

**REMARKS ON THE GENUS AFR OLA OPHONTE
(CRUSTACEA, COPEPODA, HARPACTICOIDA)**

Description of three new species

V Cottarelli, G Mura

► **To cite this version:**

V Cottarelli, G Mura. REMARKS ON THE GENUS AFR OLA OPHONTE (CRUSTACEA, COPEPODA, HARPACTICOIDA) Description of three new species. Vie et Milieu / Life & Environment, Observatoire Océanologique - Laboratoire Arago, 1981, 31, pp.153 - 161. hal-03010189

HAL Id: hal-03010189

<https://hal.sorbonne-universite.fr/hal-03010189>

Submitted on 17 Nov 2020

HAL is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.

REMARKS ON THE GENUS *AFROLAOPHONTE* (CRUSTACEA, COPEPODA, HARPACTICOIDA)

Description of three new species

V. COTTARELLI and G. MURA

Institute of Zoology - University Roma

HARPACTICIDES INTERSTITIELS
AFROLAOPHONTE
NOUVELLES ESPÈCES

RÉSUMÉ. - Dans cet article trois nouvelles espèces de Copépodes Harpacticoides du genre *Afrolaophonte*, dont deux originaires des Iles Maldives et la troisième de Sierra Leone sont décrites. L'étude de ce matériel a souligné l'exigence d'une révision de la diagnose du genre à laquelle ont été apportés des changements qui vont être discutés dans le texte. Une clé des espèces connues jusqu'à présent, ainsi que des éléments sur la taxonomie, les affinités et la géonomie des espèces citées seront donnés.

INTERSTITIAL HARPACTICOIDS
AFROLAOPHONTE
NEW SPECIES

ABSTRACT. - Three new species of the genus *Afrolaophonte* (Crustacea, Copepoda, Harpacticoidea) are listed and described; two are from the Maldive Islands, the third is from Sierra Leone. The data provided by the study of these three species necessitate a further review of the diagnosis of the genus and some changes, which are discussed together with some data on taxonomy and affinity of the species. Furthermore, a key to the species hitherto known is given.

In the present paper three new species of Harpacticoidea of the genus *Afrolaophonte* Chappuis (1960) are established and described; two of them were collected in interstitial littoral waters of the Maldive Islands, while the third one comes from interstitial waters of Sierra Leone. The results of our study on these specimens demonstrate the need for changes in the diagnosis of the genus; these will be given together with some remarks on the taxonomy and affinity of the discussed species. Besides, a key to the species of the genus hitherto known, is given together with some data on their geography.

small island of Dunidu (Male Atoll, Republic of Maldives, Indian Ocean).

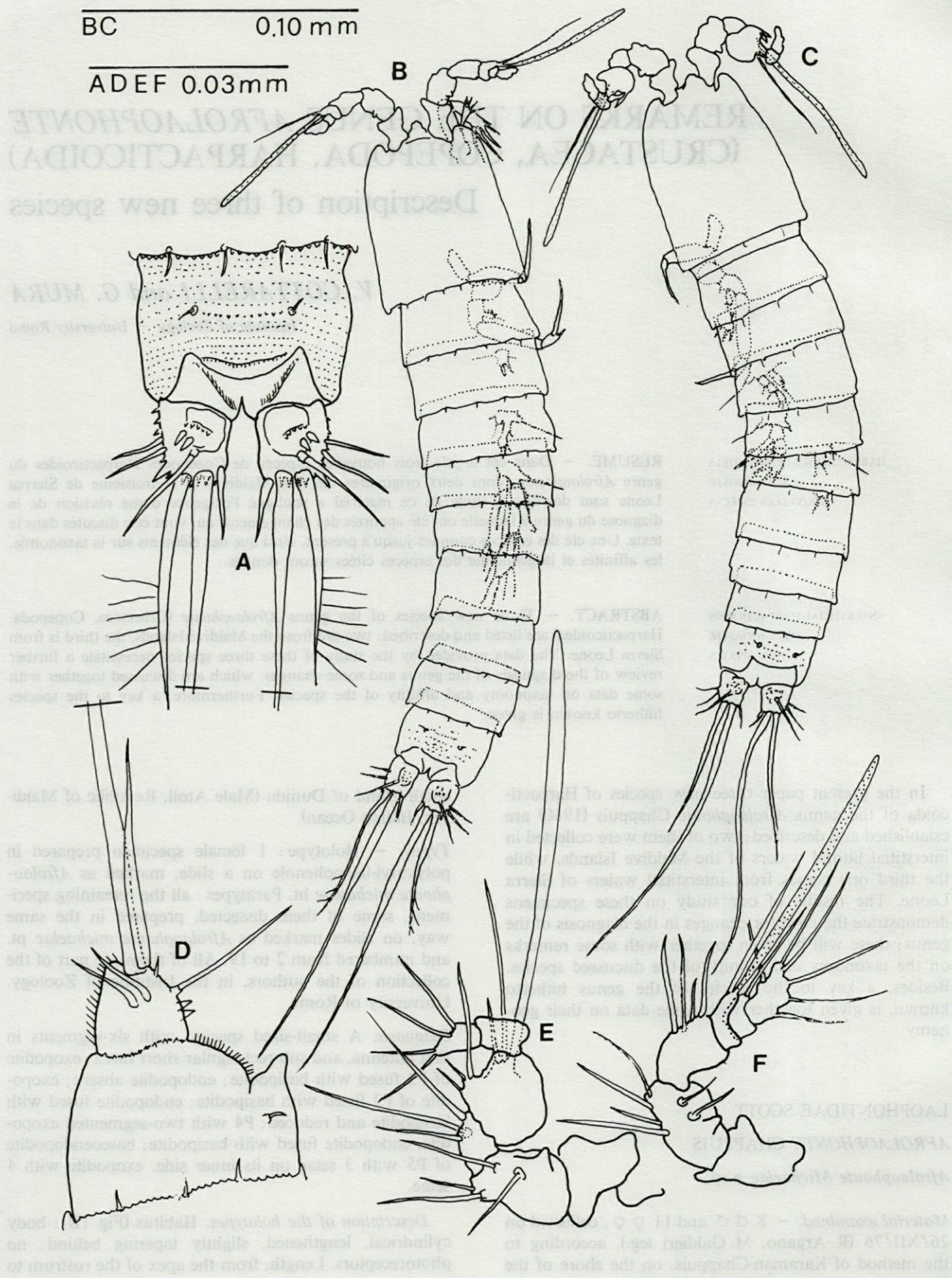
Types. - Holotype: 1 female specimen prepared in polyvinyl-lactophenole on a slide, marked as *Afrolaophonte michaelae* ht. Paratypes: all the remaining specimens, some of them dissected, prepared in the same way, on slides marked as *Afrolaophonte michaelae* pt. and numbered from 2 to 19. All of them are part of the collection of the authors, in the Institute of Zoology, University of Rome.

