

Isopoda from coral reefs of Réunion Island : Cirolanidae and Gnathiidae (Crustacea).

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Abstract : A new species of the Cirolanidae (*Cirolana mascarenensis* n.sp.) and of the Gnathiidae (*Gnathia firin-gae* n.sp.) are described from reef localities along the west coast of La Réunion, tropical Indian Ocean. Their relationships are discussed.

Résumé : Deux espèces nouvelles de Cirolanidae (*Cirolana mascarenensis* n.sp.) et de Gnathiidae (*Gnathia firin-gae* n.sp.) sont décrites de localités récifales le long de la côte occidentale de La Réunion, Océan Indien tropical (Crustacea : Isopoda). Les affinités de ces espèces sont discutées.

INTRODUCTION

This paper forms part of a series surveying the marine isopod fauna from coral reefs at the west coast of La Réunion, southern Indian Ocean. The number of species representing the Cirolanidae and Gnathiidae was unexpectedly low, with only one species in each of these families. This might be due to the relatively young geological age of this island and its isolation by deep water. Because the isopod fauna of the Mascarene Islands is almost completely unknown, it was not surprising that the two isopod species were unknown to science. They are described in detail to improve step by step the knowledge of the coral reef inhabiting fauna of the Mascarene Islands, leading to a better understanding of coral reef ecosystems and zoogeographical implications of that area. The specimens are stored in the Muséum National d'Histoire Naturelle, Paris, France (MNHN) and in the Senckenberg Museum, Frankfurt, Germany (SMF).

