

**Notes on the genus *Ethusa* Roux, 1828,
and description of *Ethusa steyaerti* n. sp.
(Crustacea, Decapoda, Dorippidae),
from the continental shelf of the Gulf of California, Mexico**

by Michel E. HENDRICKX

Abstract. On the basis of the morphology of male pleopods, two American *Ethusa* Roux formerly recognized as subspecies of *Ethusa mascarone* (Herbst) from the Mediterranean, are given species rank : *E. americana* A. Milne Edwards, from the west Atlantic and *E. panamensis* Finnegan from the east Pacific. During trawling operations on the continental shelf of the Gulf of California, México, numerous specimens of *E. lata* Rathbun and *E. ciliatifrons* Faxon were collected. A new species of *Ethusa* was also found at two localities in the Central Gulf and represents the fourth species of *Ethusa* known for the eastern Pacific.

Résumé. L'examen détaillé des pléopodes mâles de deux *Ethusa* Roux américaines, désignées jusqu'à ce jour comme sous-espèces de *Ethusa mascarone* (Herbst) de la Méditerranée, permet de leur donner le rang d'espèce : *E. americana* A. Milne Edwards, de l'Atlantique ouest, et *E. panamensis* Finnegan, du Pacifique est. D'autre part, des chalutages réalisés le long de la plate-forme continentale du golfe de Californie, Mexique, ont permis de récolter de nombreux spécimens d'*Ethusa*, y compris deux espèces connues, *E. lata* Rathbun et *E. ciliatifrons* Faxon, et une nouvelle espèce capturée dans deux localités du Golfe central. Celle-ci est décrite et représente donc la quatrième espèce du genre connue pour les côtes du Pacifique est.

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Three species of *Ethusa* Roux, 1830, are currently recognized along the Pacific coast of America. Two of these, *Ethusa lata* Rathbun, 1893, known from Baja California (west coast) and the Upper Gulf of California to Tumbes, Peru, and *Ethusa ciliatifrons* Faxon, 1893, known from the Central Gulf of California to Paita, Peru (GARTH, 1960; DEL SOLAR *et al.*, 1970), are relatively well defined and illustrated (see FAXON, 1895; RATHBUN, 1937). The third species has been referred to in earlier literature as *Ethusa mascarone americana* A. Milne Edwards, 1880 (Atlantic and Pacific Oceans), and as *E. m. panamensis* Finnegan, 1931 (Pacific Ocean) (CRANE, 1937; RATHBUN, 1937; GARTH, 1948; 1960; 1966).

During sampling activities on the continental platform of the Gulf of California, México, aboard the research vessel "El Puma" of the Universidad Nacional Autonoma de México (SIPCO and CORTES Cruises; see HENDRICKX, 1986), a large series of specimens of *Ethusa* was collected using semi-commercial otter-trawls. This material included the largest specimens

of *E. ciliatifrons* ever collected so far and a large number of specimens of *E. lata*. Although *Ethusa mascarone* subssp. sensu Rathbun (1917) were not collected during this survey, the author had the opportunity to examine specimens of both *E. m. americana* and *E. m. panamensis* held at the Smithsonian Institution (USNM), Washington, and at the Allan Hancock Foundation (AHF), Los Angeles (including specimens identified or examined by M. J. RATHBUN) and to compare them to material of *E. mascarone* (Herbst) from the Mediterranean and to a type-series of *E. vossi* Manning and Holthuis, 1981. Indeed, all records of *E. mascarone* (Herbst, 1785) from the west coast of Africa (except Canary and Cape Verde Islands and Mauritania, which are doubtful) correspond to *E. vossi* (distributed from Senegal to Angola), a species closely allied to *E. mascarone* but with a distinct male first pleopod, male telson and exorbital teeth (see MANNING and HOLTHUIS, 1981 : 41). EXCEPT FOR THE DOUBTFUL RECORDS MENTIONED HEREBOVE, *E. mascarone* emend. is known only from the Mediterranean and as it will be seen herein, the American records of this species should be referred to *E. americana* and *E. panamensis*, the former species being restricted to the Atlantic coast.

Among the specimens of *Ethusa* that were collected during the Gulf of California survey, several crabs could be separated from the rest for their distinctive coloration. A comparative analysis of their external morphology and pleopods with types of both *E. lata* and *E. ciliatifrons* and with specimens of *E. americana* and *E. panamensis* demonstrated that they belonged to a new species closely resembling *E. microphthalmia* Smith, 1881, from the Atlantic.

***Ethusa lata* Rathbun, 1893**

(Fig. 1 E-G)

Ethusa lata Rathbun, 1893 : 258; 1898b : 615; 1937 : 84, fig. 19, pl. 24, fig. 1, pl. 25, fig. 1, pl. 28, fig. 3. CRANE, 1937 : 105. — GARTH, 1946 : 352, pl. 60, fig. 3; 1948 : 17; 1960 : 121; 1966 : 6.

DEL SOLAR *et al.*, 1970 : 25. — CHIRICHIGNO, 1970 : 39, fig. 78.

Aethusa pubescens Faxon, 1893 : 160.

Aethusa lata : FAXON, 1895 : 35, pl. 6, fig. 1, 1a, 1b.

MATERIAL EXAMINED. — Velero III, station 212, 10-II-1934, La Plata Island, Ecuador, trawling at 80-90 m. shale rock, RATHBUN det. *Ethusa lata*, 1 ♀ (USNM 69178). — Albatross, station 2803, 30-III-1888, 8°27' N-79°35' W, Bay of Panama, trawling at 47 m, green mud, RATHBUN det. *Ethusa lata*, 1 ♂ (USNM 22145). — Albatross, station 2805, 30-III-1888, 7°56' N-79°41'36" W, Bay of Panama, trawling at 93 m, green mud, RATHBUN det. *Ethusa lata*, 1 ♀ (USNM 22146). — Albatross, station 3031, 27-III-1889, 31°06'45" N-114°28'15" W, off San Felipe Bay, Baja California, Mexico, trawling at 60 m, brown mud, 1 ♂ holotype, c.w. 14.5 mm (USNM 17483). — SIPCO I Cruise, station A2, 23-IV-1981, 22°17' N-106°11' W, off Teacapan, Sinaloa, Mexico, trawling at 61 m, mud, 5 ♂ c.w. 9.7-22.0 mm, 1 ♀ c.w. 14.3 mm (EMU-2625). — SIPCO I Cruise, station P1, 21-IV-1981, 23°06' N-106°30' W, off Mazatlan, Sinaloa, Mexico, trawling at 30 m, sand, 1 ♂ 18.7 × 21.1 mm and 1 ♀ 17.3 × 19.5 mm (MP-B 20897). — SIPCO I Cruise, station C1, 24-IV-81, 23°37'30" N-106°56' W, off Punta Piaxtla, Sinaloa, Mexico, trawling at 40 m, sand, 6 ♂ c.w. 11.7 — 14.5 mm (EMU-2626). — CORTES I Cruise, station 3, 3-V-1982, 25°03' N-108°31'30" W, off Bahia Santa Maria, Sinaloa, Mexico, trawling at 28 m, sand, 2 ♂ c.w. 10.3 mm (EMU-2627A). — CORTES 2 Cruise, station 4, 10-III-1985, 24°57' N-108°44' W, off Bahia Santa Maria, Sinaloa, Mexico, trawling at 61-67 m, 1 ♀ ovig. c.w. 14.5 mm (EMU-2627B). — CORTES I Cruise, station 51, 12-V-1982, 25°39' N-109°31' W, off Rio Fuerte, Sinaloa, Mexico, trawling at 56 m, mud, 1 ♂ 19.5 × 21.0 mm (EMU-2624). — CORTES 2 Cruise, station 49B, 19-III-1985, 26°59' N-111°53'30" W, off Bahia Santa Inés, Baja California, Mexico, trawling at 68 m, mud, 2 ♂ c.w. 17.7-21.6 mm, 1 ♀ c.w.

