

24231

J. Williams  


AUSTIN B. WILLIAMS

**Revision of the genus *Latreilia* Roux**  
**(Brachyura: Homoloidea)**

Reprint from:  
*Quaderni del Laboratorio di Tecnologia della Pesca*

ANCONA 1982

---

VOL. III° - N. 2 - 5

24231

REVISION OF THE GENUS *LATREILLIA* ROUX  
(Brachyura: Homoloidea)

AUSTIN B. WILLIAMS

National Marine Fisheries Service, Systematics Laboratory,  
National Museum of Natural History,  
Washington, D.C. 20560

ABSTRACT

The genus *Latreillia* Roux, as recognized until now, is composed of two subdivisions which may be regarded as distinct genera. *Eplumula* n. gen. receives those species having fifth pereopods with propodus half or less than half the length of the carpus and lacking a fringe of setae along each side, but with subdistal spinules opposed by a short dactyl closing to form a moderately strong subchela (i. e., *L. australiensis*, SE Australia and New Zealand; *L. phalangium*, Japan and Korea). *Latreillia* s. str. receives those species having fifth pereopods with propodus clearly more than half the length of the carpus and bearing a conspicuous fringe of setae along each side. This genus is further subdivided into a cluster of closely related species having fifth pereopods with tiny dactyl closing against subdistal propodal spinules as a weak subchela (*L. elegans* s. str., Mediterranean and east Atlantic; *L. manningi* n. sp. western Atlantic, hertofore recognized as *L. elegans*; a few specimens from east Africa and Hong Kong, *Latreillia* sp. near *L. manningi*; *L. metanese* n. sp., central Pacific), and two species having fifth pereopods with the tiny dactyl trailing (*L. pennifera*, Philippines, Indonesia and Bay of Bengal to South Africa; *L. valida*, western Indo-Pacific).

RIASSUNTO

**Revisione del genere *Latreillia* Roux (Brachyura, Homoloidea):** - Il genere *Latreillia* Roux viene suddiviso in due generi. In *Eplumula* n. gen. vengono poste quelle specie che hanno i quinti pereiopodi col propodite lungo la metà o meno della metà della lunghezza del carpopodite e privi di una frangia di setole su ogni lato e con le spine subdistali opposte al corto dattilopodite in modo da formare una robusta pseudochela (*L. australiensis*, S.E Australia e Nuova Zelanda; *L. phalangium*, Giappone e Corea).

*Latreillia* s. str. comprende quelle specie in cui il quinto pereiopode ha il propodite ben più lungo della metà della lunghezza del carpopodite ed una evidente frangia di setole su ciascun lato.

Nell'ambito del genere si distinguono: un gruppo di specie strettamente affini, che hanno i quinti pereiopodi terminanti con un sottile dattilo che, con le spine subdistali del propodite forma una debole pseudochela (*L. elegans*, Mediterraneo ed Atlantico orientale; *L. manningi* n. sp., Atlantico occidentale, in passato identificata con *L. elegans*; alcuni individui dell'Africa orientale ed Hong Kong, *Latreillia* sp.

affine *L. mannigi*; *L. metanesa* n. sp., Pacifico orientale) e due specie che hanno il dattilopodite dei quinti pereopodi sottile e non ripiegabile a formare una pseudochele (*L. pennifera*, Filippine, Indonesia, Golfo del Bengala, Sud Africa; *L. valida*, Indo-Pacifico occidentale).

Fragile, spiderlike crabs of the genus *Latreillia* Roux 1830, sensu lato, have been reported until now in tropical and temperature continental shelf and slope waters of the world ocean except in the central and eastern Pacific. Following preliminary study, Dr. R. B. Manning suggested to me that *Latreillia* might actually consist of two genera, a dichotomy previously recognized by HENDERSON (1888), BALSS (1922), SAKAI (1976), and others, and that the eastern and western Atlantic *L. elegans* Roux might be distinct. These and related problems are analyzed here.

I am grateful for study specimens provided by Dr. Manning, National Museum of Natural History (USNM), Dr. Carlo Froggia, Laboratorio di Tecnologia della Pesca (presently Istituto di Ricerche sulla Pesca Marittima) (LTP), Ancona, Italy, Dr. Brian Kensley, South African Museum (SAM), Cape Town, Dr. L. B. Holthuis, Rijksmuseum van Natuurlijke Historie (RNH), Leiden, and for measurements of specimens in the Natur-Museum Senckenberg, Frankfurt am Main (SMF), made for me by Dr. Michael Türkay. The manuscript was critically read by Dr. Holthuis, Dr. Manning, and Dr. B. B. Collette. Maria Diéguez prepared the illustrations. Jean M. Williams assembled locality data.

### *Family Latreilliidae* Stimpson 1858

**Definition.** - Carapace pyriform, not covering bases of legs, extremely narrowed anteriorly and drawn into elongate gastric region ("neck"); basal article of ocular peduncle much longer than terminal article; each supraocular spine very long, divergent, with short deflexed, ventrally strutted rostrum between; *linea homolica* absent; 8 gills on either side, walking legs extremely long and slender; female abdomen with broadened segments 4-6 fused into cupped plate. (Adapted from WRIGHT and COLLINS 1972; GUINOT 1978).

The family has a fossil record dating from the upper Cretaceous, one fossil genus being known (WRIGHT and COLLINS 1972).

The Latreilliidae have recently been placed in the Section Podotremata Guinot 1977, Subsection Archaeobrachyura Guinot 1977 (GUINOT 1978).

Species of the genera *Latreillia* and *Latreillopsis* Henderson 1888, because of their distinctive body form and tendency to reduced number of gills, have either been placed in the family Latreilliidae (ALCOCK 1900b, 1901; STEBBING 1902, 1910, 1914; BORRADAILE 1903 [as Latreilliidae]; RATHBUN 1937; BARNARD 1950; ZARIQUEY ALVAREZ 1968; SAKAI 1976), included in the family Homolidae de Haan 1839 (IHLE 1913; GORDON 1950; BALSS 1957; SERENE and LOHAVANIJAYA 1973), Thelxiopeidae (MONOD 1956), or treated as a sub-family of the Homolidae (BOUVIER 1940). Some authors (HENDERSON 1888; ALCOCK 1900b; BARNARD 1950) regarded *Latreillopsis* as intermediate between the two families because its front is narrower than that of *Homola* Leach 1815, the rostrum less pronounced, each supraorbital spine much elongated, each hepatic

region much inflated and tipped by a prominent spine, the abdominal segments are free, and the legs are as in *Latreillia*.

WILLIAMSON (1965, 1967) pointed out that the larvae of *Latreillia elegans* and *L. australiensis* (Henderson) are homolid in affinities, noting that GORDON (1950:219-221) regarded gill reduction in *Latreillopsis* and *Latreillia* as merely lying at the lower end of an array ranging from 14 to 13 to 10 to 8 among seven genera that could be grouped in the Homolidae. WRIGHT and COLLINS (1972), and GUINOT (1978) following them, excluded *Latreillopsis* from the Latreilliidae, placing it in the Homolidae because it has a *linea homolica*. Species of *Latreillopsis* have been reported from the central and western Pacific, and aside from their debated transitional position and recent exclusion from the Latreilliidae are of no further concern in this paper.

### *Latreillia*, sensu lato

The genus *Latreillia* as recognized until now is composed of two distinct subdivisions which may be regarded as separate genera distinguished by means of the following key.

1. Last pair of legs (fourth walking legs) with propodus half or less than half length of carpus and lacking conspicuous hairs.....*Eplumula*.  
Last pair of legs (fourth walking legs) with propodus clearly more than half length of carpus and bearing conspicuous, featherlike row of long hairs along full length of that article at each side.....*Latreillia*.

### *Eplumula*, new genus

**Definition.** - Last (fifth) pair of legs (fourth walking legs) subdorsal in position, total length not equaling merus of preceding leg. Propodus half or less than half length of carpus and broadened distally in region of terminal subchela, merus reaching about to tip of rostrum; lacking conspicuous, featherlike row of close-set, long, soft setae along full length of propodus at each side. Chelae of mature males robust, as broad as "neck."

**Type-species.** - *Latreillia phalangium* de Haan 1839.

**Name.** - From the Latin "e" without, "plumula" little feather, with reference to lack of a featherlike vane of long soft hairs on the propodus of the last leg. Gender feminine.

**Number of species.** - Two, which may be distinguished by the following key.

### Key to species of *Eplumula*

1. Dorsal, gastric, spine absent on "neck"..... *E. australiensis*.  
Dorsal, gastric, spine present on "neck" ..... *E. phalangium*.

## *Eplumula australiensis* (Henderson) Fig. 8.

*Latreillia australiensis* Henderson 1888:24, pl. 2, fig. 4. — Whitelegge 1900:165. — Rathbun 1923:139. — Dell 1963:245, figs. 1-3. — Williamson 1965:369-372 (larvae), fig. 1A-K. — 1967:206-211 (megalopa), figs. 1-2.

**Diagnosis.** - Carapace with surface irregular, regions fairly marked but lacking spines. Male abdomen with middorsal protuberance on narrow first segment, narrow second segment with slender backward pointing spine. Female abdomen with middorsal protuberance on narrow first segment and slender backward pointing spines on broadening second and third segments; fused broad fourth to sixth segments with proximal spines laterally near articulation with third segment.

**Measurements in mm.** - Carapace: (USNM specimens) ♂, length in midline to base of rostrum, 13.6, width 9; ♀, length 12.1, width 8.6. ♂, length 15.3; ♀, length 19.0 (DELL 1963).

**Variation.** - Rostral horns vary from one-half to as long as ocular peduncles and bear variable fixed spinules. Rostral length varies somewhat. Males have a proportionately narrower carapace than females; females also have more pronounced hepatic swellings. (USNM material and DELL 1963).

**Habitat.** - Mud, sandy mud or hard bottom; 55 to 274 m.

**Type-locality.** - Challenger Stn. 163A, off Twofold Bay, NSW, Australia, 274 m, green mud.

**Material studied.** - Four lots containing 4 ♂, 1 ♀ from Bass Strait and off New South Wales, Australia (USNM 55139, 1 ♂, 1 ♀; 64531, 1 ♂; 98865, 1 ♂; 98866, 1 ♂).

**Known range.** - Bass Strait to New South Wales, Australia, New Zealand along north coast of North Island (DELL 1963).

## *Eplumula phalangium* (de Haan) Fig. 1a, 8

*Latreillia phalangium* de Haan 1839:108, pl. 30, fig. 2. — Adams and White 1848:[5]. — Ortmann 1892:542. — Doflein 1902:649. — Parisi 1915:116[19]. — Balss 1922:114. — Urita 1926:2 (not seen). — Yokoya 1933:100. — Sakai 1934:282. — 1936:37, pl. 4 (colored). — 1936a: pl. 4, fig. 1 (colored). — 1965:17, pl. 9 (colored), text-figs. 1a, b. — 1976:45, pl. 45 (colored). — Kim 1966:400, fig. 2, pl. 1, fig. 1. — 1970:9 (listing). — 1973:283, fig. 83A-C, pl. 75, fig. 54. — Kim and Rho 1971:11.

**Diagnosis.** - Carapace with surface irregular, regions fairly marked; cardiac eminence prominent and "neck" bowed dorsally. "Horns" well developed and usually bearing 3 fixed spinules. Spines prominent, especially on females, strong spine dorsally on "neck", hepatic swellings usually spined, females with spine on each branchial region. Male abdomen with first 2 segments narrow, first segment with middorsal protuberance, second with broad based acute spine directed

posterodorsally. Female abdomen with middorsal protuberance on narrow first segment and broad base, fairly acute, backward pointing spines on broadening second and third segments; fused broad fourth to sixth segments with proximal spines laterally near articulation with third segment and occasionally with midlateral pair on fused fifth segment.

