

STUDIES ON THE FAUNA OF CURAÇAO AND OTHER  
CARIBBEAN ISLANDS: No. 155.

**CORALLOVEXIIDAE, A NEW FAMILY OF  
TRANSFORMED COPEPODS ENDOPARASITIC  
IN REEF CORALS**

WITH TWO NEW GENERA AND TEN NEW SPECIES FROM CURAÇAO

by

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The CORALLOVEXIIDAE are a new family of highly transformed, presumably poecilostome, Copepoda, found endoparasitic in 13 species of stony corals in the sublittoral zone (0.5–40 meters) on the south coast of Curaçao (Netherlands Antilles). The copepods are large (2–5 mm), strongly sexually dimorphic, and sometimes very abundant. The family consists of 10 named new species, 1 named new variety, and 2 unnamed forms, distributed over 2 new genera, *Corallovexia* and *Corallonoxia*. The Corallovexiidae are probably most closely related to the Antheacheridae, though they are less transformed than these, and possibly also to the Mytilicolidae.

Quite a few endoparasitic copepods are known from Indo-Pacific stony corals, but not a single species has so far been recorded from the West Indies. Intensive search in the past few decades has even supported the prevailing opinion that West Indian stony corals are devoid of endoparasitic copepods, and that this absence could be related to the complicated zoogeographic past of the West Indian reef.

However, during a 6-months stay (November 1973–April 1974) at the Caribbean Marine Biological Institute, in Curaçao (Netherlands' Antilles), endoparasitic copepods have been found in not less than 14 species of stony corals. Some of these belong to a new family of curiously transformed animals, the CORALLOVEXIIDAE, of which the following forms were found during this study:

Genus *Corallovexia* nov. (type-genus)

*C. brevibrachium* n. sp. (type-species), from *Diploria labyrinthiformis* (Linnaeus).

- C. longibrachium* n. sp., from *Manicina areolata* (Linnaeus) forma *mayori* (typical host), *Colpophyllia natans* (Müller), and *Diploria strigosa* (Dana).
- C. mediobrachium* n. sp., from *Diploria strigosa* (Dana) (typical host), *D. clivosa* (Ellis & Solander), and possibly from *Manicina areolata* (Linnaeus) f. *mayori*.
- C. mixtibrachium* n. sp., from *Colpophyllia natans* (Müller).
- C. kristenseni* n. sp., from *Colpophyllia natans* (Müller).
- C. similis* n. sp., from *Acropora palmata* (Lamarck).
- C. ventrospinosa* n. sp., from *Montastraea brasiliiana* (Verrill) (typical host) and *M. cavernosa* (Linnaeus).
- C. dorsospinosa* n. sp., from *Montastraea cavernosa* (Linnaeus) (typical host) and *M. brasiliiana* (Verrill).
- C. dorsospinosa* var. *minor* nov., from *Montastraea cavernosa* (Linnaeus).
- C. spec.*, from *Montastraea annularis* (Ellis & Solander).

Genus *Corallonoxia* nov.

- C. longicauda* n. sp. (type-species), from *Meandrina meandrites* (Linnaeus) (typical host) and *Dendrogyra cylindrus* Ehrenberg.
- C. baki* n. sp., from *Eusmilia fastigiata* (Pallas) (typical host), and *Dendrogyra cylindrus* Ehrenberg.
- C. spec.*, from *Dichocoenia stokesii* Milne Edwards & Haime.

All material, copepods and hosts, has been preserved in the Zoölogisch Museum, Amsterdam.

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## METHODS

The corals used in this study were collected during SCUBA-dives or skin dives on the south coast of Curaçao. All together 37 species have been studied, most of them in a number of colonies from different depths; 14 of these contained endoparasites. At once after collection each coral was isolated in a plastic bag and transported dry (but in the humid atmosphere of the closed bag) to the laboratory. Most of the collecting was done at some 500 yards west of the lab., some 5 boat minutes distance. In the lab., the coral was placed in a mixture of 5% aethyl-alcohol in seawater; in this fluid, the coral was allowed to anaesthetize and to expand its polyps during a period of some 12 hours at a temperature of about 20° C.

Then, the corals were washed with a vigorous jet of water, and the wash-water was filtered. This resulted in the 1st filtration residue, which usually contains only ectoparasites and no endoparasites. The next 12 hours, the coral is placed in a mixture of tapwater and sodium-hypo-chlorite (1 part of the commercial solution in 10 parts of tapwater). Again, the coral is washed, and the wash-water filtered (= 2nd filtration residue). The procedure is repeated for the third time, again for 12 hours, now in a 3 : 10 sodium-hypo-chlorite/tapwater mixture (= 3rd residue), and for a fourth time in a 1 : 1 mixture (= 4th residue). By now, most endoparasites have been recovered.

The material can be preserved in formalin (10% of the commercial solution) or in 70% aethyl-alcohol. For further study, the poorly sclerotized endoparasites are transferred to a solution containing 40% alcohol, 50% tapwater, and 10% glycerine. In a stove (40° C) this solution is allowed to evaporate; after a day or so, the material can be transferred into pure glycerine or lactophenol, and can be mounted in Reyne's modification of Faure's medium.

Once the presence of a particular parasite in a particular host being established, freshly collected material of the host can be dissected under a stereo-binocular microscope, in order to find out the location of the parasite in the host's tissue. The calcification of the coral makes such a study not very easy, however.

## CORALLOVEXIIDAE new family

**Diagnosis.** – Fairly large (2 to 5 mm in the adult stage) endoparasites, with a very pronounced sexual dimorphism. Females usually slightly smaller than the males. Both sexes have a vermiform trunk, the female has, however, at least 4 pairs of fleshy lateral processes, the pereionites, all or the posterior pairs of which are several times longer than the diameter of the trunk. The cephalosome (♀, ♂) is separated from the metasome by an articulation; the metasome – urosome boundary is marked by an articulation in ♂, but not in ♀. The urosome in ♂ is long and vermiform, short and reduced in ♀. The caudal rami (♀, ♂) are not articulated with the

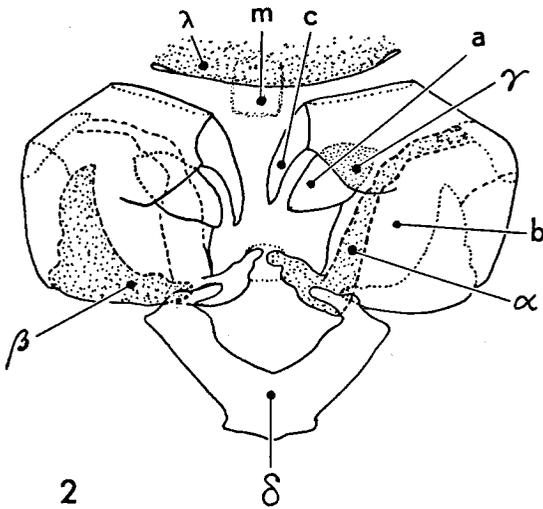
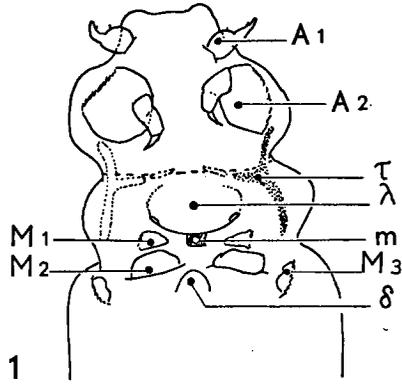


Fig. 1. Cephalosome and anterior part of the metasome of a female of the Corallovexiidae (diagrammatic). - A1 = anterior antenna; A2 = posterior antenna; m = oral aperture; M1 = anterior maxilla; M2 = posterior maxilla; M3 = maxilliped; δ = postoral medial swelling; λ = labrum; τ = T-shaped sclerite.

Fig. 2. Male oral area in the genus *Corallovesia*, semi-diagrammatic. - a = arthrite; b = basipodite of maxilliped; c = claw of maxilliped; m = oral aperture; α, β, and γ = maxillipedal sclerites; δ = postoral medial sclerite; λ = labrum.

urosome, and consist of fleshy, tapering lobes, usually ending in a minute spiniform process.

Appendages (Fig. 1). – The anterior antenna (A 1 in the figure) is of almost identical shape in both sexes, and consists of a more or less inflated basal portion, carrying 1 or 2 minute anterior spinules, separated by a non-functional articulation from the more or less digitiform distal portion, carrying usually 1 minute anterior, sub-distal, spiniform process; the distal portion may show vague pseudo-articulation lines, but is in fact unsegmented.

The posterior antenna (A 2 in the figure) is composed of a heavy basipodite, reinforced by a complex system of sclerites, and a prehensile endopodite (the exopodite is entirely absent). The appendage usually shows slight sexual dimorphism in that the separation (= articulation) between endopodite segments 1 and 2 is more distinct in ♂ than in ♀. Moreover, the terminal, claw-like endopodal segment is more slender in ♂ than in ♀, and carries a tooth-like and a lobe-like process, that might be absent in the ♀.

At the boundary of the cephalosome and metasome, a roughly T-shaped (sometimes X-shaped) sclerite is constantly present ( $\tau$  in the figure).

The labrum ( $\lambda$  in the figure) is rather well-defined, being a mid-ventral swelling in lateral view, with a well-sclerotized posterior margin. The labrum partly covers the roughly quadrangular oral aperture (m).

A labium is not clearly differentiated.

Female oral appendages – In most species, two pairs of amorphous mouth-parts are present in the form of unsegmented and unarmed lobes. These two pairs are tentatively homologized (vide infra) with the anterior maxilla (M1 in the figure) and posterior maxilla (M2). In some species only the second of these pairs is present. In some species one finds a pair of shapeless lobes, placed rather laterad, which might be homologous with the maxilliped (M3 in Fig. 1). In some species, a medioventral swelling arises between and caudad of the posterior maxillae. This postoral swelling ( $\delta$  in Fig. 1) might be homologous with the postoral medial sclerite found in the male.

Male oral area – The male oral area is very complexly built (Fig. 2). Like in female it is delimited at the frontal side by the

labrum ( $\lambda$  in Fig. 2). There is only one pair of appendages, which are strongly developed, prehensile, and are tentatively called maxillipeds (vide infra). They consist of a robust basipodite (b), which is reinforced by several sclerites. Two of these sclerites are of particular importance, since they may project in median and/or anterior direction, forming a heavily chitinized structure which forms, in opposition with the maxilliped claw (c), a prehensile apparatus, the shape of which is characteristic in the various species. The two sclerites participating in the prehensile complex are: (1) a linear one, often running from the anterior margin of the maxilliped, obliquely to the medioposterior side of the appendage, bending there in an angular way in anterior direction (sclerite  $\alpha$  in Fig. 2); and (2) a scapula-shaped one, lying on the dorsal and posterior side of the maxilliped (sclerite  $\beta$  in Fig. 2). The basipodite of the maxilliped carries, as mentioned before, a terminal claw (c), but moreover a medial arthrite (a), usually shaped like a half of an egg. The arthrite is supported by a sclerite,  $\gamma$ , which is more or less the mirror-image of the arthrite. Finally, the oral area of the male is delimited at the caudal side by a V- or U-shaped sclerite ( $\delta$ ), the anteromedian projections of which may participate in the formation of the prehensile complex chiefly formed by the sclerites  $\alpha$  and  $\beta$ .

Thoracic appendages – Globular, unsegmented swellings are present in most species<sup>1</sup>, on either side of the median body axis, at the level of the first and second pereionites; these swellings represent no doubt the rudimentary first and second legs (in juvenile specimens, they are already rudimentary, but show traces of having a biramous origin). No other thoracic appendages are present.

Ovaries lie in two uniserial bands, left and right in the metasome; vulvae at the boundary of metasome and urosome. Ovisacs have never been found, notwithstanding the fact that many hundreds of specimens have been examined; it is supposed, therefore, that the eggs are deposited loose in the host's tissues. In the development of the ovaries, I have not found an indication that the members of this family are viviparous. Two seminal vesicles, discharging at the posterior end of the male metasome, are visible in ventral view. The

<sup>1</sup>) Not found in adult females of *Corallovexia dorsospinosa* and *Corallonoxia longicauda*, but present in juveniles of the latter.

intestine is tubular, swelling into a bulbous terminal part; anus often marked by a slight swelling or tubercle, in the median cleft of the furcal rami.

**Homologies.** – The lateral processes of the ♀ metasome are called here pereionites, although similar processes in the genus *Staurosoma* have been considered homologous with the pereiopods (OKADA, 1927). However, in the Corallovexiidae, vestiges of the pereiopods 1 and 2 are present, which make it clear that the lateral processes of the metasome must be called pereionites.

The chief reason for calling the anterior two pairs of female oral appendages anterior and posterior maxillae, is found in the general agreement of the oral area in the Corallovexiidae and Mytilicolidae. In the latter, the larval development of at least three species is known in detail, and it has been proved there that the disappearing appendage is the mandible. In analogy, I have assumed in the present case also that the mandible has disappeared. In fact, it seems a general tendency in cyclopoids that, at least in the cephalosomal appendages, reduction proceeds in a series from anterior to posterior.

The main reason for calling the appendages in the oral area of the male maxillipeds, is that they appear to be implanted at the caudal side of the articulation separating cephalosome and metasome.