18.9 mm, and 1 ♀ ovig. c.w. 18.7 mm (EMU-2629). — CORTES 1 Cruise, station 21, 6-V-1982, 28°08'30" N-112°42'30" W, off Cabo San Miguel, Baja California, Mexico, trawling at 102-110 m, sand, 12 ♂ c.w. 7.4-19.2 mm, 14 ♀ c.w. 6.7-16.6 mm (EMU-2628A). — CORTES 3 Cruise, station 21, 1-VIII-1985, 28°09'30" N-112°42' W, off Cabo San Miguel, Baja California, Mexico, trawling at 115 m, sand, 2 ♂ c.w. 14.5-18.6 mm (EMU-2628B). — CORTES 1 Cruise, station 47, 11-V-1982, 28°17' N-111°31'30" W, off Estero Tastiota, Sonora, Mexico, trawling at 49 m, sand, 1 ♀ ovig. c.w. 13.2 mm (EMU-2630). Albatross, station 2834, 3-V-1888, 26°14' N-113°13' W, off Abreojos Point, west coast of Baja California, Mexico, trawling at 88 m, yellow mud, RATHBUN det. *Ethusa lata* 5 ♂ (USNM 22150).

REMARKS

The male pleopods of *E. lata* had never been illustrated. The first one is similar in shape to the first pleopod of *E. steyaerti* sp. nov. (fig. 1 A), but the tip is distinct (fig. 1 E) and the constricted distal part is shorter (fig. 1 F). The second pleopod of *E. lata* is long and flagelliform, with a distal segment much longer than the proximal (fig. 1 G).

Environmental conditions at the sampling stations in the Gulf of California were as follows: trawling depth of 28 to 115 m; sandy (72 to 100 %) bottom in most cases, with two captures on muddy (71 to 74 % silt-clay) bottom; water temperature (13.2 to 19.2 °C) and dissolved oxygen concentration (0.44 to 3.1 ml/l 02/1) variable.

DISTRIBUTION. — *Ethusa lata* has been recorded from Isla Cedros, on the west coast of Baja California, and throughout the Gulf of California, south to Tumbes, Peru; Isla Cocos, Costa Rica and Islas Galapagos (RATHBUN, 1937; GARTH, 1966; DEL SOLAR *et al.*, 1970).

COLOUR. — Carapace brownish-grey. Meri of pereopods 2-3 carnation with a distal and a proximal band of brownish-purple; other distal segments violet, with a white spot distally and proximally. Major cheliped brownish-carmine, with some dark orange distally; ventral side of merus carnation.

Ethusa ciliatifrons Faxon, 1893

(Fig. 1 H-L)

Aethusa ciliatifrons Faxon, 1893 : 159; 1895 : 34, pl. 5, figs. 3, 3a, 3b.

Ethusa ciliatifrons : RATHBUN, 1937 : 88, fig. 20, pl. 24, fig. 2, pl. 25, fig. 2, pl. 28, fig. 4. GARTH, 1960 : 121; 1966 : 6. — DEL SOLAR *et al.*, 1970 : 25.

MATERIAL EXAMINED. — Albatross, station 3391, 9-III-1891, 7°33'40" N-79°43'20" W, Bay of Panama, trawling at 275 m, green mud, syntype ♂ 26.4 × 29.3 mm (USNM 20630). — SIPCO 1 Cruise, station C2, 24-IV-1981, 23°37' N-106°56' W, off Punta Piaxtla, Sinaloa, Mexico, trawling at 66 m, mud, 2 ♂ c.w. 16.1 mm, 2 ♀ c.w. 21.5-38.5 mm, 1 ♀ ovig. c.w. 33.5 mm (EMU-2631). — CORTES 2 Cruise, station 4, 10-III-1985, 24°57' N-108°44' W, off Bahía Santa María, Sinaloa, Mexico, trawling at 61-67 m, sand, 1 ♂ c.w. 37.3 mm (EMU-2632). — CORTES 2 Cruise, station 16, 12-III-1985, 25°53' N-110°03'30" W, off Punta Arboleda, Sonora, Mexico, trawling at 24 m, sand, 1 ♂ c.w. 6.8 mm (EMU-2633). — CORTES 3 Cruise, station 50, 8-VIII-1985, 25°48' N-109°37' W, off Río Fuerte, Sinaloa, Mexico, trawling at 98 m, 1 ♂ c.w. 54.0 mm (MP-B 20821); 6 ♂ c.w. 46.0-60.2 mm, 2 ♀ c.w. 43.6-45.3 mm (EMU-2634).