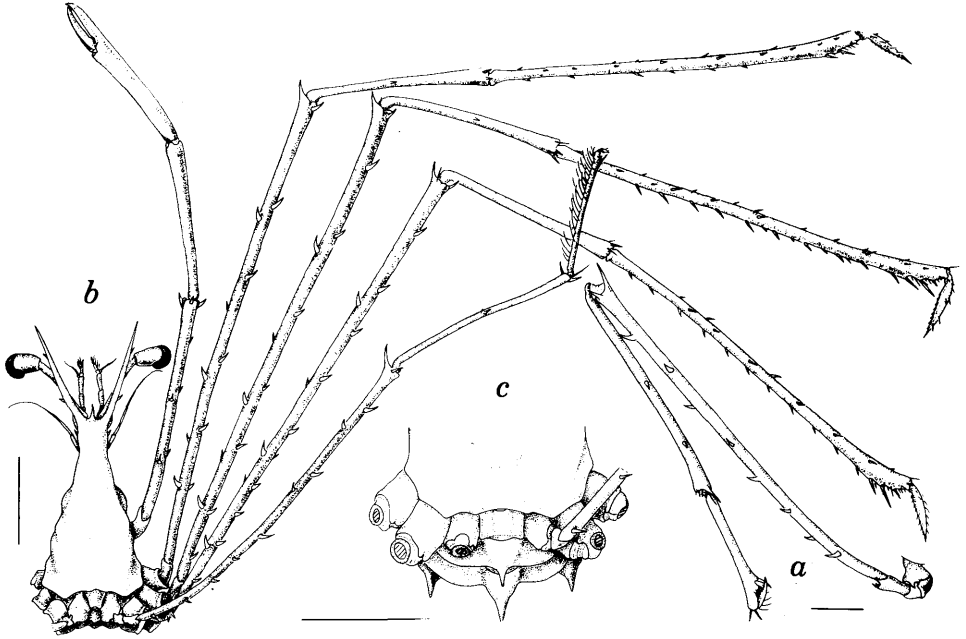


Fig. 1. *a*, *Eplumula phalangium*, right 5th leg in dorsal view (USNM 74562). *Latreillia manningi*: *b*, ♂ holotype in dorsal view, legs of left side not shown; *c*, ♀ abdomen and associated structures in dorsal view (USNM 55989). Scales in mm: *a* = 2; *b-c* = 5.

**Measurements in mm.** - Carapace: ♂, length in midline to base of rostrum 12.4, width 7.9; ♀, length 14.0, width 9.5, also Table 1.

**Variation.** - There is considerable variation in spines on the carapace and spinules on the "horns", all of these usually being more prominent on mature females than on mature males; however, immature males often show strong development of these features. The "horns" vary in length, often exceeding the eyes. Males have a proportionately narrower carapace and more slender "neck" than females; mature females also have the "neck" rather strongly bowed dorsally, especially in the region of the dorsal "neck" spine. Mature males have robust chelae with noticeable gape at base of fingers.

**Habitat.** - Sandy, muddy, rocky or weedy bottoms; 30 to 307 m (YOKOYA 1933; SAKAI 1976).

**Type-locality.** - Japan.

**Material studied.** Thirty-five lots containing 89 ♂, 76 ♀ (47 ovig.) from Japan

(USNM 13712, 18868, 48459, 63686, 74560-68, 71-74, 87, 134139-45, 48-56, 172320-22.

**Known range.** - The species is endemic to Japan and extreme southern Korea, ranging around the coasts of Honshu, Shikoku and Kyushu, northward to Aomori Bay, including Cheju do (island) (SAKAI 1976; KIM 1973).

**Remarks.** - AIKAWA (1937) described the first larval stage of this species.

## *Latreillia* Roux

*Latreillia* Roux 1830, pl. 22 (col.), unnumbered page (see Manning 1962). — de Haar 1839:105. — Heller 1863:146. — Carus 1885:498. — Henderson 1888:23. — A Milne-Edwards and Bouvier 1894:59. — 1899:13. — Ortmann 1898:1156. — Alcock 1899: 167. — 1901:70. — Stebbing 1902:23 (synonymy only). — 1914:273 (synonymy only). — Ihle 1913:81 (abbreviated synonymy and list of species). — Balss 1922: 114 (abbreviated synonymy). — Rathbun 1937:73. — Barnard 1950:23. — China 1966:256, name no. 1630. — Serene 1968:37 (listing). — Serene and Lohavanijaya 1973:32. — Kim 1973:283. — Sakai 1976 (synonymy, distribution).

*Practor* Gistel 1848: IX.

**Definition.** - Last (fifth) pair of legs (fourth walking legs) with propodus clearly more than half length of carpus; propodus bearing conspicuous, featherlike row of close-set, long, soft setae along full length of article at each side and oriented at right angle to flexion plane of dactyl, not broadened distally; merus reaching far beyond rostrum. Chelae of mature males never as broad as "neck".

**Type-species.** - *Latreillia elegans* Roux.

**Gender.** — Feminine.

**Number of species.** - Five, of which two are described as new. The species may be distinguished by the following key.

## Key to Species of *Latreillia*

1. Dorsal spine absent on "neck" ..... 2  
    Dorsal spine present on "neck" ..... 4
2. Last leg with propodus decidedly shorter than carpus; dactyl closing against subdistal spinules to form subchela ..... 3  
    Last leg with propodus equal to or longer than carpus; dactyl not closing against subdistal propodal spinules and usually trailing ..... *L. pennifera*.
3. Propodus of last leg 0.44-0.61 length of carpus; length of carapace about 1/3 length merus of walking legs; western Atlantic ..... *L. manningi*.  
    Propodus of last leg 0.60-0.75 length of carpus; length of carapace about 1/4 length merus of walking legs; eastern Atlantic ..... *L. elegans*.
4. "Neck" length about 0.6-0.8 greatest carapace width; last leg with propodus

decidedly shorter than carpus; dactyl closing against subdistal propodal spinules to form subchela ..... *L. metanasa*.  
 "Neck" length about 0.33-0.45 greatest width; last leg with propodus longer than carpus, dactyl not closing against subdistal propodal spinules and usually trailing ..... *L. valida*.

***Latreillia manningi*, new species Figs. 1b-c, 2a-e, 3a, 8**

*Latreillia elegans*. - Smith 1881:419. — 1883:23. — 1884:35 [7], pl. 2, figs. 2, 2a; pl. 3, fig. 1. — 1887:637 [33]. — Stebbing 1914:255, 273. — Hay and Shore 1918: 419 (part). — Rathbun 1937:73, fig. 18, pl. 21, figs. 1-8 (part). — Chace 1940:10. — Williams, McCloskey and Gray 1968:43, figs. 1A-D (part). — Powers 1977:23 (part).

**Description.** - Integument smooth to finely granulate. Carapace pyriform; broadest at level of first walking legs (p2), deepest at level of hepatic lobes; cardiac region most elevated. Front drawn out into 2 long, divergent supraocular spines ("horns") either longer or shorter than eyestalks; each "horn" variably spinulose, with spine on lower side near proximal 1/3; anterior margin with small, acute spinelike rostrum projecting ventrolaterally at base of eyestalks; gastric area elongated into a "neck," narrowest at base of "horns" and gradually widening posteriorly to juncture with swollen hepatic regions (rarely bearing tiny middorsal spine at most elevated point), expanded branchial regions with lateral margins sinuate.

Eyestalks long, first article slender and about as long as supraorbital "horn"; second article short, thick and pyriform, cornea large somewhat reniform, width about 3.7-4 times that of slender stalk.

Antennules prominent, reaching to base of terminal ocular article; peduncle longer than flagella; basal article bulbous and at its mesioventral anterior corner articulated with second, much more slender, subcylindrical article; third article about 0.7 length of second and more slender, but both it and second article somewhat broadened distally; ventral ramus of flagella slender, tapering, dorsal ramus densely clothed ventrally with silky hairs.

Antennae filiform except for rounded basal article bearing prominent, ventral urinary pore; arising ventrally on "neck" behind antennules and extending slightly beyond their peduncles.

Mouth frame with sides diverging anteriorly, but anterolateral corners slightly rounded or rectangular at flared efferent opening; endostome transversely reniform in outline, its anterior margin slightly concave or occasionally notched in midline. Epistome greatly elongated on ventral side of "neck."

Third maxilliped with endognath pediform, tapering, reaching about 2/3 distance along "neck", its mesial margin setose, most densely so along basis-ischium and merus. Ischium nearly as long as merus, rectangular; rounded, variable, remote teeth on mesial edge; fused with short, triangular basis. Merus asymmetrically ovate, about as long as dactyl and propodus together, articulating with carpus on its slightly oblique anteromesial margin; a spine, tubercle or raised



area at broadest and ventralmost point. Short, broad carpus bent mesially at nearly a right angle in proximal 1/3. Longer and broader propodus cylindrical. Slender dactyl subcylindrical, slightly bent mesially and tapered to rounded tip. Slender exognath with ischium reaching to midlength of merus on endognath.

Legs long, almost filiform; armed with remote, acute, fixed spines tending to form rows originating laterally on ischia, running along meri, and becoming strongest at basically trispinose mero-carpal joints; tiny similar spines flanking usually bispinose propodo-carpal joints of walking legs; meri, carpi, propodi and dactyls of walking legs also with scattered, movable, often appressed spinules varying in size, most conspicuous and concentrated along flexor and extensor margins. Bases of legs arranged in an arc from ventralmost chelipeds to dorsalmost last walking legs.

Chelipeds (p 1) subcylindrical, nearly equal, heavier than other legs, nearly spineless, about twice as long as carapace (measured in midline to base of "horns") and about half as long as third walking legs (p 4); chela shorter than to approximately equal length of carapace, palm most noticeably thickened at base of fingers; fingers curved slightly inward, tips pointed, dactyl about 1/2 length of palm. Male with opposed edges of fingers smooth, sharp, nearly straight in distal half, becoming rounded and variably gaping proximally; dactyl often with obliquely truncate basal tooth in gape closing against anterior slope of obtusely triangular propodal tooth proximal to it, lateral ridge extending from each proximal corner of extensor side merging distally. Female with opposed edges of fingers sharp and toothless throughout length, gape obsolescent, suggestion of obsolescent basal tooth on dactyl.

Merus of cheliped not extending as far anteriorly as that of last walking leg (p5) but meri of walking legs 1-3 (p2-4) greatly exceeding both those of cheliped and last leg, their order of increasing extension when directed anteriorly being 1, 3, 2 (p2, 4, 3). Carpo-propodal joints of walking legs 1-3 bearing same sequence of extension. Propodi of walking legs 1-3 similar, portion near distal end somewhat broadened and flattened, flexor surface bearing usually 3 enlarged, movable spinules and some smaller spinules. Dactyls of walking legs 1-3 similar, length slightly over twice width of "neck", slender, compressed, slightly bent in direction of prehensile surface distally, tapering to needle sharp point and armed with closely appressed movable spinules on both extensor and flexor surfaces but much more numerous and close-set on latter. Dactyls folding against distal spinules of propodi to form modified subchelae.

Last leg (p5) reaching a little beyond chelipeds; length of carpus equal to or slightly greater than length of carapace; extended carpus exceeding merus of first walking leg, occasionally reaching about same level as merus of second walking leg. Propodus shorter than carpus ( $\bar{x} = 0.66$ ) and bearing featherlike vane of close-set, long, soft hairs along full length of each side at right angle to flexion plane of dactyl; flexor surface with subdistal, single, long, strong, movable spinule projecting obliquely distad from buttressed socket, followed by one or more very short, stout spinules and some tiny setae; articular condyles for dactyl each bearing a movable spinule. Dactyl exceedingly short and drawn to acute point, extending to base of subdistal propodal spinule and flexing to form a subchela; extensor surface

moderately convex, flexor surface sinuous and bearing close-set comb of 7-8 movable spinules along its distal 3/4.

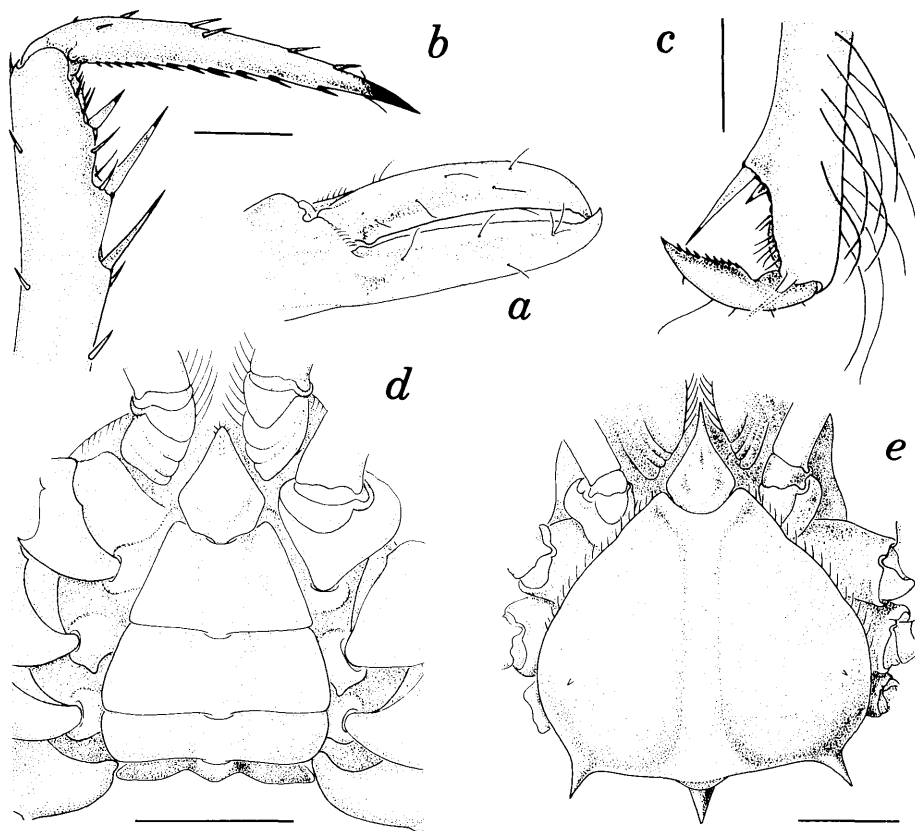


Fig. 2. *Latreillia manningi* ♂ holotype: a, Fingers of right chela; b, Dactyl and distal propodus of 3rd leg; c, Subchela of 5th leg; d, Abdomen and associated structures in ventral view. e, ♀ abdomen, etc., in ventral view (USNM 55989). Scales in mm: a-b = 1; c = 0.5; d-e = 2.