**Colouration.** – All members of the family are semitransparent to opaque, of a dirty white (sometimes, especially in the case of the parasites of the greenish *Diploria*-species, with a yellowish hue). The ovaries are white. A dark, blackish dot is visible, through transparency, in the cephalic region; this probably is the oesophagus ganglion.

**Place in the host.** – The members of this family are definitely endoparasitic; they have sometimes been found between the mesenteries of the coelenteric cavity, but mostly in the host's mesogloea.

**Specific distinction.** – The body shape of the female, more in particular the relative length of the "lateral horns" (pereionites),

the tuberculation of the dorsal and ventral side, and the length of the caudal rami offers distinctive characters. In the male, the relative length of the urosome and the caudal rami, but especially the detailed morphology of the appendages and sclerites in the oral area, are of importance. Certain identifications are most easily made when both sexes are available, but keys to each sex are provided in the sequel.

**Abundance, host specificity.**—The only really abundant species in Curaçao are *Corallovexia brevibrachium* (in *Diploria labyrinthiformis*), *C. longibrachium* (in *Manicina areolata*), and in particular *Corallonoxia longicauda* (in *Meandrina meandrites*). The numbers, especially of the latter parasite, are so elevated that it is presumed that the parasites must play quite a significant rôle in the carbon-flux.

Five of the named taxa recorded in the sequel (*Corallovexia brevibrachium*, *C. mixtibrachium*, *C. similis*, *C. kristenseni*, *C. dorsospinosa* var. *minor*) and two unnamed forms (*Corallovexia* spec. and *Corallonoxia* spec.) have been found in a single host species only.

Four species have been found in two hosts: *Corallovexia ventrospinosa* and *C. dorsospinosa* in two very closely related species of the coral genus *Montastraea*; *Corallonoxia longicauda* in two related coral genera belonging to one family, the Trochosmiliidae; only *Corallonoxia baki* has been found in two not very closely related host species.

Two species have been found in three host species, but the hosts in this case were very closely related corals, belonging all to the same subfamily, the Faviinae.

It should be noted, moreover, that the genus *Corallovexia* is found almost exclusively in members of one family of corals, the Faviidae. This family has two subfamilies in Curaçao, viz. the Montastraeinae (that harbour the parasites *Corallovexia dorsospinosa* and *C. ventrospinosa*, which occupy an isolated position within the genus *Corallovexia*) and the Faviinae (which accomodate quite an array of closely related *Corallovexia* species). An exception forms *Corallovexia similis* found in *Acropora*.

*Corallonoxia* on the other hand is never found in Faviidae, but occurs in Trochosmiliidae and Cariophylliidae.

Some hosts have only 1 species of parasite, others harbour up to 3 different species:

— with 1 parasite species: *Acropora palmata*, *Diploria labyrinthiformis*, *D. clivosa*, *Montastraea annularis*, *Meandrina meandrites*, *Dichocoenia stokesii*, and *Eusmilia fastigiata*.

— with 2 species of parasites: *Diploria strigosa*, *Manicina areolata* f. *mayori*, *Montastraea brasiliiana*, and *Dendrogyra cylindrus*.

— with 3 species of parasites: *Colpophyllia natans* and *Montastraea cavernosa*.

The presence of more than one species of, obviously very closely related, endoparasites in a single host species, poses problems in that it is quite often difficultly understood how such double or triple infection could evolve. Several authors have in the past postulated sympatric evolution (in the very strict sense of the word, viz., in the same tissue of the same host) for such cases. Close analysis shows, however, that either one or more other hosts are involved for one of the parasite species, or

that the host populations have once during their evolutionary history been divided into two isolates (cf. Srock, 1967: 246 for examples). The first of these alternatives seems obviously the case for the two *Corallovesia* species parasitizing *Diploria strigosa*: *C. mediobranchium* might be the original parasite of that coral, whereas *C. longibranchium* might have developed in *Manicina areolata* and only secondarily infested (at a low infection rate) *Diploria*. Vice versa, *C. mediobranchium*, typical for *Diploria*, is sporadically able to infest *Manicina* as well.

A similar conclusion seems to hold for *Montastraea brasiliiana*, which appears to have suffered from a subsequent infection wave from the form that originally developed in *Montastraea cavernosa*.

For *Montastraea cavernosa* itself, that is known to lodge 3 different parasite taxa, I am inclined to think that the host might not be monospecific but might consist of a couple of sibling species, differing in the size of the calyx.

For *Colpophyllia natans*, likewise parasitized by 3 species of *Corallovesia*, I have no watertight explanation for the moment, except that one of the parasites involved, *C. longibranchium*, is assumed to have evolved in another host, *Manicina areolata*.

**Affinities.** – The greater part of the appendages are reduced to such an extent in the new family, that it is hard to decide upon its taxonomic status. It seems to me that the closest relatives of the new family are found amongst certain parasites of Actiniaria, viz., the group of genera centered around *Antheacheres* M. Sars, 1857. VADER (1970a: 100–101) united the following genera tentatively into the family Antheacheridae M. Sars, 1870: *Antheacheres*, *Staurosoma* Will, 1844, and *Gastroecus* Hansen, 1887. For *Staurosoma*, DE ZULUETA (1912) proposed a monotypic family, Staurosomatidae; *Gastroecus* appears to be very closely related to, if not identical with, *Staurosoma*. Both genera differ from *Antheacheres* chiefly in having pigmy males.

There are several similarities between the Antheacheridae (taken for the moment in the sense proposed by VADER) and the present coral parasites: the presence of large “lateral horns” (pereionites) on the metasome of the ♀, the presence of two pairs of rudimentary oral appendages, the reduction of the antennules, the presence of prehensile maxillipeds in male, the considerable sexual dimorphism, the elongation of the male urosome, etc.

However, there are a number of fundamental differences, which made the erection of a new family for the coral parasites necessary. So, in the Corallovesiidae the anterior antennae, but in particular the posterior antennae, are better developed (the A2 in the Antheacheridae lacks a terminal claw). The “lateral horns” of the ♀ in

in the Anthecheridae are biramous (and are for that reason considered homologous with the pereopods), while in the Corallovexiidae they are simple and certainly not homologous with (the equally present) pereopods. Furthermore, the Anthecheridae have ovisacs, the Corallovexiidae have not. In the Anthecheridae, the male is smaller (or even much smaller) than the female, in the Corallovexiidae, the male is slightly longer than the female. The Corallovexiidae have caudal rami, they are lacking in the Anthecheridae. The body segmentation on the contrary is more reduced in the Corallovexiidae.

Although the great reduction of the appendages, shown already by the most juvenile stages known so far, makes it not easy to determine the relationships of the Corallovexiidae, I take it for granted that the family belongs to the poecilostome cyclopoids. At any rate, the general organization of the cephalic appendages does not seem to be siphonostome or gnathostome, but seems to show affiliation in the direction of the Mytilicolidae.

#### KEY TO THE GENERA OF CORALLOVEXIIDAE

- 1a. Urosome short; metasomal pereionites transformed into fleshy lateral processes; all appendages in the oral area reduced to shapeless lobes . . . . . FEMALES 2
- 1b. Urosome long; pereionites not transformed; one pair of appendages in the oral area developed into a strongly prehensile organ . . . . . MALES 3
  
- 2a. Four pairs of laterally protruding pereionites in front of the vulvae. Caudal rami bifid, longer than the posteriormost pereionite. Rudimentary maxillipeds present . . . *Corallonoxia* n. gen.
- 2b. Five or six pairs of laterally protruding processes in front of the vulvae. Caudal rami simple, shorter than pereionite 5. Maxillipeds, or rudiments thereof, lacking . . . . *Corallovexia* n. gen
  
- 3a. Maxillipedal sclerite  $\alpha$  not recurved in the medial plane in anterior direction, not participating in the formation of a prehensile complex. Sclerite  $\delta$  U-shaped, anterior branches thin,

- running parallel, not participating in the prehensile complex .  
 . . . . . *Corallonoxia* n. gen.
- 3b. Maxillipedal sclerite  $\alpha$  recurved in the medial plane, in anterior direction, forming a major element in a well-developed prehensile complex. Sclerite  $\delta$  roughly V-shaped, branches heavy, usually diverging or converging, participating in the prehensile complex. . . . . *Corallovexia* n. gen.

### **Corallovexia** n. gen.

Female: With 5 or 6 pairs of straight, or slightly curved, "lateral horns" (= pereionites) (the posteriormost of which is much longer than the first one) in front of the vulvae. Urosome short. Caudal rami short, unbranched. Mandibles present (exc. *C. ventrospinosa*), posterior maxillae present, both as unstructured lobes. Maxillipeds absent.

Male: Oral sclerite  $\alpha$  sharply recurved in anterior direction, forming with parts of sclerites  $\beta$  and  $\delta$  a prehensile structure opposing the maxillipedal claw. Sclerite  $\delta$  heavy, roughly V-shaped, with two anterior branches which first diverge and then converge.

Type-species. – *Corallovexia brevibrachium* n. sp. Other species see p. 2.

Derivatio nominis. – The proposed generic name is a combination of letters, with clear allusion to the latin words *corallium* (= coral) and *vexator* (= tormentor, teaser). The gender is feminine.

### KEY TO THE SPECIES OF *Corallovexia*

#### FEMALES

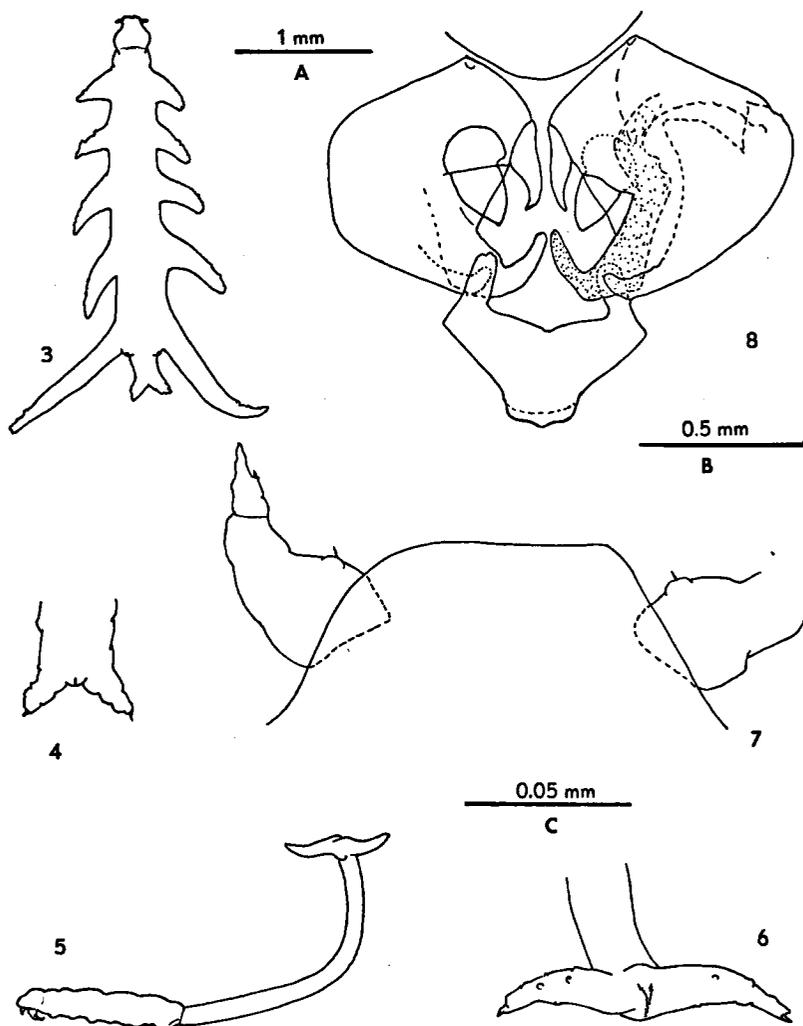
- 1a. Fifth "lateral horn" bifid, giving the impression that 6 pairs of "lateral horns" are present in front of the vulvae . . . . .  
 . . . . . *C. ventrospinosa* n. sp.
- 1b. Five simple pairs of "lateral horns" in front of the vulvae . . 2
- 2a. At the base of the claw of the posterior antenna, there is a pointed process like in the  $\delta$ . Three tall middorsal processes on the metasome. . . . . *C. dorsospinosa* n. sp.

- 2b. No pointed process at the base of the antennal claw. No dorsal metasome processes, or – if present – they are very low . . . 3
- 3a. The posteriormost “lateral horn” is at least twice as long as the penultimate one . . . . . *C. brevibrachium* n. sp.
- 3b. Ultimate and penultimate “lateral horns” not so much different in length . . . . . 4
- 4a. The 3 anterior pairs of “lateral horns” very short (< diameter trunk), the 2 posterior pairs at least twice as long as the anterior ones . . . . . *C. mixtibrachium* n. sp.
- 4b. With 2 shorter and 3 longer pairs of “lateral horns”, size difference between the anterior and posterior “horns” less pronounced . . . . . 5
- 5a. Anteriormost “lateral horn” nearly twice as long as the diameter of the trunk . . . . . *C. longibrachium* n. sp.
- 5b. Length of the anteriormost “lateral horn” ranging from slightly shorter to slightly longer than the diameter of the trunk . . 6
- 6a. “Lateral horns” separated by intervals much narrower than their own diameter. With low middorsal trunk tubercles and a pair of conspicuous postvulval tubercles . *C. kristenseni* n. sp.
- 6b. “Lateral horns” separated by intervals of about their own diameter. No trunk tubercles . . . . . 7
- 7a. Caudal rami short. Body length 3.0–3.3 mm. . . . .  
. . . . . *C. mediobrachium* n. sp.
- 7b. Caudal rami of medium length. Body length 2.4 mm. . . . .  
. . . . . *C. similis* n. sp.

