CUNA INSULARIS N. GEN. AND N. SP. (ISOPODA: CYMOTHIOIDAE)  
FROM THE GILL CHAMBER OF THE SERGEANT MAJOR,  
ABUDEFDUF SAXATILIS (LINNAEUS),  
(OSTEICHTHYES) IN THE WEST INDIES  

Ernest H. Williams, Jr. and Lucy Bunkley Williams  
Department of Marine Sciences, University of Puerto Rico, Mayaguez, Puerto Rico 00708  

ABSTRACT: The genus is characterized by having appendix masculina on the first 3 pairs of pleopods of the male, a reduced number of articles in the antennae, basal articles of antennae 1 expanded but not contiguous, antennae 1 expanded, antennae 2 compressed, head immersed in pleonite 1, pleon not immersed in pereon, as wide as pereon, and hunched and compressed. The new species possesses rudimentary penis lobes in the female. Development from a male to a female may be inhibited by the presence of a female. Transition from male to female requires more than one molt in Cuna insularis. Both single and multiple molt sex reversal patterns occur among cymothoids. Erosion exposing the heart of the host was frequently caused by this parasite. Infections of Abudefduf saxatilis with Anilocra abudefduf may favor infection with Cuna insularis. This parasite probably has a continental distribution along the Caribbean shores and near-shore islands of Central America and northern South America. Cuna insularis is the only species of cymothoid isopod known to possess appendix masculina on the first 3 pairs of pleopods. The appendages and mouthparts of C. insularis are unusually free of hair and setae.

While observing, photographing and collecting specimens of the cymothoid, Anilocra abudefdufi Williams and Williams, 1981, occurring externally on Abudefduf saxatilis (Linnaeus) in the San Blas Islands off the Caribbean coast of Panama, we discovered a second isopod in the gill chamber of this fish. Closer inspection showed that, although cymothoid, it did not belong to any of the known genera of Cymothoidae. Metzelaar (1919) identified an isopod taken from the gills of A. saxatilis collected in Curacao as Cymothoa excisa. We examined his specimen and found it to be identical to our new isopod. We also identified 3 more specimens of this species in a U.S. National Museum collection of fish-parasitic isopods from Belize.

MATERIALS AND METHODS  
Specimens of Abudefduf saxatilis were collected with snorkeling or Scuba techniques and a multiprong, mcrorobarb spear and an elastic band speargun. Fish were immediately sealed in individual plastic bags, and stored in a dive bag for no more than 3 hr. Hosts were measured for standard and total length to the nearest mm. Isopods were measured for total length and maximum width to the nearest 0.1 mm, while alive. They were preserved in 70% ethanol. Mouthparts and appendages were mounted in glycerine jelly. Drawings of appendages were made with the aid of a Bausch and Lomb Trismyplex microprojector, whole specimens were drawn from projections of 35 mm slides made with a Nikon F2, 55 mm macro lens or a reversed 24 mm wide angle lens and reversing ring. Pleotelsons of the illustrated specimens were drawn in a natural or slightly depressed position; therefore, the length of pleotelsons in illustrated dorsal views do not represent the actual total lengths. Measurements are given in mm. Comparative material included specimens from the Instituut voor Taxonomische Zoologie, Amsterdam (ZMD) and the U.S. National Museum of Natural History (USNM).  

DESCRIPTION  
Cuna n. gen.  
(Figs. 1–29)  
Diagnosis  
Appendix masculina present on first 3 pairs of pleopods in male. Number of articles in antennae reduced. Basal articles of antennae 1 expanded but not contiguous. Antennae 1 expanded, antennae 2 compressed. Head somewhat immersed in pleonite 1. Anterior margin of pleonite 1 not trisinate. Coxal plates do not extend to or near posterior border of pleonites. Pleon compressed, hunched, as wide as, and not immersed in, pereon.  
The name is in honor of the Cuna Indians of the San Blas Islands of the Caribbean coast of Panama.  