Abdomen of both sexes generally ovate, that of mature female broadest; telson spearhead shaped, somewhat angled at greatest width, that of female more acuminate distally. Male with 6 free segments plus narrowed telson; first segment narrow; second segment narrow proximally and broadening distally, bearing blunt dorsal spine; fifth segment broadest. Female with dorsal tubercle on narrow first segment, broadening second segment with median spine; still broader third with mucronate median spine; much broadened fourth to sixth segments fused into cupped plate in adults, stout spines on each lateral margin proximally and another lateral pair (often obsolescent) at about midlength near proximal edge of fused fifth segment.

First pleopods of male with coxa of right and left sides fused in midline but each diverging to articulate with flattened, rhomboid basis in turn articulated with

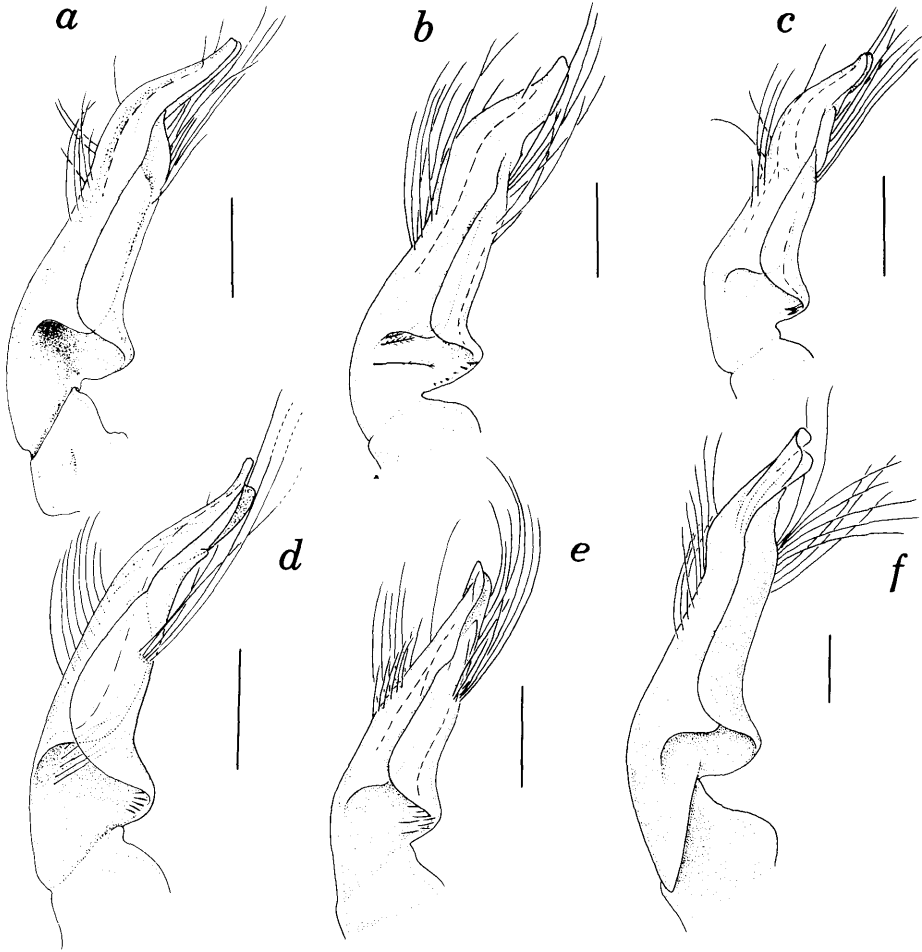


Fig. 3. Male pleopod 1 in ventral view: a, *Latreillia manningi* (USNM 19296); b, *L. elegans* (USNM 152218); c, *L. sp.* near *L. manningi* (USNM 134161); d, *L. metanasa* (USNM 134157); e, *L. pennifera* (USNM 172333); f, *L. valida* (USNM 74575). Scales = 0.5 mm.

longer terminal portion; latter essentially a lanceolate, leaf-shaped plate having narrow base shallowly cupped (in ventral view) but body of plate loosely rolled into depressed tube tapering from proximal broad entrance at 1/4-length level to narrowed membranous tip flared open near tip of distal 1/4; edge of rolled tube exposed along ventral (abdominal) side; central tapered tubular section nearly straight, but open proximal and flared distal portions bent mesially; proximolateral margin curved in broad arc; tip narrow but rounded; long hairs on lateral and mesial edges in third quarter of length. Proximal entrance of first pleopod receives pistonlike tip of second pleopod.

**Measurements in mm.** - Table 1.

**Variation.** - There is considerable variation in length of the supraocular

“horns” which may fall short of or exceed the eyestalks and may be asymmetrical in length as well. The “horns” each bear a subdistal dorsolateral spinule and proximal lateroventral spinule, but these vary in size or may be absent. The legs increase relatively in length with age, and the strength and length of the chelipeds increase relatively more in males than in females.

**Habitat.** - Mud, sand, shell, sponge, and fine coral bottoms; 82-474 m.

**Types.** - Male holotype (USNM 57071), carapace length in mm 9.8, width 5.9; right carpus of p2, 3, 5 and merus of p3-5, left carpus of p2-5 and merus of p3-5 broken (folded) but not detached; American Shoal Light, Florida, about 10 mi, N by W 1/2 W, 192-201 m, 27 June, 1893, Univ. Iowa Bahama Exped. Stn. 52. Paratypes: USNM 19296, 21697, 21698, 55989, 172323. Paratypes are to be placed in the Rijksmuseum van Natuurlijke Historie, Leiden.

**Material studied.** - Twenty-four lots including 18 ♂, 29 ♀ (12 ovig.), 1 juv. from Nantucket Shoals off Massachusetts to off Havana, Cuba; Venezuela; Ascension Island. (The following with locality data given in RATHBUN (1937): USNM 8044, 1 ♀; 19295, 2 ♀; 19296, 4 ♂, 4 ♀ (2 ov) (paratypes); 21697, 1 ♂ (paratype); 21698, 1 ♂ (paratype); 51060, 1 ♂, 2 ♀ (1 ov); 55987, 1 ♂; 55988, 1 ♀ ov; 55989, 2 ♀ ov (paratypes); 172323 (ex. 57071), 1 ♀ (paratype); 67740, 2 ♂, 1 ♀ ov; 68860, 1 ♀ juv., [State U. of Iowa Bahama Expedition]; 68861, 1 ♀ ov, State U. of Iowa Bahama Expedition; 69019, 1 ♀, American Shoal Light, Fla., N by W about 8 mi., 210 m, 29 June 1893; 69027, 1 ♂, 3 ♀ ov, Pourtales Plateau, Florida Straits; 24°16'N, 81°22'W, 366 m, 27 June, 1893; 69040, 1 ♀, American Shoal light bearing NE by N 8 mi. 128-146 m, 24 June 1893; 74588, 1 ♂, 3 ♀, off No Mans Land, Mass., 119 m, 29 Apr. 1930, *Albatross* Stn. 20780; 136827, 1 juv., Straits of Florida 25°15'N, 79°15'W, 236 m, 30 Jan. 1964; 136828, 1 ♀ ov, Straits of Florida 25°21'N, 79°15'W, to 25°23'N, 79°17'W, 293-375 m, 31 Mar. 1964; 136829, 1 ♀, Straits of Florida, 25°23'N, 79°17'W, 329 m, 31 Mar. 1964; 172324, 1 ♀ ov, off Venezuela, 10°45'N, 66°37'W, 229 m, 17 Oct. 1963, *Oregon* Stn. 4465. RNH 22772, 3 ♂, 1 ♀, Straits of Florida, 25°40'N, 79°21'W-25°41'N, 79° 23' W, 403-421 m, 30 Jan. 1964, *Gerda* Stn. 233; 22773, 2 ♂, 2 ♀, Straits of Florida, 25°42'N, 79°23'W -25°44'N, 79°22'W, 452-474 m, 30 Jan. 1964, *Gerda* Stn. 234. Royal Scottish Museum 1921.143.859, 2 ♂, Ascension Island, off Pyramid Point, 82 m, 10 June 1914, *Scotia* Stn. 507.

**Known range.** -- Nantucket Shoals off Massachusetts to off Havana, Cuba; Venezuela; Ascension Island. A megalopa from off Newfoundland, described by FROST (1936) and identified by R. Gurney, was collected in a year marked by reduced Arctic current and influx of warm water.

**Remarks.** - Specimens of *Latreillia manningi* from the western Atlantic and *L. elegans* from the eastern Atlantic and Mediterranean Sea closely resemble each other. With rather limited material for study having reasonably complete complements of legs (Tab. 1), the following comparisons were made: carapace length, width, and “neck” length; proportional lengths of legs including their separate articles; ornamentation of all body parts; relative lengths of eyestalks, “horns”, antennae, and antennular peduncles; shape of abdomens and structure of male first pleopods. There is considerable individual variation in all of these features, in-

cluding proportional growth changes with increasing size. There is overlap in all features of specimens examined from the two areas except in relative length of the legs. Analysis shows that specimens from Great Meteor Tablemount eastward, along north-western Africa and through the Mediterranean Sea have relatively longer legs in proportion to the length of carapace than do those from the western Atlantic. (A tiny sample from Ascension Island was initially left out of calculations on the chance that it might be intermediate). The carpus of the last leg (p5), for example, is relatively longer in the eastern Atlantic species than in the western Atlantic species for specimens of given carapace length. This can be shown by: the ratio, propodus length/carpus length (pr/c); by the ratio, carapace length measured in midline to base of rostrum/carpus length (cm/c); or by the ratio, carapace length/length of last leg excluding the tiny folded dactyl (cm/lp5). The difference can also be shown by the ratio, carapace length/length of ischiomerus in any of the walking legs, which differ insignificantly among themselves (cm/i-mp2, or p3, or p4). Specimens of these fragile crabs often have missing or broken legs. In making the comparisons, no dissociated legs were used unless they were bottled with a single specimen or could be associated with a specimen on the basis of size. To increase the sample size slightly, either right, left, or both right and left legs of individual specimens were measured as a basis for calculations. Right legs are often slightly longer than left legs, but in a few individuals the reverse is true.

The ratios for measured samples from the eastern and western Atlantic were corrected for inherent skewness, normalizing the data by the arcsine transformation (ZAR 1974), and then compared by Student's *t*-test for the significance of the difference between two sample means (SIMPSON, ROE and LEWONTIN 1960). Each of the comparisons show highly significant statistical differences (Tab. 2).

A similar set of comparisons with both east and west was made for the tiny and fragmentary sample from Ascension Island (Tab. 3). Though a poor statistical sample, the specimens can more readily be assigned to one or the other of these similar groups by this means than by inspection alone. The pr/c ratio is intermediate between those for *L. elegans* and *L. manningi*, but the remaining three ratios indicate significant differences from the eastern species. I assign it therefore to *L. manningi*.