SYSTEMATIC ACCOUNT

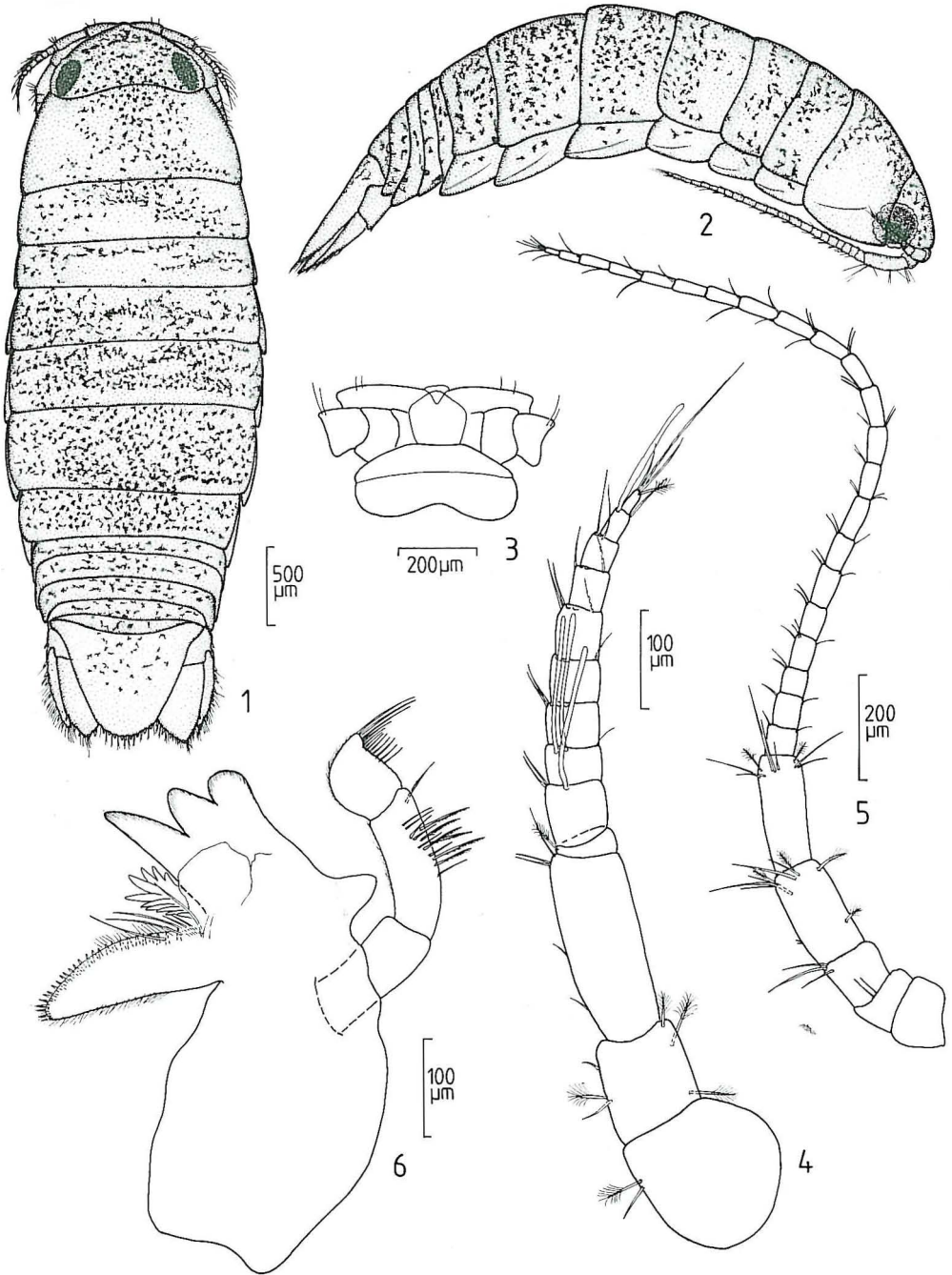
Cirolanidae

Cirolana Leach, 1818

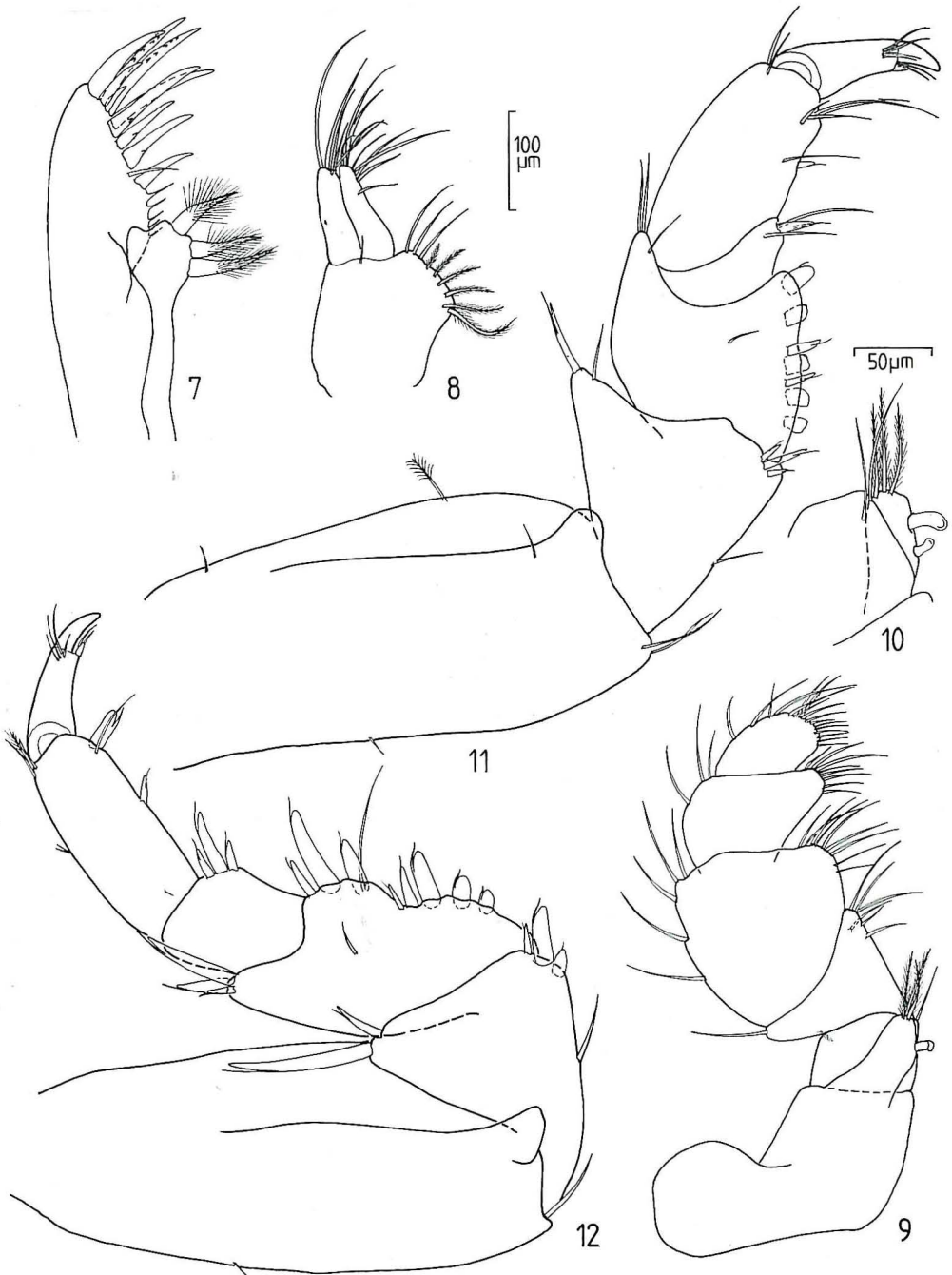
Cirolana mascarenensis n.sp. (Figs. 1-22)

Holotype : ♂ (SMF), La Réunion ; harbour of St-Gilles-les-Bains ; crest of fringing reef ; dead corals covered with coralline algae, 0.5-1 m, 23 January 1989.

Paratypes : 1 ♂, 1 postmanca (SMF), collected together with holotype. 1 ♂ (MNHN) ; La Saline-les-Bains ; crest of fringing reef, dead corals, 0.5-1 m, 18-20 January 1989.



Figs. 1-6: *Cirolana mascarenensis* n.sp., ♂ : 1. dorsal view ; 2. lateral view ; 3. clypeal region; 4. antenna 1 ; 5. antenna 2 ; 6. mandible.



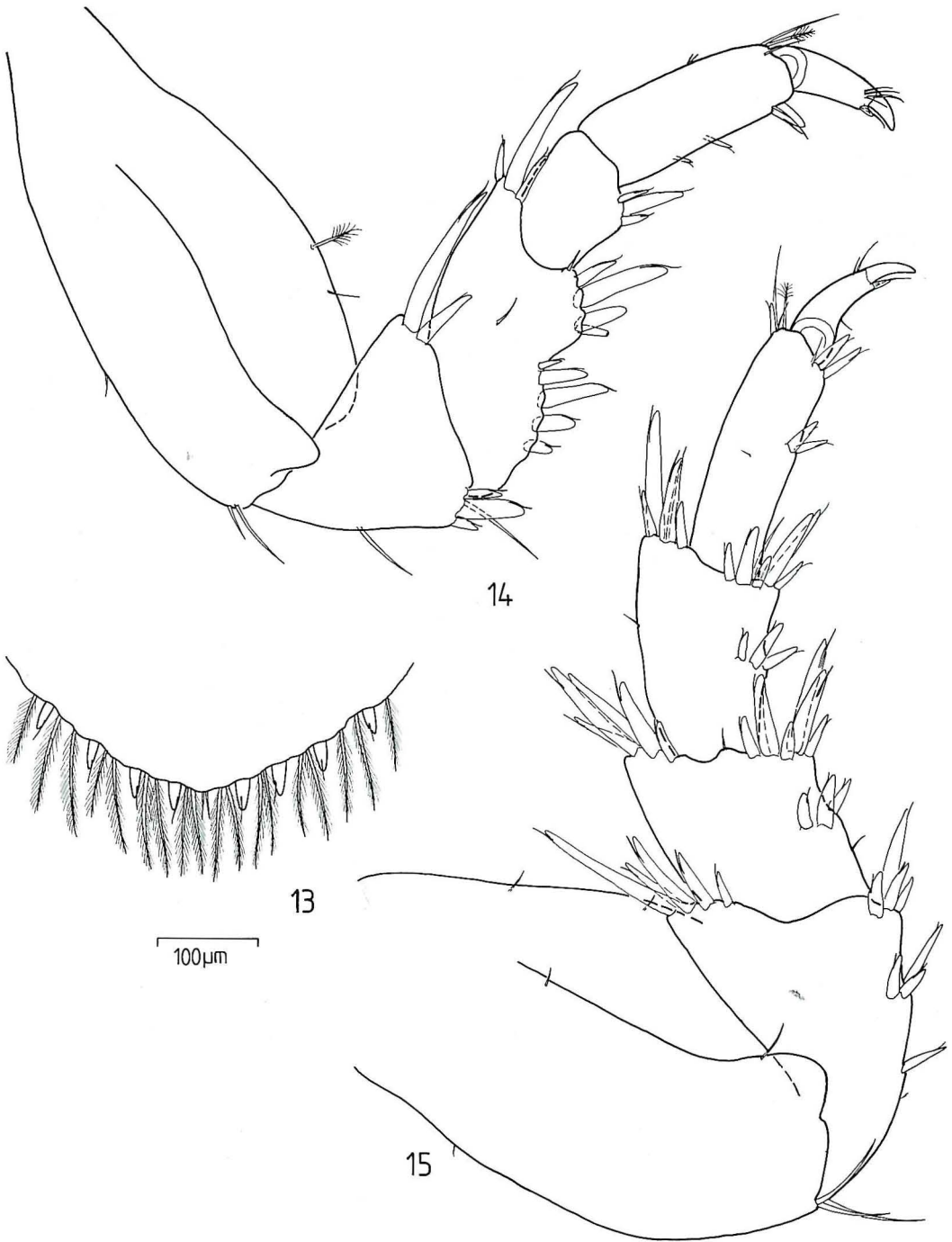
Figs. 7-12 : *Cirolana mascarenensis* n.sp., ♂ : 7. maxilla 1 ; 8. maxilla 2 ; 9. right maxilliped ; 10. endite and first palp article of left maxilliped ; 11. pereopod 1 ; 12. pereopod 2.