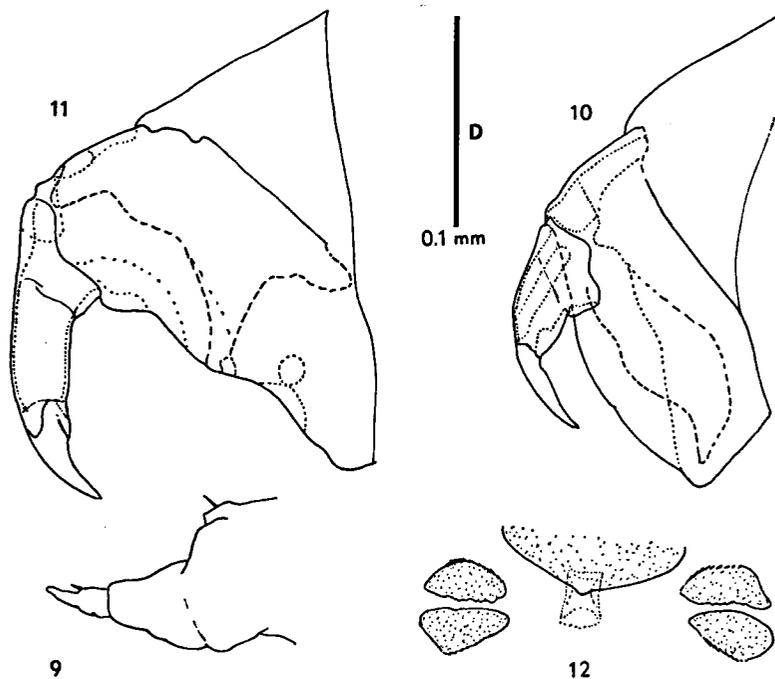
#### MALES

- 1b. Anterior branches of sclerite  $\delta$  separated by a slit-like space. Sclerites  $\alpha$  and  $\beta$  forming a complex projecting in frontal direction beyond the maxillipedal claw. Maxilliped claw very short, almost triangular. Urosome as long as the metasome . . . . .  
. . . . . *C. dorsospinosa* n. sp.

- 1b. Anterior branches of oral sclerite  $\delta$  enclosing a roughly lozenge-shaped space. Complex of sclerites  $\alpha$  and  $\beta$  not so much projecting in anterior direction. Maxilliped claw really claw-like. Urosome longer than the metasome . . . . . 2
- 2a. Urosome  $3\frac{1}{2}$  times as long as the metasome. Furcal rami very short (about as long as the urosomal diameter). . . . .  
. . . . . *C. ventrospinosa* n. sp.
- 2b. Urosome much shorter in relation to the metasome. Furcal rami longer . . . . . 3
- 3a. Sclerite  $\delta$  longer than wide. Arthrite shaped like a human tongue, about twice as long as wide . . . . . *C. kristenseni* n. sp.
- 3b. Sclerite  $\delta$  wider than long. Arthrite not much longer than wide 4
- 4a. Sclerite  $\delta$  with the lateral corners projecting into a narrow point . . . . . 5
- 4b. Lateral corners of sclerite  $\delta$  not produced into a sharp point. 6
- 5a. Caudal rami at least twice as long as the diameter of the urosome. Arthrite shaped like the pointed end of a lemon . . . . .  
. . . . . *C. mediobrachium* n. sp.
- 5b. Caudal rami shorter. Arthrite almost semicircular . . . . .  
. . . . . *C. similis* n. sp.
- 6a. Median projection of sclerite  $\beta$  not reaching beyond the angular bend of sclerite  $\alpha$  . . . . . 7
- 6b. Median projection of sclerite  $\beta$  very elongated, running parallel with the anteriorly bent branch of sclerite  $\alpha$  . . . . .  
. . . . . *C. mixtibrachium* n. sp.
- 7a. Posterior half of sclerite  $\delta$  very heavy. Anterior, incurving arms of sclerite  $\delta$  heavy . . . . . *C. brevibrachium* n. sp.
- 7b. Posterior half of sclerite  $\delta$  "normal". Anterior, converging arms of sclerite  $\delta$  thin. . . . . *C. longibrachium* n. sp.



Figs. 3–8. *Corallovidia brevibrachium* n.sp. (from *Diploria labyrinthiformis*). – 3, female, dorsal (scale A); 4, caudal rami, ♀, dorsal (B); 5, male, from the left (A); 6, caudal rami, ♂, dorsal (B); 7, frontal part of cephalosome, with left anterior antenna, ♂ (C); 8, oral area, ♂, ventral (C).



Figs. 9–12. *Corallovexia brevibrachium* n.sp. (from *Diploria labyrinthiformis*). – 9, anterior antenna, ♀ (scale C); 10, posterior antenna, ♀ (C); 11, posterior antenna, ♂ (C); 12, labrum and maxillae 1 and 2, in situ, ventral, ♀ (D).

### *Corallovexia brevibrachium* n. sp.

(Figs. 3–12)

**Material.** – 103 ♀, 113 ♂, all from *Diploria labyrinthiformis* (Linnaeus), from different localities (Piscadera Bay; about 500 m W. of Piscadera; and Blauw Bay), depths 4–6 m. Type lot: “blue edge”, Piscadera Bay, 5 m.

**Female.** – Total length (frontal margin cephalosome to tip furcal rami) 2.5–3.2 mm. Body and “lateral horns” less tuberculated than in most other species. “Lateral horns” 1 and 2 shorter than the diameter of the trunk, 3 about as long as, and 4 slightly longer than that diameter. Each of the “horns” 1 to 4 has a convex anterior margin and a straight, or slightly concave, posterior margin. “Horn”

5 more than twice as long as "horn" 4, not strongly curved. Caudal rami very short, shorter than the diameter of the urosome.

Basal part of A1 with a large swelling or tubercle, bearing a spinule. The A2 claw is very slender, devoid of an internal spiniform process. The two pairs of rudimentary mouth-parts and the presence of rudimentary P1 and P2 are in agreement with the diagnosis of the genus, and the family, respectively.

Male. — Total length 3.5–4.0 mm (hard to measure because of the upturned attitude of the urosome). Caudal rami long, about twice as long as the diameter of the urosome. Urosome almost devoid of cuticular tubercles.

A1 similar to that in female. A2 with a slender endopod, and with distinct sexual dimorphism in the structure of the claw (viz., the presence of a spiniform and of a rounded process at the proximal articulation of the claw).

Maxilliped claw not very heavy. Arthrite pointed (shaped like the pointed end of a lemon). Sclerite  $\gamma$  semicircular. Sclerite  $\beta$  not reaching the place where sclerite  $\alpha$  bends sharply back in anterior direction. Sclerite  $\delta$  not very wide, posterior portion and anterior arms heavy; lateral corners not produced, forming an apical angle of about  $90^\circ$ .

REMARKS. — The female is easily recognizable by the configuration of the "lateral horns", viz. 4 short and 1 very long pair, by which character it is distinguished from all other species. (The proposed specific name alludes to this character.) In the configuration of the oral area, the male strongly resembles *C. mixtibrachium* and *C. longibrachium*, but differs in details of the shape of the various sclerites.

This is the only member of the family found in *Diploria labyrinthiformis*. It is sometimes rather numerous, but in most colonies it is rare.

**Corallovexia longibrachium** n. sp.

(Figs. 13–19)

**Material.** – 58 ♀, 150+ ♂, 3 juveniles, from *Manicina areolata* (Linnaeus) f. *mayori* (typical host), about 500 m W. of Piscadera, in depths from 9 to 15 m. Found in the same host in Blauw Bay, 4 m.

7 ♀, 2 ♂, 1 juv., from *Colpophyllia natans* (Müller), about 500 m W. of Piscadera, depth 10 m.

5 ♀, 5 ♂, from *Diploria strigosa* (Dana), about 500 m W. of Piscadera, depth 5–6 m; 3 ♂ in the same host, Blauw Bay, in 4 m.

**Female.** – Total length (to tip of caudal rami) 3.0–3.1 mm. All “lateral horns” very long, very much longer than the diameter of the trunk. Caudal rami also rather long. “Horns” 1 and 2 still almost straight, 3 and 4 gently curved backward, 5 curved or bent in a more irregular way.

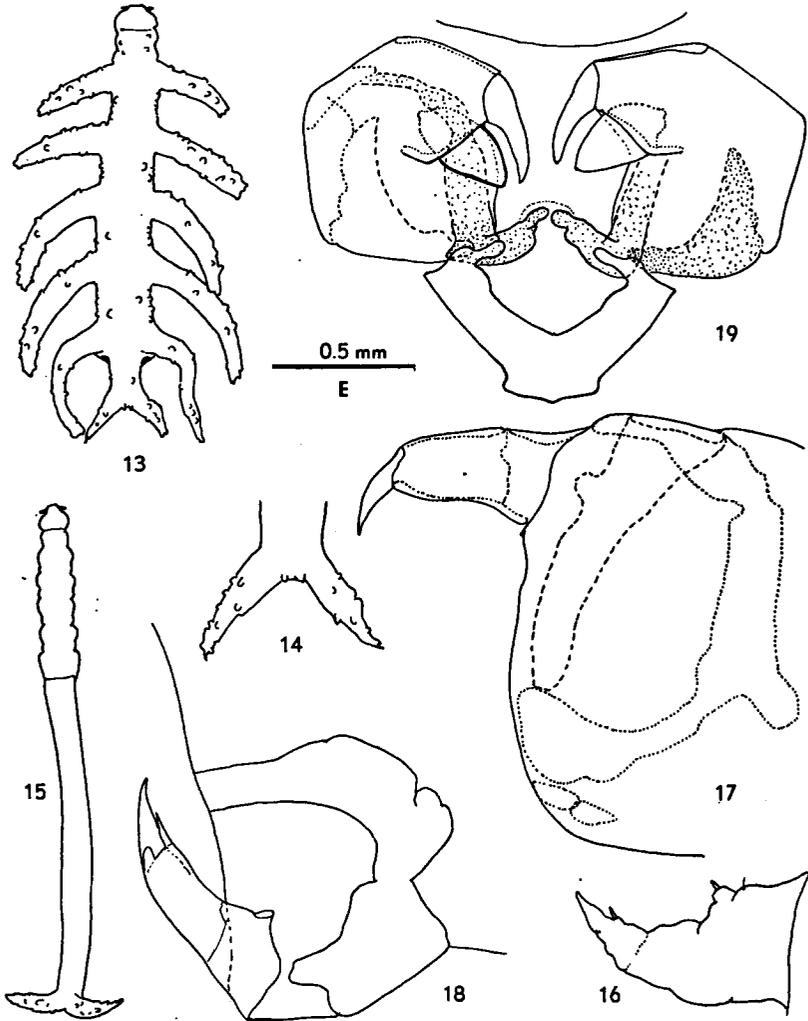
Anterior antenna with 1 smaller and 1 larger spinule on the anterior margin of its swollen basal part, the latter implanted on a marked tubercle. Posterior antenna with a rather slender endopod; claw of medium slenderness, without proximal denticle.

**Male.** – Total length 3.5–3.7 mm. Urosome about twice as long as the cephalosome. Caudal rami rather clumsy, but twice as long as the diameter of the urosome.

Posterior antenna: endopod more slender than in female; claw with a slender spiniform process at the inner margin, and a rounded one at the outer margin.

Maxilliped claw slender, rather thin. Arthrite pointed. Sclerite  $\gamma$  shaped like the end of a lemon, shorter than the arthrite. Sclerite  $\beta$  shaped like a boomerang, its medially directed arm is shorter than in most other species and does not reach the angular bend of sclerite  $\alpha$ . Hence, sclerite  $\alpha$  is the only sclerite contributing significantly to the formation of the prehensile complex. Sclerite  $\delta$  wider than long; anterior, converging arms short and thin; lateral corners not produced, apical angle of some 70°.

**Remarks.** – Reasonably common in *Manicina*, where it is almost the exclusive endoparasite of this family (in one instance only,



Figs. 13–19. *Corallovexia longibrachium* n.sp. (from *Diploria strigosa*). – 13, female, dorsal (scale A); 14, caudal rami, ♀, dorsal (E); 15, male, dorsal (A); 16, anterior antenna, ♀ (C); 17, posterior antenna, ♀ (C); 18, posterior antenna, ♂ (C); 19, oral area, ♂, ventral (C).

3 ♀♀ of another *Corallovesia*, possibly *mediobranchium*, have been found along with the present species).

In the other two hosts, *Diploria strigosa* and *Colpophyllia natans*, *C. longibranchium* occurs only occasionally, and it is outnumbered in these hosts by other members of the Corallovesiidae.

*C. longibranchium* is characterized in the female sex by the presence of 5 pairs of long and slender pereionites (hence the specific name). The male is rather similar to those of *C. mixtibranchium* and *C. brevisbranchium*, but differs chiefly from those in the shape of sclerite  $\beta$ .