**Name.** - It is a pleasure to name this species in honor of Dr. R. B. Manning.

### *Latrellia elegans* Roux Fig. 3b, 8

*Latreillia elegans* Roux 1830, pl. 22 (colored), unnumbered page (see Manning 1962). — H. Milne Edwards 1834:277. — Lucas 1849:3, pl. 1, fig. 1. — Heller 1863:147, pl. 4, fig. 14. — Carus 1885:498. — A. Milne Edwards and Bouvier 1894:59, pl. 6, figs. 13 (colored), 14-15. — 1899:13. — 1900:13. — Bouvier 1896:64 [31], fig. 26. — 1922:52. — 1940:193, fig. 139. — Monod 1933:488 [33]. — 1956:78. — Karlovac 1952:3, fig. 1. — Nunes-Ruivo 1961:13. — Lewinsohn and Holthuis 1964:55. — Zariquey Alvarez 1968:305. — Türkiye 1976:36.

**Description.** - As *L. manningi* except for proportionately longer carpus on the

last legs (p5); see key to species of *Latreillia*, description and remarks for *L. manningi*.

**Measurements in mm.** - See Table 1.

**Color.** - Carapace and abdomen of female pale yellow, legs with transverse bands of yellowish and red (ROUX 1830, pl. 22). Pale rose, with longitudinal bands of red on cephalothorax, transverse bands of same color on ocular peduncles and legs; eyes black (A. MILNE EDWARDS and BOUVIER 1900). Carapace pale yellowish porcelain with longitudinal wine stripes; legs transversely striped with wine-brown (KARLOVAC 1952).

**Habitat.** - Clay, sandy mud, sand, shell, coral; 35 to 405 m.

**Type-locality.** - Sicily.

**Material studied.** - Six lots including 11 ♂, 6 ♀ (4 ov) from Mediterranean sea. USNM 152218, 2 ♂, 1 ♀ (ov), Adriatic Sea; 152219, 1 ♀ (ov), Sicily. I TP, D190, 1 ♀, Golfo di Patti, Sicily, 8 May 1974, 210-120 m, col. C. Froglija; D352, 4 ♂, 1 ♀, Adriatic Sea, Fossa di Pomo, 42°53'N, 16°33'E, 165 m, 10 Oct. 1972, col. C. Froglija; D1096, 7 ♂, 2 ♀ (ov), Adriatic Sea, 42°32'N, 17°10'E, 200 m, 11 July 1973, col. C. Froglija. RNH19077, 1 ♀, Turkije, 1950.

Additional lots of measured specimens from SMF including 6 ♂, 6 ♀ (ov). Morocco coast, 6008, 1 ♀ (ov) 31°1'N, 10°16'W, 360-375 m, Stn. 9c-80a; Josephine Bank, 4772, 1 ♀ (ov), 36°45.8'N, 14°15.2'W, 310-345 m, Stn. 9c-127; 4783, 1 ♂, 36°40.2'N, 14°17.5'W, 235-240 m, Stn. 9c-132; 6003, 2 ♂, 1 ♀ (ov), 36°42'N, 14°14'W, 210-305 m, Stn. 9c-121a; 6004, 6007, 1 ♂, 1 ♀ (ov), 36°41.4'N, 14°14.8'W, 216-225 m, Stn. 9c-130; 6009, 2 ♂, 36°41'N, 14°16.18'W, 223-237 m, Stn. 19-210; Great Meteor Tablemount, 5544, 1 ♀ (ov), 30°18'N, 28°38.5'W, 269 m, Stn. 19-131.

**Known range.** - Portugal to Cape Verde Islands; Azores; Mediterranean Sea.

**Remarks.** - The colored figure of a female *L. elegans* given by A. MILNE-EDWARDS and BOUVIER (1894, pl. 4, fig. 13) does not conform to all features observed in specimens from either the eastern or western Atlantic. In it the propodus of the last leg lacks feathered setae, the propodus is shown as longer (24 mm) than the carpus (21.5 mm) rather than shorter, the merus of p4 if swung forward would equal that of p3, and the merus of p3 if swung forward would exceed that of p2. Lengths of the meri of p2, 3, 4 would fall within the limits of observed variation but features of the carpus and propodus would not.

Both KARLOVAC (1952) and ZARIQUEY ALVAREZ (1968) gave good reviews of the occurrence of this species in the Mediterranean Sea. Karlovac's Adriatic samples came from 11.4-14.8°C water in a salinity of 37.81-38.78‰ at depths below 100 m. No specimens were found in shallow northern parts of the Adriatic Sea. He found ovigerous females in January, May to July, September and November and thought that favorable samples would have produced them in intervening months as well. Eggs on six females varied from 496 to 1976.

CANO (1893) described two larval stages of a *Latreillia* which can be attributed to *L. elegans*, a metazoea and a megalopa with branched horns. WILLIAMSON

(1965, 1967) along with his description of the megalopa of *L. australiensis* gave comparisons with the megalopa of *L. elegans* as well as larvae of homolids.

***Latreillia metanesa* new species - Figs. 3d, 4, 5a-d, 8**

**Description.** - Strongly resembling *L. manningi* but less robust, the most readily apparent difference being presence of a proximal middorsal "neck" spine. As in *L. manningi* except as follows:

"Neck" with proximal middorsal gastric spine; length 0.39 or more length of carapace in midline to base of rostrum; swollen hepatic regions of carapace each often bearing tiny spine at apex.

Eyestalks exceeded by supraorbital horns each having a variable fixed spinule ventrolaterally at 0.16 length and dorsolaterally at 0.40 and 0.75 length.

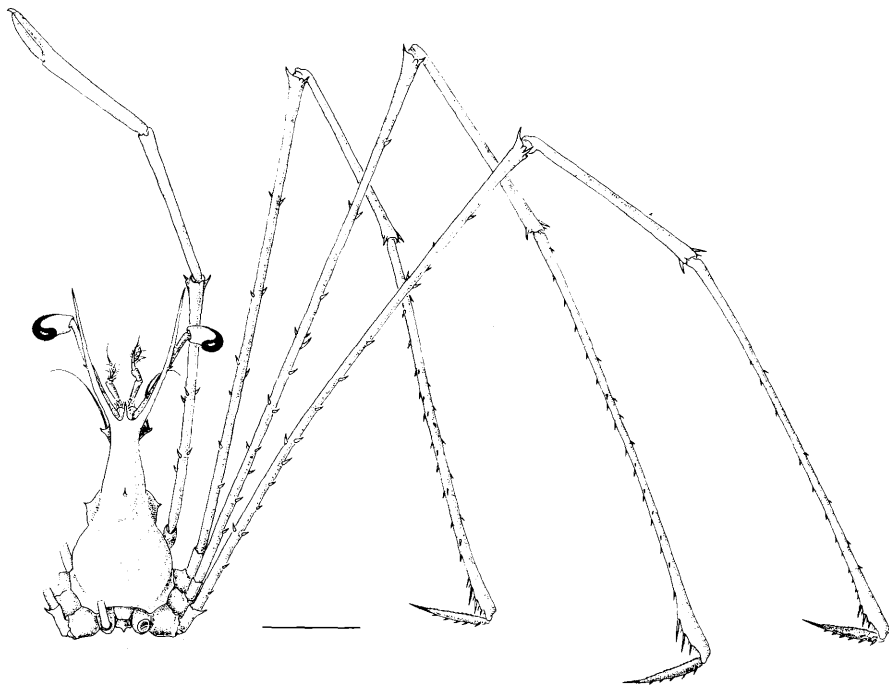


Fig. 4. *Latreillia metanesa*. ♂ holotype in dorsal view, legs of left side and right 5th leg not shown. Scale = 5 mm.

Antennules reaching to near base of terminal ocular article; second peduncular article almost subcylindrical; third peduncular article about 0.70-0.75 length of second, slender proximally but noticeably broadened distally.

Third maxilliped with ventral spine on merus poorly if at all developed; ischium with rounded, remote teeth on mesial edge variable in number, occasionally nearly absent.

Chelipeds (p 1) nearly equal, heavier than other legs; length of merus about 3 times midlength of carapace to base of rostrum, 1 spine proximomesially, 2 or 3 spines at 1/3 length, 3 at 2/3 length, and 3 at mero-carpal joint, internal one usually strongest. Chela shorter than carapace; palm subcylindrical, about 1.5 times diameter of carpus in adults, less in juveniles, suggestion of longitudinal row of obsolescent granules along dorsal, lateral and ventral sides; dactyl a little less than 1/2 length of palm; opposed edges of fingers in female sharp, toothless and straight, closing closely throughout length; similar in male except for truncate proximal tooth on dactyl preceded by smaller tooth on fixed finger, tips of fingers crossing.

Merus of cheliped extending almost to midlength of merus of first walking leg (p 2) and to point well short of that of last walking leg (p 5); meri of walking legs 1-3 (p 2-4) greatly exceeding those of both cheliped and last leg, their order of increasing extension in adults, when directed anteriorly, being 1, 3, 2 (p 2, 4, 3) but length changes with age; in juveniles 3, 1, 2 (p 4, 2, 3). Carpo-propodal joints of walking legs 1-3 with same sequence of extension. Propodi of walking legs similar, portion near distal end hardly broadened but somewhat flattened, flexor surface bearing usually 2, sometimes 3 elongate movable spinules and some smaller spinules. Dactyls of walking legs 1-3 similar, length a little over twice width of "neck", slender, compressed, slightly bent in direction of prehensile surface distally, tapering to needle sharp point and armed with closely appressed movable spinules on both extensor and flexor surfaces but much more numerous and close-set on latter. Dactyls folding against distal spinules of propodi to form modified subchelae.

Last leg reaching a little beyond chelipeds; length of carpus slightly greater than to slightly less than length of carapace, extended carpus exceeding merus of first walking leg, occasionally reaching about same level as merus of second walking leg (p 3). Propodus slightly shorter than carpus ( $\bar{x} = 0.89$ ) with featherlike vane of close-set, long, soft hairs along full length of each side at right angle to flexion plane of dactyl; flexor surface with subdistal, single, long, strong, movable spinule projecting obliquely distad from buttressed socket, followed by one or more very short, stout, potentially movable spinules and some tiny setae; articular condyles for dactyl each bearing a movable spinule. Dactyl exceedingly short and drawn to acute point extending to base of subdistal propodal spinule and flexing to form subchela; flexor surface sinuous and bearing 5-6 movable spinules along its distal 3/4.

Male abdomen bearing blunt dorsal spine on second segment. Female with low dorsal prominence on narrow first abdominal segment, broadening second segment with mucronate median spine, third with stronger mucronate median spine; fourth to sixth segments fused in adults, stout spine on each lateral margin proximally and another lateral pair at about midlength near proximal edge of fused fifth segment, latter spines suppressed in large females; some individuals with short median spine distally on sixth segment near base of telson.

First pleopods of male essentially as in *E. manningi* but entire lateral margin curved in flattened, longitudinal arc.

**Measurements in mm.** - See Table 1.

**Variation.** - The legs increase in length proportionately relative to carapace length with age. Difference in strength of chelipeds in males and females is not marked. Tiny males may have a spine on summit of hepatic and branchial regions.



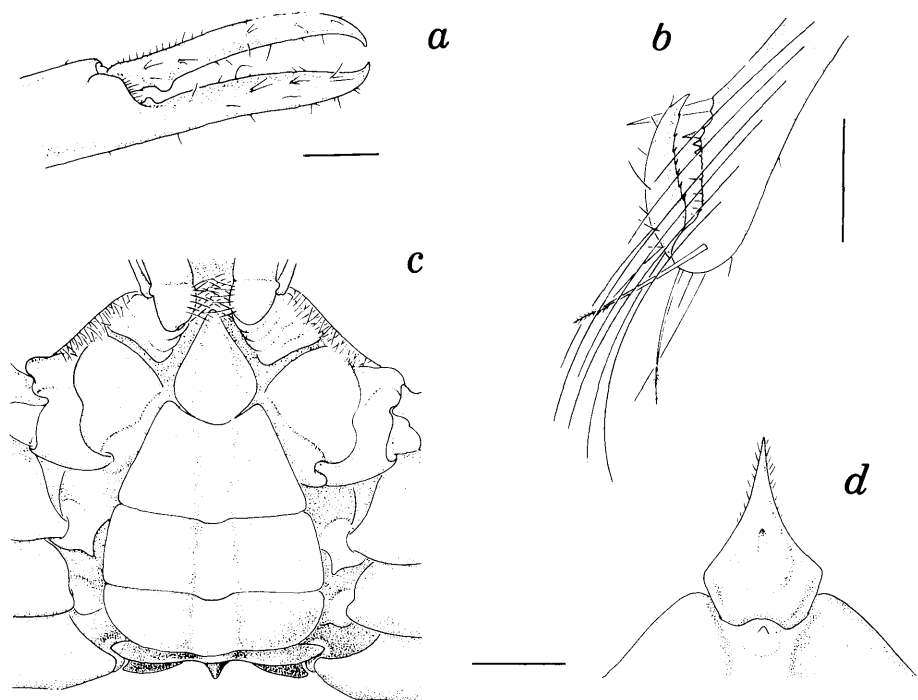


Fig. 5. *Latreillia metanese*. USNM 134157: a, Fingers of right chela; b, Subchela of 5th leg; c, ♂ holotype abdomen and associated structures in ventral view; d, ♀ telson and adjacent part of 6th abdominal segment (USNM 172325). Scales in mm: a, c-d=1; b=0.5.