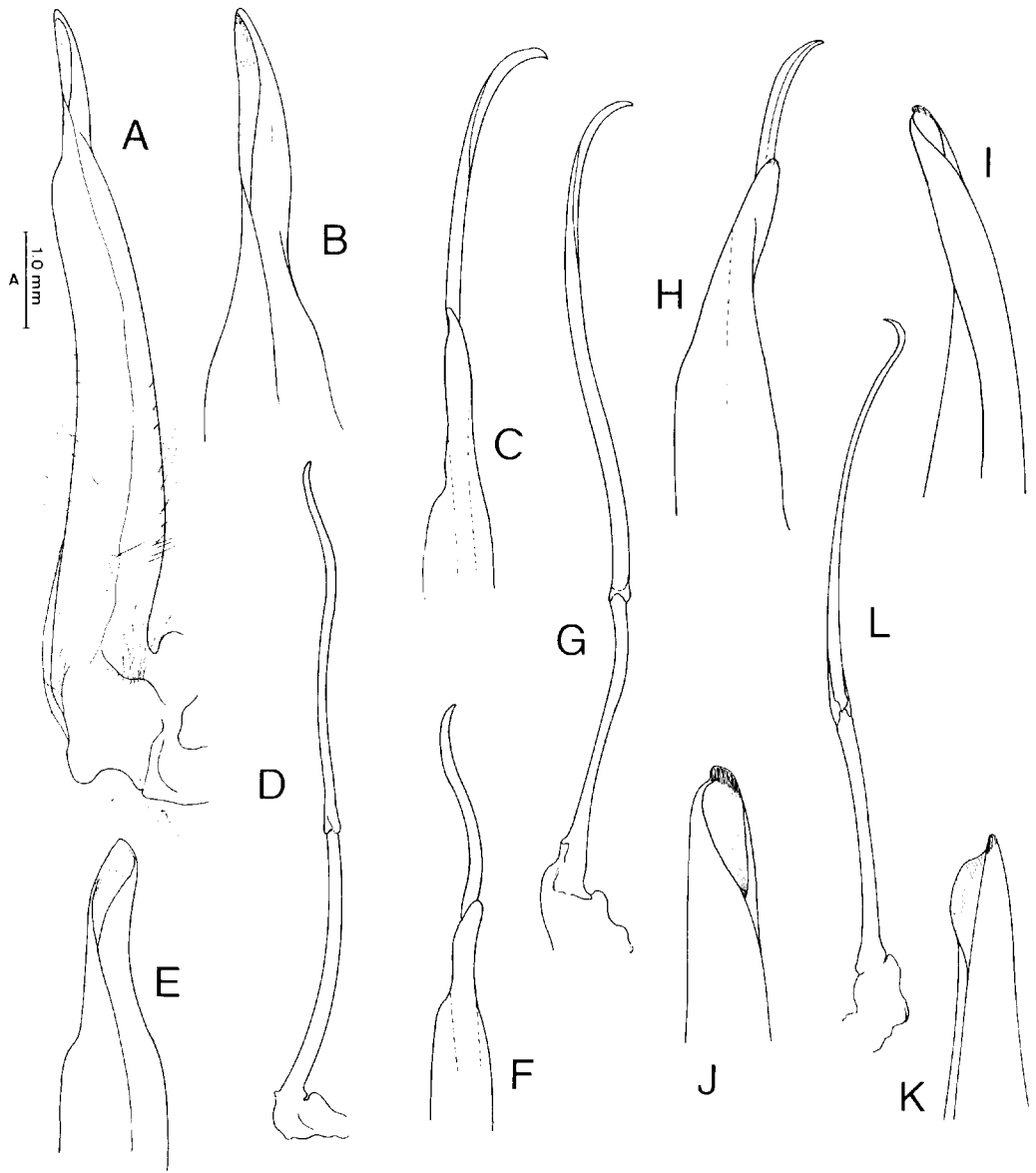


FIG. 1. — Male first and second pleopods of species of *Ethusa* Roux : A-D, *E. steyaerti* sp. nov., holotype ♂ 19.7 × 19.8 mm (MP-B 20876) : A, pl. 1 ; B, tip of pl. 1 ; C, pl. 2 inserted in pl. 1, tip ; D, pl. 2. — E-G, *E. lata* Rathbun, ♂ 21.0 mm c.w., Gulf of California (EMU-2624) : E, tip of pl. 1 ; F, pl. 2 inserted in pl. 1, tip ; G, pl. 2. — H-L, *E. ciliatifrons* Faxon, ♂ 54.0 mm c.w., Gulf of California (MP-B 20821) : H, pl. 2 inserted in pl. 1, tip ; I-K, tip of pl. 1 ; L, pl. 2.

REMARKS

As in *E. lata*, the male pleopods of *E. ciliatifrons* had never been illustrated. Here again, the shape of the first pleopod is similar to the shape of the pleopod of *E. steyaerti* sp. nov. (fig. 1 A), but the constricted distal part is deflexed and twisted (fig. 1 H), and the tip is corneous (fig. 1 I-K). The second pleopod of *E. ciliatifrons* is long and flagelliform, with a slender, curved extremity and a relatively long distal segment (fig. 1 L).

Some of the specimens of *E. ciliatifrons* collected during this survey are considerably larger than the largest male and female taken previously. Species of *Ethusa* are known for their small to medium size, and the carapace widths of the largest male (c.w. 60.2 mm) and female (c.w. 45.3 mm) collected off the coast of Sinaloa are rather astonishing.

All the specimens examined, including the small male of c.w. 16.1 mm, have the branchial regions strongly inflated and meeting on the median line. The heterochely of the adult male, strongly marked in specimens of c.w. 37.3-60.2 mm, had never been reported heretofore.

Environmental conditions at the sampling stations in the Gulf of California were as follows : trawling depth of 24 to 90 m; sandy (77 to 92 % sand) and muddy (51 to 90 % silt-clay) bottom; water temperature (13.2 to 17.4° C) and dissolved oxygen concentration (0.77 to 2.0 ml O₂/l) variable.

DISTRIBUTION. Including the present records, *E. ciliatifrons* is known from off Rio Fuerte, Sinaloa, on the east coast of the Gulf of California, south to Paita, Peru (GARTH, 1966; DEL SOLAR *et al.*, 1970).

COLOUR. — Carapace brownish-grey. Pereiopods 2-3 white with red transverse bands; two bands on merus and one on the other distal segments. Major cheliped of male brownish-red, lighter on the ventral side.

Ethusa panamensis Finnegan, 1931

(Fig. 2 A-C)

Ethusa mascarone americana : RATHBUN, 1898b : 615; 1937 : 78 (in part, the material from western Mexico; not the western Atlantic records, = *E. americana* A. Milne Edwards), pl. 22, fig. 2, pl. 23, fig. 2 (a male specimen, USNM 66829 ex. GLASSELL collection, from Isla Tiburon, Gulf of California, Mexico). — CRANE, 1937 : 105. GARTH, 1948 : 17; 1960 : 121.

Ethusa americana : A. MILNE EDWARDS and BOUVIER, 1902 : 67 (in part, the eastern Pacific records; not pl. XIII, figs. 1-4 = *E. americana* A. Milne Edwards, 1880).

Ethusa mascarone var. *americana* : FINNEGAN, 1931 : 615.

Ethusa mascarone var. *panamensis* Finnegan, 1931 : 616.

Ethusa mascarone panamensis : RATHBUN, 1937 : 79, pl. 22, fig. 1, pl. 23, fig. 1 (an ovigerous female, USNM 66797, from shore of Panama, Panama). GARTH, 1960 : 121; 1966 : 5.

MATERIAL EXAMINED. — North of Punta Santa Elena, La Libertad, Ecuador, 9-II-1934, RATHBUN det. *Ethusa mascarone panamensis*, 1 juv. 4.7 × 4.0 mm (AHF, "Velero III", station 209-34). — Bahia Honda, Panama, 10-I-1933, RATHBUN, det. *Ethusa mascarone panamensis*, 1 ♂ 6.1 × 5.4 mm (USNM 69191). — Secas Island, Panama, 5-II-1935, RATHBUN det. *Ethusa mascarone panamensis*, 1 ♂ 6.1 × 5.3 mm and 1 ♀ 7.5 × 6.6 mm (AHF "Velero III", station 448-35). — Perlas Islands and Chame Point, Panama, January 1934, RATHBUN det. *Ethusa mascarone panamensis*, 1 ♀ 12.0 × 11.0 mm (USNM

69406). Puerto Culebra, Costa Rica, 25-II-1934, RATHBUN det. *Ethusa mascarone panamensis*, 4 ♂ 6.6 × 6.0 mm, 7.4 × 6.8 mm, 6.5 × 5.8 mm and 5.8 × 5.2 mm and 3 ♀ 11.6 × damaged, 4.0 × 3.6 mm and 5.1 × 4.0 mm (USNM 69190). Isabel Island, Nayarit, Mexico, 8-III-1938, det. *Ethusa mascarone panamensis*, 1 ♀ ovig. 9.7 × 8.5 mm (AHF "Velero III", station 870-38). -- Isabel Island, Nayarit, Mexico, 5-III-1934, RATHBUN det. *Ethusa mascarone panamensis*, 1 ♂ 9.6 × 8.5 mm (USNM 69188). Maria Madre Island, Nayarit, Mexico, date unknown, det. *Ethusa mascarone americana*, 1 ♂ 7.3 × 6.3 mm (USNM 97702, ex. Calif. Acad. Sci.). -- Angeles Bay, Baja California, Mexico, 20.III.1937, det. *Ethusa mascarone americana*, 1 ♂ 8.4 × 7.2 mm (AHF, "Velero III", station 702-37). Puerto Refugio Bay, West side Mexico, 27-I-1940, GARTH det. *Ethusa mascarone americana*, 1 ♀ 10.4 × 9.3 mm (AHF, "Velero III", station 1051-40). North of Angel de la Guardia Island, Baja California, Mexico, 5-III-1936, 1 ♂ 7.2 × 6.6 mm and 1 ♀ 7.3 × 6.5 mm (AHF, "Velero III", station 546-36).