Diagnosis. A small-sized species, with six-segments in first antenna, and sub-rectangular short furca; exopodite of P2 fused with basipodite; endopodite absent; exopodite of P3 fused with basipodite; endopodite fused with basipodite and reduced; P4 with two-segmented exopodite, endopodite fused with basipodite; baseoendopodite of P5 with 3 setae on its inner side, exopodite with 4 setae.

LAOPHONTIDAE SCOTT
AFROLAOPHONTE CHAPPUIS
Afrolaophonte Michaelae n.sp.

Description of the holotypes. Habitus (Fig. 1B): body cylindrical, lengthened, slightly tapering behind; no photoreceptors. Length, from the apex of the rostrum to

Material examined. - 8 ♂♂ and 11 ♀♀, collected on 26/XII/76 (R. Argano, M. Galdieri leg.), according to the method of Karaman-Chappuis, on the shore of the



the distal margin of the anal operculum, 0,238 mm. Distal dorsal margin of the somites with thin denticles; ventral surface covered with thin setae, also on the distal edge. 1st antenna (Fig. 1F) with 6-segments; 1st article without ornamentation; 2nd article with an exolateral sharply pointed apophysis; 4th article with a long sensillum and a seta; (for further details about ornamentation and morphology see illustrations). Rostrum (Fig. 2S) rounded. 2d antenna (Fig. 2M) coxa and allobasipodite without ornamentation; single exopodite with 4 setae; endopodite with 6 apical setae, 3 geniculate and 3 spiniform setae, another spiniform seta sub-apical. Mandible (Fig. 2H): palp consisting of a short article with 2 apical setae; pars molaris with 2 teeth and an indented lamina apically. Maxillula (Fig. 2F): arthrite of praecoxa with 2 apical curved spines; coxa with an apical seta; basipodite with 3 setae on its apex, the innermost more developed; exopodite formed by a small article with a thin seta. Maxilla (Fig. 26): with 2 cylindrical endites, the proximal one with an apical plumose seta, the 2nd one with 2 setae; basipodite running out into a sharp-pointed claw. Maxillipede (Fig. 2T). P1 (Fig. 2A): coxa with lateral outer margin indented; basipodite with 2 spiniform setae inserted near the exopodite, which is one-segmented, provided with 2 apical setae and 4 small setae on its outer lateral margin; well

developed two-segmented endopodite: 1st article lengthened, without ornamentation; 2nd article short, distally provided with 2 small spines and a sharp-pointed claw. P2 (Fig. 2C): reduced, basipodite with an outer-lateral seta on the tip of a short projection; one segmented exopodite fused with the basipodite and provided with an apical seta and 2 sub-apical; endopodite absent. P3 (Fig. 2D): projection bearing the lateral seta of the basipodite more developed; exopodite consisting of a rectangular article partially fused with the basipodite, with 2 apical setae, a 3rd one on the outer distal corner, and a 4th one, the longest, on the outer margin at 2/3 of the total length; endopodite represented by a small tubercle fused with the basipodite, bearing a thin seta on its tip. P4 (Fig. 2I): basipodite as in P3, but the outer seta is longer; 2 segmented exopodite, not fused with basipodite: the 1st article bears a seta on its outer distal margin, the 2nd article is provided with 3 distal setae; endopodite represented by an article not much longer than the 1st article of the corresponding exopodite, fused with the basipodite and provided with 2 apical setae. P5 (Fig. 2L): baseoendopodite laminar, nearly triangular in form, as long as the halfth of the exopodite, ornamented with 1 outer-lateral and 3 inner setae, 2 apical while the 3rd one sub-apical, of different length. Exopodite nearly quadrangular with 2 apical

