid is from the Nicobar Islands, Christmas Island, Indonesia and Fiji.

Literature after 1918 has not been reviewed, except Couret (1978) mentions a Ptychognathus sp. taken from a station in Papa Stream (ele. 100 ft.) in Am. Samoa. Unfortunately, his material has not been available for study.

Ptychognathus riedeji (A. Milne Edw., 1868)

This species comprises 0.7 percent of the crustacean collection, and is represented by four specimens from three stations, one at less than ten feet elevation (Table 11). Our specimens ranged from 2 mm to 16.8 mm in carapace breadth.

Tesch (1918) distinguished this species from P. pusillus by: (1) non-granular carapace; (2) anterior margin of the carapace with a single row of granules; (3) exomath of third maxilliped twice as broad as the ischium; and (4) tuft of hair on fingers of cheliped located near lower tip of fingers. This species cannot be discerned from that species which Couret (1978) considered as Ptychognathus sp.

Records of this species range from Indonesia, the Andamans, and Atjeh (W. Sumatra, Indonesia).

Tesch (1918) and De Man (1905) provide keys for the identification of Ptychognathus spp.

FAMILY OCYPODIDAE

Uca (Amphiuca) chlorophthalmus crassipes (Adams & White, 1848)

This species comprises 0.1 percent of the crustacean collection and is represented by one male specimen taken below station 5B (mangrove swamp at stream mouth). It measures 7.7 mm in maximum

breadth across the carapace.

U. (A.) chlorophthalmus crassipes is characterized by having the front broad, and the major claw of the male with a shallow triangular depression outside pollex base with no distal crest on merus and no large teeth near tip of dactyl.

This subspecies has an Indo-Pacific distribution from Malaysia, Indonesia, Philippines, to West and Central Pacific (Crane, 1975). It lives characteristically not close to the open sea but near high tide levels on muddy banks and flats of mangrove estuaries. On small islands in the S. Pacific in the absence of mangroves, U. chlorophthalmus lives closer to the open shore, usually on muddy sand, again near high tide levels and close to the mouth of streams or rivulets (Crane, 1975). Previous records from Samoa include: De Man, 1891; Ortmann, 1894; Nobili, 1907; and Maccagno, 1928.

Uca (Thalassuca) tetragonon (Herbst, 1790).

This species comprises 0.1 percent of the crustacean collection and is represented by one individual taken from the same station as U. (A.) chlorophthalmus crassipes. It measures 14 mm in maximum breadth across the carapace.

This fiddler crab is characterized by the large (major) claws having: (1) the pollex and dactyl normally rounded with furrows absent; (2) an oblique ridge inside palm indistinct without enlarged tubercles; and (3) the merus with a large sharp tooth at the distal end of its antero-dorsal margin.

U. tetragonon is found throughout the Indo-Pacific from

E. Africa to the Tuamotus (Crane, 1975). It inhabits the lowest tide levels, often barely protected by a strait or reef from the ocean. It is often found among mixed coral and shell, on mud or muddy sand with underlying dead coral and can be associated with Uca (Thalassuca) vocans pacificensis. Previous records from Samoa include De Man, 1891.

Uca (Thalassuca) vocans pacificensis Crane, 1975.

This species also comprises 0.1 percent of the crustacean collection and is represented by one male from station 5B. It measures 10.6 mm maximum breadth across the carapace.

This subspecies is characterized by having the large claw: (1) with pollex and dactyl flattened, the dactyl especially notably broad without furrows, except basal traces dorsally; (2) the pollex with deep outer furrows in basal two-thirds; (3) the ridge inside palm high, its tubercles strong and large on outer margin; and (4) merus same as U. tetragonon.

U. vocans pacificensis prefers unshady, sandy mud to mud along edges of protected bays (Crane, 1975). This species ranges from E. Africa to Samoa, from the Red Sea to Natal and from Okinawa to subtropical Australia. Previous records from Samoa are Pesta, 1913; Nobili, 1907; and Maccagno, 1928.

Crane (1975) provided a key for the identification of Uca spp. from the Indo-Pacific region.