### ***Corallovesia mixtibranchium* n. sp.**

(Figs. 20–27)

**Female.** – 49 ♀, 14 ♂, from *Colpophyllia natans* (Müller), Santa Marta Bay, in front of Coral Cliff Hotel, depth 5–6 m (type lot).

12 ♀, 7 ♂, same host, about 500 m W. of Piscadera, depth 10 m.

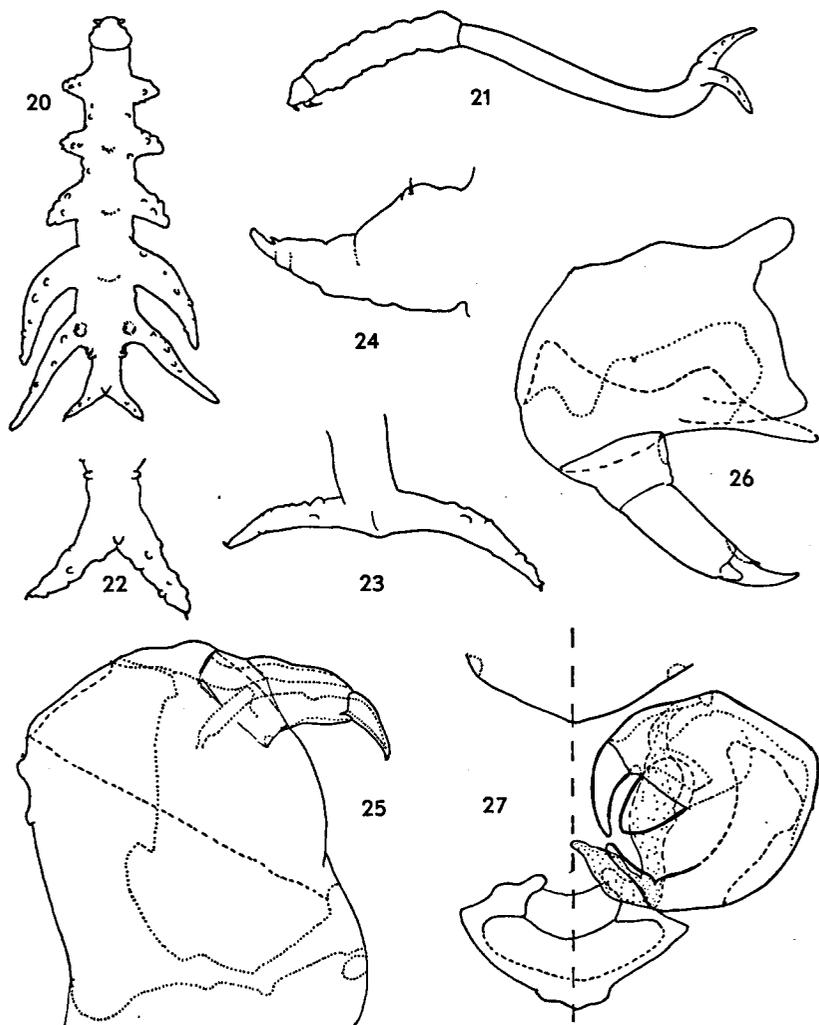
**Female.** – Total length (to tip of caudal rami) 2.9–3.2 mm. Anterior three pairs of “lateral horns” very short (about as long as wide, and much shorter than the diameter of the trunk), triangular in outline. “Lateral horns” 4 and 5 very much longer, 4 more heavy than 5. Three very low, vestigial middorsal trunk tubercles are present at the level of metasome segments 2, 3, and 4. Two distinct dorsal swellings occur at the implantation of the 5th pair of “horns”. Caudal rami rather long, slender.

Anterior antenna: basal part not much swollen, bearing 1 setule. Posterior antenna: endopodite rather thickset; claw not very slender, without basal projections.

**Male.** – Total length 3.3–3.5 mm. Urosome slightly less than twice as long as the metasome. Caudal rami very slender, between 3 and 4 times as long as the diameter of the urosome.

Posterior antenna: endopodite slender; a spiniform and a rounded projection are present at the base of the claw.

Maxilliped claw rather heavy, regularly curved. Arthrite pointedly oval; sclerite  $\gamma$  semicircular. Sclerite  $\beta$  with a very elongated, nar-



Figs. 20–27. *Coralloverxia mixtibrachium* n.sp. (from *Colpophyllia natans*). – 20, female, dorsal (scale A); 21, male, from the left (A); 22, caudal rami, ♀, dorsal (E); 23, caudal rami, ♂, dorsal (E); 24, anterior antenna, ♀ (C); 25, posterior antenna, ♀ (C); 26, posterior antenna, ♂ (C); 27, oral area, ♂, ventral (C).

row, median projecting part, reaching almost as far as the tip of the recurved end of sclerite  $\alpha$ . Sclerite  $\delta$  wide in relation to its length.

**Remarks.** – The female is well-characterized by having 3 very short and 2 very long “lateral horns”. The male has very long caudal rami. The general organisation of the  $\delta$  oral complex resembles that of the two previous species, although the detailed morphology of the sclerites  $\beta$  and  $\delta$  offers some fine distinctions.

This is not the only member of the family found in *Colpophyllia natans*. *Corallovidia kristenseni* and *C. longibrachium* occur in the same host, but the 3 species have never been found together in one and the same coral colony. This might indicate that they are mutually exclusive, but also that *Colpophyllia natans* consists in reality of more than one sibling species.

### ***Corallovidia mediobrachium* n. sp.**

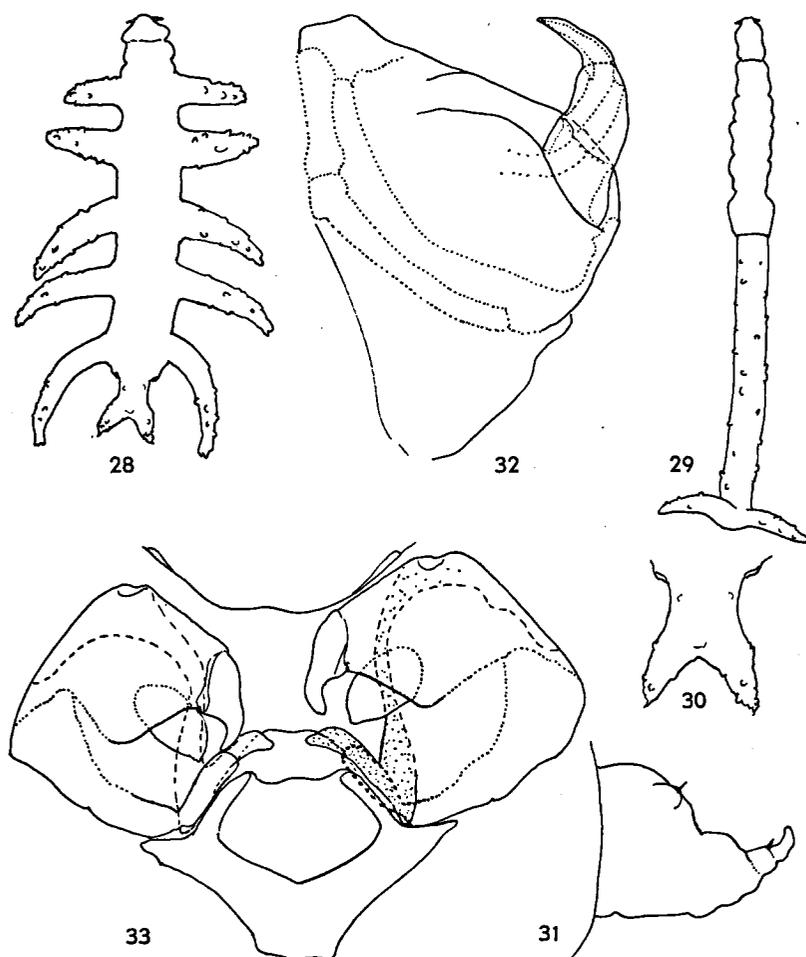
(Figs. 28–33, 49)

**Material.** – 30 ♀, 3 ♂, from *Diploria strigosa* (Dana), from different localities: Piscadera Bay in front of the Caribbean Marine Biological Institute, depth 0.30 m (type locality); about 500 m W. of Piscadera, depth 3–4 m; Jan Thiel Bay, depth 1–2 m.

11 ♀, 3 ♂, from *Diploria clivosa* (Ellis & Solander), from Piscadera Bay, Blauw Bay, Jan Thiel Bay, depths from less than 0.5 to 4 m.

**Female.** – Total length (to tip of caudal rami) 3.0–3.3 mm. Very heavy and thick-set in general appearance. “Lateral horns” 1, 2, and 3 gradually increasing in length, each of medium length; “horns” 1 and 2 straight, “horns” 3 and 4 slightly curved, “horn” 5 more so. Caudal rami very short, almost triangular. Trunk without dorsal or ventral processes, but small cuticular tubercles are scattered over the lateral “horns” and caudal rami.

Anterior antenna with a spiniferous swelling on the gonflated basal part. Posterior antenna with not very slender endopodite and ditto claw; no projections at the base of the claw.



Figs. 28–33. *Corallovidia mediobranchium* n.sp. (from *Diploria strigosa*). – 28, female, dorsal (scale A); 29, male, dorsal (A); 30, caudal rami, ♀, dorsal (E); 31, anterior antenna, ♂ (C); 32, posterior antenna, ♀ (C); 33, oral area, ♂, ventral (C).

Male. – Total length 3.4–4.0 mm. Urosome slightly less than twice as long as the metasome. Caudal rami slightly more than twice as long as the diameter of the urosome.

Posterior antenna with a slender endopodite. Claw with 1 spine-like and 1 lobe-like projection.

Maxilliped claw very robust, strongly curved. Arthrite shaped like the pointed end of a lemon. Sclerite  $\alpha$  strongly hooked. Sclerite  $\beta$  with a long medially directed arm. Sclerite  $\delta$  wide, lateral corners produced into a narrow, projecting point; anterior, converging arms long and slender.

Remarks. — The thick-set female, and the relative lengths of the “lateral horns”, distinguish this species from the three foregoing, but less clearly from the two next species. From the latter two, the ornamentation of the dorsum of the trunk and the length of the caudal rami, may serve as discriminating characters. In male, the produced lateral corners of sclerite  $\delta$  and the heavy maxilliped claw distinguish *C. mediobrachium* from all other members of the genus, except *C. similis*. The latter, however, has short caudal rami in male.

*C. mediobrachium* occurs regularly in the two closely related shallow-water species of *Diploria*, *strigosa* and *clivosa*, never however in great numbers. *D. strigosa* also harbours *C. longibrachium*, but that species hardly can be confused with *C. mediobrachium*.

### ***Corallovexia similis* n. sp.**

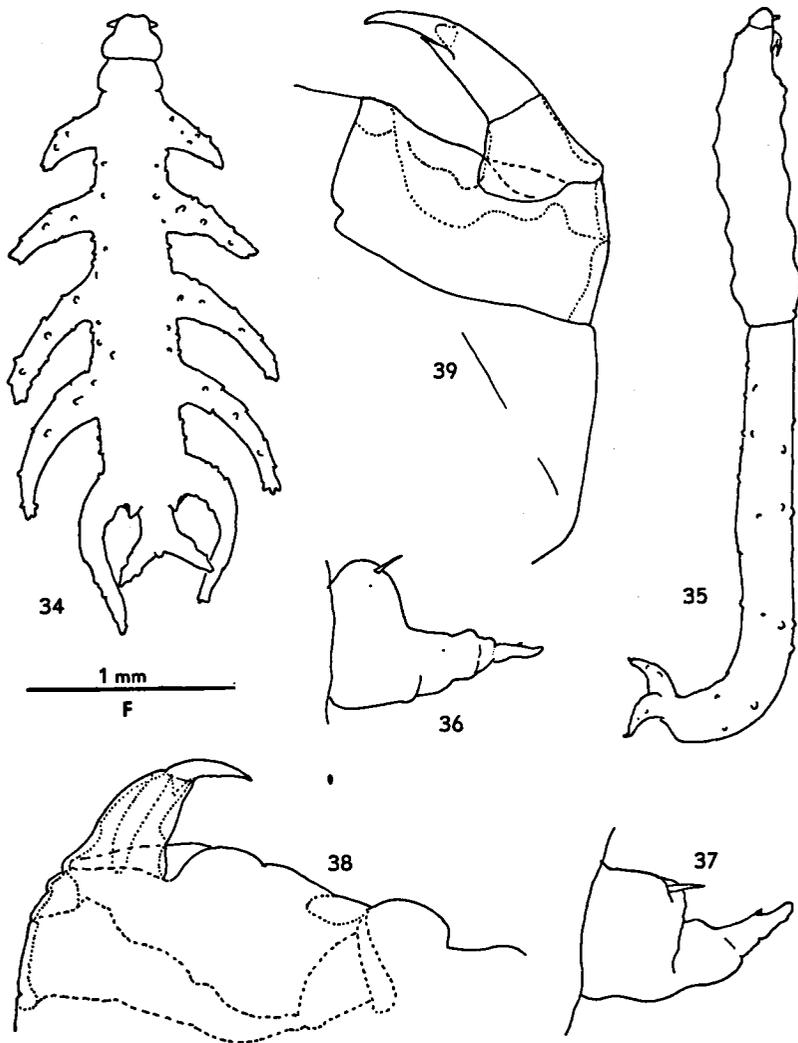
(Figs. 34–39, 50)

Material. — 1 ♀, 1 ♂, from *Acropora palmata* (Lamarck), Jan Thiel Bay, 1½–2 m depth (holo- and allotype).