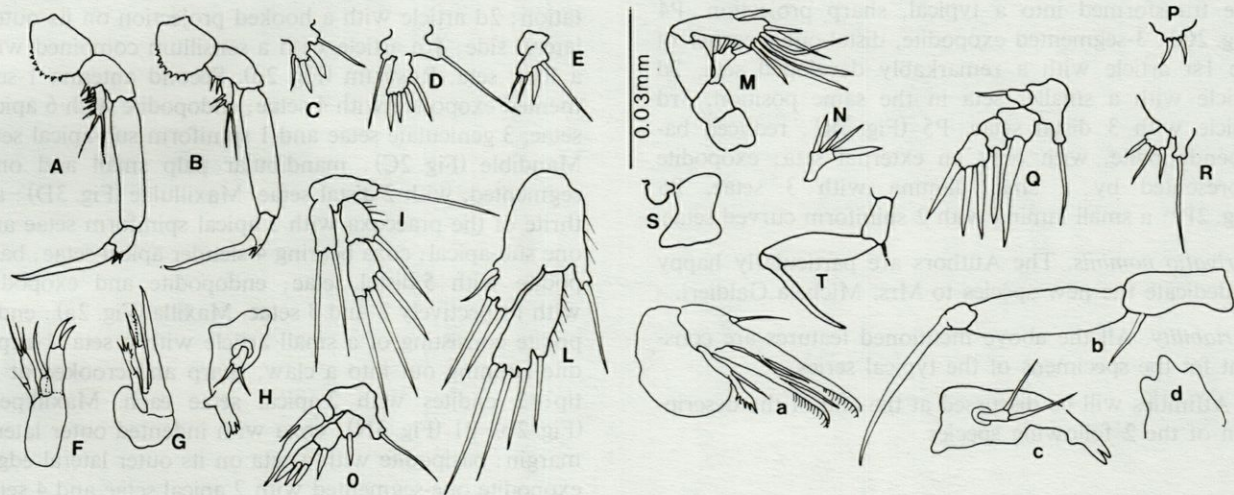


Fig. 2. — *Afrolaophonte michaelae* n.sp. Holotypus ♀ : A, C, D, F, G, H, I, L, M, N, S, T. Paratypus ♂ : B, E, O, P, Q, R. *Afrolaophonte aequatorialis* n. sp. Holotypus ♀ : a, b, c, d. A : P1, B : P1, C : P2, D : P3, E : P2, F : first maxilla; G : second maxilla; H : mandible; I : P4, L : P5, M : second antenna; N : exopodite of the second antenna; O : P3, Q : P4; R : P5; S : rostrum; T : maxillipede. a : second maxilla; b : maxillipede; c : mandible; d : rostrum.

Afrolaophonte michaelae n.sp. Holotypus ♀ : A, C, D, F, G, H, I, L, M, N, S, T. Paratypus ♂ : B, E, O, P, Q, R. *Afrolaophonte aequatorialis* n. sp. Holotypus ♀ : a, b, c, d. A : P1, B : P1, C : P2, D : P3, E : P2, F : 1^{re} maxille; G : 2^{me} maxille; H : mandibule; I : P4, L : P5, M : 2^{me} antenne; N : exopodite de la 2^{me} antenne; O : P3, Q : P3; P : P6; R : P5; S : rostrum; T : maxillipède. a : 2^{me} maxille; b : maxillipède; c : mandibule; d : rostre.

Fig. 1. — *Afrolaophonte michaelae* n.sp. Holotypus ♀ : A, B, D, F. Paratypus ♂ : C, E. A : last abdominal somite with furca, dorsal; B : habitus; C : habitus; D : last abdominal somite with furca, lateral; E : first antenna; F : first antenna.

Afrolaophonte michaelae n.sp. Holotypus ♀ : A, B, D, F. Paratypus ♂ : C, E. A : dernier segment abdominal et furca, vue dorsale; B : habitus; C : habitus; D : dernier segment abdominal et furca, vue latérale; E : 1^{re} antenne; F : 1^{re} antenne.

setae, a 3rd one sub-apical outer, and a 4th one on the outer lateral margin at 3/4 of the total length. Anal operculum (Fig. 1A). Furcal rami (Fig. 1A): nearly as long as one half of the last abdominal somite; dorsally they look nearly rectangular in shape, while laterally they are tapering toward the apex; dorsal surface provided with a seta combined with 2 spines; proximally a row of slender tubercles is arranged transversally; on the outer-lateral margin are ranged several spinules and 2 setae at about 1/2 of the total length; on the distal outer corner occurs a stronger spine; the main apical seta is combined with a thin, small seta on the inner distal corner and with a strong, plumose seta on the distal outer corner; below, the distal margin is provided with spinules.

Description of the male. Habitus (Fig. 1C); smaller than the female: 0,223 mm of length. Rostrum, antenna, oral appendages, ornamentation of the somites, P2, anal operculum and furca as in the female. Antennula (Fig. 1E) 6-segmented, the 4th article, enlarged and rounded, bears a sensillum more developed than in the female. P1 (Fig. 2B): differ from those of the female because of the chaetotaxy of the exopodite, which is provided with 4 setae. P2 (Fig. 2E). P3 (Fig. 20): 3-segmented exopodite, last article with 3 distal setae; endopodite transformed for mating, 2-segmented; the basal article short, without ornamentation; the second one transformed into a typical, sharp projection. P4 (Fig. 2Q): 3-segmented exopodite, distal-outer corner of the 1st article with a remarkably developed seta, 2d article with a smaller seta in the same position, 3rd article with 3 distal setae. P5 (Fig. 2R): reduced baseoendopodite, with only an external seta; exopodite represented by a small lamina with 3 setae. P6 (Fig. 2P): a small lamina with 2 spiniform curved setae.

Derivatio nominis. The Authors are particularly happy to dedicate the new species to Mrs. Michela Galdieri.

Variability. All the above mentioned features are constant for the specimens of the typical series.

Affinities will be discussed at the end of the description of the 2 following species.

Afrolaophonte aequatorialis n.sp.

Material examined. – 11 ♂♂, 6 non ovigerous ♀♀, 1 ovigerous ♀ (2 eggs) collected on 28/XII/76 (R. Argano, M. Galdieri leg.) according to the method indicated by Karaman-Chappuis, on the shore of the

small island of Furana-Fushi (Male Atoll, Republic of Maldives, Indian Ocean).