**Habitat.** - On bottoms of sand, coral, foraminifera and rock; 174 to 278 m; one specimen associated with a hydrographic station of 2418 m.

**Types.** - Male holotype (USNM 74570), carapace length in mm 8.6, width 5.1; right p5 missing, left p2 missing, left p3 and 5 regenerating; Puniawa Point, N coast of Maui Id., Hawaii, S52°30', E6.5', 174-278 m, 23 Jul. 1902, Trawl, *Albatross* Stn. 4098. Paratypes: 134157, 172325. Paratypes are to be placed in the Rijksmuseum van Natuurlijke Historie, Leiden.

**Material studied.** - 12 ♂, 10 ♀ (6 ov), 2 juv. from Hawaiian, Paumotu, Gilbert and Caroline Islands. USNM 74577, 1 ♂, 1 ♀ (ov), 2 juv., Puniawa Point, NE and N coast of Maui Id., Hawaii, S 45°45', E 6.1', 181-194 m, 21 Jul. 1902, Trawl, *Albatross* Stn. 4077. 74578, 1 ♀ (ov), N coast of Maui Id., Hawaii, 174-278 m, 23 Jul. 1902, *Albatross* Stn. 4098. 134146, 1 ♂, Pailolo Channel off Mokuhooniki Islet, Hawaiian Ids., 252-256 m, 9 Apr. 1902, *Albatross* Stn. 3859. 134147, 1 ♂, 1 ♀, Pailolo Channel off Mokuhooniki Id., Hawaiian Ids., 223-260 m, 23 Jul. 1902, *Albatross* Stn. 4101. 134157, 1 ♂, 1 ♀ (paratypes), Laysan Id. off Laysan Light, Hawaii, S 83°, E 8.1', 212-269 m, 23 May 1902, Trawl, *Albatross* Stn. 3665. 134158, 1 ♂, 1 ♀, Pailolo Channel off Mokuhooniki Islet, between Maui and Malaki Ids., Hawaii, N 83°30', E 4.8', 122-143 m, 23 Jul. 1902, Trawl,

*Albatross* Stn. 4101. 172325, 1 ♂, 3 ♀ ov. (paratypes), Puniawa Point, N coast of Maui Id., Hawaii, S 52°30', E 6.5', 174-278 m, 23 Jul. 1902, Trawl, *Albatross* Stn. 4098. 172326, 1 ♂, NE coast of Hawaii Id., Kauhola Light, S 79°, E 6.7', 44-152 m, 18 Jul. 1902, Tangles, *Albatross* Stn. 4061. 172327, 1 ♂, Pailolo channel between Maui and Molokai Ids., Mokuhooniki Islet N 35°, W 3.1' Hemp Tangles, 238-276 m, 23 Jul. 1902, *Albatross* Stn. 4100. 74586, 1 ♂, Paumotu Ids. (Tuamotu Archipelago), 16°03'S, 147°11'W, 2418 m, 7 Oct. 1899, *Albatross* Stn. H 3846. 74579, 1 ♂, 1 ♀, 3/4 mi. off village, S coast Abemama Id., Gilbert Ids., 23 Dec. 1899, *Albatross* Stn. H 3958. 74569, 1 ♂, 1 ♀ (ov), Kusaie Id., Caroline Ids., 13 Feb. 1900, *Albatross* Stn. 4002 or 3.

**Known range.** - Based on above localities, Hawaiian Islands and Oceania from Caroline Islands on NW to Tuamotu Islands on SE.

**Remarks.** - These records amend a statement (EDMONDSON 1932) that no member of the genus *Latreillia* has been reported from the central Pacific, including Hawaii.

*Latreillia metanese* resembles *L. valida* in having a middorsal "neck" spine but its general body shape in other respects more closely resembles that of *L. manningi*. The last leg in both *L. metanese* and *manningi* has the propodus feathered on each side with a long row of soft setae and armed subdistally with 1 long, movable spinule followed by 1 or 2 short, potentially movable spinules and some fine setae which oppose the extremely short, folded dactyl to form a subchela. The propodus of this leg is relatively longer in *L. metanese* ( $\bar{x}$  = 0.86 length of carpus) than in *L. manningi* ( $\bar{x}$  = 0.67 length of carpus); however, length of the entire last leg in relation to that of the carapace is identical in the two species.

**Name.** - From the Greek "meta", near, among, and "nesos", island, with reference to occurrence near or among Pacific islands.

### *Latreillia* sp., near *L. manningi* Fig. 3c, 8

A few collections ranging from the Sulu Archipelago to east Africa contain meager material of a species that greatly resembles *L. manningi* from the western Atlantic. The propodus/carpus ratio of the fifth leg is almost identical in the two as is the carapace length/merus of walking legs, and differences in first pleopods of males are inconsequential, but the Indo-Pacific form seems to have a somewhat longer "neck", extended but variable supraocular "horns" with correspondingly extended eyestalks in east African specimens, fingers of chelae slightly shorter relative to length of palm than in *L. manningi*, and females lack lateral spines near the proximal edge of the fused fifth abdominal segments. Similar *L. metanese* from the Pacific has a well developed middorsal "neck" spine. Because no clear-cut key characters can be determined from this little series, it seems best to leave the form unnamed at present.

**Material studied.** - USNM 172328, 1 ♂, Sulu Archipelago, Tawitawi Group, Simunul (Simonor) Id., N side, 04°56'10"N, 119°46'E, 177 m, 24 Feb. 1908,

*Albatross* Stn. D 5166. 134161, 1 ♂, 2 ♀ (ov), Pacific Ocean, China Sea, near Hong Kong, 21°33'N, 116°13'E, 183 m, 4 Nov. 1908; 172329, 1 ♀ (ov), Indian Ocean off Kenya, 02°42'S, 40°53'E, 140 m, 6 Nov. 1964. *Anton Bruun* Stn. 420-A. 172330, 1 ♀, (ov), off NE Somali Republic, 09°41'N, 51°03'E, 16 Dec. 1964. *Anton Bruun* Stn. 445.

*Latreillia pennifera* Alcock Figs. 3e; 6b-c; 7b-c, 8

*Latreillia pennifera* Alcock 1900a:118.-1900b:168. — 1901:71, pl. 7, figs. 27, 27a, 27b. — Rathbun 1911:196. — Ihle 1913:82. — Barnard 1947:372 (listing). — 1950:344, figs 65h, i. — Gordon 1950:229, 243, fig. 22B.

*Latreillia elegans*. — Stebbing 1902:24. — 1910:347 (not *L. elegans* Roux). — Barnard 1926:120 (listing).

*Latreillia valida*. — Yokoya 1933:102 (part). — Sakai 1934:282 (part). — 1936:37 (part). — 1936a:57 (part). — 1965:17 (part). — 1976:44 (part), not the specimens from Japan and Philippines.

**Description.** - Resembling both *L. manningi* and *L. valida*; "neck" lacking dorsal spine as in former and longer in relation to width of carapace than in latter; propodus of last leg lacking subdistal spinules, its dactyl usually trailing rather than closed to form an imperfect subchela. As *L. manningi* except as follows:

"Neck" length about 0.25 - 0.40 that of carapace measured in midline to base of rostrum and about 0.40-0.66 greatest carapace width, narrower in males than in females, extremely slight raised area dorsally in region of spine in other species. Swollen hepatic regions of carapace prominent, not spine tipped; branchial regions nearly smooth; branchial and posterior margins shallowly emarginate over coxa of each leg; cardiac region raised, bearing 3 small but fairly distinct low tubercles in triangle, median one posterior.

Supraorbital horns variable in length but shorter than eyestalks, ventrolateral proximal accessory spinules present, dorsolateral spines near midlength and near tip variable.

Third maxillipeds without spine on merus.

Chelipeds heavier than other legs. Merus-ischium in small male about 1.6 times midlength of carapace measured to base of rostrum; spine at about 1/3 length, 2 spines at about midlength, and 3 spines at mero-carpal articulation; in large dried female also 1.6 times length of carapace; palm subcylindrical and about 1.6 times diameter of carpus, slightly granular; fingers a little less than 1/2 length of palm, slender, inward curved, tapering to pointed, slightly crossed tips, sharp edges meeting along entire length.

Relative lengths of walking legs and their articles as in *L. valida*, but slender, compressed dactyls slightly bent in direction of prehensile surface distally, tapering to needle sharp point and armed with closely appressed movable spinules on both extensor and flexor surfaces, much more numerous and close-set on latter proximally; folding against distal spinules of propodi to form modified subchelae. Propodus of last leg usually exceeding carpus in length (ca. 0.99-1.12).

Abdomen as in *L. valida*.

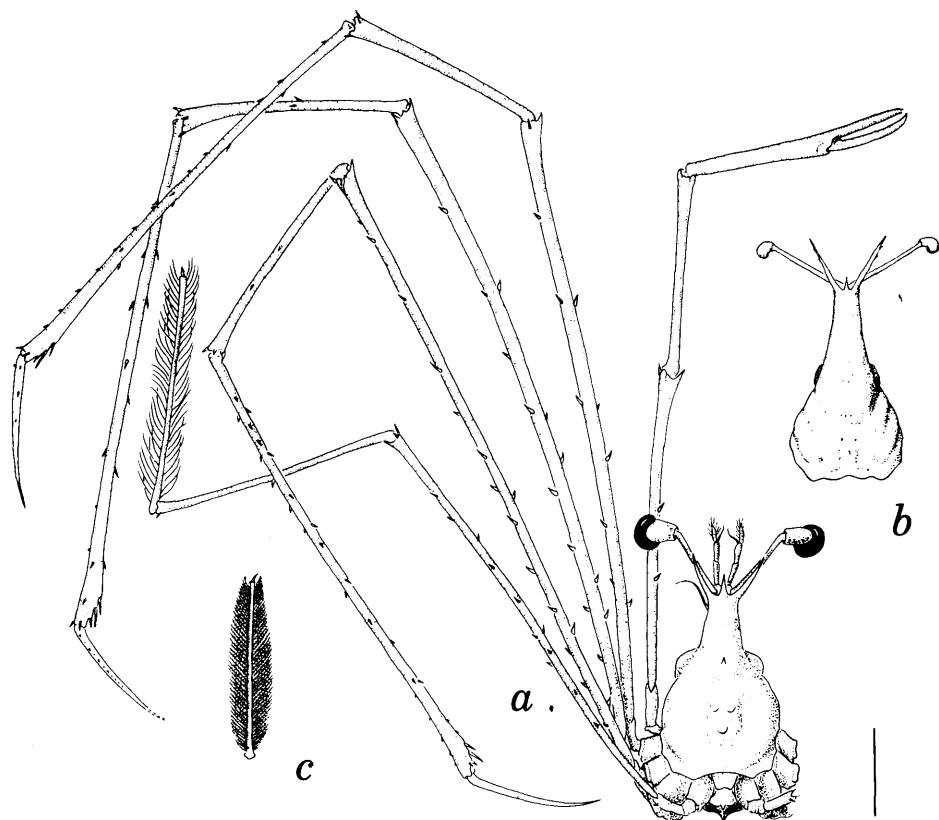


Fig. 6. *a*, *Latreillia valida*, ♂ in dorsal view, legs of right side not shown (USNM 74576); scale = 5 mm. *L. pennifera*: *b*, Carapace and eyes [♀]; *c*, Propodus and tiny dactyl of 5th leg (after BARNARD 1950).

Male first pleopods basically as in *L. manningi*; central tapered tubular section relatively straight but relatively broader than in other species of *Latreillia* at level of proximal opening, diminishing from that level to rather abrupt narrowing at  $3/4$  length where mesial margin pinches inward; distal membranous portion flared open ventromesially (abdominal aspect) with acute tip at extreme distolateral corner; lateral margin almost straight, not produced at  $3/4$  length as in *L. valida*.

**Measurements in mm.** - See Table 1.

**Color.** - Orange banding on limbs, eyestalks and frontal spines (STEBBING 1902). Narrow reddish longitudinal stripes on carapace, legs banded alternately red and white (BARNARD 1950).