Female. — Total length 2.4 mm. First pair of “lateral horns” shorter than the diameter of the trunk, other pairs longer. “Lateral horns” 1 to 4 gently curved backward, 5th pair more strongly and more irregularly curved. Caudal rami rather long.

Anterior antenna with a strong spine on the swollen basal portion. Posterior antenna with a very robust endopodite and a rather thin claw.

Male. — Total length 3.4 mm. Urosome distinctly less than twice as long as the metasome. Caudal rami short, less than 1½ times the urosomal diameter.



Figs. 34–39. *Corallovexia similis* n.sp. (from *Acropora palmata*). – 34, female, dorsal (scale F); 35, male, dorsal (F); 36, anterior antenna, ♀ (C); 37, anterior antenna, ♂ (C); 38, posterior antenna, ♀ (C); 39, posterior antenna, ♂ (C).

Posterior antenna with slender endopodite; claw with a spiniform and a lobiform process at its base.

Maxilliped claw very robust, strongly curved. Arthrite shorter than wide, almost semicircular. Sclerite  $\beta$  almost not participating in the formation of the prehensile complex. Sclerite  $\delta$  with its lateral corners very strongly produced into a sharp point.

**Remarks.** — This is a very rare species. Several pails of *Acropora* have been washed, and only the present two specimens have been found. The female resembles in general shape somewhat *C. mediobrachium*, but is smaller and has longer caudal rami. The male is characterized by a combination of characters: short caudal rami, laterally produced corners of sclerite  $\delta$ , strongly curved maxilliped claw, semicircular arthrite. More material of this species will be necessary to study its variability, etc. The proposed specific name alludes to the close resemblance to *C. mediobrachium*, at least in the female.

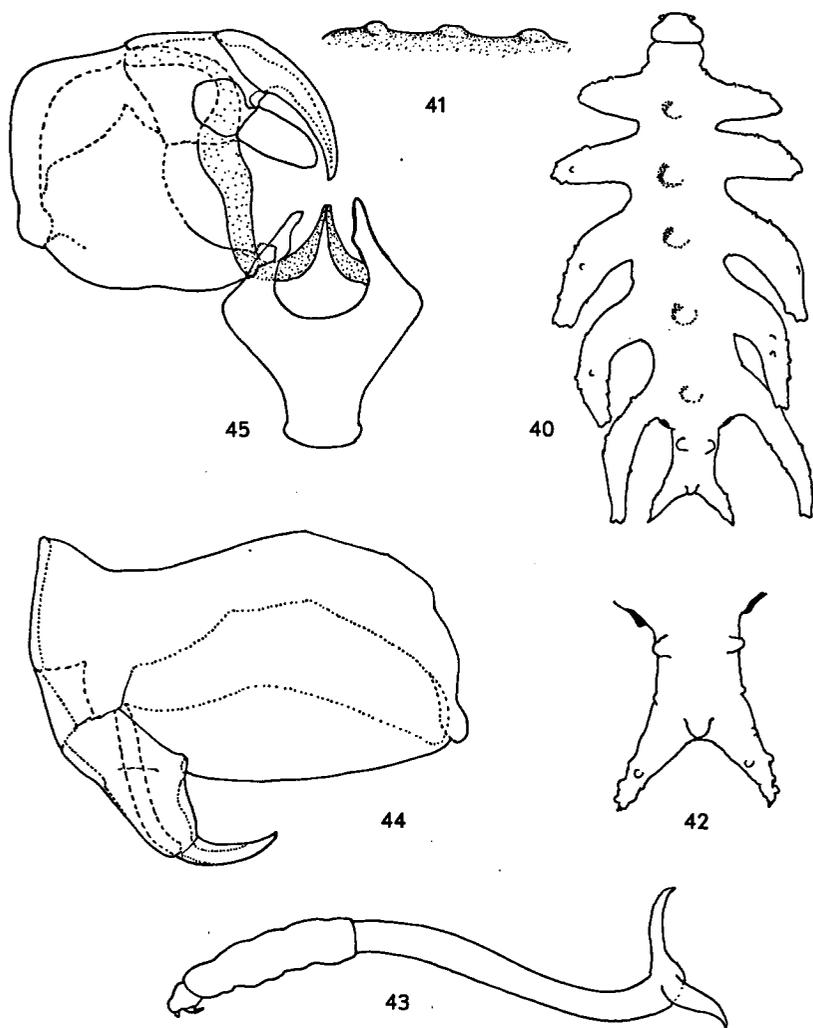
### ***Corallovidia kristenseni* n. sp.**

(Figs. 40–48)

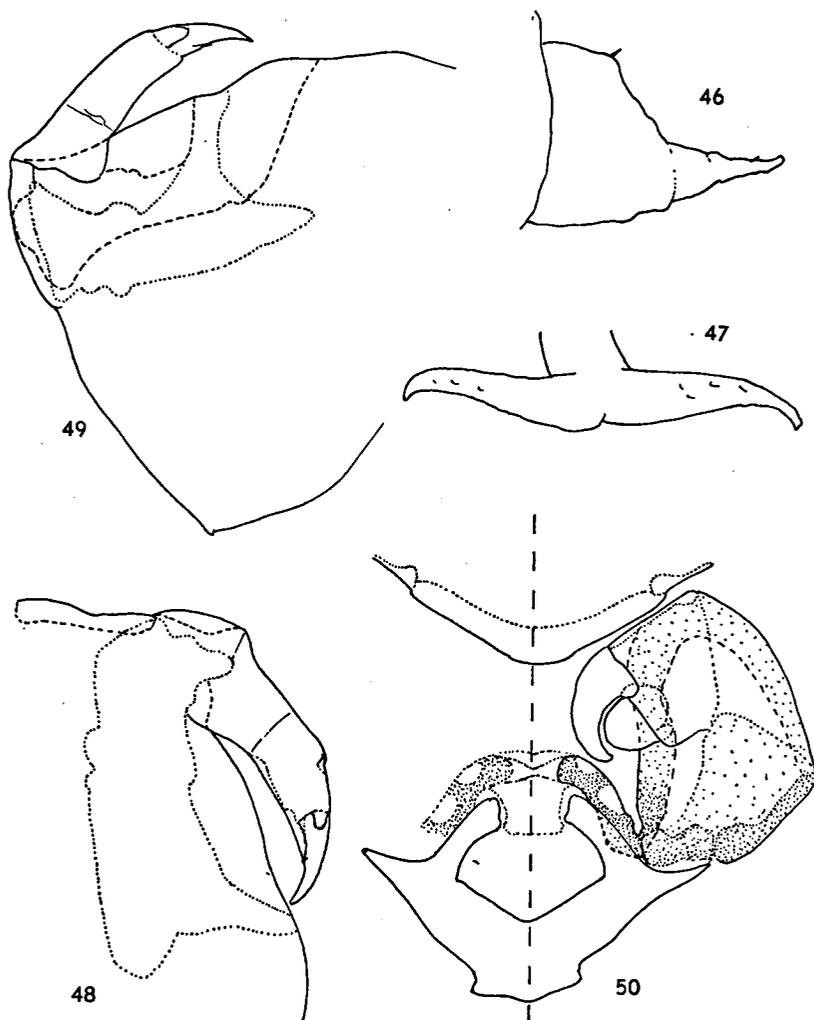
**Material.** — 55 ♀, 21 ♂, from *Colpophyllia natans* (Müller), about 500 m W. of Piscadera, depth 9 m (type lot); moreover 4 ♀, 1 ♂, from the same host, Santa Marta Bay, depth 5–6 m.

**Female.** — Total length (to tip of caudal rami) 3.5–4.1 mm. General appearance particularly heavy; the “lateral horns” resemble those in *C. mediobrachium*, but are placed closer together, so that the interval between the “horns” is less than their own diameter. In the middorsal line, the trunk carries 5 flat tubercles. Behind the vulvae, another pair of dorsolateral tubercles is found. Caudal rami rather long.

Anterior antenna with strongly swollen, more or less trapezoidal, basal part, armed with 1 anterior spinule; distal part narrowly produced. Posterior antenna with a tapering endopodite, and a slender, slightly curved claw, devoid of processes.



Figs. 40–45. *Corallovexia kristenseni* n.sp. (from *Colpophyllia natans*). – 40, female, dorsal (scale A); 41, contour of ♀ dorsum, free-hand sketch; 42, caudal rami, ♀, dorsal (E); 43, male, from the left (A); 44, posterior antenna, ♀ (C); 45, oral area, ♂, ventral (C).



Figs. 46–48. *Corallovexia kristenseni* n.sp. (from *Colpophyllia natans*). – 46, anterior antenna, ♂ (scale C); 47, caudal rami, ♂, dorsal (E); 48, posterior antenna, ♂ (C).  
 Fig. 49. *Corallovexia mediobrachium* n.sp. (from *Diploria strigosa*). – Posterior antenna, ♂ (scale C).  
 Fig. 50. *Corallovexia similis* n.sp. (from *Acropora palmata*). – Oral area, ♂, ventral (scale C).

Male. — Total length 4.0–4.2 mm. Urosome about twice as long as the metasome. Caudal rami long, about  $2\frac{1}{2}$  times as long as the diameter of the urosome.

Posterior antenna with slender endopodite; claw with 2 basal processes, one spiniform, one lobiform.

Maxilliped claw particularly slender. Arthrite very elongated, almost twice as long as wide. Sclerite  $\gamma$  almost circular. Sclerite  $\alpha$  with a slender recurved arm. Sclerite  $\beta$  hardly at all contributing to the prehensile complex. Sclerite  $\delta$  longer than wide, shape not unlike a tuning-fork.

Remarks. — The thick-set habit and the presence of (though low) dorsal trunk tubercles characterize the female. In the other sex, the long maxilliped claw and long arthrite, as well as the particular shape of sclerite  $\delta$  are fully distinctive. Other species occurring in the same host, *Colpophyllia*, are *C. mixtibrachium* and *C. longibrachium* (see remarks under the former).

It is with pleasure that I dedicate this new species to Dr. INGVAR KRISTENSEN, the present Director of the Caribbean Marine Biological Institute, in recognition of many signs of friendship shown by him during my stay at his premises.

### *Corallovidia ventrospinosa* n. sp.

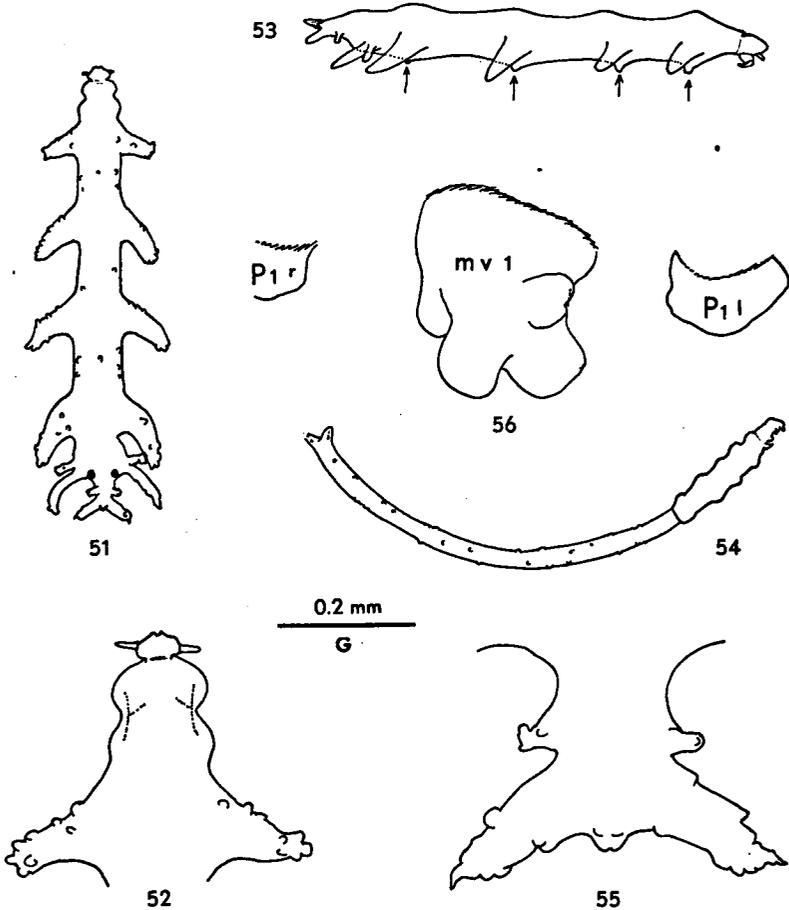
(Figs. 51–62)

Material. — 9 ♀, 5 ♂, from 4 colonies of *Montastraea brasiliana* (Verrill), about 500 m W. of Piscadera, depths 22–40 m (type batch).