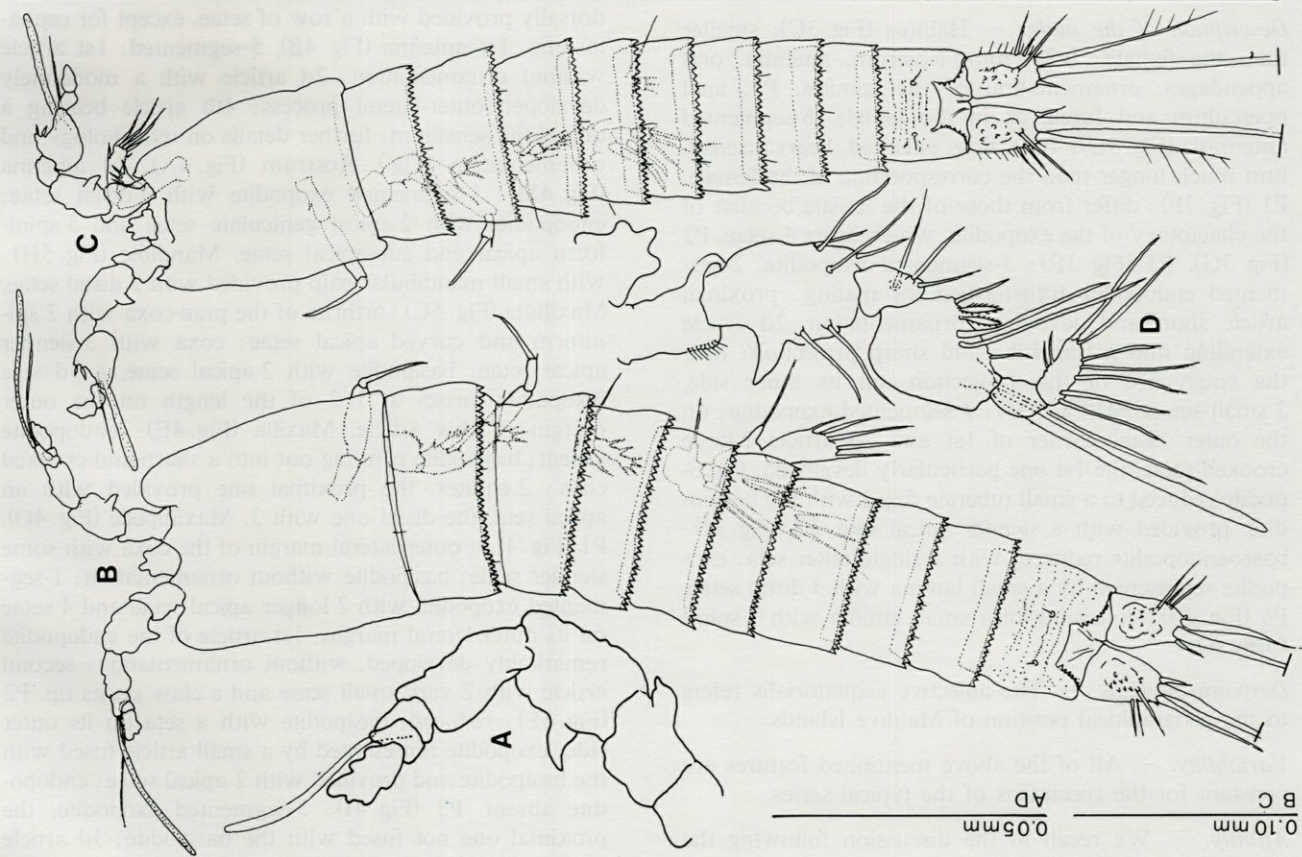
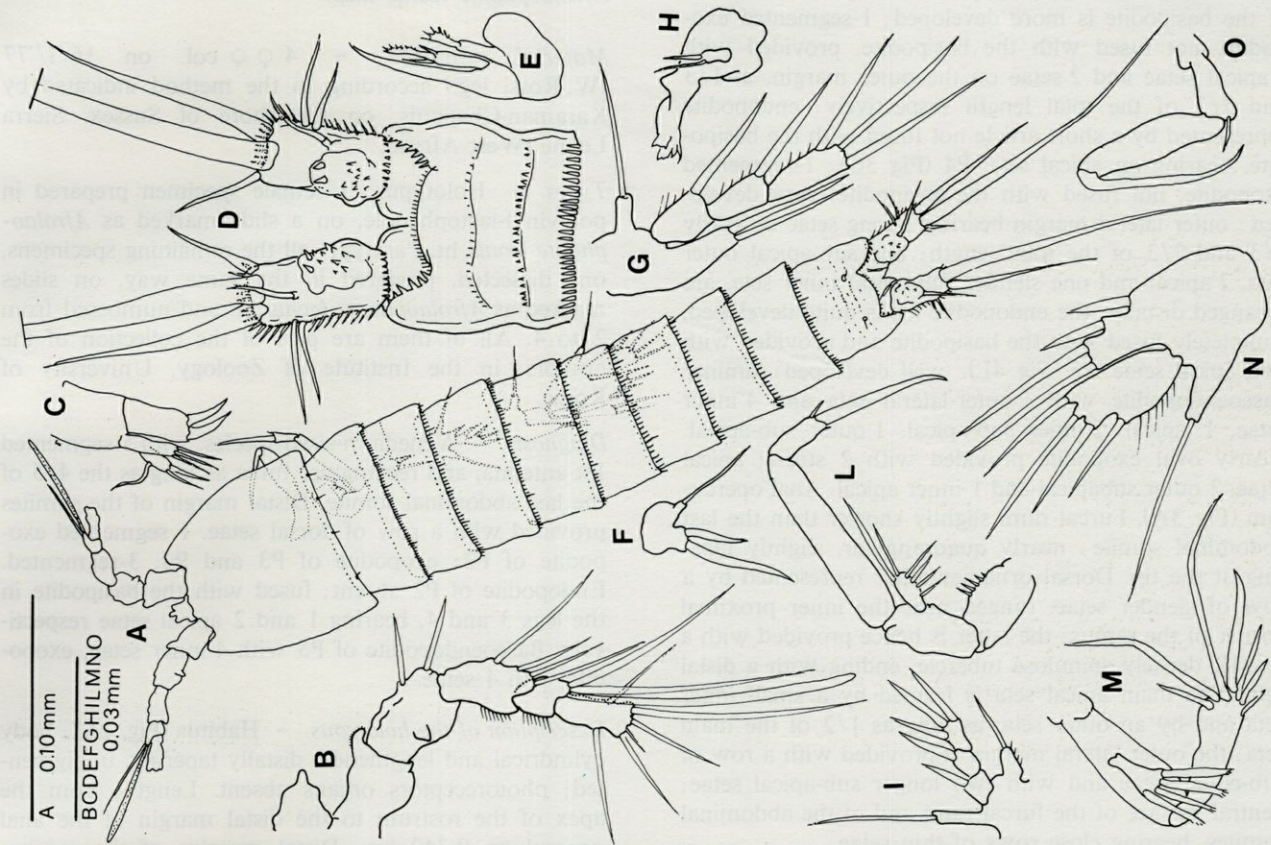
Types. – Holotypus: 1 female specimen, prepared in polyvinyl-lactophenole, on a slide marked as *Afrolaophonte aequatorialis* ht. Paratypes: all the remaining specimens, some of them dissected, prepared in the same way, on slides marked as *Afrolaophonte aequatorialis* pt. and numbered from 2 to 18. All of them are part of the collection of the Authors, in the Institute of Zoology, University of Rome.