Cuna insularis n. sp.  
(Figs. 1–29)  
Cymothoa excisa of Metzelaar (1919), p. 100.  
General: Anterior margin of head ventrally flexed, produced into a lobe between bases of antennae 1. Antennae 1 4-merous. Antennae 2 4-merous. Antennae 1 distinctly broader and approximately equal in length with antennae 2. First segment of mandibular palp expanded. Incisor process of mandible with pointed tip and expanded proximal portion. Maxilla 1 with 1 large and 3 small apical spines. Distal lobes of maxilla 2 each with 2 spines, occasionally with only 1 spine each. Distal segment of maxillipedal palp with 3 stout
recurred apical spines. Posteroventral angles of pereonites 3–7 slightly produced, that of pereonite 7 slightly overlapping pleonite 1. Anterolateral angles of pereonites 1–7 slightly produced. Pleotelson 1.44–1.50 times wider than long. Pereopods without swelling on dactyl or lobe at posteroventral corner of basis. Inner ramus of uropod shorter than outer ramus. Uropods not reaching posterior margin of pleotelson. Color of body and appendages uniformly white, with pigment spots on dorsal surface of head and along margins of pereonites and pleonites.

**Male (measurements from 6 specimens):** Length 4.2 to 8.7 (6.5), maximum width 2.3 to 3.8 (2.9). Penes lobes large, forming raised "U"-shaped projection over the peduncles of pleopods 1 (Fig. 28). Appendix masculina of pleopods 1–3 linear, with unmodified apices. Cephalons of some specimens with small, low protuberances posterior to each eye. Pigment spots on pereonites and pleonites confined to posterior and lateral margins.

**Male-female transitional (measurements from 2 specimens):** Length 9.6 and 9.8, maximum width 4.2 and 4.7. Remnants of appendix masculina present on pleopods 1–3. Penes lobes reduced in size in comparison to those found in male.

**Female (measurements from 7 specimens):** Pereon slightly compressed, sometimes with a raised median ridge. Length 11.1 to 17.2 (12.2), maximum width 5.2 to 8.4 (6.9). Large remnants of pene lobes present (Fig. 29). No remnants of appendix masculina present. All but 1 female possessed oostegites. Pigment spots on pereonites and pleonites confined to anterior and lateral margins.

**Brood pouch reproduction (measurements from 20 specimens of each brood):** See Table I.

The specific name is from the Latin *insularis*, meaning 'of an island.'

**TAXONOMIC SUMMARY**

**Specimens examined:** Fourteen total. One female, 1905, Curaçao, Netherland Antilles, L. Boeke coll. (ZMD); 1 male, 9 December 1980, Carrie Bow Cay, Belize (USNM CB-121); 1 female–male pair, 20 November 1982, Carrie Bow Cay, Belize (USNM CB-175); 4 female–male pairs, 1 female, and 2 transitionals, Nalunega, San Blas Islands, Panama, 25–30 October 1980.

**Type specimens:** Holotype (male), USNM 213523; allotype (associated female), USNM 213524; 7 paratypes, USNM 213525–213531; 2 paratypes in authors' collection.

**Type locality:** Nalunega (Island), San Blas Islands, Panama, 9°33.8'N, 78°58.1'W.

**Type host:** Sergeant major, *Abudeidus saxatilis* (Linnaeus).

**Site of infection:** Female occurs in the ventral part of the gill chamber between the third and fourth gill arches. Male attached beneath the female (Fig. 27).

**DISCUSSION**

*Cuna* differs from all known genera in the family Cymothoidea by possessing appendix masculina on the first 3 pairs of pleopods in the male, and a reduced number of articles in antennae 2. The new genus most closely resembles the cymothoid genus *Lironeca* Leach in body shape, immersed head, anterior margin of pereonite 1 not trisinuate, antennae 1 not contiguous, pleon not immersed in the pereon and approximately the same width as the pereon. *Cuna* differs from *Lironeca* by having a reduced number of articles in the antennae, appendix masculina on pleopods 1–3, an expanded basal article of antennae 1, antennae 1 which is broader than antennae 2, and a pleon which is compressed and hunched.

The specimens of *Cuna insularis* from Nalunega occurred as 5 male–female pairs (the male of 1 pair was lost in spearing) and 2 single transitionals. A male–female pair and a single male occurred in the Carrie Bow Cay specimens. The status of the female in the Curaçao collection is unknown. Transitionals occurred only in the absence of females. Development from a male to a female may be inhibited in the presence of a female, as has been suggested in other cymothoids (Legrand, 1951, 1952; Bowman, 1960; Williams and Williams, 1980).
Brusca (1981) suggested that sex reversal in cymothoids usually takes place, at least superficially, during a single molt. In 9 species of Caribbean Anilocra, Williams and Williams (1981) found that the transition from male to female required multiple molts. Transition from male to female also requires more than 1 molt in Cuna insularis. Both single molt and multiple molt sex reversal patterns occur among cymothoids.