Derivatio nominis : the specific name refers to the geographic area of the type locality, the Mascarene Islands.

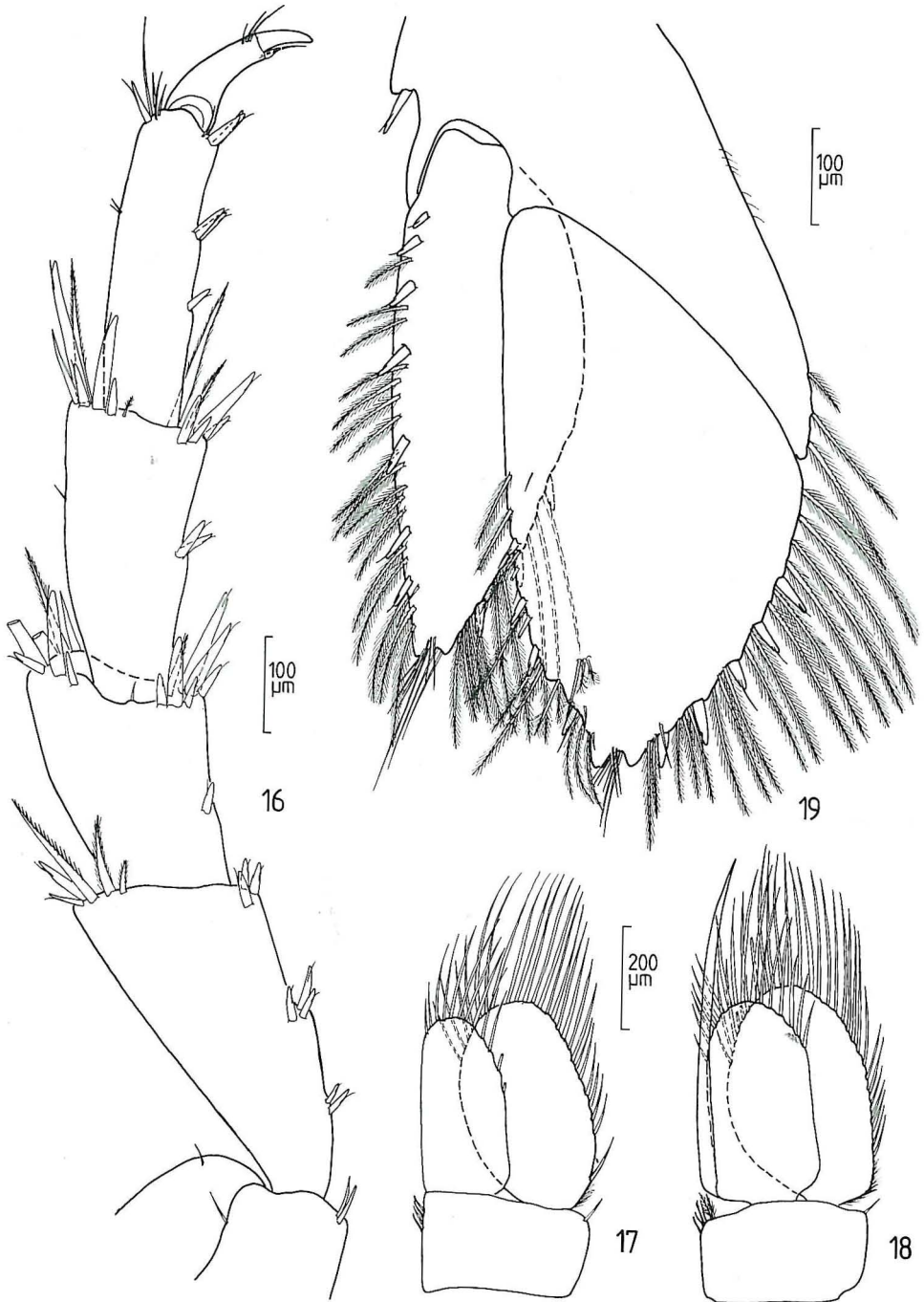
Description, ♂ : total length 4.5-5.5 mm (frontal margin of cephalon to tip of pleotelson), maximum width at pereonite 5. Body covered with many small pigment spots in variable number. Cephalon 2.4 times wider than long, with narrowly rounded anterior margin and large, well pigmented lateral eyes. Clypeal region as figured. All coxae with carina. Pleonites subequal in length. Pleotelson roughly triangular with rounded distal margin bearing 8 robust compound spines ; moreover, mediodistal margin of pleotelson bearing 2 short simple setae and 8 pairs of longer plumose setae in arrangement as figured ; also, a single plumose seta set anterior of the first posterolateral compound spine.

Openings of vasa deferentia at pereonite 7 inconspicuous.