Diagnosis. – A large species, with 6-segmented 1st antenna and furca dorsally tapering, as long as the 4/5 of the last abdominal somite. Distal margin of the somites markedly indented dorsally. 1-segmented exopodite in the legs: P2, P3 and P4; endopodite of P2 absent; endopodite of P3 represented by a single with an apical seta, endopodite of P4 fused with the basipodite. Baseoendopodite of P5 provided with 4 inner setae, exopodite with 5 setae.

Description of the holotypus. – Habitus (Fig. 3B): body cylindrical, lengthened, tapering behind, unpigmented, with no photoreceptors. Length (from the apex of the rostrum to the distal margin of the anal operculum) 0,420 mm. Distal margins of the somites dorsally very indented, except in the cephalosoma. 1st antenna consisting of 6 articles (Fig. 3A); 1st article without ornamentation; 2d article with a hooked projection on its outer-lateral side; 4th article with a sensillum combined with a long seta. Rostrum (Fig. 2d). Second antenna 1-segmented exopodite with 4 setae; endopodite with 6 apical setae, 3 geniculate setae and 1 spiniform sub-apical seta. Mandible (Fig. 2C): mandibular palp small and one-segmented, with 2 distal setae. Maxillulae (Fig. 3D): arthrite of the praecoxa with 5 apical spiniform setae and one sub-apical; coxa bearing 4 slender apical setae; basipodite with 5 distal setae; endopodite and exopodite with respectively 2 and 3 setae. Maxilla (Fig. 2a): endopodite consisting of a small article with a seta; basipodite running out into a claw, sharp and crooked at its tip; 2 endites with 2 apical setae each. Maxillipede (Fig. 2b). P1 (Fig. 3N): coxa with indented outer lateral margin; basipodite with a seta on its outer lateral edge; exopodite one-segmented with 2 apical setae and 4 setae on the outer-lateral margin; endopodite remarkably developed, 2-segmented; 1st article without ornamentation, 2d article with 2 slender spiniform setae and a « claw » distally. P2 (Fig. 3H): reduced, basipodite with an outer lateral seta, 1-segmented exopodite not fused with basipodite, provided with 4 setae; endopodite ab-

Fig. 3. – *Afrolaophonte aequatorialis* n.sp. On the left, Holotypus ♀: A, B. Paratypus ♂: C, D. A: first antenna; B: habitus; C: habitus; D: first antenna. On the right, Holotypus ♀: A, B, C, D, H, L, N. Paratypus ♂: E, F, G, I, M, O. A: anal operculum and furca; B: P3; C: P4; D: first maxilla; E: P3; F: P1; G: P2; H: P2; I: P5; L: P5; M: P4; N: P1; O: P6.

Afrolaophonte aequatorialis n.sp. A gauche, Holotype ♀: A, B. Paratype ♂: C, D. A: première antenne; B: habitus; C: habitus; D: première antenne. A droite, Holotype ♀: A, B, C, D, H, L, N. Paratype ♂: E, F, G, I, M, O. A: operculum anal et furca; B: P3; C: P4; D: première maxille; E: P3; F: P1; G: P2; H: P2; I: P5; L: P5; M: P4; N: P1; O: P6.



sent. P3 Fig. 3B): the projection bearing the outer seta of the basipodite is more developed; 1-segmented exopodite, not fused with the basipodite, provided with 4 apical setae and 2 setae on the outer margin, at 1/3 and 2/3 of the total length respectively; endopodite represented by a short article not fused with the basipodite, bearing an apical seta. P4 (Fig. 3C): 1-segmented exopodite, not fused with the basipodite, very developed: outer lateral margin bearing 2 long setae at nearly 1/3 and 2/3 of the total length; one sub-apical outer seta, 2 apical and one slender sub-apical inner seta, are arranged distally; the endopodite looks quite developed, completely fused with the basipodite and provided with two apical setae. P5 (Fig. 4L): well developed; laminar baseoendopodite with 1 outer-lateral seta and 4 inner setae, 1 apical, 2 inner sub-apical, 1 outer sub-apical. Nearly oval exopodite provided with 2 strong apical setae, 2 outer subapical and 1 inner apical. Anal operculum (Fig. 3A). Furcal rami slightly shorter than the last abdominal somite: nearly quadrangular, slightly tapering at the tip. Dorsal ornamentation represented by a row of slender setae, ranged near the inner proximal corner of the ramus; the latter is hence provided with a strong, densely spinulose tubercle, ending with a distal seta. The main apical seta is framed by a small inner seta and by an outer seta, as long as 1/2 of the main seta; the outer lateral margin is provided with a row of sub-equal setae and with two longer sub-apical setae; ventral surface of the furcal rami and of the abdominal somites, bearing close rows of thin setae.

Description of the male. – Habitus (Fig. 3C); smaller than the female: 0,360 mm. Rostrum, antenna, oral appendages, ornamentation of the somites, P2, anal operculum and furca, as in the female. 6-segmented antennula (Fig. 3D); 4th article, enlarged, bears a sensillum much longer than the corresponding of the female. P1 (Fig. 3F): differ from those of the female because of the chaetotaxy of the exopodite, which bears 4 setae. P2 (Fig. 3G). P3 (Fig. 3E): 3-segmented exopodite, 2-segmented endopodite transformed for mating: proximal article short and devoid of ornamentation, 2d article extending into a fingerlike and sharp projection; near the emergence of this projection, on its inner side, 2 small setae. P4 (Fig. 3M): 3-segmented exopodite; on the outer distal corner of 1st and 2d article 2 large crooked setae, the 1st one particularly developed. Endopodite reduced to a small tubercle fused with the basipodite, provided with a slender apical seta. P5 (Fig. 3J): baseoendopodite reduced, with a single outer seta; exopodite represented by a small lamina with 3 distal setae. P6 (Fig. 30): consisting of a small lamina with 2 spiniform setae.

Derivatio nominis. – The adjective *aequatorialis* refers to the geographical position of Maldive Islands.

Variability. – All of the above mentioned features are constant for the specimens of the typical series.

Affinity. – We recall to the discussion following the description of the 3d species.