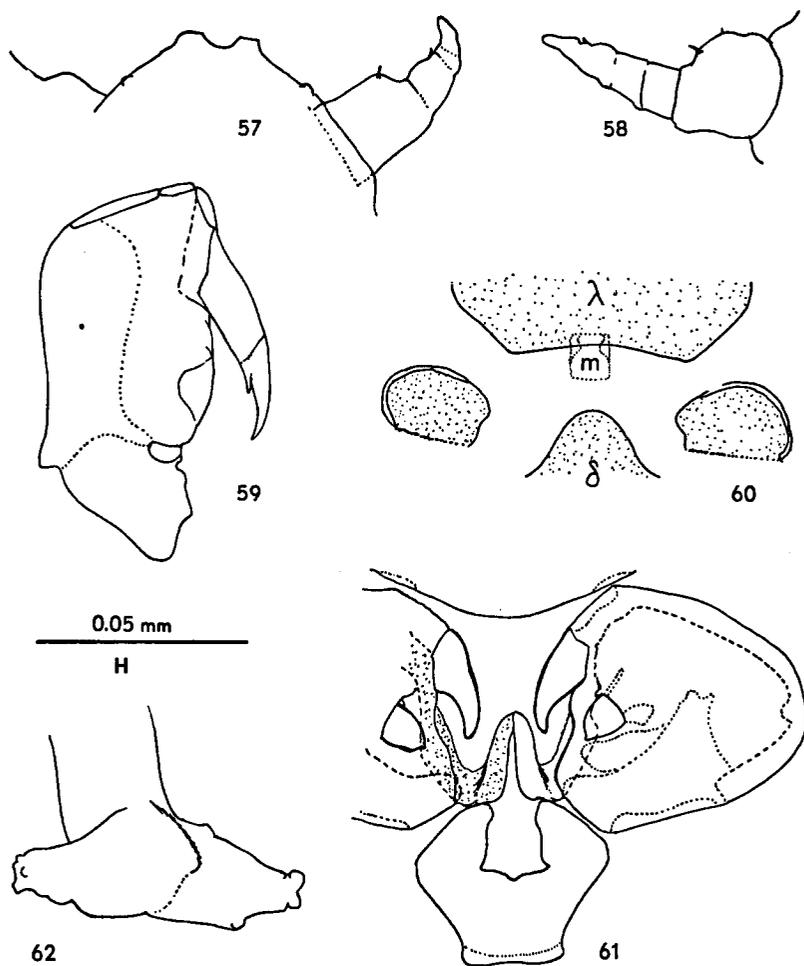
8 ♀, 12 ♂, from 8 colonies of *Montastraea cavernosa* (Linnaeus), same locality as previous record, depths 4–40 m.

Female. — Total length (to tip of caudal rami) 3.2–3.5 mm. “Lateral horns” 1 to 4 widely spaced, nearly straight, pointing slightly backwards. “Lateral horn” 5 biramous, the dorsoanterior branch short and straight, the ventroposterior one much longer, curved. The vulvae are found at the base of the longer branch. Between the vulvae and the cylindrical caudal rami, a pair of short lateral processes arises (pereionites 6?). The dorsum shows, in the shape of swellings, the segmentation of the trunk. On the ventral

side of the trunk, at the level of the "horns" 1 to 4, a small but distinct knob arises in the midline, each knob being (under stronger magnification) tuberculated. Cephalosome much narrower than the



Figs. 51–56. *Corallovidia ventrospinosa* n.sp. (from *Montastraea brasiliiana*). – 51, female, dorsal (scale A); 52, anterior part of the trunk, ♀, dorsal (B); 53, female, from the right (A), midventral processes indicated by arrows; 54, male, from the right (A); 55, caudal rami, ♀, dorsal (G); 56, midventral process (mv1), and rudiments of left and right first legs (P1 l and P1 r), in ventral view – the anterior side faces the top of the illustration (scale D).



Figs. 57–62. *Coralloverxia ventrospinoso* n.sp. (from *Montastraea brasiliiana*). – 57, anterior margin of cephalosome, with right anterior antenna, ♂, dorsal (scale C); 58, anterior antenna, ♀ (C); 59, posterior antenna, ♀ (C); 60, oral area, ♀, ventral (D) (δ = postoral midventral swelling; λ = labrum; m = oral aperture); 61, oral area, ♂, ventral (H); 62, caudal rami, ♂, dorsal (G).

metasome. "Lateral horns" and metasome covered with cuticular tubercles.

Anterior antenna with short, swollen basal part, armed with 2 minute spinules at the frontal margin. Distal part finger-shaped, relatively long.

Posterior antenna with slender endopodite; claw very slender, armed at the inner side of its proximal end with a spiniform process.

The female oral area is in so far interesting, in that it forms a kind of transition between the situations found in *Corallovexia dorsospinosa* and *Corallonoxia longicauda*. Like in the former, rudimentary maxillipeds are lacking, whereas a marked postoral swelling (possibly homologous with the male sclerite  $\delta$ ) is present. Like in *Corallonoxia*, however, mandibles are lacking. The pair of, rather conspicuous, lobes present in the oral area, are interpreted as rudiments of the posterior maxillae.

Legs 1 and 2 are present, as rudimentary lobes.

Male. – Total length 4.5–5.0 mm. Urosome very long, fully 3 times as long as the metasome. Caudal rami short, obtuse. No sexual dimorphism in anterior and posterior antennae.

Maxilliped claw heavy, curved. Arthritis relatively small, shaped like the pointed end of a lemon. Sclerite  $\alpha$  sharply recurved; sclerite  $\beta$  without strongly prolonged median arm, hardly at all participating in the formation of the prehensile complex. Sclerite  $\delta$  thick-set, with very heavy anterior arms, about as long as wide.

Remarks. – The female body shape is unmistakable (biramous 5th pair of "lateral horns", midventral trunk processes). The absence of sexual dimorphism in the posterior antennae is also noteworthy, as is the absence, in female, of rudimentary mandibles. The long male abdomen, the short caudal rami, and the shape of sclerite  $\delta$  characterize the male. Taken all together, this species is very clearly differentiated from all other members in the family. There is no possibility of confusion with the only other *Corallovexia* in the same host, *C. dorsospinosa*.

**Corallovexia dorsospinosa n. sp.**

(Figs. 63-79)

**Material.**—16 ♀, 10 ♂, from 6 colonies of *Montastraea cavernosa* (Linnaeus), about 500 m W. of Piscadera, mostly in deeper waters (34-40 m), but also 2 ♀ from 6 m depth. These samples include the type batch.

3 ♂, from 1 colony of *Montastraea brasiliiana* (Verrill), same locality, 22-24 m.

**Female.**—Total length (to tip of caudal rami) 2.7-3.0 mm. Trunk rather heavy. "Lateral horns" 1 to 4 straight, gradually, but slightly, increasing in length from anterior to posterior. "Horn" 5 much longer, snake-like curved in various directions. Caudal rami very short. The most conspicuous character of this species is the presence, on metasome segments 2, 3, and 4, of a tall middorsal process, tallest on somite 4, lowest on somite 2. Dorsal and lateral trunk processes, and caudal rami, with cuticular tubercles. Frontal margin of cephalosome with 2 tubercles. Behind the implantation of the anterior antennae, the cephalosome widens suddenly.

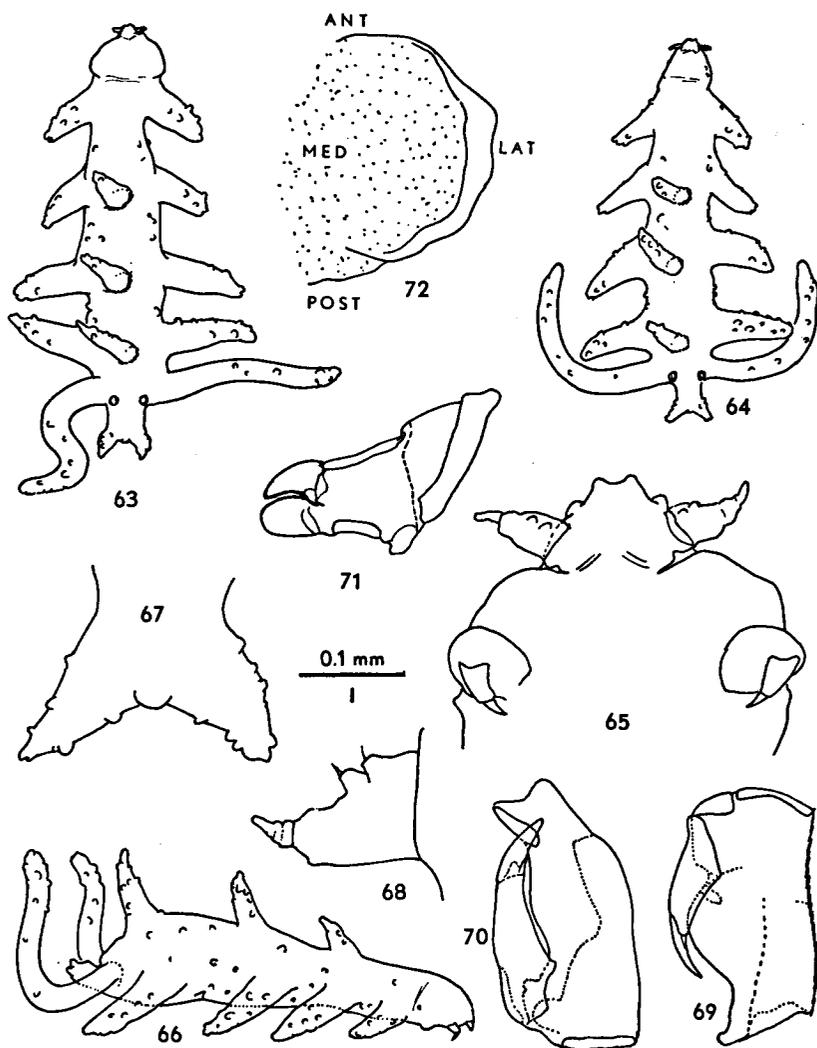
Anterior antenna with two very marked, spine-tipped tubercles on the anterior margin of the swollen basal part. Posterior antenna with a tapering, rather slender, endopodite; claw with a spiniform process at the inner side, near its proximal articulation.

Two pairs of rudimentary mouth parts and a postoral swelling are present in adult females. In a young female studied, two swellings found slightly posteriad and laterad of the rudimentary maxilla 2, seem to represent the (likewise rudimentary) maxillipeds. This young female has 2 pairs of lobe-shaped legs, which are not found back in the adult.

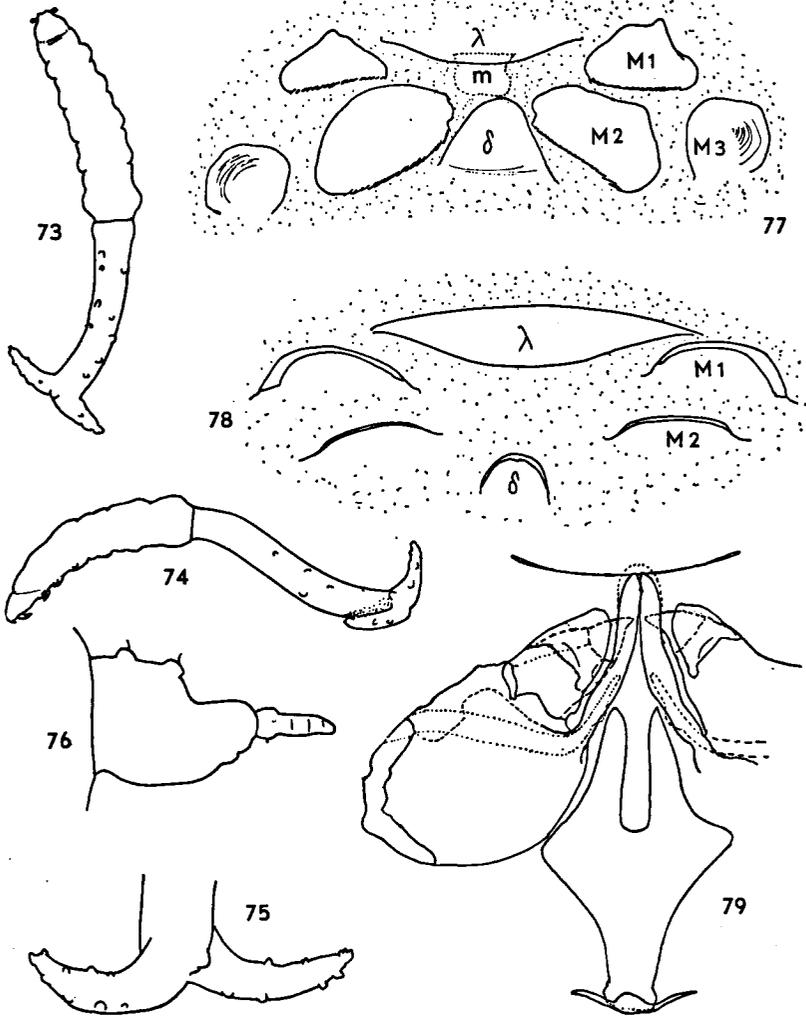
**Male.**—Total length 2.9-3.2 mm. Urosome hardly longer than the metasome. Caudal rami and urosome with distinct tubercles. Caudal rami fleshy, rather long.

Posterior antenna slightly sexually dimorph, in that the endopodite is more slender than in female.

Oral area extremely complexly built. The maxilliped claw is very short and heavy, almost triangular. The arthrite is nearly as long as the claw, ovate. The arthrite is not implanted on the medial surface



Figs. 63–72. *Corallovexia dorsospinosa* n.sp. (from *Montastraea cavernosa*). – 63, 64, two different females, dorsal (scale A); 65, cephalosome, ♀, ventral (I); 66, female, from the right (A); 67, caudal rami, ♀, dorsal (G); 68, anterior antenna, ♀ (D); 69, posterior antenna, ♀ (D); 70, posterior antenna, ♂ (D); 71, maxilliped, ♂ (C); 72, first leg of juvenile, ♀ (D) (ANT, MED, LAT, and POST, anterior, medial, lateral and posterior sides of the appendage, respectively).