**Habitat.** - Recorded in depths from 37 to 229 m.

**Type-locality.** - Gulf of Martaban,  $14^{\circ}26'N$ ,  $96^{\circ}23'E$ , 122.5 m, Andaman Sea.

**Material studied.** - Nine lots containing 3 ♂, 6 ♀ (1 ov), 1 juv. USNM 41049, 1 ♂, Seychelles, Western Indian Ocean, 62 m, 20 Oct. 1905; 41050, 1 ♀, Seychelles,

Western Indian Ocean, 71 m, 20 Oct. 1905; 172331, 1 ♂, off NE Somali Republic, 09°41'N, 51°03'E, 16 Dec. 1964, *Anton Bruun* Stn. 445; 172332, 1 juv. off southern Mozambique, 25°07'S, 34°34'E, 112 m, 19 Aug. 1964, *Anton Bruun* Stn. 372-L; 172333, 1 ♂, off NE Somali Republic, 09°36'-09°40'N, 51°01'-51°03'E, 16 Dec. 1964, *Anton Bruun* Stn. 9-444. South African Museum, dried specimens in a single jar with numbers on slips of paper (specimens and legs separated by color). One ♀ (ov), SAM, A1352, 2 mi. off Umtawalumi River, Natal, 46 m is Stebbing's (1902, 1910) specimen with original label. Three ♀ cannot be assigned among the following numbers (localities supplied by Dr. B. Kensley): A1453, Tugela RMW 15 1 2 mi. (Zululand coast), 36 fm (66 in); A6492, Portuguese East Africa, 25°55'S, 33°4'E, 37 m; A8214, Durban, 36 fm (66 m). RNH, D4203, 1 ♀, Brazilian Strait SW of Mindanao, 6°58'N, 121°52.5'E, 72-80 m, *Snellius* Stn. 60.

**Reported range.** - Mindanao, Philippines, Kai - Kepulauan (= Kei Islands), Indonesia, Gulf of Martaban and Mergui Archipelago in Andaman Sea to coast of Natal, South Africa.

**Remarks.** - ALCOCK'S (1901) statement, "Very closely related to *L. elegans* Roux" is an apt general summary of the external aspect of *L. pennifera*, but his fig. 2 7b clearly shows the dactyl of the last leg trailing. There should be no confusion with *L. valida*, though the two have often been synonymized. The distribution given above is based on Alcock's and Ihle's records plus the USNM, SAM and RNH material.

### *Latreillia valida* de Haan figs. 3f; 6a; 1a, 8

*Latreillia valida* de Haan 1839:107, pl. 30, fig. 1. — Adams and White 1848: [5]. — Henderson 1888:24 (?). — Doflein 1902:649. — Ihle 1913:81. — Bals 1922:114 (not *L. pennifera* Alcock). — Yokoya 1933:102 (part). — Sakai 1934:282. — 1936:37 (part), pl. 5. — 1936a:5 7 (part), pl. 4 (colored). — 1965:17 (part), pl. 9 (colored), text-fig. 1c. — 1976:44 (part), pl. 16 (colored). — Serene 1968:37 (listing). — Serene and Lohavanijaya 1973:32 (part), figs. 51-55. — Kim and Rho 1971:11 (listing). — Kim 1973:284, fig. 84A-E, pl. 75, fig. 55.

**Description.** - Resembling *L. pennifera* but more robust and with obviously longer legs; most readily apparent difference being presence of proximal middorsal spine or its rudiment on relatively short, narrow "neck", but similar in having last leg with propodus lacking subdistal spinules, its dactyl usually trailing rather than closed to form an imperfect subchela. As *L. manningi* except as follows:

"Neck" short, length less than 0.35 that of carapace measured in midline to base rostrum and usually not exceeding 0.43 greatest carapace width, rather narrow in males, broader in females, slightly arched dorsally in region of proximal middorsal spine or rudiment of it. Swollen hepatic regions of carapace prominent, not spine tipped; branchial regions well marked; cardiac region raised, bearing 3 indistinct tubercles in triangular arrangement, median one posterior.

Supraorbital horns variable in length, shorter than to exceeding eyestalks,

ventrolateral proximal accessory spinules present, dorsolateral spines near midlength and near tip variable.

Third maxillipeds without ventral spine on merus.

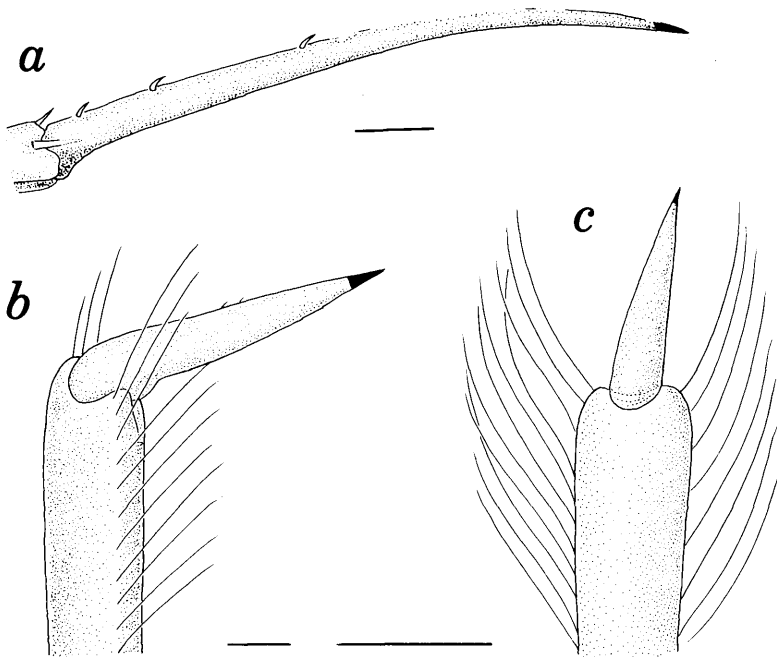


Fig. 7. *a*, *Latreillia valida*, dactyl and distal end of propodus, 3rd leg, lateral view (USNM 74576). *Latreillia pennifera*, dactyl and distal end of propodus, 5th leg: *b*, Lateral; *c*, Ventral views (USNM 41090). Scales = 1 mm.

Chelipeds heavier than other legs, length of merus-ischium about 1.5 to 2 times midlength of carapace to base of rostrum; 2 or 3 spines along merus, 1 beyond 1/3 length and usually 2 just before 2/3 length, 3 spines at mero-carpal joint, inner one strongest. Chela growing relatively with age; in large male, 1.4 times length of carapace, palm subcylindrical and about 1.7 times diameter of carpus, slightly granular; fingers a little more than 1/2 length of palm, slender, tapering to pointed, slightly crossed tips, sharp entire edges meeting in distal 2/3 but gaping proximally; dactyl shorter than fixed finger and armed with proximal, low, broad tooth slightly dilated longitudinally at flattened crown; female lacking gape.

Merus of cheliped extending beyond midlength of merus of first walking leg (p 2) and to point just short of distal end of merus of last leg; meri of walking legs 1-3 (p 2-4) greatly exceeding those of both cheliped and last leg, their order of increasing extension in adults, when directed anteriorly, being 1, 3, 2 (p 2, 4, 3). Propodi of walking legs similar, portion near distal end somewhat broadened and flattened, flexor surface bearing 3 elongate, movable spinules and some smaller spinules. Dactyls of walking legs 1-3 similar, length 4.5-5.5 width of "neck", slender, compress-

ed, slightly bent in direction of prehensile surface distally, tapering to needle sharp point and armed with a few movable spinules on extensor surface but lacking spinules on flexor surface; folding against distal spinules of propodi to form modified subchelae.

Last leg reaching beyond chelipeds; length of carpus greater than midlength of carapace, extended carpus slightly exceeding merus of first walking leg and about equal with that of third walking leg (p 4). Propodus slightly longer than carpus (ca. 1.07) with featherlike vane of close-set, long, soft hairs along full length of each side at right angle to flexion plane of dactyl; flexor surface neither spined nor dilated distally. Dactyl exceedingly short, almost straight, pointed, unarmed, usually not folded but trailing.

Male abdomen bearing blunt dorsal spine on second segment. Female with dorsal, short, sharply acute mucronate spine on second abdominal segment, larger similar backward pointing spine on third segment; fourth to sixth segments fused into broad cupped plate in adults, stout spine on each lateral margin proximally. Telson well recessed in sixth segment; spearhead shaped but lateral angles broadly rounded, oval basal portion longer than broad, tending to become angled laterally in large individuals, distally drawn to acuminate extended tip.

Male first pleopods basically as in *L. manningi* but narrowed membranous tip flared into troughlike channel open mesially; dorsal (sternal) side slightly exceeding ventral (abdominal) side to give extreme tip a bilobed appearance under low magnification; central tapered tubular section nearly straight; proximolateral margin broadly curved, distolateral margin produced laterally at about 3/4 length proximal to membranous distal portion and distal to lateral tract of long setae.

**Measurements in mm.** - Carapace:  $\sigma$ , length 16, width 11.5 (SAKAI 1976); see also Table 1.

**Variation.** - Arching of the "neck" is not pronounced but is somewhat associated with development of the middorsal spine and in females is associated with maturation of the ovary, a lobe of which extends into the "neck". In some specimens, the spine and arch are obsolescent.

**Habitat.** - Reported in depths from 62 to 304 m.

**Type-locality.** - Japan.

**Material studied.** - Eight lots containing 16  $\sigma$ , 5  $\text{♀}$ . USNM 26285, 1  $\text{♀}$ , Wakanoura, Kii, Japan, 1900; 74575, 1  $\sigma$ , E coast of Mindoro, Philippines, 198 m, 2 Feb. 1908, *Albatross* Stn. 5121; 74576, 1  $\text{♀}$ , E of Masbate Id., Philippines, 146 m, 20 Apr. 1908, *Albatross* Stn. 5213; 134160, 1  $\sigma$ , Off Sombrero Id., Luzon Id., Philippines, 13°52'22"N, 120°46'22"E, 216 m, 21 Jan. 1908, *Albatross* Stn. 5117; 172334, 3  $\sigma$ , 1  $\text{♀}$  (ov), off Honshu Island, Japan, Kinkwashan Lt. N 15, E 3.2 mi. 104 m, 5 Jun. 1900, *Albatross* Stn. 3775; 172335, 1  $\sigma$ , China Sea, vicinity southern Luzon, Malavatuan Id., 13°56'55"N, 120°13'45"E, 214 m, 17 Jul. 1908, *Albatross* Stn. 5279. South African Museum, dried specimen, 1  $\text{♀}$ , specimen and data mixed with *L. pennifera*, see above.

**Reported range.** - Akita Prefecture and Tokyo Bay, southwestward in Japan

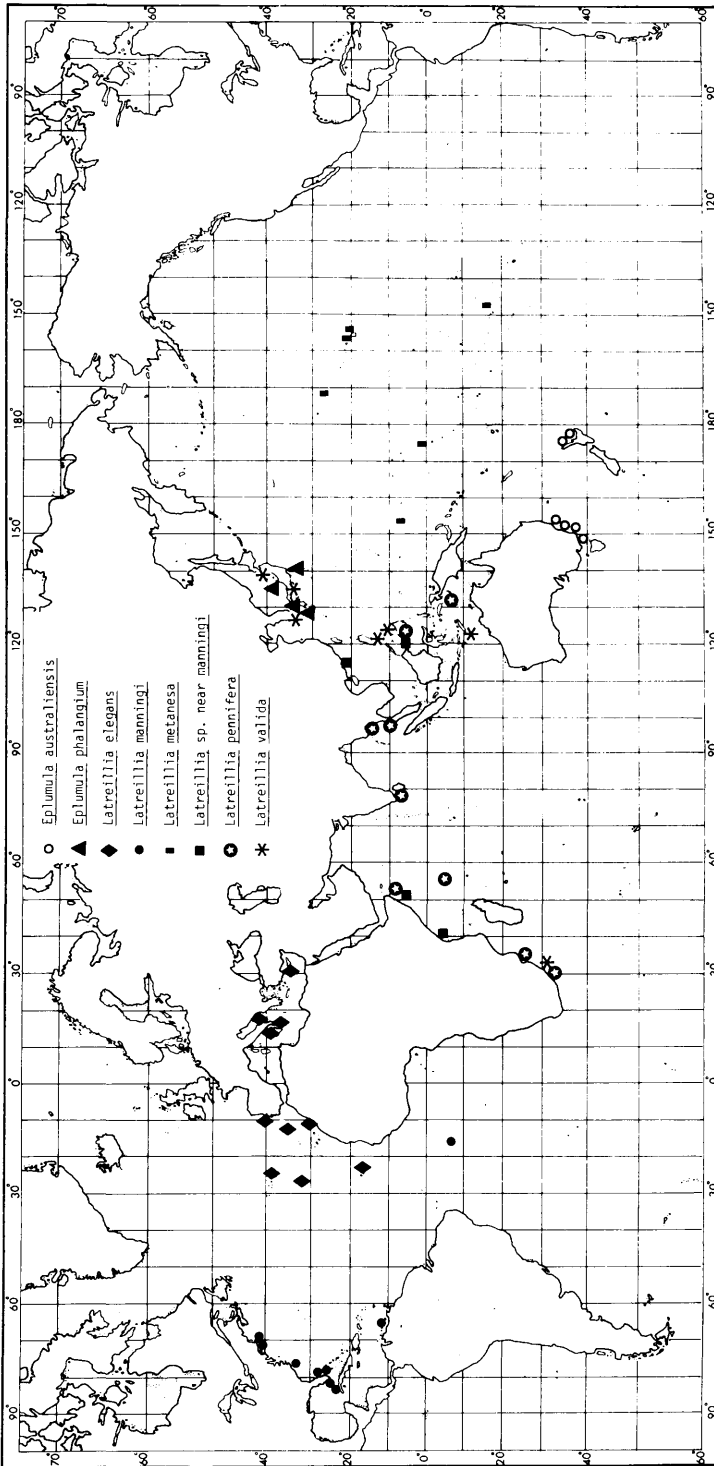


Fig. 8. Distribution of the species of *Eplumula* and *Latreillia*.