Afrolaophonte leonis n.sp.

Material examined. – 4 ♀♀ col. on 16/I/77 (W. Rossi leg.) according to the method indicated by Karaman-Chappuis, on the shore of Sussex, Sierra Leone (West Africa).

Types. – Holotypus: 1 female specimen prepared in polyvinyl-lactophenole, on a slide marked as *Afrolaophonte leonis* ht. Paratypes: all the remaining specimens, one dissected, prepared in the same way, on slides marked as *Afrolaophonte leonis* pt. and numbered from 2 to 4. All of them are part of the collection of the authors, in the Institute of Zoology, University of Rome.

Diagnosis. – A medium-sized species, with 5-segmented 1st antenna, and rectangular furca as long as the 4/5 of the last abdominal somite. Distal margin of the somites provided with a row of dorsal setae. 1 segmented exopodite of P2; exopodite of P3 and P4, 3-segmented. Endopodite of P2 absent; fused with the basipodite in the legs 3 and 4, bearing 1 and 2 apical setae respectively. Baseoendopodite of P5 with 4 inner setae, exopodite with 4 setae.

Description of the holotypus. – Habitus (Fig. 4A): body cylindrical and lengthened, distally tapering, unpigmented; photoreceptors organs absent. Length, from the apex of the rostrum to the distal margin of the anal operculum, 0,340 mm. Distal margins of the somites dorsally provided with a row of setae, except for cephalosoma. 1st antenna (Fig. 4B), 5-segmented; 1st article without ornamentation; 2d article with a moderately developed outer-lateral process; 4th article bearing a quite long sensillum; further details on morphology and ornamentation (Fig.). Rostrum (Fig. 4A). 2d antenna (Fig. 4M): 1-segmented exopodite with 4 distal setae; endopodite with 2 apical geniculate setae and 5 spiniform apical and sub-apical setae. Mandible (Fig. 5H): with small mandibular palp provided with 2 distal setae. Maxillula (Fig. 5C): arthrite of the prae-coxa with 2 spiniform and curved apical setae; coxa with 3 slender apical setae; basipodite with 2 apical setae, a 3d seta (exopodite) arises at 1/2 of the length on the outer margin of this article. Maxilla (Fig. 4E): endopodite absent; basipodite running out into a sharp and crooked claw; 2 endites, the proximal one provided with an apical seta, the distal one with 3. Maxillipede (Fig. 4O). P1 (Fig. 4L): outer-lateral margin of the coxa with some slender setae; basipodite without ornamentation; 1-segmented exopodite with 2 longer apical setae and 4 setae on its outer lateral margin; 1st article of the endopodite remarkably developed, without ornamentation; second article with 2 very small setae and a claw on its tip. P2 (Fig. 5F): reduced; basipodite with a seta on its outer side; exopodite represented by a small article fused with the basipodite and provided with 2 apical setae; endopodite absent. P3 (Fig. 4I): 3-segmented exopodite, the proximal one not fused with the basipodite; 3d article with 3 distal setae; endopodite represented by a small

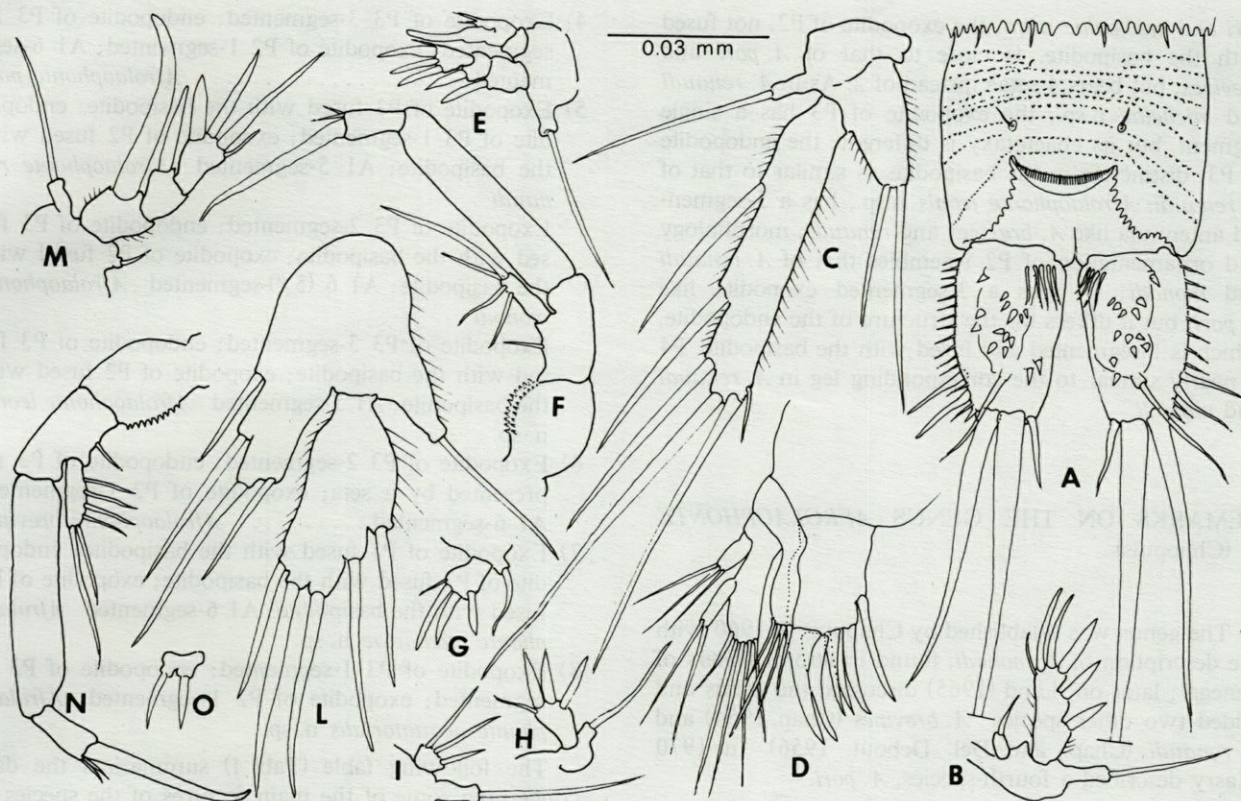


Fig. 4. — *Afrolaophonte leonis* n.sp. Holotypus ♀ : A-O. A : habitus; B : first antenna; C : first maxilla; D : anal operculum and furca; E : second maxilla; F : P2; G : P4; H : mandibule; I : P3; L : P1; M : second antenna; N : P5; O : maxillipede.