REMARKS

In 1880, on the basis of two male specimens dredged off the coast of Florida by the U.S. Coast Survey Steamer "Blake", A. MILNE EDWARDS described a new species of *Ethusa* Roux, *E. americana*, which in his opinion closely resemble *E. mascarone* (Herbst) from the Mediterranean yet was sufficiently distinct from it as to be considered another species. The description by A. MILNE EDWARDS was short and no illustration were provided.

In 1897, M. J. RATHBUN, published a preliminary note on the American species of *Ethusa*, including the description of a new species, *E. tenuipes*, and a short statement indicating that she was considering *E. americana* as a "... form so slightly different..." from the Mediterranean *E. mascarone* that the former could not be regarded as more than a subspecies, *E. mascarone americana* (RATHBUN, 1897).

The same year BOUVIER (1896, published in 1897) published a revision of the Dorippidae in which he listed the eleven species of *Ethusa* known to him, including *E. tenuipes* (a fact that demonstrated he knew about RATHBUN's 1897 paper) and *E. mascarone* (... "des Antilles à l'Atlantique Oriental et la Méditerranée"...), but not *E. americana*, thus following RATHBUN's opinion about A. MILNE EDWARDS species.

The next two records of *E. mascarone americana* are both by M. J. RATHBUN : first, off Key West, Florida (RATHBUN, 1898a) and second off Cape St. Lucas, Baja California, on the Pacific coast of Mexico (RATHBUN, 1898b).

It is in 1902 that A. MILNE EDWARDS and BOUVIER provided the first illustration of the species using one of the two syntypes that was held at the Muséum national d'Histoire naturelle, Paris¹ (MILNE EDWARDS and BOUVIER, 1902 : 67, pl. xiii, figs. 1-4). The result of their work, which emphasized the differences existing between *E. mascarone*, the Mediterranean species, and their American material, led them to conclude that *E. americana* was indeed a valid species and not a mere subspecies of *E. mascarone* as claimed by RATHBUN (1897; 1898a, b).

Until today, however, American authors have followed RATHBUN's position. A third subspecies, *E. mascarone panamensis*, was even added by FINNEGAN (1931) on the basis of material collected in the Bay of Panama and reported since from Western Mexico (northernmost distribution limit in the southeastern Gulf of California) to Ecuador (RATHBUN, 1937; CRANE, 1937; GARTH, 1960, 1966). During the same period of time, *E. mascarone americana* was again reported from the Pacific coast of America by FINNEGAN (1931).

1. A search at the Muséum in Paris was unsuccessful in locating this syntype.

RATHBUN (1937), CRANE (1937) and GARTH (1948; 1960), extending the known range of the Pacific population of this subspecies from the Northern Gulf of California to Ecuador. The overlap of the Pacific distribution of the two American subspecies of *E. mascarone*, as recognized by these authors, and the fact that one of these subspecies (i.e. *E. mascarone americana*) was present on both sides of the continent apparently did not draw their attention, except for GARTH (1966 : 5) who observed that the characters used by FINNEGAN (1931) to distinguish two subspecies of *E. mascarone* in the eastern Pacific were not satisfactory and who suggested either to recognize only one subspecies in this region or to redefine the two on the basis of better characters.

Since its original description by HERBST (1785 : 191, pl. XI, fig. 62, as *Cancer mascarone*), *E. mascarone* (the nominal subspecies *E. mascarone mascarone* sensu Rathbun) had also been reported from Senegal to Angola, but these records corresponded in fact to a species endemic to tropical west Africa, *E. vossi*, recently described by MANNING and HOLTHUIS (1981) who concluded that *E. mascarone* sensu Herbst was restricted to the Mediterranean with only a few possible records in Mauritania, the Cape Verde and Canary Islands that would need confirmation. They did not, however, reexamine the case of the American subspecies of *mascarone*.

During our study of the species of *Ethusa* from the eastern Pacific, we were able to examine part of the material held at the National Museum of Natural History (USNM), Washington, and at the Allan Hancock Foundation (AHF), Los Angeles, including :

— a series of specimens labeled *Ethusa mascarone americana* from the east coast of America (table 1) and cited by RATHBUN (1937 : table 22) as part of the material she examined in her monograph on the Oxystomatous crabs of America;

— a series of specimens labeled *E. mascarone americana* and *E. mascarone panamensis* from the west coast of America (see under material examined), part of which had also been examined by RATHBUN (1937 : table 22 and 23).

TABLE 1. — Specimens of *Ethusa americana* H. Milne Edwards, 1880, from the Western Atlantic examined during the present study (USNM = National Museum of Natural History, Smithsonian Institution).

LOCALITY	REFERENCE	
S.W. of Cape San Blas, Florida, 7/II/1885 "Albatross" st. 2372)	USNM 17881	1 ♂ det. <i>Ethusa mascarone</i> *
St. Thomas, 6/II/1899 ("Fish Hawk" st. 6079)	USNM 24517	1 ♀ det. <i>Ethusa mascarone americana</i> **
Anclote Station, Florida, 28/III/1901 ("Fish Hawk" st. 7106)	USNM 25605	1 ♂ det. <i>Ethusa mascarone americana</i> ** (pleopods figured herein)
Off Cedar Keys, Florida, 11/I/1913 ("Fish Hawk" st. 7807)	USNM 66802	1 ♀ RATHBUN det. <i>Ethusa mascarone americana</i>

* *Ethusa mascarone americana*, fide RATHBUN, 1937 : table 22.

** Material examined by RATHBUN (1937) and cited as such.

These specimens were compared with a type-series of *E. vossi* kept at the Rijkmuseum van Natuurlijke Historie, Leiden (RMNH-31538, 1 ♂, holotype; RMNH-27165, 6 ♂ and 11 ♀, paratypes; RMNH-27167, 2 ♂ and 2 ♀, paratypes) and to specimens of *E. mascarone* held at the Muséum national d'Histoire naturelle, Paris (MP-B 20620, ex B4098S, 1 ♂, Méditerranée; MP-B 13593, 6 ♀, Monaco). Special attention was given to the shape of the first and second pleopods of these species (see fig. 2 and 3) and the following conclusions were reached :

1. None of the " American subspecies " previously referred to *E. mascarone* belong to that species, their male first and second pleopods (fig. 2 A-C, *E. panamensis* and fig. 2 D-F, *E. americana*) being markedly distinct from those of *E. mascarone* (fig. 3 D-F). Their pleopods also differ from the pleopods of *E. vossi* (fig. 3 A-C), the west-African species previously confused with *E. mascarone*.