(SAKAI 1976); Cheju do (island) off South Korea (KIM 1973); Philippines; South China Sea; off Timor (IHLE 1913); southeast coast of Africa.

**Remarks.** - DE HAAN (1839) clearly shows the dactyl of the fifth leg trailing in his figure. Dactyls on walking legs of specimens examined may lack spinules on the flexor surface because they are worn.

**Table 1.** Measurements in mm for *Latreillia* species: ranges of variation for carapace dimensions; means, and standard deviations for fifth legs (not always associated with crab bodies), N = number of legs. Proportions of ♂ and ♀ coincide.

Species	Sex	Carapace			p 5		
		Length	Width	Neck length	Carpus	Propodus	Ip5
<i>L. elegans</i>	♂ (23)	6.5-14.3	5.0-8.8	3.0-5.3	N=27		
	♀ (15)	8.5-12.9	5.0-7.5	3.0-5.3	13.98 ± 2.12	8.50 ± 1.73	47.73 ± 6.18
<i>L. manningi</i>	♂ ( 9)	6.5-10.9	3.9-6.6	2.5-4.4	N=29		
	♀ ( 9)	8.25-12.25	5.6-7.25	3.6-5.0	11.03 ± 2.31	7.30 ± 2.03	38.48 ± 6.91
<i>L. metanesa</i>	♂ (12)	4.1-12	2.5-7.4		N=18		
	♀ ( 5)	9.5-14.8	5.4-9.0		10.0 ± 3.23	8.87 ± 3.04	39.19 ± 12.28
<i>L. sp. near manningi</i>	♂ ( 2)	7.25-7.5	4.0-4.5	3.1-3.25	N=5		
	♀ ( 4)	8.25-9.1	4.75-5.75	3.0-4.1	8.6 ± 1.02	5.7 ± 0.41	31.7 ± 12.2
<i>L. pennifera</i>	♂ ( 4)	6.75-10.4	6.75-10.4	2.25-3.9			
	♀ ( 5)	9.25-12.25	9.25-12.5	3.5-4.5			
<i>L. valida</i>	♂ ( 5)	7.6-12.1	7.6-12.1	2.25-3.6			
	♀ ( 5)	9.6-17.9	9.6-17.9	2.75-5.0			

**Table 2.** Comparison of selected carapace-pereopod length ratios of *Latreillia* specimens from eastern and western Atlantic regions, with results of tests of significance for difference between two sample means. Length measured characters: c = carpus; cm = carapace midline to base rostrum; i-m = ischio-merus; p = pereopod 2, 3, 4, or 5; pr = propodus. Sample ratios normalized by arcsine transformation: N = number;  $\bar{x}$  = mean;  $s^2$  = variance; DF = degrees of freedom. Ascension Island specimens excluded.

Ratio	Western Atlantic	Eastern Atlantic
(p5) pr/c	N = 27 $\bar{x}$ = 54.685 $s^2$ = 8.200 t = 4.086	N = 27 $\bar{x}$ = 51.322 $s^2$ = 10.270
	P < 0.001, 52 DF	
cm/c (p5)	N = 26 $\bar{x}$ = 68.477 $s^2$ = 94.215 t = 4.508	N = 27 $\bar{x}$ = 58.974 $s^2$ = 24.891
	P < 0.001, 51 DF	
cm/p5	N = 27 $\bar{x}$ = 29.463 $s^2$ = 2.733 t = 4.682	N = 27 $\bar{x}$ = 27.456 $s^2$ = 2.229
	P < 0.001, 52 DF	
cm/i-m (p2, 3, 4)	N = 47 $\bar{x}$ = 36.260 $s^2$ = 10.408 t = 6.424	N = 25 $\bar{x}$ = 31.62 $s^2$ = 4.879
	P < 0.001, 70 DF	

**Table 3.** Comparison of selected carapace-pereopod length ratios of *Latreillia* specimens from eastern and western Atlantic regions, and Ascension Island, with results of tests of significance between sample means. Sample ratios normalized by arcsine transformation. (For symbols see Table 2).

Ratio	Western Atlantic	Ascension Island	Eastern Atlantic
(p5) pr/c	(Table 2) t = 1.192	N = 2 $\bar{x}$ = 52.25 $s^2$ = 1.445 t = 0.402	(Table 2) P > 0.05, 27 DF
	P > 0.05, 27 DF		
cm/c(p5)	(Table 2) t = 1.055	N = 2 $\bar{x}$ = 75.85 $s^2$ = 1.805 t = 4.737	(Table 2) P < 0.001, 27 DF
	P > 0.05, 26 DF		
cm/1p5	(Table 2) t = 1.377	N = 2 $\bar{x}$ = 31.1 $s^2$ = 0.02 t = 3.393	(Table 2) P < 0.01, 27 DF
	P > 0.05, 27 DF		
cm/i-m(p2, 3, 4)	(Table 2) t = 1.660	N = 9 $\bar{x}$ = 38.333 $s^2$ = 19.725 t = 5.892	(Table 2) P < 0.001, 32 DF
	P > 0.05, 54 DF		

## LITERATURE CITED

- ADAMS A., and WHITE A., 1948 - Crustacea. Pages i-viii + 1-66, pls. 1-13 in A. Adams (ed.), 1850, *The zoology of the voyage of H.M.S. Samarang..... during the years 1843-1846*. Reebe, Benham, and Reeve, London.
- AIKAWA H., 1937 - Further notes on brachyuran larvae. *Records of Oceanographic Works in Japan*, 9 (1): 87-162.
- ALCOCK A., 1900 a - Natural history notes from the Royal Indian Marine Survey Ship 'Investigator', ... .. - Series III. No. 3. On some notable new and rare species of Crustacea. *Journal of the Asiatic Society of Bengal* 68, Pt. 2 (2) (for 1899):111-119, 1 pl.
- , 1900b - Materials for a carcinological fauna of India. N. 5. The Brachyura Primigenia or Dromiacea. *Journal of the Asiatic Society of Bengal*, 68, Pt. 2 (3) (for 1899): 123-169.
- , 1901 - *Catalogue of the Indian decapod Crustacea in the collection of the Indian Museum. Part. I. Brachyura. Fasc. I. Introduction and Dromides or Dromiacea (Brachyura Primigenia)*. Calcutta, ix + 80 pp., pls. A and 1-8.
- BALSS H., 1922 - Ostasiatische Decapoden. III. Die Dromiaceen, Oxystomen und Parthenopiden. *Archiv für Naturgeschichte*, 88 Abt. A (3): 104-140.
- , 1957 - Decapoda. VIII. Systematik. *Bronns Klassen und Ordnungen des Tierreichs*, 5, Abt. 1(7), Lf. 12:1505-1672.
- BARNARD K.H., 1926 - Report on a collection of Crustacea from Portugese East Africa. *Transactions of the Royal Society of South Africa*, 8 (2): 119-129, pls. 10-11.
- , 1947 - Descriptions of new species of South African decapod Crustacea, with notes on synonymy and new records. *Annals and Magazine of Natural History*, Ser. 11, 8 (for 1946) (13):361-392.
- , 1950 - Descriptive catalogue of South African decapod Crustacea (crabs and shrimps). *Annals of the South African Museum*, 38:1-837.
- BORRADAILE L.A., 1903 - Marine crustaceans. IX. The sponge crabs (Dromiacea), pages 574-578, pl. 33, in J. Stanley Gardiner (ed.), *The fauna and geography of the Maldive and Laccadive archipelagoes...*, 2 (1): 473-805, pls. 26-34.
- BOUVIER E.-L., 1896 - Sur l'origine homarienne des crabes: étude comparative des Dromiacés vivants et fossiles. *Bulletin de la Société Philomathique de Paris*, Ser. 8, 8:34-110.
- , 1922 - Observations complémentaires sur les Crustacés Décapodes (abstraction faite des Carides) provenant des campagnes de S.A.S. le Prince de Monaco. *Résultats des Campagnes Scientifiques .... Prince de Monaco*, 62:106 pp., 6 pls.
- , 1940 - Décapodes marcheurs. *Faune de France* 37:404 pp., 14 pls.
- CANÓ G., 1893 - Sviluppo dei dromidei. *Atti della Reale Accademia della Scienze Fisiche e Matematiche di Napoli*, Ser. 2, 4 (for 1894) (2):1-23, 2 pls.
- CARUS J.V., 1885 - *Prodromus Faunae Mediterraneae.... Vol. 1. Coelenterata, Echinodermata, Vermes, Arthropoda*. E. Schweizerbart'sche Verlagshandlung (E. Koch), Stuttgart:xii + 525 pp.
- CHACE F. A. JR., 1940 - Reports on the scientific results of the Atlantic expeditions to the West Indies, under the joint auspices of the University of Havana and Harvard University. The brachyuran crabs. *Torreia*, 4: 1-67.
- CHINA W.E. (ed.), 1966 - Official list of generic names in zoology. Second installment: names 1275-1651. *International Trust for Zoological Nomenclature, London*, xli-xliii, 201-267.
- DELL R.K., 1963 - Some deep-water crabs (Crustacea, Brachyura) from New Zealand. *Records of the Dominion Museum*, 4 (18):243-253.
- DOFLEIN F., 1902 - Ostasiatische Dekapoden. *Abhandlungen der Mathematische Physikalischen Klasse der Königlich Bayerischen Akademie der Wissenschaften*, Cl. 2, 21 (3): 613-670, pls. 1-6.
- EDMONDSON C.H., 1932 - A giant *Latreillopsis* from Hawaii. *Bernice P. Bishop Museum, Occasional Papers*, 9 (24):1-9.