Afrolaophonte leonis n.sp. Holotypus ♀ : A-O. A : habitus; B : première antenne; C : première maxille; D : operculum anal et furca; E : 2^e maxille; F : P2; G : P4; H : mandibule; I : P3; L : P1; M : 2^e antenne; N : P5; O : maxillipède.

article fused with the basipodite, bearing a seta on its tip. P4 (Fig. 4G): quite developed 3-segmented exopodite; 1st article not fused with the basipodite, 3d one with 3 distal setae. Endopodite fused with the basipodite, with 2 apical setae and longer than the 1st article of the corresponding exopodite. P5 (Fig. 4N): the laminar baseoendopodite bears, in addition to the outer lateral seta usually present, 4 setae on the inner side of the exopodite, 2 apical and 2 on the inner lateral margin. Exopodite, nearly oval, with 3 apical setae and 1 sub-apical on the outer side. Anal operculum (Fig. 4D): convex distal margin with a row of thin setae. Furcal rami (Fig. 4D): dorsally they look nearly rectangular, not tapering toward the apex. Dorsal surface with several spines on a quite developed tubercle, and a seta; distal margin with 3 setae: of these the middlemost is the longest one; 2 other setae arise at 3/4 of the total length of the outer lateral margin, where is also arranged a row of small setae, which reaches the distal margin beneath the 3 apical setae. The length of the furcal rami does not exceed the 4/5 of the last abdominal somite; all these appendages are provided on their ventral surface with very close series of thin setae, ranged transversally, just like in the abdominal somites. *Males unknown.*

Derivatio nominis. — This new species is named after the African Republic of Sierra Leone, where it has been discovered.

Affinities. — *Afrolaophonte michaelae* n.sp. has a 6-segmented antennula just like *A. monodi pori* and *aequatorialis* n.sp.; the leg 2 of this species has the same structure as *A. renaudi*, *monodi* and *leonis* n.sp., but the exopodite of *A. michaelae* bears 3 setae, while in the above-mentioned species, only 2 setae occur on it; P3 is like that of *A. renaudi* and *aequatorialis* n.sp., but it is easy to distinguish because of the form and chaetotaxy of the exopodite, and because of the fusion of the latter with the basipodite. The 2-segmented exopodite of P4, is similar to that of *A. brevipes*, but it differs because of the chaetotaxy of its second article and by the fusion between the endopodite and the basipodite. The inner part of the baseoendopodite of P5, is provided with 3 setae, in contrast to all the other known species of the genus, where 4 setae are present.

Morphology and ornamentation of the furcal rami are similar to conditions in *A. brevipes*. *Afrolaophonte aequatorialis* n.sp. differs from the other species of the genus for the morphology of P4, which has a 1-segmented exopodite; antennula is 6-segmented as in *A. monodi*

pori and *michaelae* n.sp.; the exopodite of P2, not fused with the basipodite, is close to that of *A. pori* and *brevipes*, but bears 4 setae instead of 2. As in *A. renaudi* and *micelae* n.sp., the exopodite of P3 has a single segment, but its chaetotaxy is different; the endopodite of P3, distinct from the basipodite, is similar to that of *A. renaudi*; *Afrolophonte leonis* n.sp., has a 5-segmented antennula like *A. brevipes* and *renaudi*; morphology and ornamentation of P2 resembles that of *A. renaudi* and *monodi*; P3 has a 3-segmented exopodite like *A. pori*, but it differs for the structure of the endopodite, which is 1-segmented and fused with the basipodite. P4 is nearly similar to the corresponding leg in *A. renaudi* and *monodi*.

REMARKS ON THE GENUS *AFROLAOPHONTE* (Chappuis)

The genus was established by Chappuis in 1960 with the description of *A. monodi*, found in littoral waters of Senegal; later on, Land (1965) discussed the genus and added two other species: *A. brevipes* (Chap. 1954) and *A. renaudi* (Chap. and Del. Debout. 1956). In 1970 Masry described a fourth-species, *A. pori*.

Some of the features of the three species described in the present work, do not agree with the diagnosis of the genus, sensu Lang 1965, which is therefore changed as follows.

Laophontidae with exopodite of P2 1-segmented or fused with the basipodite; endopodite absent; exopodite of P3, 3, 2 or 1-segmented fused or not with the basipodite, in the female; always 3-segmented in the male; exopodite of P4, 3, 2 or 1-segmented (distinct from the basipodite) in the female; 3-segmented in the male. Endopodite of P3 2-segmented (fused or not with the basipodite) or reduced to a single seta in the female, transformed in the male endopodite of P4 one-segmented (fused or not with the basipodite) in the female, rudimentary in the male. Baseoendopodite of P5 in the male clearly distinct and provided with 3 setae, unarmed; furcal rami without dorsal dentiform projection; the proximal part of the main seta of these appendages is not pedunculate.