2. The pleopods of these American forms also present strong differences in their structure (compare fig. 2 A to fig. 2 D) and they should therefore be considered as two distinct species, *E. americana* and *E. panamensis*.

3. All specimens labeled *E. mascarone americana* or *E. mascarone panamensis* and collected along the Pacific coast of America present the same male first pleopod, with a typical conical, hood-shaped terminal portion (fig. 2 A-B), a fact that indicate that only one species, *E. panamensis* is present in the eastern Pacific and endemic to this region. The other species, *E. americana* is therefore restricted to the western Atlantic.

The American species *E. panamensis* and *E. americana*, also differ in several respects (table 2). Males are easily differentiated by the relative size of the protuberances on the third abdominal somite (table 2); male and female of *E. panamensis* also have their carapace, sternum and abdomen more coarsely granulate than *E. americana*.

TABLE 2. Main differences between *Ethusa panamensis* Finnegan and *E. americana* A. Milne Edwards.

	<i>E. panamensis</i>	<i>E. americana</i>
1. Frontal teeth	Almost parallel.	Diverging.
2. Carapace	Regions elevated, well-marked; coarse, rounded granules on elevations; branchial regions slightly inflated laterally (carapace relatively wider).	Regions little elevated (in particular the branchial regions), finely granulate; branchial regions not inflated laterally (carapace relatively narrower).
3. Male abdomen and sternum	Coarsely granulate; abdominal somite 6 wider proximally; somite 3 with two strongly produced bumps, its length more than twice the length of somite 2 in dorsal view.	Finely granulate; abdominal somite 6 almost rectangular; somite 3 with two rounded bumps, its length less than twice the length of somite 2 in dorsal view.
4. Female abdomen	Coarsely granulate; tip of telson broadly rounded.	Finely granulate; tip of telson obtusely triangular.

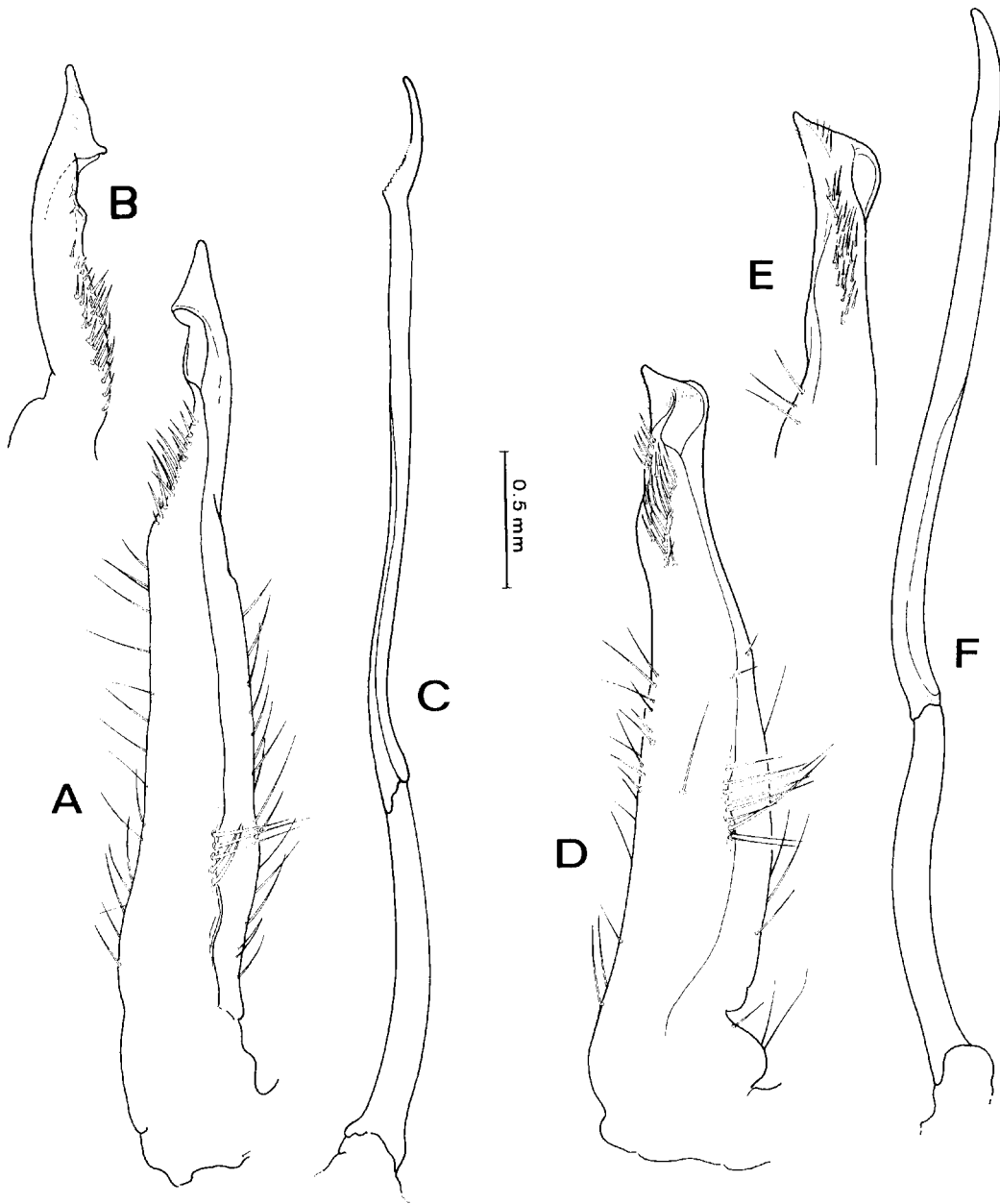


FIG. 2. — Male first and second pleopods of species of *Ethusa* Roux : A-C, *E. panamensis* Finnegan, ♂ 6.1 × 5.5 mm, Bahía Honda, Panama RATHBUN det. *E. mascarone panamensis* (USNM 69191) : A, B, pl. 1; C, pl. 2. — D-F, *E. mascarone americana* A. Milne Edwards, ♂ 6.3 × 5.3 mm, Anclote Station, Florida, RATHBUN (1937 : table 23) det. *E. mascarone americana* (USNM 25605) : D, E, pl. 1; F, pl. 2.