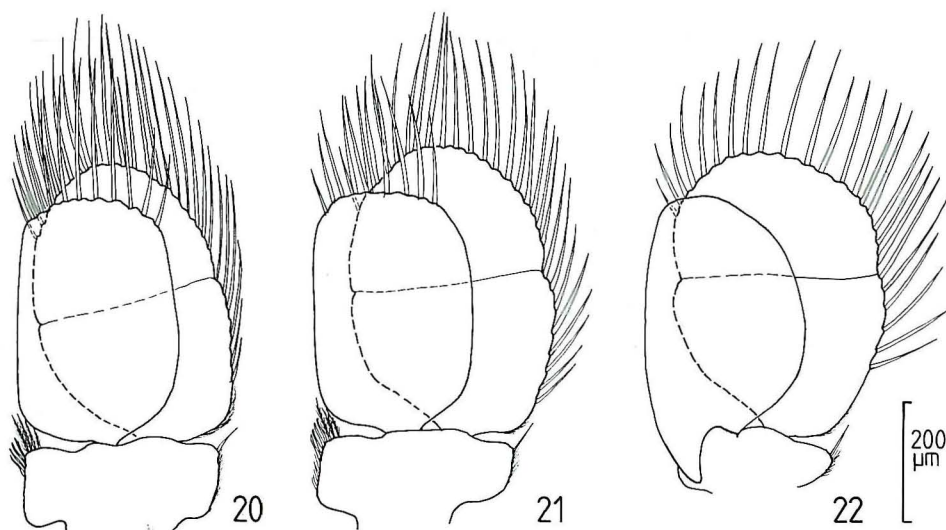
Antenna 1, peduncle of 3 articles, with first article widest ; third article elongate, longer than either first or second article ; flagellum 10-articulated ; proximal article shortest, much wider than long ; articles 3-8 with 2 aesthetascs ; articles 2 and 9 with single aesthetasc. Antenna 2 slender, peduncle of 5 articles ; three proximal peduncular articles short, distal two articles elongate and subequal in length ; flagellum composed of 22 setose articles. Incisor of mandible 3-cuspidate, with group of 10 spine-shaped structures near base of molar ; molar a slender, ovate lobe with several denticles along medial margin and 4 slender simple setae in proximal half. Distal two articles of 3-articulated palp with several simple and pectinate spines. Maxilla 1, inner ramus slender and short, widening distally, bearing 3 strong plumose spines at mediodistal margin ; mediodistal margin of outer ramus with 10 mostly denticulate spines of different length, a simple seta and some proximal, spine-shaped structures. Maxilla 2, inner ramus with truncate distal margin bearing 6 slender plumose setae and 3 distal simple setae ; inner and outer lobe of outer ramus slender ; inner lobe with 9, outer lobe with 5 curved setae. Maxillipedal endite reaching to distal margin of first palp article, its distal margin bearing 3 plumose setae ; medial margin of endite with single coupling hook in right maxilliped and 2 coupling hooks in left maxilliped ; 3rd article of 5-articulated palp much larger than other palp articles ; mediodistal margin of these articles more densely setose than outer margin. Pereopods robust and barely setose. Carpus of pereopod 1 very short, lacking free anterior margin, bearing single compound spine at posterodistal margin ; posterior margin of merus with 7 compound spines of different shape. Pereopods 2-7, posterior and distal margin of all articles except dactylus and basis bearing varying number of robust compound spines ; these compound spines partly pectinate at pereopod 7. Endopodite of pleopods 1-5 always shorter than exopodite ; exopodite of pleopods 3-5 with transverse suture line at midlength. Medial margin of sympodite with 4 retinaculae in pleopods 1-4. Pleopod 1, lateral margins of endopodite straight, distal margin bearing 12 plumose setae ; margin of ovate exopodite bearing 25 plumose setae. Endopodite of pleopod 2 with almost parallel lateral margins, wider than endopodite of pleopod 1 ; appendix masculina slender, articulating at inner base of endopodite, tapering to acute apex ; appendix masculina extending beyond distal margin of endopodite



Figs. 13-15 : *Cirolana mascarenensis* n.sp., ♂ : 13. distal margin of pleotelson ; 14. pereopod 3 ; 15. pereopod 4.



Figs. 16-19 : *Cirolana mascarenensis* n.sp., ♂ : 16. pereopod 7 ; 17. pleopod 1 ; 18. pleopod 2 ; 19. uropod.



Figs. 20-22 : *Cirolana mascarenensis* n.sp., ♂ : 20. pleopod 3 ; 21. pleopod 4 ; 22. pleopod 5.

with about 2/5 of its entire length; distal margin of endopodite bearing 16 plumose setae ; margin of ovate exopodite provided with 28 plumose setae. Pleopod 3, endopodite with subparallel lateral margins, distal margin bearing 10 plumose setae ; margin of ovate exopodite bearing 26 plumose setae. Pleopod 3, rami quite similar to pleopod 2 ; distal margin of endopodite bearing 9 plumose setae ; margin of exopodite with 27 plumose setae. Pleopod 5, ovate endopodite devoid of any setae, with slender, antierad directed lobe at inner proximal margin ; exopodite broadly ovate, with 25 plumose marginal setae. All plumose setae of pleopodal rami drawn as simple setae. Uropodal endopodite slightly extending beyond apex of pleotelson ; uropodal sympodite with single compound spine at outer distal margin and 3 plumose setae at inner distal margin ; exopodite narrower than but subequal in length to endopodite ; lateral margins of both rami convex ; endopodite with strong distal notch, with group of simple setae set within this notch, and with 5 compound spines at lateral margins, respectively ; compound spines separated from each other by some plumose setae ; exopodite with shallow distal notch bearing group of some simple setae ; outer margin of exopodite with row of 7 compound spines, inner margin with row of 3 compound spines ; most compound spines of exopodite separated from each other by some plumose setae ; dorsodistal surface of exopodite with group of 3 feathered sensory setae.

Remarks : in general habitus and spination of the distal pleotelsonic margin the new species closely resembles *Cirolana hesperia* Bruce, 1986 from Western Australia. However, ♂♂ of *hesperia* are generally larger, up to twice the length of *C. mascarenensis* n.sp. Moreover, several ♂♂ mentioned in the original description of *hesperia* have a setose fringe at the posterior margin of propodus, carpus and merus of pereopod 1, a feature not found in

any of the specimens of *C. mascarenensis*. According to Bruce (1986 : 181), this setose fringe is a variable feature, because it was not found in "numerous males" of *hesperia*. Also, most setae of the uropodal rami of *C. hesperia* are shown to be much shorter than in the new species (cf. Bruce 1986 : 182 ; Fig. 124D).

Only three specimens of *C. mascarenensis* were collected at Réunion, and all have been found in more or less exposed locations on the reef flat. As for *Gnathia Firingae* described in that paper, none was present in the extensive sampled reef lagoon.

Distribution : La Réunion, France.