TABLE I  
Species/Specimen Enumeration for Am. Samoan Freshwater Crustaceans Examined

Species	Stations																									Total	Leele	Total	%
	1a	1b	2a	2b	3a	3b	4a	4b	5a	5b	6a	6b	7a	7b	8a	8b	9a	9b	10a	10b	11a	12a	13a	14a	15a				
<u>Atva serrata</u>	3(3)	53(1)	2	1	3(77)	5	4(1)	4	17(6)	5(5)	2(7)	2	5	100(100)	25														
<u>A. spinipes</u>	5			9	4	13	3	3	8	11																			
<u>Caridina serratirostris</u>	9		3																										
<u>C. weberi</u>	54	40		39	31	11	6	3	3	1	3	11																	
<u>Macrobrachium lar</u>	23	2	2	4	7	14	1	3	13	15	23	1	21	6	1	7	3												
<u>M. latimanus</u>							1																						
<u>M. sp. aff. australe</u>	2	8	4	1	9		1	26	9	9	11	2	8	20	13	19													
<u>Ptychoanathus pusillus</u>												2																	
<u>P. riedelii</u>																													
<u>Uca (Amphiuca) s. crassipes</u>													2																
<u>U. (Thalassuca) tetragonon</u>																													
<u>U. (T.) vocans pacificensis</u>																													
	34	21	112	48	14	126	60	7	51	23	49	24	38	40	6	34	40	22	39	3	6	4	801						

NOTE: numbers in parentheses refer to Ortmannia-form of A. serrata

TABLE II  
Station Data for Freshwater Am. Samoan Crustaceans

Station	Stream	Elevation (ft.)	Collection Date
1a	Vaitele	20	29 VIII 80
1b	Maloata	120	25 IX 79
2a	Aasu	840	30 VIII 80
3a	Auvai	< 40	28 VIII 80
3b	Leaveave	ca 10	22 IX 79
4a	Vaitele	280	29 VIII 80
4b	Maga	40	29 IX 79
5a	Leafu	(under hwy bridge)	28 VIII 80
5b	Papa	" " "	30 IX 79
6a	Vaisa	40 (on ledge)	22 VIII 80
7a	Maloata	120	22 IX 79
8a	Pago	40	27 IX 79
9a	Leaveave	40	25 IX 79
10a	Pago	40	27 IX 79
10b	Aasu	(above stream mouth)	21 VIII 80
11a	Leafu	10	26 IX 79
12a	Vaisa	< 40	25 IX 79
13a	Papa	40	29 IX 79
14a	Leafu	--	26 IX 79
15a	Maloata	< 10	25 IX 79
--	Vailoa	120	28 VIII 80
--	Leele	(above hwy bridge)	27 VIII 80

TABLE III

## American Samoan Freshwater Crustacea

Species	Couret (1978)	Present Study
<u>Atya serrata</u> Spence Bate	x	x
<u>A. spinipes</u> Newport.	x	x
<u>Caridina nilotica</u> (Roux)	x	
<u>C. serratirostris</u> de Man		x
<u>C. typus</u> Milne-Edwards	x	
<u>C. weberi</u> de Man	x	x
<u>Macrobrachium lar</u> (Fabricius)	x	x
<u>M. latimanus</u> (Von Martens)	x	x
<u>M. sp. aff. australe</u> (Guérin Méneville)		x
<u>Palaemon debilis</u> Dana	x	
<u>P. sp.</u>	x	
<u>Ptychognathus pusillus</u> Heller	?	x
<u>P. riedelii</u> (Milne-Edwards)	?	x
<u>Uca (Amphiuca) chlorophthalmus crassipes</u> (Adams & White)		x
<u>U. (Thalassuca) tetragonon</u> (Herbst)		x
<u>U. (T.) vocans pacificensis</u> Crane		x

## SUMMARY:

1. Seven species of caridean shrimps with two species each in the genera Atya and Caridina (family Atyidae) and three in the genus Macrobrachium (family Palaemonidae), as well as five species of brachyuran crabs, including two in the genus Ptychognathus (family Grapsidae) and three in the genus Uca (family Ocypodidae) are recorded from the samples examined, based on 801 specimens.
2. Atya serrata and Macrobrachium lar were the most common species of shrimp, occurring in 25 percent of the stations sampled.
3. The brachyurans (Ptychognathus spp. and Uca spp.) were the least common Crustacea occurring in less than one percent of stations examined.
4. While the identification of the species of Macrobrachium are considered accurate for adult males, some reservations are warranted in the determinations of small and some female specimens due to intraspecific variation in taxonomically important characteristics; e.g., shape and size of second pair of clawed appendages, rostral shape and tooth count, that occur with respect to growth and sexual dimorphism.
5. Further investigations on the American Samoan streams is necessary to determine species distribution in particular streams. Ecological factors including bottom cover, water quality, elevation and stream turbulence should be correlated with the taxa recorded at particular stations.

For your information please note that subsequent to the draft report we found in one of the other Am. Samoan samples a typical specimen of Macrobrachium hirsutum (Olivier) a species not included in the final report. This species is easily distinguished from others in the genus we found in Am. Samoa by having: a) the second pair of chelae of the adult male unequal, the smaller of which has the fingers longer than the palm and provided with long, stiff inwardly directed setae along the cutting edges. According to Holthuis (1950) this species is recorded from Fiji but we don't know of any previous Samoan records.

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