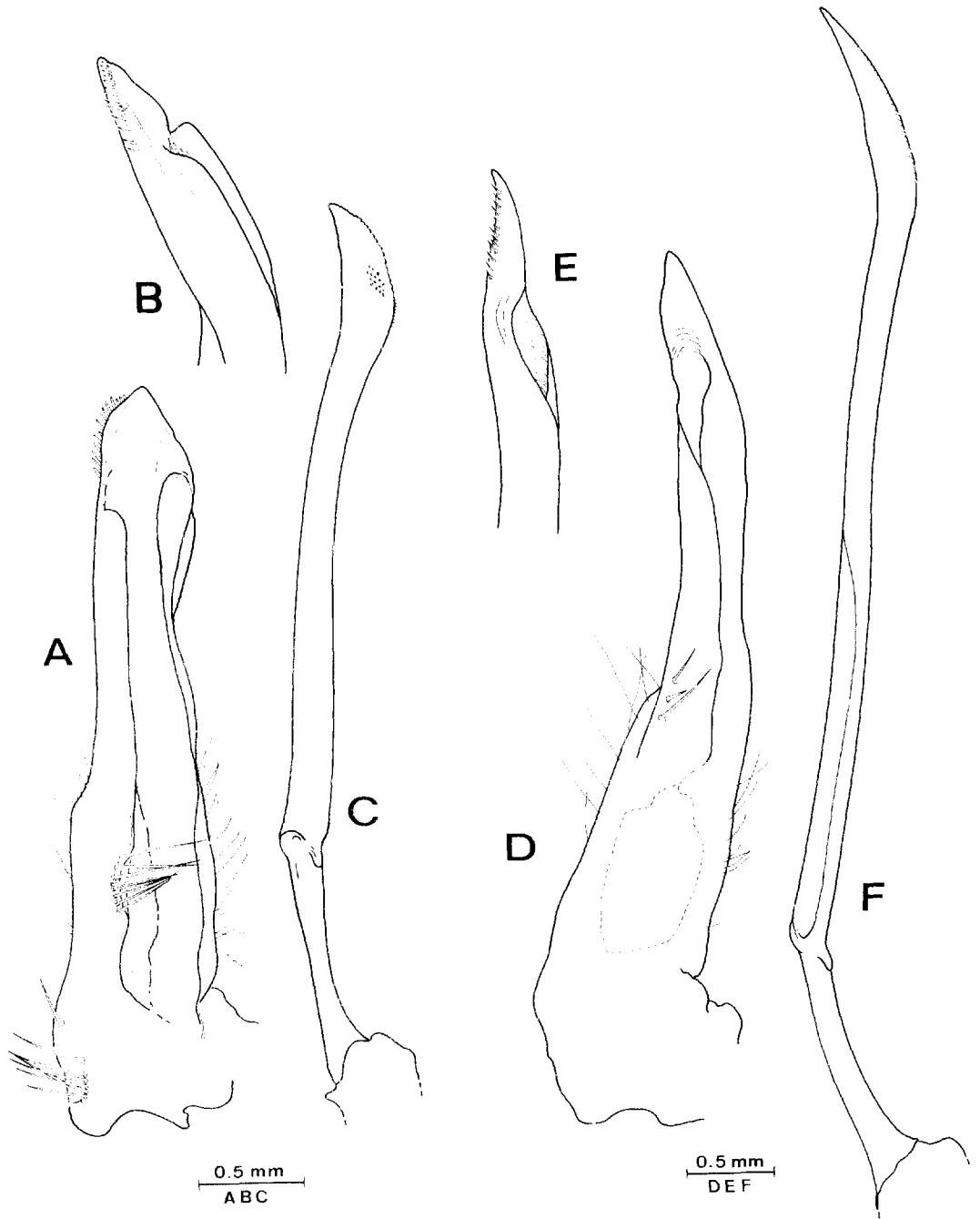


FIG. 3. — Male first and second pleopods of species of *Eihusa* Roux: A-C, *E. yossi* Manning and Holthuis, holotype ♂ 8.8 × 7.7 mm, off Nigeria (RMNH 31538): A, B, pl. 1; C, pl. 2. — D-F, *E. mascarone* (Herbst), ♂ 13.0 × 10.9 mm, Méditerranée, det. *E. mascarone* (MP-B 20620 ex B4098S): D, E, pl. 1; F, pl. 2.

***Ethusa steyaerti* sp. nov.**

(Fig. 1 A-D, 4; pl. I)

MATERIAL EXAMINED. — CORTES 3 Cruise, station 21, 1-VIII-1985, 28°10' N-112°42' W, off Cabo San Miguel, Baja California, trawling at 107-118 m, sand, 1 ♂ 19.7 × 19.8 mm (MP-B 20876); 1 ♀ 14.0 × 14.3 mm (MP-B 20877); 1 ♂ 20.1 × 20.4 mm (EMU-2613); 1 ♂ 18.6 × 18.8 mm (EMU-2614); 1 ♂ 15.1 × 15.1 mm (EMU-2615); 1 ♂ 19.2 × 19.2 mm (EMU-2616); 1 ♂ 19.5 × 19.4 mm (EMU-2617); 1 ♀ 15.4 × 15.7 mm (EMU-2619); 1 ♂ 14.6 × 14.8 mm (EMU-2620); 1 ♂ 13.4 × 13.3 mm (EMU-2621); 1 ♂ 18.2 × 18.6 mm (AHF-854); 1 ♂ 19.4 × 19.7 mm (MP-B 20617); 1 ♂ 19.9 × 19.8 mm (USNM-237637). — CORTES 3 Cruise, station 46, 6-VIII-1985, 28°09' N-111°37' W, off Estero Tastiota, Sonora, sand, 1 ♂ 16.1 × 16.4 mm (EMU-2618).

TYPES. The male (MP-B 20876) is the holotype, the female (MP-B 29877) is the allotype and the eleven other specimens are all designated the paratypes.

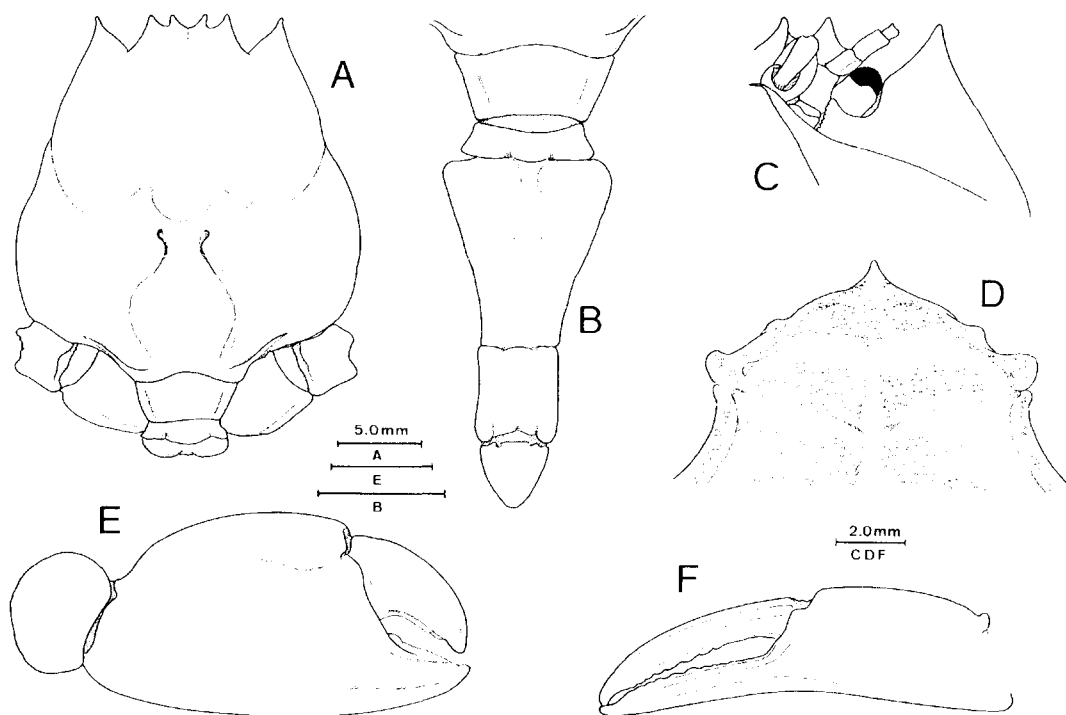


FIG. 4. — *Ethusa steyaerti* sp. nov., holotype ♂ 19.7 × 19.8 mm (MP-B 20876) : A carapace; B, abdomen; C, orbital region, ventral; D, anterior sternal shield; E, major chela; F, minor chela.