Gnathiidae

Gnathia Leach, 1814

Gnathia firingae n.sp. (Figs. 23-56)

Holotype : ♂ (SMF), La Réunion ; L'Ermitage-les-Bains, south of St-Gilles-les-Bains ; reef-flat, from dead corals, 0.5-1 m, 25 January 1989.

Paratypes : 1 ovigerous ♀, 2 Pranzia-larvae (SMF), collected together with holotype. 3 ♂♂ (SMF), La Réunion ; La Saline-les-Bains, reef-flat, from dead corals covered with algae, 0.5-1 m, 18-20 January 1989. 1 ♂ (MNHN), La Réunion ; reef-flat near St-Leu, north of turtle farm ; from dead *Tubipora*-octocorallia, 26 January 1989.

Derivatio nominis : the specific name refers to the strong cyclon "Firinga", which caused considerable damage on the reefs of La Réunion during the author's fieldwork.

Description, ♂ : total length 1.7-2.1 mm (frontal margin of cephalon to tip of pleotelson), maximum width at pereonite 5. Body covered with several simple setae. Pigmentation variable ; some specimens with several small brown pigment spots scattered over entire body ; most specimens devoid of any pigmentation. Cephalon 1.9 times wider than long, with 2 longitudinal furrows adjacent to midline ; anteromedial part of cephalon with shallow sulcus. Frontal margin of cephalon with shallow, medially notched, non-setose medio-frontal process ; frontolateral processes rounded, with 2 simple setae on dorsal and 3 simple setae on ventral surface. Lateral eyes relatively large and well pigmented, with many small ocellae. Pereonite 1 very short, lateral margins not visible in dorsal view. Pereonites 2-4 subequal in length. Pereonites 5-6 much longer than other pereonites, smooth. Pereonite 7 very short, hidden beneath posterior margin of pereonite 6, devoid of any setae. Genital papillae small rounded tubercles, set close to one another. Pleon straight with pleonites subequal in length, each bearing pair of lateral setae. Pleotelson roughly triangular, with sinuous lateral margins. Dorsal surface of pleotelson with 3 pairs of simple setae ; apex of pleotelson with pair of long simple setae.

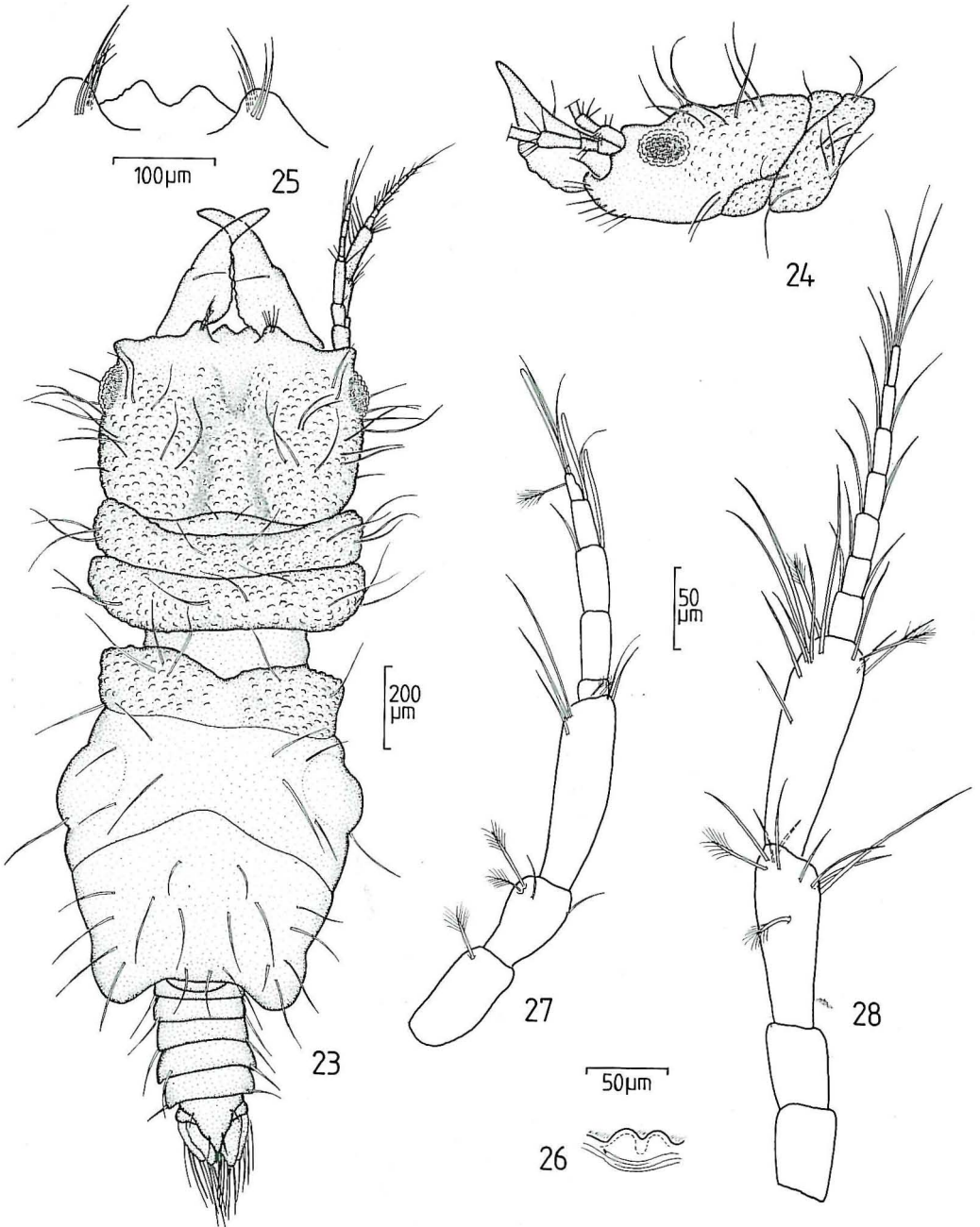
Antenna 1, peduncle of 3 articles ; second article shortest ; elongate third article almost as long as first and second articles combined ; flagellum 5-articulated ; first flagellar article shortest and wider than long ; distal 3 articles bearing aesthetasc. Antenna 2, peduncle 4-articulated ; proximal 2 articles short and subequal in length ; distal 2 articles elongate with 4th article 1.2 times longer than third ; third and fourth articles with several distal simple