A simple key (referred to the female) of the species hitherto known of the genus *Afrolophonte* is thus established:

- 1) Exopodite of P4 3-segmented; endopodite of P4 1-segmented 4
- Exopodite of P4 3-segmented; endopodite of P4 fused with the basipodite. 5
- 2) Exopodite of P4 2-segmented; endopodite of P4 1-segmented. 6
- Exopodite of P4 3-segmented; endopodite of P4 fused with the basipodite. 7
- 3) Exopodite of P4 1-segmented; endopodite of P4 fused with the basipodite. 8

- 4) Exopodite of P3 3-segmented; endopodite of P3 2-segmented; exopodite of P2 1-segmented; A1 6-segmented. *Afrolophonte pori*
- 5) Exopodite of P3 fused with the basipodite; endopodite of P3 1-segmented; exopodite of P2 fused with the basipodite; A1 5-segmented *Afrolophonte renaudi*
Exopodite of P3 2-segmented; endopodite of P3 fused with the basipodite; exopodite of P2 fused with the basipodite; A1 6 (5 ?)-segmented *Afrolophonte monodi*
Exopodite of P3 3-segmented; endopodite of P3 fused with the basipodite; exopodite of P2 fused with the basipodite; A1 5-segmented *Afrolophonte leonis* n. sp.
- 6) Exopodite of P3 2-segmented; endopodite of P3 represented by a seta; exopodite of P2 1-segmented; A1 6-segmented. *Afrolophonte brevipes*
- 7) Exopodite of P3 fused with the basipodite; endopodite of P3 fused with the basipodite; exopodite of P2 fused with the basipodite; A1 6-segmented *Afrolophonte michaelae* n. sp.
- 8) Exopodite of P3 1-segmented; endopodite of P3 1-segmented; exopodite of P2 1-segmented *Afrolophonte aequatorialis* n. sp.

The following table (Tabl. I) summarizes the data concerning some of the main features of the species of the genus *Afrolophonte*; these data have been obtained from the literature on the subject and from the study of the above mentioned new species: In the first column, the symbols + and o indicate that antennula is 6 or 5-segmented respectively; in the column referred to P2, + indicates that the only article of the exopodite is not fused with the basipodite, while o indicates their complete fusion. The following columns concern P3 and P4 and illustrate the variability occurring in these structures, from the less specialized species (i.e. P3 of *A. pori* with 3-segmented exopodite, + + +, and 2-segmented endopodite + +), to the more transformed ones, where appendages are reduced and fused to various extents (i.e. *A. michaelae*, with P3 consisting of exo, ooo, and endopodite, oo, completely fused with the basipodite).

It must be stressed that in the genus *Afrolophonte*, the males, known for five species, show a lesser extent

Tabl. I. - Data concerning the main features of the species of the genus *Afrolophonte*.

Résumé des principaux caractères concernant les espèces du genre *Afrolophonte* (entre parenthèses : chiffre indiquant le nombre d'articles des antennules).

	A1	P2		P3		P4	
		Exp.	Exp.	Exp.	Exp.	Exp.	Exp.
<i>A. pori</i> (6)	+	+	+++	++	+++	+	
<i>A. monodi</i> (6)	+	o	+++	oo	+++	o	
<i>A. brevipes</i> (5)	o	+	+++	oo	+++	+	
<i>A. leonis</i> (5)	o	o	+++	oo	+++	o	
<i>A. aequatorialis</i> (6)	+	+	+++	+	+++	o	
<i>A. renaudi</i> (5)	o	o	ooo	+	+++	o	
<i>A. michaelae</i> (6)	+	o	ooo	oo	+++	o	

of specialization compared with the females, and therefore, are very similar; this is not true for *Afrolaophonte pori*, where both sexes, apart from usual dimorphism concerning antennula and P5, show nearly the same features; in this species even the endopodite of P2, although transformed in the male, is 2-segmented-like in the female. These aspects suggest that *A. pori* is the species closest to the ancestor of the group, while *A. michaelae* is more derived.

P4 of the female of the genus, provides a particularly significant example of the different extent of specialization and reduction furthermore as far as these appendages are concerned, the fusion of the segments does not necessarily imply a parallel reduction in total length of the corresponding leg: comparing 1-segmented exopodite of *A. aequatorialis* with the exopodite of P2 and P3, we obtain equal or bigger values for the length, as compared with values obtained for the corresponding legs in *A. pori*. The persistence of a P4 not reduced even when 1-segmented and provided with well developed distal setae, could be explained assuming that this appendage is used to keep and protect the eggs, instead of locomotion; in other words it would support the function of the P5 and show a very similar structure (1-segmented exopodite and baseopodite), like in the case of *A. aequatorialis*.

REMARKS ON THE GEONEMY OF THE GENUS *AFROLAOPHONTE*

The genus occurs in the atlantic area with 3 species, 2 from the African coast and 1 from the Bahamas, with 1 species in the Mediterranean Sea, Israel, and with 3 species in the Indian area, 1 from Madagascar and 2 from the Maldives; therefore the species shows a rather wide distribution. It is interesting to note that hitherto all the species were found in warm waters and indeed 5 of the 7 species, are intertropical; hence it is

possible that these forms are very stenotherm forms, closely connected with interstitial warm waters; however this assumption needs further evidence before it can be definitively accepted. Finally, *A. michaelae* and *A. aequatorialis*, from different localities of the Maldivian Islands, are highly specialized, but differ markedly in size; 0,238 mm for *A. michaelae* and 0,420 for *A. aequatorialis*. This difference in size, together with other features, would demonstrate that the above species underwent adaptative radiation, in relation to the need of occupying different ecological niches; a further evidence could be the fact that, while *A. michaelae* colonizes small-grains sands, the other species was found in larger grains sands.

ACKNOWLEDGEMENTS. – The authors wish to thank their friends and colleagues Mrs. Galdieri Argano and Prof. Argano, who collected the material.

LITERATURE CITED

- CHAPPUIS, P.A., 1954. Copépodes psammiques des plages du Roussillon. *Arch. Zool. exp. gén.*, **91** : 35-50.
- CHAPPUIS, P.A. et R. ROUCH, 1960. Harpacticides psammiques d'une plage près d'Accra (Ghana). *Vie Milieu*, **11** (4) : 605-615.
- CHAPPUIS, P.A. et Cl. DELAMARE DEBOUTTEVILLE, 1956. Etudes sur la faune interstitielle des îles Bahamas récoltée par Madame Renaud-Debyser. 1. Copépodes et Isopodes. *Vie Milieu*, **7** (3) : 373-397.
- LANG, K., 1965. Copepoda Harpacticoida from the California Pacific Coast. Almqvist & Wiksell ed., Stockholm.
- MASRY, D., 1970. Ecological studies of some sandy beaches along the Israeli mediterranean coast, with a description of the interstitial Harpacticoids (Crustacea, Copepoda). *Cahiers Biol. Mar.*, **11** : 229-258.

Accepté le 1^{er} février 1980