DESCRIPTION

Carapace as long as wide (including frontal teeth), rather flat dorsally, covered by a short pubescence and very finely granulate; front and dorsal side of anterolateral teeth ornamented with longer cilia. Branchial regions little inflated, sutures rather distinct, not meeting on

median line and separated by a shallow depression. Frontal border divided into four subequal teeth; median sinus V-shaped, wide, as deep as the 2 lateral sinus which are U-shaped; these three sinus much shallower than the orbital sinus. Anterolateral (= exorbital) tooth rather long, pointing forward, acute, its extremity at the same level as the frontal teeth or slightly behind. Eyestalk short, mobile, not extending beyond the anterolateral teeth. Male chelipeds very unequal; major chela 2.5 to 3 times as high as the minor chela. Large cheliped (the right one) almost entirely smooth, except for some striae on the external margin and a few granules ventrally; merus not very strong; carpus globular, with a strong rounded bump on the inner side; manus high, strongly inflated; dactylus curved, thick, short, slightly compressed laterally; fixed finger triangular. Small cheliped (the left one) entirely smooth, except for some granules on the lower border of the merus; chela long, incurving, fingers subequal, compressed laterally and about as long as the palm, the cutting edges in contact on less than half their length. Chelipeds of female reduced, equal, similar in shape to the minor cheliped of male. Pereiopods 2 and 3 long, relatively strong, the third one the strongest, entirely smooth, except for fine granules on the ventral margin of the merus; dactylus strongly compressed laterally; merus of second pereiopod 3.8 times as long as wide, of third pereiopod 4.2 times as long as wide. Third maxilliped slightly pubescent; the longitudinal crest on the merus and ischium weak, finely granulate. Sternum finely granulate and pubescent; grooves distinct but shallow; anterior sternal shield without deep pits and with a shallow transverse sulcus. Abdominal segments 3-5 fused; a pair of strong, well-separated lateral protuberances on third somite; a pair of weak protuberances on fourth somite; a low, median elevation on fifth somite; sixth somite longer than wide, with lateral margins almost parallel and the distal border as wide as the proximal; seventh somite equilateral. Male first pleopod rather long, thick on most of its length, with a subterminal, bottle-neck shaped constriction; the narrower extremity more than five times as long as wide, with a pointed tip. Second pleopod much longer than first, protruding extremity long; distal segment more than 1 1/2 time as long as the peduncle.

COLOUR. Carapace yellowish-brown. Pereiopods 2-3 whitish, with a large violet transversal band. Major cheliped almost completely purple dorsally, chela violet; ventral side of merus lighter, whitish and light violet.

DEDICATION. — This new species of brachyuran crustacean is dedicated to Dr. Marc STEYAERT, for his constant support throughout my career and his friendship.

REMARKS

This new species differs from the other three species of *Ethusa* Roux known from the eastern Pacific by several characteristics. It is very distinct from *E. panamensis*, which is a much smaller species with long eyestalk and short anterolateral teeth not extending to base of frontal teeth. The distinction between *E. steyaerti* and the two other species, *E. ciliatifrons* and *E. lata*, is a little more difficult, especially when dealing with females or immature specimens.

All the types of the new species were compared to one of FAXON's syntypes of *E. ciliatifrons* (USNM 20630) and to the series of specimens of this later species collected in the Gulf of California (see under *E. ciliatifrons*). They were also compared to the holotype of *E. lata* (USNM 17483) and to specimens of *E. lata* also collected in the Gulf of California (see

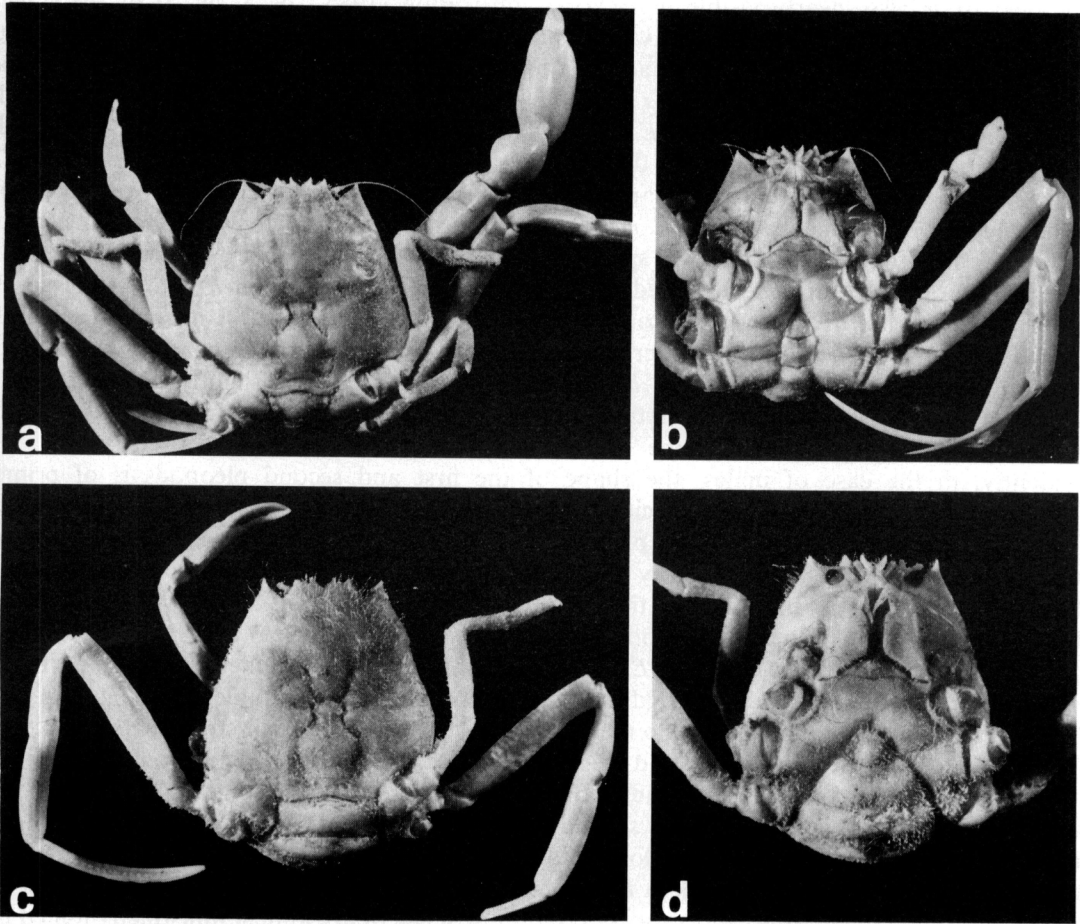


PLATE I. — a-d - *Ethusa steyaerti* sp. nov., Baja California, off Cabo San Miguel, CORTES 3 Cruise, station 21, 107-118 m. a, b, holotype, ♂ 19.7 × 19.8 mm (MP-B 20876) : dorsal and ventral views. c, d, allotype, ♀ 14.0 × 14.3 mm (MP-B 20877) : dorsal and ventral views (photographs by Jacques REBIÈRE).