setae ; flagellum with 7 slender setose articles. Mandibles almost as long as cephalon, with simple seta at inner dorsal margin ; mandibular blade with several small, rounded teeth. Maxilliped of 5 articles ; large proximal article with slender mediobasal lobe, reaching slightly beyond distal margin of second article ; broadly rounded outer margin of first article densely setulose ; distal 4 articles bearing finely fringed setae at ectal and distal margins, formula 4-7-5-8 ; moreover, terminal article with short simple seta. Pylopod of 2 articles ; enlarged proximal article with 24 finely fringed setae at convex medial margin, and 5 simple setae on ventral surface near ectal and distal margin ; distal margin of proximal article with 3 small denticles ; distal article almost circular, its lateral margins densely setulose and distal margin with 2 short simple setae. Pereopods relatively slender and moderately setose. Tooth-shaped tubercles present at posterior margin of carpus in pereopods 1-5, merus and ischium of pereopods 3-4, as well as merus of pereopod 5 ; anterior margin of basis in pereopod 5 granulate ; anterodistal margin of carpus in pereopod 5 with short, robust compound spine and posterodistal margin of merus with 2 such spines. Both rami of pleopods 1-5 ovate, exopodite always shorter than endopodite. Sympodite of pleopods 1-5 with 2 setulose retinaculae. Pleopod 1, distal margin of endopodite with 7 plumose setae, of exopodite with 8 plumose setae. Pleopod 2, distal margin of endopodite and exopodite each with 9 plumose setae. Pleopod 3, distal margin of endopodite with 8 plumose setae, of exopodite with 9 plumose setae. Pleopod 4, distal margin of endopodite with 8 plumose setae, of exopodite with 9 plumose setae. Pleopod 5, distal margin of both endopodite and exopodite with 9 plumose setae. All plumose setae of pleopodal rami drawn as simple setae. Uropodal exopodite narrower than but subequal in length to endopodite, both rami bearing several long fringed setae and simple setae ; endopodite with 7 feathered sensory setae on dorsal surface.

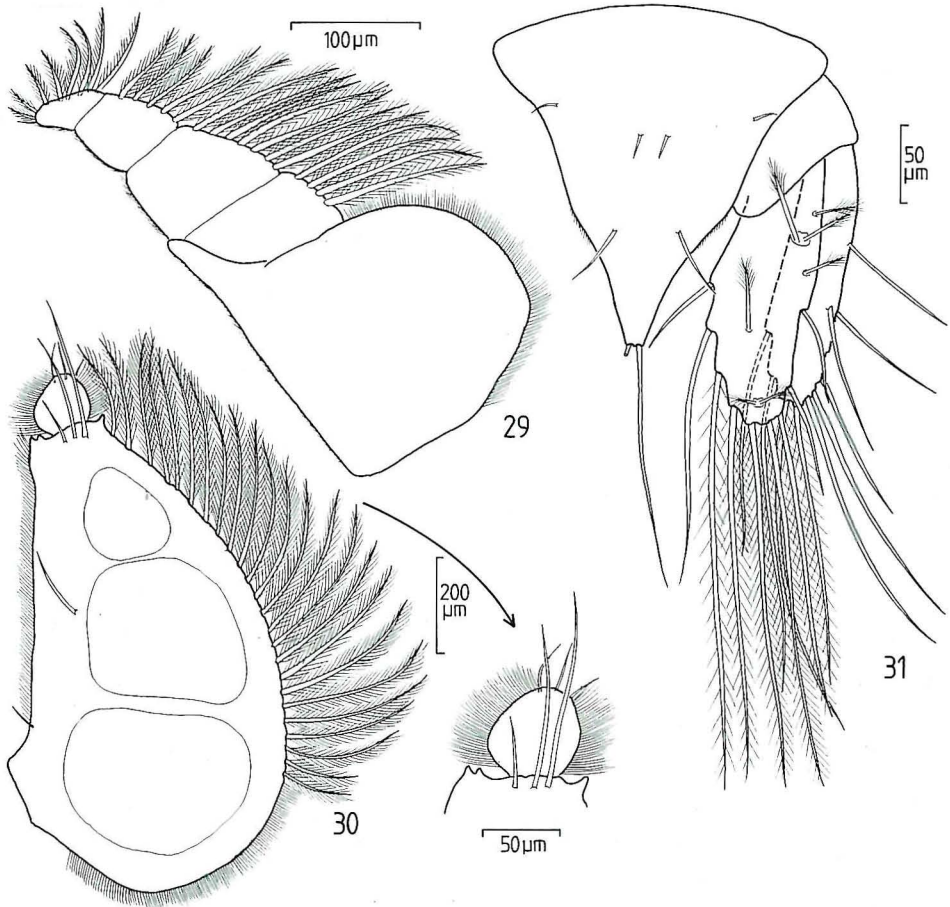
Ovigerous ♀ : total length 1.9 mm (frontal margin of cephalon to tip of pleotelson) ; maximum width at pereonite 5. Body smooth, covered with several short simple setae and some small pigment spots. Cephalon 1.6 times wider than long, frontal margin broadly rounded. Eyes relatively large, located on shallow lateral projections. Pereonites 4-6 greatly expanded for accommodation of eggs. Pleotelson and uropodal rami less setose than in ♂ ; all marginal setae of uropods simple.

Antenna 1, flagellum 4-articulated ; elongate second article longer than other flagellar articles together ; distal 3 flagellar articles bearing aesthetasc. Antenna 2 quite similar to ♂, distal 2 peduncular articles less setose. Pylopod of 3 articles ; first article elongate and strongly curved ; second article elongate-ovate, with 2 distal simple setae ; tiny terminal article tipped with short simple seta. Pereopods similar to ♂ ; anterodistal margin of merus in pereopod 5 with pair of slender pectinate spines. Pleopods generally much smaller than in ♂, sympodite lacking retinaculae. Pleopod 1, distal margin of endopodite with 8 plumose setae, of exopodite with 9 plumose setae (drawn as simple setae).

Praniza-larva : total length 2.2 mm (frontal margin of cephalon to tip of pleotelson) ; maximum width at pereonite 5. Cephalon 1.2 times wider than long, frontal margin almost straight. Lateral eyes very large, composed of many small ocellae. Pereonites 4-5 greatly



Figs. 23-28 : *Gnathia firingae* n.sp., ♂ : 23. dorsal view ; 24. cephalon and pereonites 1-2 in lateral view ; 25. frons in dorsal view ; 26. genital papillae ; 27. antenna 1 ; 28. antenna 2.