Figs. 73-79. *Corallovexia dorsospinosa* n.sp. (from *Montastraea cavernosa*). - 73, male, dorsal (scale A); 74, male, lateral (A); 75, caudal rami, ♂, dorsal (B); 76, anterior antenna, ♂, showing pseudo-articulations in the distal part (C); 77, oral area, ♀ juv. (D) ( $\lambda$  = labrum; m = oral aperture;  $\delta$  = postoral midventral swelling; M1 = anterior maxilla; M2 = posterior maxilla; M3 = maxilliped); 78, oral area, ♀ adult (D) (explanation as in fig. 77); 79, oral area, ♂, ventral (C).

of the maxillipedal basipodite, as in all other species, but on the ventral surface. The prehensile complex is more strongly developed than in any other species, and its anterior tip projects beyond the tips of the – anteriorly directed – maxilliped claws. It seems to me, that this anterior tip of the prehensile complex is formed chiefly by sclerite  $\beta$  (and not by sclerite  $\alpha$  as in the other species). Sclerite  $\alpha$  is visible as a broad band running over the maxillipedal basipodite, forming a narrow anterior arm, reaching about halfway the anterior projection of sclerite  $\beta$ . Sclerite  $\delta$  is much longer than wide, lozenge-shaped, with a kind of anchor-shaped caudal end; its two anterior arms run parallel (and do not distally converge as in the other species), leaving a narrow, slit-like space between them.

Remarks. – This species has so many particularities that it cannot be confused with any other member of the family Corallovexiidae.

#### **Corallovexia dorsospinosa var. minor nov.**

(Figs. 80–82)

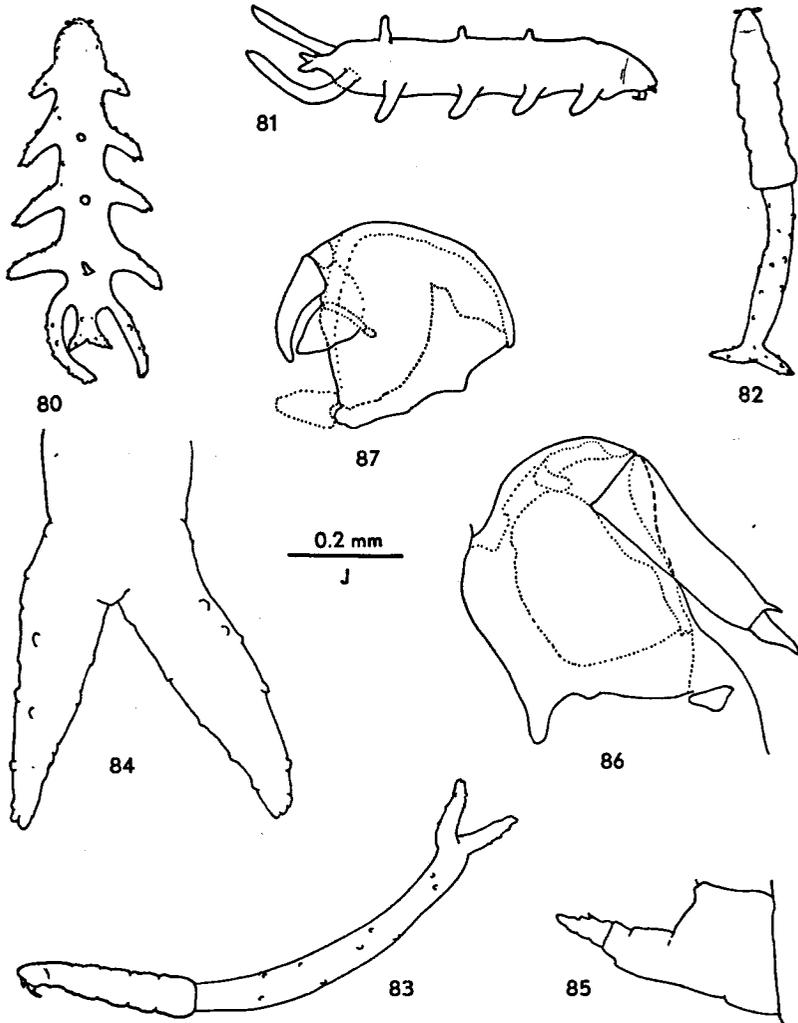
Material. – 24 ♀, 21 ♂, from *Montastraea cavernosa* (Linnaeus) (the shallow-water form with the small calices), all from a depth of 4 to 6 m, about 500 m W. of Piscadera.

Smaller than the typical form (♀ 2.2–2.8 mm, ♂ 2.5–3.0 mm). The female has much more feeble, and lower, middorsal trunk tubercles. The chief reason to consider these animals as a variety, and not as a separate species, is that the appendages, and the overall configuration of the male, in particular of its oral area, conform those of the typical form.

#### **Corallovexia spec.**

(Figs. 83–87)

Material. – 1 ♂, from *Montastraea annularis* (Ellis & Solander), pool of Hilton Hotel, Piscadera Bay, depth about 4 m.



Figs. 80–82. *Corallovidia dorsospinosa* var. *minor* nov. (from *Montastraea cavernosa*). – 80, female, dorsal (scale A); 81, female, from the right (A); 82, male, dorsal (A). Figs. 83–87. *Corallovidia* spec. (from *Montastraea annularis*). – 83, male, from the left (scale A); 84, caudal rami, ♂, dorsal (J); 85, anterior antenna, ♂ (C); 86, posterior antenna, ♂ (C), claw slightly distorted in the mounting; 87, maxilliped, ♂ (C).

Remarks. — More material will be required of this rare form. The body shape and maxilliped structure resemble those of *C. longibrachium*, but the endopodite of A2 is excessively slender. It might well represent a new species. The only male at my disposal comes from repeated washings of 12 colonies of the host; it has a total length of 4.2 mm.

### **Corallonoxia** n. gen.

Female: With 4 pairs of strongly incurved pereionites, mutually of nearly the same length, in front of the vulvae. A smaller pair of "horns", implanted on the ventral side of the urosome, is present behind the vulvae. Urosome very short, almost non-existent. Caudal rami very long, with a longer dorsal, and a shorter ventral branch. Anterior maxilla absent; posterior maxilla present, though rudimentary; maxilliped present but rudimentary.

Male: Oral sclerite  $\alpha$  not recurved in anterior direction. Sclerite  $\delta$  thin, posterior end truncated (not pointed), anterior branches running parallel; through these features, the sclerite assumes roughly a U-shape. Sclerites  $\alpha$  and  $\delta$  do not participate in the formation of a prehensile complex.

Type-species. — *Corallonoxia longicauda* n. sp. Only other species: *C. baki* n. sp.

Derivatio nominis. — The proposed generic name is a combination of letters, with clear allusions to the latin words *corallium* (= coral) and *noxius* (= noxious, harmful). The gender is feminine.

#### KEY TO THE SPECIES OF *Corallonoxia* (females only, since the male of *C. baki* is unknown)

##### FEMALES

- 1a. Postvulval, ventrolateral process much longer than wide. Medioventral abdominal process tall. Anal tubercle vestigial. . . . .  
 . . . . . *C. longicauda* n. sp.
- 1b. Postvulval, ventrolateral process, as well as the medioventral abdominal process, low, about as tall as wide. Anal tubercle tall. . . . .  
 . . . . . *C. baki* n. sp.

**Corallonoxia longicauda n. sp.**

(Figs. 88-110)

**Material.** — More than 500 specimens of both sexes. Very abundant in the coral *Meandrina meandrites* (Linnaeus). Found in the proximity of Piscadera Bay, at Blauw Bay, and at Santa Marta Bay, in depths between 3 and 30 meters. Also several young stages have been found in the same coral (vide infra). Moreover, 1 adult ♀ was found in *Dendrogyra cylindrus* Ehrenberg, collected in 5-6 m, some 500 m W. of Piscadera.

Type batch: from *Meandrina*, collected in a depth of 20 m, 500 m W. of Piscadera.

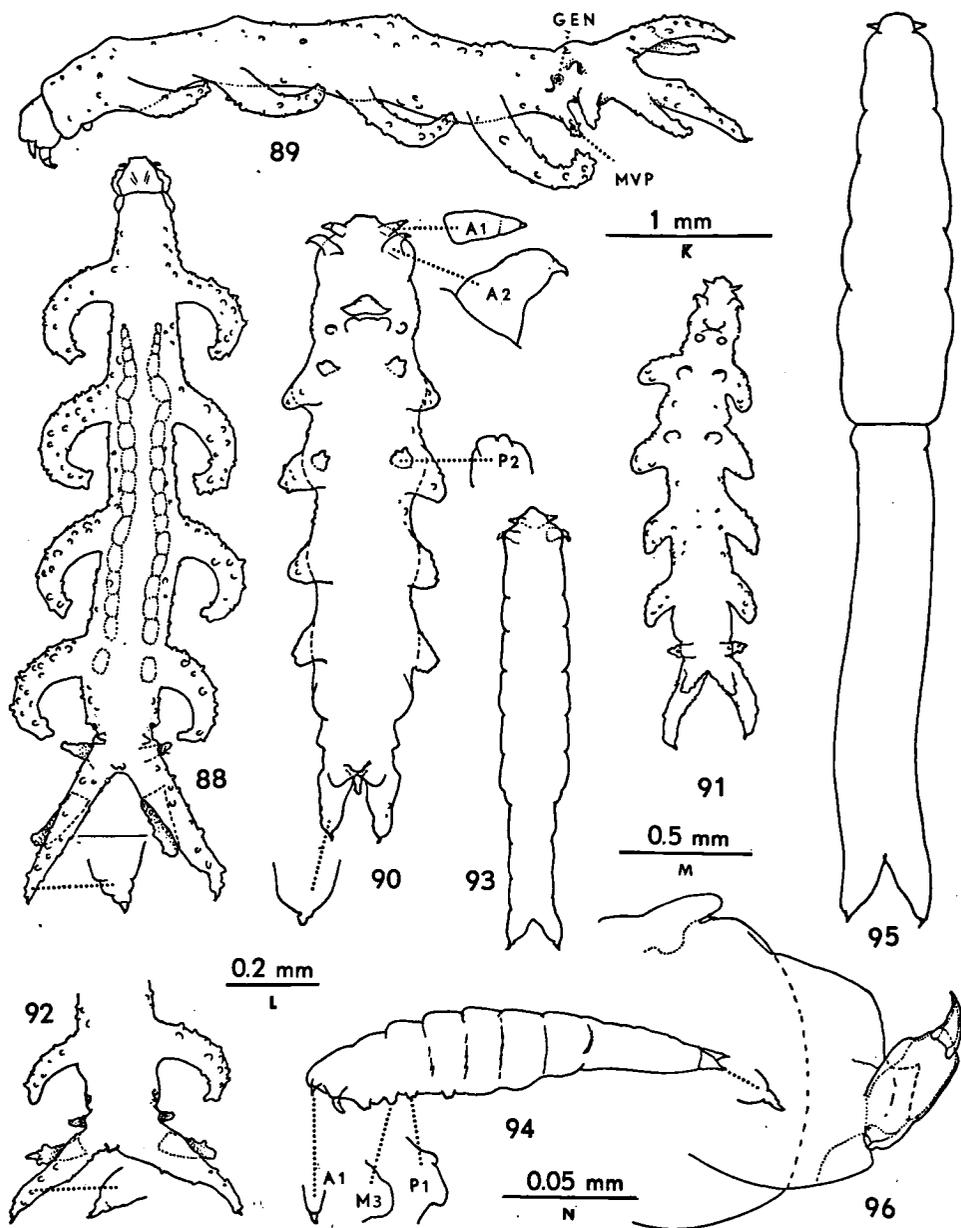
**Female.** — Total length 4.1-4.9 mm. Pereionites of metasome segments 1 to 4 assuming the shape of curved "horns", the degree of curvature being variable, in some specimens the "horns" are almost coiled up. Behind the 4th pair of pereionites, the genital pores are present. Almost immediately behind these pores, slightly more dorsad, one finds a low tubercle on either side, whereas latero-ventrally 2 more slender processes arise. In the midline of the ventral surface of the abdomen, at the level of the vulvae, a tall, tuberculated process arises.

The degree of divergence of the caudal rami is variable. The furcal branches are, in comparison with the pereionites, nearly straight. Each furcal branch is forked, the longer dorsal branch is slightly and gently curved downward, the shorter ventral branch is slightly curved upward. The dorsal branch ends into a very small, pointed process, the ventral branch is terminally rounded. The entire metasome, urosome, pereionites, and furcal branches are covered with numerous cuticular tubercles. The anus is marked by a small swelling, inside the diverging branches of the furca.