Isopods occurred with equal frequency in the right and left gill chambers. No more than 1 male–female pair occurred per host. Adult female isopods produced severe erosion in the gular region of their hosts, which frequently exposed their heart. The filaments of the third and fourth gill arches were eroded. All of the filaments were eroded from the fourth arch of 1 host. Cymothoid isopods dwelling in the gill chamber commonly erode gill filaments of hosts (Brusca, 1981), but we are unaware of any other cymothoid which exposes the heart of a host.

Cuna insularis has been collected on the type host from 3 islands off the coasts of Belize, Panama, and Venezuela. It probably occurs along the Caribbean coasts of central and northern South America. This species has not been found on any of the more insular (Robins, 1971) portions of the Caribbean and may be limited to the extreme western and southern Caribbean. Many species of fishes possess such a continental distribution in the Caribbean (Erdman, 1963; Robins, 1971). At least 1 other cymothoid isopod, Cymothoa excisa Perty, 1830, may also possess a continental distribution in the Caribbean (Williams and Williams, unpubl. data). Anilocra abudefufi may have a continental distribution, but has only thus far been collected from the southwestern Caribbean (Williams and Williams, 1981).

Cuna insularis occurred on 7 of 33 Abudefufi saxatilis (680 to 950, averaging 840, in length) which were infected externally with 1 or more specimens of Anilocra abudefufi. No Cuna insularis occurred on 14 A. saxatilis which were not infected with A. abudefufi. Possibly the presence of Anilocra abudefufi favors the infection of the host by Cuna insularis. A similar situation is found with 2 cymothoid isopod parasites of the doctorfish, Acanthurus chirurgus (Bloch), in the northeastern Caribbean Sea (Williams and Williams, 1981). In this case, Anilocra acanthuri Williams and Williams, 1981 occurs externally and Agarna cumulus (Haller, 1880) in the gill chamber.
FIGURE 28. Ventral view of *Cuna insularis* holotype male, illustrating penes lobes, pleopods, and appendix masculina.

FIGURE 29. Ventral view of *Cuna insularis* allotype female, illustrating remnants of penes lobes and absence of any remnants of appendix masculina.
Males of most, but not all, cymothoid species possess appendix masculina on the endopods of pleopods 2. Some species occasionally, but not consistently, also possess these structures on pleopod 3. *Cuna insularis* is the only cymothoid known to consistently possess appendix masculina on the first 3 pairs of pleopods of the male (Fig. 28).

The numbers, sizes, and types of hair and setae are reduced in the cymothoids in comparison with most other families of isopods. Usually some of these structures occur on the antennae, mandibular palp, maxilliped, pereopods, pleopods, and uropods on cymothoids. Specimens of *Cuna insularis* are particularly unornamented. The only setae present are 1 or 2 which occasionally occur on the mandibular palp, or rarely on the maxilliped.

Only 1 abnormality was noted in the specimens examined. The right margin of the pleonite 5 of 1 isopod was fused to the pleotelson. Brusca (1981) noted the complete fusion of pleonite 5 to the pleotelson in a specimen of *Renocila thresherorum* Williams and Williams, 1980.

**ACKNOWLEDGMENTS**

Drs. Peter Glynn, Harilaos Lessios, and John Cubit, Smithsonian Tropical Research Institute, Panama, gave advice and loaned collecting equipment; Prof. Charles E. Cutress loaned equipment; Drs. Roger F. Cressy, National Museum of Natural History, Smithsonian Institution, and Dirk Platvoet, Instituut voor Taxonomische Zoologie, Amsterdam, loaned specimens; Luis Burgos, Orasio Burgos, Grisela Burgos, Dr. Lessios, Mark Schildhauer, Joyce Gauvain, John Mann, and Susan Foster helped in collecting hosts; Dr. Andrew Cameron examined and modified the description of embryos; Dr. Thomas E. Bowman, National Museum of Natural History, Smithsonian Institution, reviewed the manuscript. Additional support was provided by the Department of Fisheries and Allied Aquacultures, Auburn University, Auburn, Alabama.

**LITERATURE CITED**