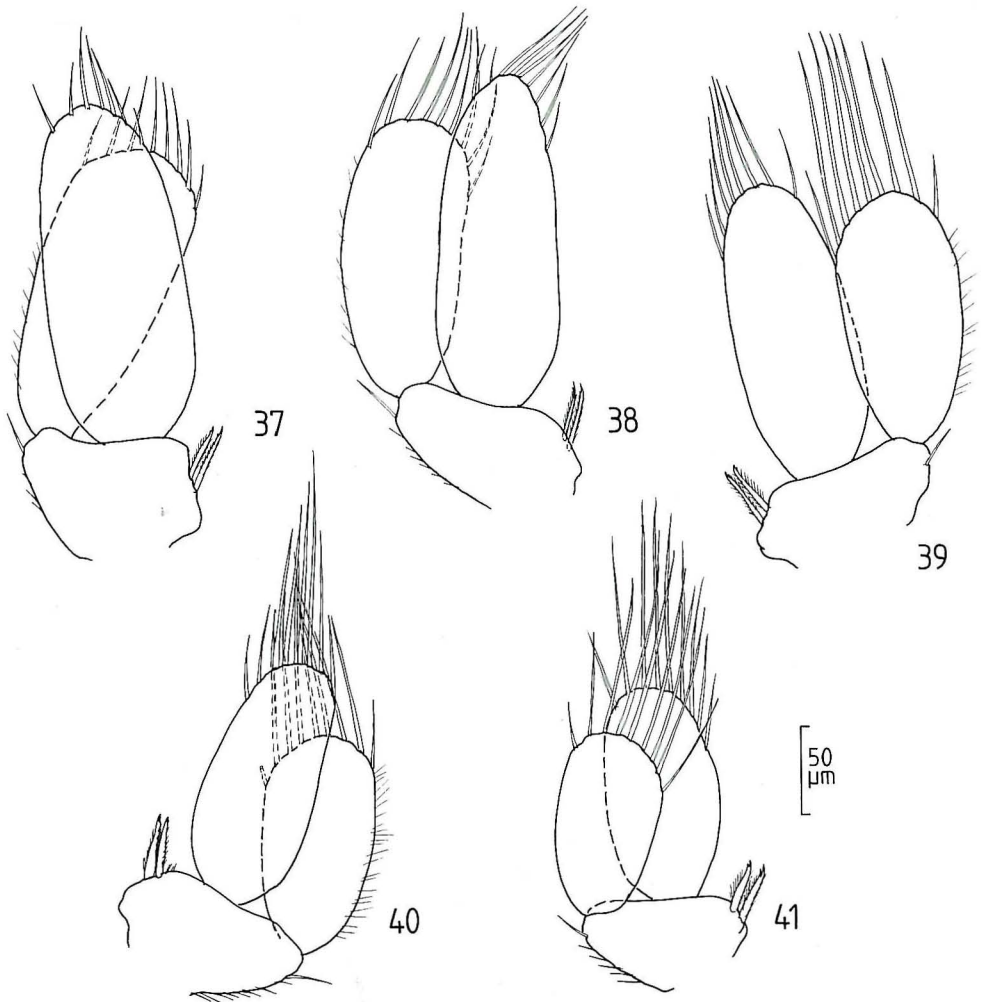
Figs. 29-31 : *Gnathia fringae* n.sp., ♂ : 29 maxilliped ; 30. pylopod ; 31. pleotelson and right uropod.

expanded. Pereonite 6 similar in shape to pleonites.

Hypopharynx and mandible very slender and styletto-like, with some distal denticulations. Maxilla similar in shape to mandible, lacking denticles. Maxilliped about twice as long as mandible and maxilla, also more robust than these appendages ; maxilliped with 3 subapical setae and some denticulations ; moreover, row of 8 stronger denticulations along medial margin in proximal half ; inner distal margin of maxilliped with slender simple seta in distal half. Pylopod prehensile, not greatly metamorphosed as in mature specimens ; suture line lacking between dactylus and unguis ; posterior margin of proximal 3 articles with some transverse folds, of tooth-shaped appearance when viewed laterally ; distal margin of first and second article with short, robust spine. Pereopods 1-5 similar to those of ♂ and ♀. Pleopodal rami much smaller than in ♂, bearing plumose marginal setae which are



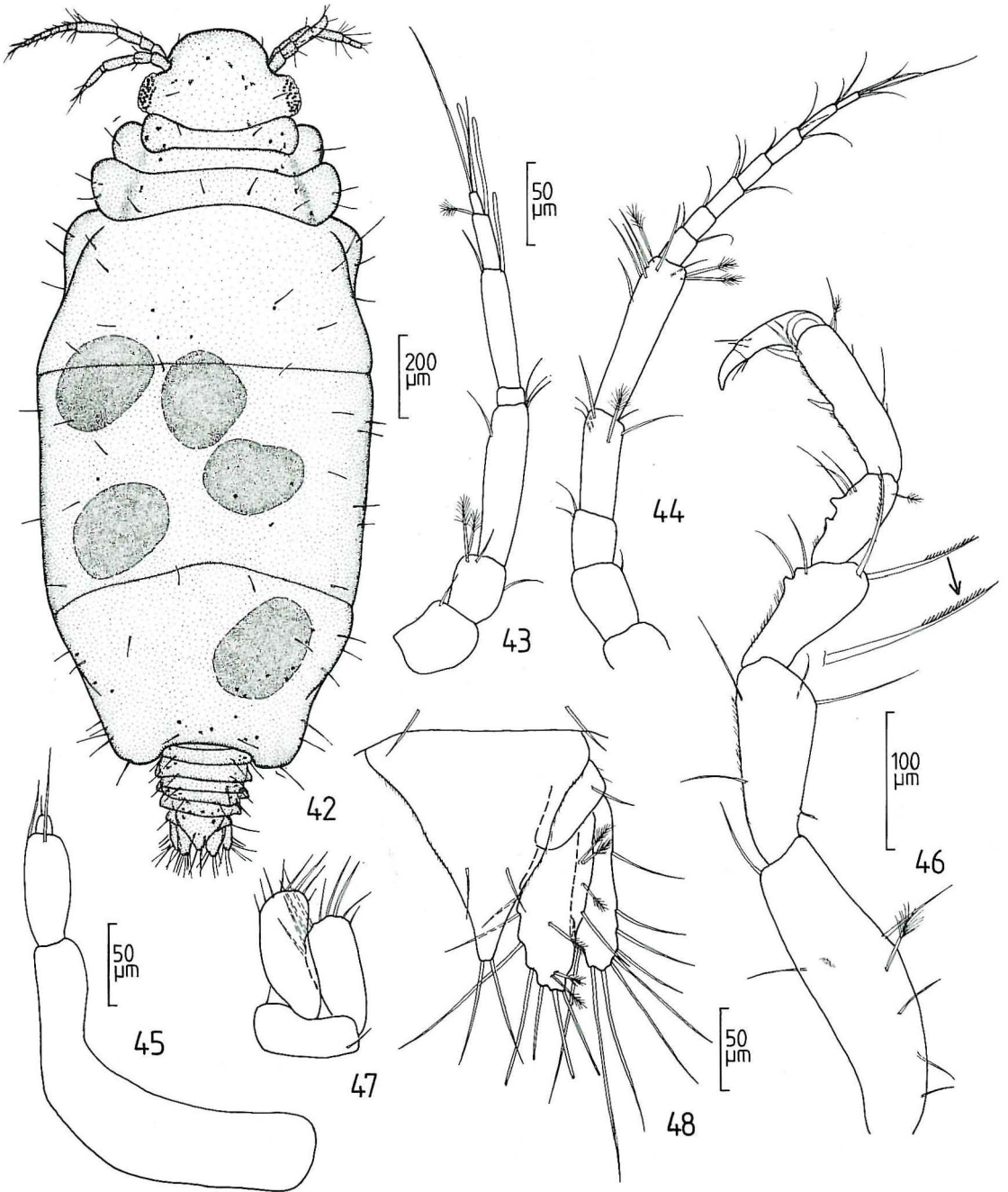
Figs. 32-36 : *Gnathia firingae* n.sp., ♂ : 32. pereopod 1 ; 33. pereopod 2 ; 34. pereopod 3 ; 35. pereopod 4 ; 36. pereopod 5.