- FROST N., 1936 - II. Decapod larvae from Newfoundland waters. *Newfoundland Department of Natural Resources, Division of Fishery Research. Reports: Faunistic Series No. 1. Research Bulletin No. 3*:11-24.
- GISTEL J., 1848 - *Naturgeschichte des Thierreichs, für höhere Schulen Stuttgart, Hoffmann'sche etc.*: xvi + 216, [4] pp., 32 col. pl.
- GORDON I., 1950 - Crustacea Dromiacea. Part I. Systematic account of the Dromiacea collected by the "John Murray" Expedition. Part II. The morphology of the spermatheca in certain Dromiacea. *The John Murray Expedition, 1933-34, Scientific Reports*, Vol. 9, Zoology and Botany, 201-253, 1 pl.
- GUINOT D., 1977 - Propositions pour une nouvelle classification des Crustacés Décapodes Brachyours. *Comptes Rendus Hebdomadaires des Séances de l'Académie des Sciences, Ser. D. Sciences Naturelles (Paris)*, 285 (10):1049-1052.
- , 1978 - Principes d'une classification évolutive des Crustacés Décapodes Brachyours. *Bulletin Biologique de la France et de la Belgique*, N.S. 112(3):211-292.
- HAAN W., de 1839 - Crustacea. Deca IV, sht. 19-27, pp. 73-108, pls. 25-32, G, H in Ph. Fr. de Siebold, *Fauna Japonica*, Leyden, (1833-1850).
- HAY W. P., and SHORE, C.A. 1918 - The decapod crustaceans of Beaufort, N.C., and the surrounding region. *Bulletin of the U.S. Bureau of Fisheries*, 35 (for 1915 and 1916): 369-475, pls. 25-39.
- HELLER C., 1863 - *Die Crustaceen des südlichen Europa. Crustacea Podophthalmia. Mit einer Übersicht über die horizontale Verbreitung sämtlicher europäischer Arten*. Wilhelm Braumüller, Wien: xi + 336 pp., pls. 1-10.
- HENDERSON J.R., 1888 - Report of the Anomura collected by H.M.S. *Challenger* during the years 1873-76. *Challenger Expedition, 1872-76. Report on the scientific results of the voyage of H.M.S. Challenger during the years 1873-76. Zoology*, 27(69): i-xi, 1-221, 21 pls.
- IHLE J.E.W., 1913 - Die Decapoda Brachyura der Siboga-Expedition. I. Dromiacea. *Siboga-Expedition Monographie 39b*, 96 pp., 4 pls.
- KARLOVAC O., 1952 - The first findings and occurrence of *Latreillia elegans* Roux in the Adriatic. *Acta Adriatica*, 4 (12): 1-10, 1 map.
- KIM HOON-SOO, 1966 - Unrecorded species of brachyuran decapods from Korea. *Sung Kyun Kwan University Journal*, 11:399-412, pls. 1-3. (Korean with English summary.)
- , 1970 - A checklist of the Anomura and Brachyura (Crustacea, Decapoda) of Korea. *Seoul National University Journal, Biology and Agriculture, Series (B)*, 21:1-34, pls. 1-5.
- , 1973 - *Hang guk tong-sik mul togam. (Illustrated encyclopedia of fauna & flora of Korea). Vol 14. Anomura-Brachyura*. Samhwa Publishing Company, Ltd., Seoul, 694 pp.
- , and BOON-JO RHO, 1971 - On the distribution of the benthic animals of Korean coastal seas. 1. Jeju Island region. *Korean National Committee, Report for the IBP*, No. 5:1-21.
- LEWINSOHN CH., and HOLTUIS L.B., 1964 - New records of decapod Crustacea from the Mediterranean coast of Israel and the eastern Mediterranean. *Zoologische Mededelingen, Rijksmuseum van Natuurlijke Historie te Leiden*, 40 (8): 45-63.
- LUCAS H., 1849 - Crustacés, Arachnides, Myriopodes et Hexapodes. *Exploration scientifique de l'Algérie pendant les années 1840, 1842. Sciences physiques. Zoologie i. Histoire naturelle des animaux articulés 1*:i-xxxv, 1-403.
- MANNING R. B., 1962 - A new species of *Parasquilla* (Stomatopoda) from the Gulf of Mexico, with a redescription of *Squilla ferussaci* Roux. *Crustaceana*, 4 (3): 180-190.
- MILNE EDWARDS A., and BOUVIER, E.-L., 1894 - Crustacés Décapodes provenant des campagnes du yacht l'Hirondelle (1886, 1887, 1888). *Résultats des Campagnes Scientifiques Prince de Monaco*, 7: 112 pp., 11 pls.
- , and —, 1899 - Crustacés Décapodes provenant des campagnes de l'Hirondelle (Supplement) et de la Princesse - Alice (1891-1897) *Résultats des Campagnes Scientifiques... Prince de Monaco*, 13:106 pp., 4 pls.
- , and —, 1900 - Crustacés Décapodes. Première partie. Brachyours et Anomures. *Expéditions Scienti-*

- fiques du Travailleur et du Talisman Pendant les Années 1880, 1881, 1882, 1883.* Masson et Cie, Paris, pp. 1-396, 32 pls.
- MILNE EDWARDS H., 1834 - *Histoire naturelle des Crustacés, comprenant l'anatomie, la physiologie et, la classification de ces animaux.* 1:i-xxxv, 1-468.
- MONOD TH., 1933 - Sur quelques Crustacés de l'Afrique occidentale. *Bulletin du Comité d'Etudes Historiques et Scientifiques de l'Afrique Occidentale Française*, 15 (2-3) (for 1932): 456-548.
- , 1956 - Hippidea et Brachyura ouest-africains. *Mémoires de l'Institut Français d'Afrique Noire*, 45:1-674.
- NUNES-RUIVO L., 1961 - Crustacea Decapoda (I - Galatheidea et Brachyura). *Résultats Scientifiques de la Campagne du N.R.P. "Faial" dans les Eaux Cotière du Portugal 1957*, 4:1-36, 2 pls.
- ORTMANN A., 1892 - Die Decapoden-Krebse des Strassburger Museums... V Theil. Die Abtheilungen Hippidea, Dromiidea und Oxystomata. *Zoologische Jahrbücher. Abtheilung für Systematik, Geographie und Biologie der Thiere*, 6:532-588, pl. 26.
- , 1898 - Gliederfüssler: Arthropoda. *Bronn's Klassen und Ordnungen des Thier-Reichs*, Bd. 5, Abt. 2, Lf. 50-52: 1121-1168.
- PARISI B., 1915 - I decapodi giapponesi del Museo di Milano. II. Dromiacea. *Atti della Società Italiana di Scienze Naturali*, 54:102-116 [5-19], pls. 2-3.
- POWERS L.W., 1977 - A catalogue and bibliography to the crabs (Brachyura) of the Gulf of Mexico. *Contributions in Marine Science*, 20 (Supplement): 190 pp.
- RATHBUN M. J., 1911 - Marine Brachyura. In The Percy Sladen Trust Expedition to the Indian Ocean in 1905, under the leadership of Mr. J. Stanley Gardiner 3 (11). *Transactions of the Linnean Society of London*, 14 (2):191-261, pls. 15-20.
- , 1923 - Report on the crabs obtained by the F.I.S. "Endeavour" on the coasts of Queensland, New South Wales, Victoria, South Australia and Tasmania. *Biological Results of the Fishing Experiments carried on by the F.I.S. "Endeavour" 1909-14*, 5 (3):95-156, pls. 16-42.
- , 1937 - The oxystomatous and allied crabs of America. *United States National Museum Bulletin*, 166:i-vi, 1-278, 86 pls.
- ROUX P., 1828 - *Crustacés de la Méditerranée et de son littoral.* pp. i-iv, 1-176 (unnumbered), pls. 1-45 Paris, Marseille. [Pub. in 9 parts, see R.B. Manning, 1962, *Crustaceana* 4 (3): 180-190].
- SAKAI T., 1934 - Brachyura from the coast of Kyusyu, Japan. *Science Reports of the Tokyo Bunrika Daigaku*, Sect. B, 1(25):281-330.
- , 1936 - *Crabs of Japan. 66 plates in life colors with descriptions.* Sansendo Co., Ltd., Tokyo, 239 pp. (Text in Japanese).
- , 1936a - Studies on the crabs of Japan. I. Dromicea. *Science Reports of the Tokyo Bunrika Daigaku*, Sect., B, 2 (Supplement No. 1): 1-66, pls. 1-9.
- , 1965 - *The crabs of Sagami Bay.* East-West Center Press, Honolulu, Hawaii, pp. i-xvi, 1-200 (English text), pls. 1-100 (colored), pp. 1-32 (Bibliography and indexes).
- , 1976 - *Crabs of Japan and the adjacent seas.* Kodansha Ltd., Tokyo, 773 pp. (English text), pls. 1-251 (many colored), 461 pp. (Japanese text), [3 vols.].
- SERENE R., 1968 - The Brachyura of the Indo-West Pacific Region. Prodomus for a check list of the (non-planktonic) marine fauna of south east Asia. (Indo-Pacific brachyurans). *UNESCO, Fourth Meeting of Marine Sciences*, Singapore, 1-4:33-112.
- , and LOHAVANIJAYA P., 1973 - The Brachyura (Crustacea: Decapoda) collected by the Naga Expedition, including a review of the Homolidae. *Naga Report*, 4 (4):187 pp., 186 figs., 21 pls.
- SIMPSON G.G., ROE A., and LEWONTIN R.C., 1960 - *Quantitative zoology*, Rev. ed. Harcourt, Brace & World, Inc., New York: vii + 440 pp.
- SMITH S.I., 1881 - Preliminary notice of the Crustacea dredged, in 64 to 325 fathoms, off the south coast of New England, by the United States Fish Commission in 1880. *Proceedings of the United States National Museum*, 3:413-452.
- , 1883 - Preliminary report on the Brachyura and Anomura dredged in deep water off the south coast

- of New England by the United States Fish Commission in 1880, 1881, and 1882. Proceedings of the United States National Museum, 6 (1): 1-57, pls. 1-6.
- , 1884 - Report on the decapod Crustacea of the Albatross dredgings off the east coast of the United States in 1883. *United States Commission of Fish and Fisheries. Part X. Report of the Commissioner for 1882*: 345-424 [1-82], pls. 1-10.
- , 1887 - Report on the decapod Crustacea of the Albatross dredgings off the east coast of the United States during the summer and autumn of 1884. *United States Commission of Fish and Fisheries. Part XIII. Report of the Commissioner for 1885*: 605-705 [1-101], pls. 1-22.
- STEBBING T.R.R., 1902 - South African Crustacea. Part II. *Marine Investigations in South Africa, Department of Agriculture, Cape Town*, 12:1-92, pls. 5-16.
- , 1910 - General catalogue of South African Crustacea. (Part V of S.A. Crustacea, for the Marine Investigations in South Africa). *Annals of the South African Museum*, 6 (4):281-593, pls. 15-22.
- , 1914 - Stalk-eyed Crustacea Malacostraca of the Scottish National Antarctic Expedition. *Transactions of the Royal Society of Edinburgh*, 50, Pt. 2 (9): 253-307, pls. 23-32.
- STIMPSON, W., 1858 - Prodrromus descriptionis animalium evertibratorum, quae in Expeditione ad Oceanum Pacificum Septentrionalem, a Republica Federata missa.... observavit et descripsit. Pars VII. Crustacea Anomura. *Proceedings of the Academy of Natural Sciences of Philadelphia*, 10: 225-252 [63-90].
- TÜRKAY M., 1976 - Decapoda Reptantia von der portugiesischen und morokkanischen Küste Auswertung der Fahrten 8, 9c (1967), 19 (1970), 23 (1971) und 36 (1975) von F.S. "Meteor". "Meteor" *Forschungs-ergebnisse*, Reihe D, No. 23:23-44.
- URITA T., 1926 - A check list of Brachyura found in Kagoshima Pref., Japan. *The Tsingtao Times*, Tsingtao, pp. 1-40. (Not seen).
- WHITELEGGE T., 1900 - Scientific results of the trawling expedition of H.M.C.S. "Thetis", off the coast of New South Wales in February and March, 1898. Crustacea, Pt. 1. *Australian Museum, Memoir*, 4:135-199, pls. 32-35.
- WILLIAMS A.B., MCCLOSKEY L.R., and GRAY I.E., 1968 - New records of brachyuran decapod crustaceans from the continental shelf off North Carolina, U.S.A. *Crustaceana*, 15 (1): 41-66.
- WILLIAMSON D. I., 1965 - Some larval stages of three Australian crabs belonging to the families Homolidae and Raninidae, and observations on the affinities of these families (Crustacea: Decapoda). *Australian Journal of Marine and Freshwater Research*, 16 (3):369-398.
- , 1967 - The megalopa stage of the homolid crab *Latreillia australiensis* Henderson and comments on other homolid megalopas. *The Australian Zoologist*, 14 (2):206-211.
- WRIGHT C.W., and COLLINS J.S.H., 1972 - British Cretaceous crabs. *Paleontographical Society Monographs*, London, pp. 1-114, pls. 1-22. [Pub. No. 533, issued as part of Vol. 126 for 1972.]
- YOKOYA YU., 1933 - On the distribution of decapod crustaceans inhabiting the continental shelf around Japan, chiefly based upon the materials collected by S.S. Sōyō-Marū, during the year 1923-1930. *Journal of the College of Agriculture, Tokyo Imperial University*, 12 (1):1-226.
- ZAR J.H., 1974 - *Biostatistical analysis*. Prentice-Hall, Inc., Englewood Cliffs, New Jersey: xiv + 620 pp.
- ZARIQUIEY ALVAREZ R., 1968 - Crustáceos Decápodos Ibéricos. *Investigación Pesquera*, Barcelona, 32:xi + 510 pp.