under *E. lata*). As a result of this comparative analysis, it appears that *Ethusa ciliatifrons* can be separated from both *E. lata* and *E. steyaerti* by the character given by RATHBUN (1937 : 78) in her key to the American species of *Ethusa* : in *E. ciliatifrons*, the branchial regions are strongly inflated, they meet on the median line, separating the cardiac from the gastric regions. As it was noted anteriorly, this is a very distinctive character, even in the smallest specimen observed. It is also clearly visible in FAXON's illustration (1985 : pl. 5, fig. 3) of the other syntype (MCZ 4498 ; not examined), which is a young male (c.w. 29.5 mm) that does not yet present the typical heterochely of the adult. This character permits to recognize rapidly males or females of *E. ciliatifrons*. In *E. lata* and *E. steyaerti*, the branchial regions are less inflated (*E. lata*) to almost not inflated at all (*E. steyaerti*) and in both species the regions are separated in the median area by a narrow but distinct distance leaving a strong (*E. lata*) or weak (*E. steyaerti*) depression connecting the cardiac and gastric regions. Another distinctive character is the male major cheliped which in *E. ciliatifrons* is coarsely tuberculate, while this appendage is almost smooth in the other two species.

Several other features can be used to separate the new species from *E. lata* (see tables 3 and 4), the most useful being : the carapace width/length ratio, 0.99 to 1.01 in *E. steyaerti* and 1.06 to 1.12 in *E. lata*, which is a wider species ; the shape of the sternum, coarsely granulated and with deep grooves and pits in *E. lata*, finely granulated and slightly grooved in *E. steyaerti* ; the shape of the male sixth abdominal somite, rectangular in *E. steyaerti* and quadrangular in *E. lata* ; the shape of the frontal and anterolateral teeth (see table 3). Evidently, in the case of males, the shape of the first and second pleopods is of prime importance to distinguish the new species from the others. Both *E. steyaerti* and *E. lata* present a relatively long, not truncate, first pleopod and a longer second pleopod. The tip of the former, however, is distinct, first, by the relative position of the subterminal constriction (fig. 1 C-F) ; second, by the shape of the terminal opening (fig. 1 B-E). The relative length of the two portions of the second pleopod is also distinctive (see table 3 and fig. 1 D-G). The extremity of the male first pleopod of *E. ciliatifrons*, in turn, is very distinct : no sharp terminal constriction, and the extremity twisted and with a corneous tip (see table 3 and fig. 1 H-K).

Other minor differences are : the merus of major cheliped is much stronger (see table 4) and the chela is higher in *E. lata*, and this often coincides with a strongly prominent fourth sternal plate on this side of the sternum, the later being more coarsely granulate than in *E. steyaerti* and with deeper sutures ; the second and third pereopods are also relatively stronger in *E. lata* (table 4). The granulate longitudinal ridge on merus and ischium of the third maxilliped is strong in *E. lata*, weak in *E. steyaerti* ; the second abdominal segment is shorter in *E. lata* and the two lateral protuberances on the third segment are almost indistinctly joined in this species, while they are separated by a shallow notch in the new species.

Ethusa steyaerti is also distinct from other American species of *Ethusa* : in *E. tenuipes* Rathbun, 1897, the dactylus of pereopods 2 and 3 are not flattened ; in *E. truncata* A. Milne Edwards and Bouvier, 1899, the carapace is much longer than broad and the eyestalks are voluminous. The new species is very close to *E. microphthalma* Smith, 1881 (material examined, USNM 66829), known from Massachusetts to Cuba (RATHBUN, 1937) ; *E. steyaerti* is certainly closer to this Atlantic species than to *E. lata*, which according to RATHBUN (1937 : 78) is the Pacific analogue of *E. microphthalma*. Some small differences between *E. steyaerti* and *E. microphthalma* are the relative length of the telson of the male (a little longer in *E.*

microphthalma), the size of the eye (smaller in *E. microphthalma*) and the size of the inner rounded projection on the carpus of major cheliped of male (stronger in *E. steyaerti*). It seems therefore more likely that *E. steyaerti*, and not *E. lata*, is the Pacific counterpart of *E. microphthalma*.

Environmental conditions at the two sampling stations where *E. steyaerti* was collected were almost identical : trawling depth of 104 to 125 m; sandy bottom (96 to 97 % sand); water temperature (16.0 to 16.3°C) and dissolved oxygen concentration (1.62 to 2.22 ml O₂/l) relatively high.

TABLE 3. — Main differences among *Ethusa steyaerti* sp. nov., *E. lata* Rathbun and *E. ciliatifrons* Faxon.

	<i>E. steyaerti</i>	<i>E. lata</i>	<i>E. ciliatifrons</i>
1. Carapace	As wide as long. Branchial regions little inflated, separated on median line.	Wider than long. Branchial regions strongly inflated, but separated on median line.	Wider than long. Branchial regions strongly inflated, meeting on median line.
2. Front	Lateral sinus deeper; anterolateral teeth longer acute.	Lateral sinus shallow; anterolateral teeth large, triangular.	Lateral sinus shallow; anterolateral teeth very large, triangular.
3. Major cheliped	Almost entirely smooth; some granules on ventral margin of merus. Dactylus curved; cutting edge of fixed finger smooth.	Almost entirely smooth; some striae on the outer margin of merus and granules ventrally. Dactylus strongly curved; cutting edge of fixed finger with small teeth.	Entirely granulate, granules coarse. Dactylus almost straight; cutting edge of fixed finger smooth.
4. Male abdomen	Sixth somite rather rectangular, proximal and distal borders subequal.	Sixth somite squarish, proximal border wider than distal.	Sixth somite rectangular, sides concave.
5. Male sternum	Finely granulate, grooves shallow; anterior sternal shield almost flat, pits shallow, sulcus shallow.	Coarsely granulate, grooves very deep, sternites prominent; anterior shield deeply pitted, with strong transverse sulcus.	Coarsely granulate, grooves deep; sternal shield prominent, not pitted, transverse sulcus deep.
6. Male pleopods	Terminal portion of first pleopod narrow, bottleneck shaped, very long, about 5-6 times as long as wide. Protruding part of second pleopod long; flagela more than 1½ time longer than peduncle.	Terminal portion of first pleopod narrow, bottleneck shaped, about 4 times as long as wide. Protruding part of second pleopod long; flagela less than 1½ time as long as peduncle.	Terminal portion of first pleopod tapering, slightly deflexed and twisted, tip corneous. Protruding part of second pleopod short; flagela about 1½ time as long as peduncle.

TABLE 4. — Measurements of a male of *Ethusa steyaerti* sp. nov. and of a male of *E. lata* Rathbun of similar carapace length. All measurements in mm.

	<i>E. steyaerti</i>	<i>E. lata</i>
Carapace : width	19.1	21.0
length	18.90	18.95
W/L ratio	1.01	1.10
Merus of major cheliped : width	3.5	5.9
length	11.5	12.4
W/L ratio	0.30	0.47
Merus of third pereiopod : width	3.6	3.8
length	18.0	17.0
W/L ratio	2.0	2.2

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