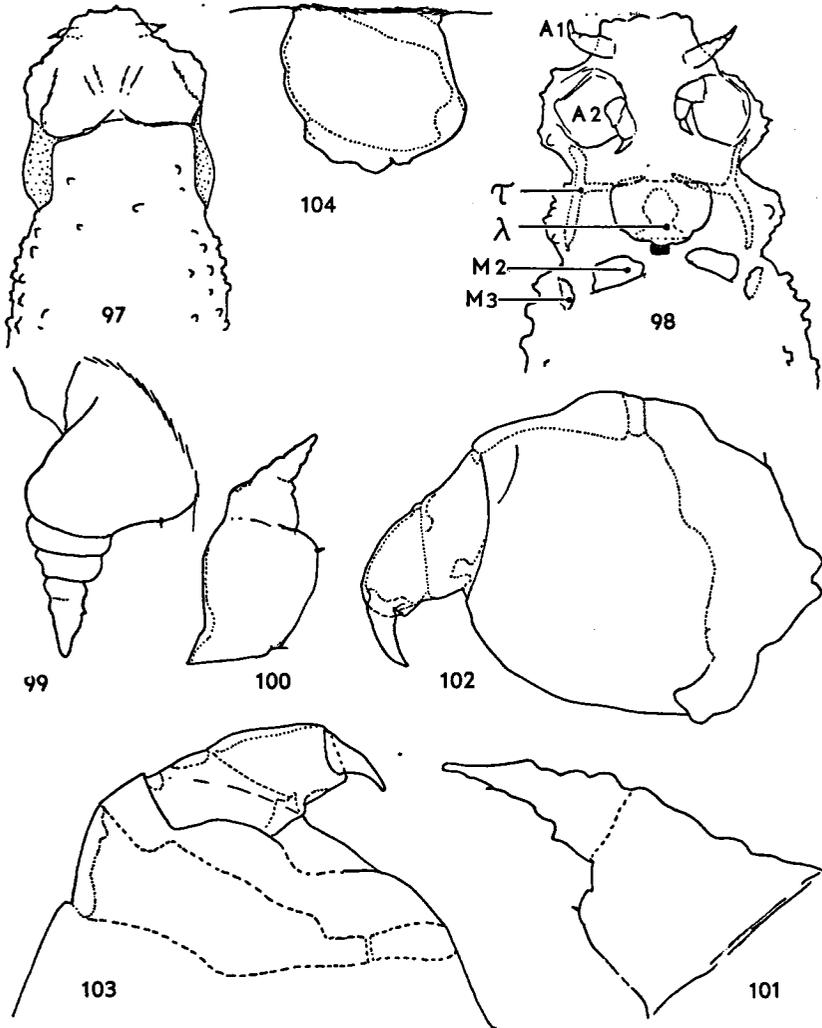
Anterior antenna indistinctly segmented; the swollen basal portion bears a minute anterior spinule; the narrowly pointed distal portion has a minute subdistal spiniform process.

Posterior antenna with a rather robust endopodite and a short, slightly curved, claw. The endopodite is subdivided, by sclerotizations into two parts assuming the character of real articles.

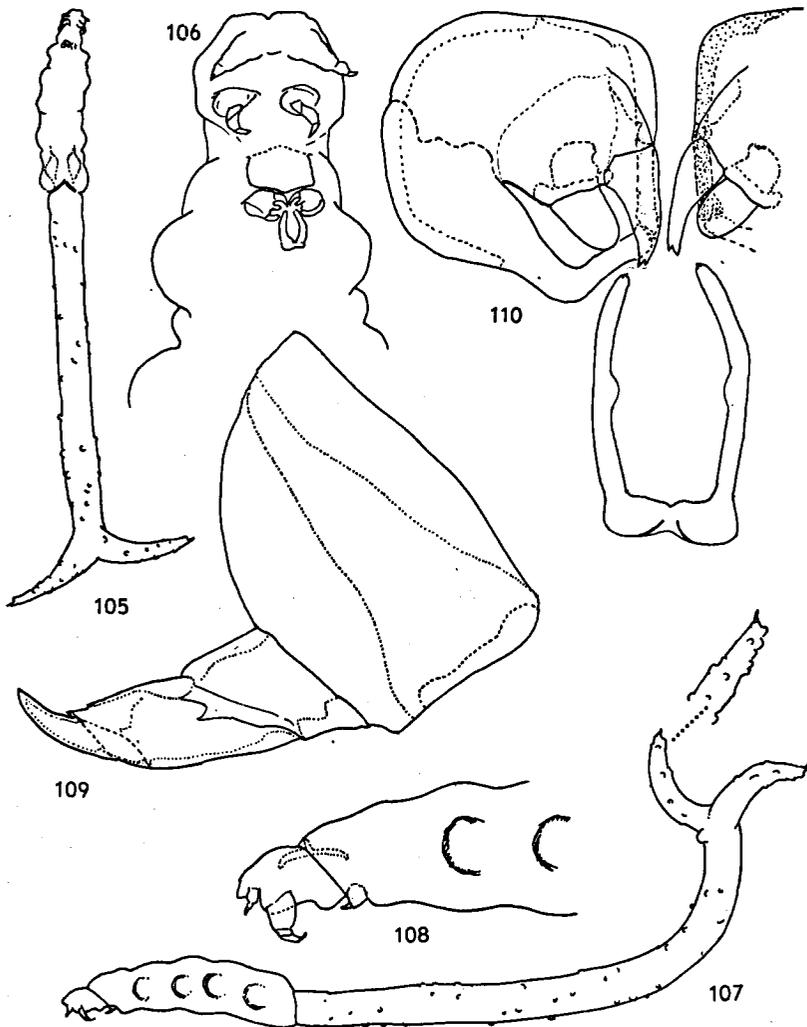
Rudiments of legs usually not visible in adults.



Figs. 88–96. *Corallonoxia longicauda* n.sp. (from *Meandrina meandrites*). – 88, female, dorsal (scale K); 89, female, from the left (K) (GEN = genital aperture; MVP = midventral papilla); 90, juvenile female, ventral (L) (A1 = anterior antenna; A2 = posterior antenna; P2 = second leg); 91, older stage of juvenile female, ventral (K); 92, caudal rami, ♀, dorsal (K); 93, juvenile male, dorsal (M); 94, same, from the left (M) (A1 = anterior antenna; M3 = maxilliped; P1 = first leg); 95, older stage of juvenile ♂, dorsal (M); 96, posterior antenna, ♀ (N).



Figs. 97–104. *Corallonoxia longicauda* n.sp. (from *Meandrina meandrites*). – 97, anterior end of trunk, ♀, dorsal (scale J); 98, same, ventral (G) (A1 = anterior antenna; A2 = posterior antenna; τ = T-shaped sclerite; λ = labrum; M2 = posterior maxilla; M3 = maxilliped); 99, anterior antenna, ♂, showing pseudoarticulation (H); 100, anterior antenna, ♀ (C); 101, anterior antenna, ♂ (H); 102, 103, posterior antenna, ♀, in different views (C); 104, posterior maxilla, ♀ (C).



Figs. 105–110. *Corallonoxia longicauda* n.sp. (from *Meandrina meandrites*). – 105, male, ventral (scale A); 106, anterior body end, ♂, ventral (G); 107, male, from the left (A); 108, anterior body end, ♂, from the left (B); 109, posterior antenna, ♂ (H); 110, oral area, ♂, ventral (H).

The smallest juvenile female has a length of 1433  $\mu\text{m}$  (Fig. 90) and is already recognizable as a female by the slightly expanded pereionites. The 5th pair of lateral processes is still undeveloped, the anal process is well-developed, the ventral branch of the furca is still bud-like.

The anterior antenna of this juvenile is tapering, vaguely 2-segmented. The posterior antenna is prehensile, but consists of a single article only. Upper and lower lips are clearly differentiated, the posterior maxilla is bud-like. The 2 anterior pairs of legs are still present, but already reduced to a rounded lobe with a bicuspidate distal end.

A juvenile female with a length of 2743  $\mu\text{m}$  is illustrated in Fig. 91. The pereionites are growing out and start curving; the 5th pair of lateral processes is present now, as is the ventral branch of the furca. The legs 1 and 2 are still visible.

Male. — Length 4.2–4.9 mm. The pereionites, which are very produced in female, are present in this sex as rounded swellings. The vermiform urosome is more than twice as long as the cephalosome and metasome combined; it bears numerous small cuticular tubercles. The urosome is usually curved upward. The caudal rami are unbranched, slightly curved, tuberculated, ending into a minute spiniform process.

Posterior antenna with a somewhat more slender endopodite than in female, more clearly 2-segmented; second endopodite segment provided on its inner margin with a minute subterminal spiniform process, and with a more distinct triangular process at the base of the claw.

Maxilliped claw with a bicuspidate tip. Arthritis much longer than wide, rounded at the tip. Sclerite  $\alpha$  narrow, straightly running in frontocaudal direction, not recurved. Sclerite  $\beta$  with an exceptionally long median process, with a V-shaped bend. Sclerite  $\gamma$  as long as wide, shorter than the arthritis. Sclerite  $\delta$  with two narrow branches, running parallel in anterior direction, having a marked swelling at about half their length; the branches do not participate in the formation of the prehensile complex.

The smallest juvenile male found was 1675  $\mu\text{m}$  long (Figs. 93–94). The segmentation of cephalo- and metasome was already clearly visible, the urosome showed traces of 3 segments. Furcal rami still short, spinelike distal process relatively large. Anterior antenna made up of 2 articles. Posterior antenna as in the young female. Maxilliped bud-like; legs 1 and 2 present as bilobate swellings.

**Abundance.** – This is the most abundant and most easily collected member of the family. It is curious that, when it is present, it is very numerous, whereas certain other colonies of *Meandrina* may be completely devoid of this parasite. I have not found any relation between presence or absence of the parasites and such factors as depth, presence or absence of zooxanthellae, shape of the host's colony, etc. The most logic explanation, not supported by any evidence, however, of the absence of parasites in some colonies and the abundance in others, might be that the parasite's eggs can hatch and the larval development can take place entirely inside the host, skipping the usual pelagic stage. In heavily parasitized colonies of *Meandrina*, rough estimates indicate that about 25% of the tissue weight is made up of parasites; such high figures make it desirable to involve the role of the parasites in biomass and production studies.

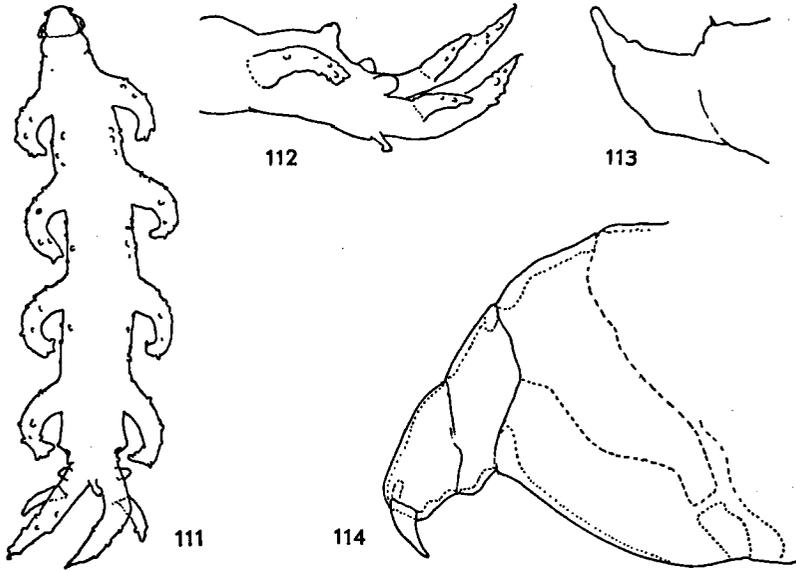
### ***Corallonoxia baki* n. sp.**

(Figs. 111–114)

**Material.** – 1 ♀ (holotype), from *Eusmilia fastigiata* (Pallas), about 500 m W. of Piscadera, depth 4 m.

1 ♀, from *Dendrogyra cylindrus* Ehrenberg, same locality, depth 5–6 m.

**Female.** – Length 4.0 mm. In general shape very similar to *Corallonoxia longicauda*, but differing in the relative lengths of various urosomal processes: the lateroventral postvulval processes are low (about as tall as wide), as is the midventral process; on the other hand, the anal tubercle is tall and finger-shaped. The antennae 1 and 2 resemble those of *C. longicauda*.



Figs. 111–114. *Corallonoxia baki* n.sp. (from *Eusmilia fastigiata*). – 111, female, dorsal (scale A); 112, posterior body end, ♀, from the right (free-hand sketch); 113, anterior antenna, ♀ (C); 114, posterior antenna, ♀ (C).

**Remarks.** – Unfortunately, the male of this species remains unknown. This is apparently a rare form, only two females of it came under my notice. The reasons that I consider these two specimens as a new species are chiefly: (a) that the specimens, though from systematically not closely related hosts, have the same morphology; (b) that one of the hosts, *Dendrogyra*, is known to lodge also the real *Corallonoxia longicauda*, so that there can be no question of a slight adaptation to a different host; and (c) that amongst the hundreds of specimens of *C. longicauda* from the typical host, *Meandrina*, not a single one shows the morphology exhibited by the present two specimens.

I have the pleasure of dedicating this rare species to Drs. ROLF BAK, in recognition of his assistance in collecting and identifying the Curaçao coral hosts.

### Corallonoxia spec.

**Material.** – 1 ♂, from *Dichocoenia stokesii* Milne Edwards & Haime, about 500 m W. of Piscadera, depth 22 m.

**Remarks.** – The male is similar to that of *Corallonoxia longicauda*, but in absence of corresponding females, I refrain from a definite identification.

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