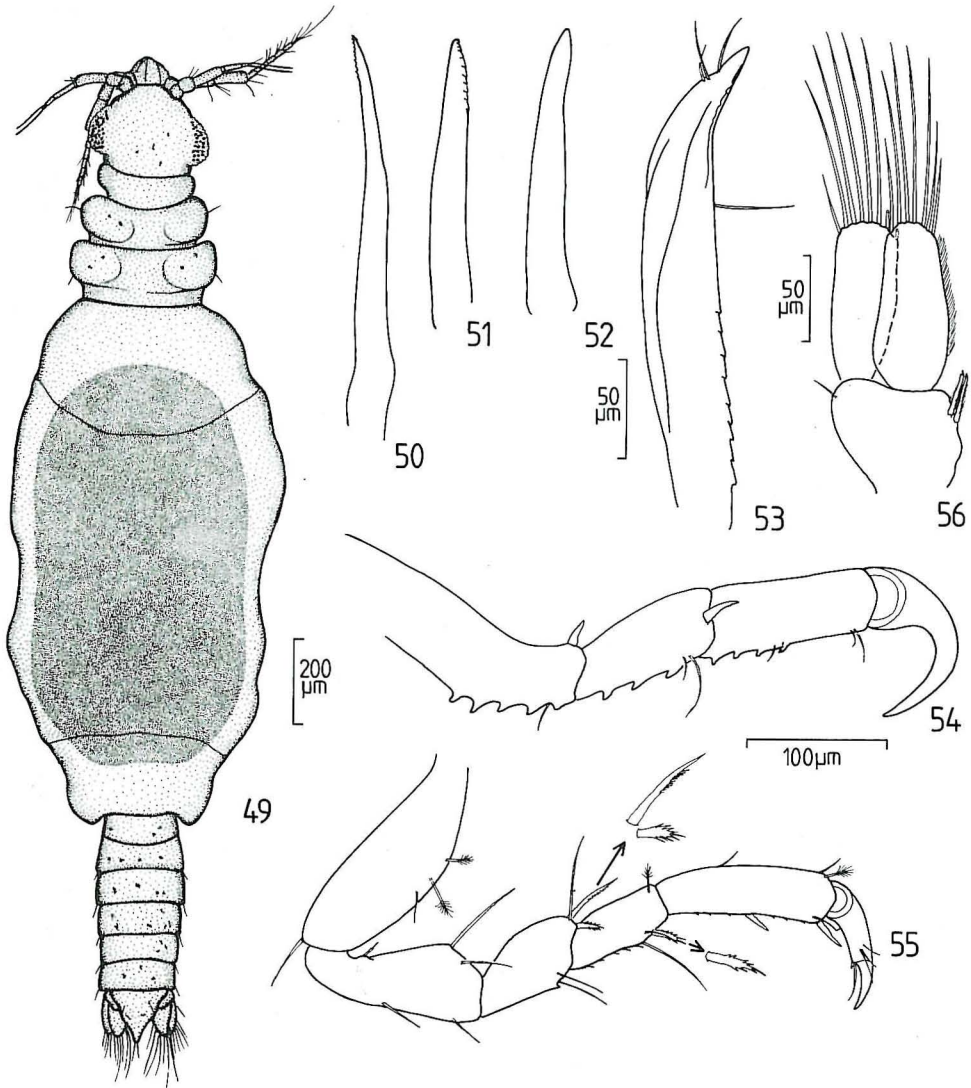
Figs. 37-41 : *Gnathia firingae* n.sp., ♂ : 37. pleopod 1 ; 38. pleopod 2 ; 39. pleopod 3 ; 40. pleopod 4 ; 41. pleopod 5.

much longer than in both ♂ and ♀. Pleopod 1, endopodite with 7 plumose setae, exopodite with 8 plumose setae (drawn as simple setae).

Remarks : the new species resembles *Gnathia africana* Barnard, 1914, a species which requires redescription and is only known from South Africa in depths between 34 and 200 m (Kensley 1978 : 118). *G. firingae* n.sp. is best distinguishable from *G. africana* through the lack of dorsolateral cephalic ridges, a shorter pleon and a much smaller size. *G. africana* is about twice as large as *firingae*, with a length of about 4 mm (cf. Kensley 1978 : Fig. 51A-B ; Monod 1926 : 432, Fig. 175). Two ♂♂ syntypes of *G. africana* were available for comparison from the British Museum (Natural History) (reference-number : 1916 : 11 :



Figs. 42-48 : *Gnathia firingae* n.sp., ovigerous ♀ : 42. dorsal view ; 43. antenna 1 ; 44. antenna 2 ; 45. pylopod ; 46. pereopod 5 ; 47. pleopod 1 ; 48. pleotelson and right uropod.



Figs. 49-56: *Gnathia firingae* n.sp., Praniza-larva : 49. dorsal view ; 50. hypopharynx ; 51. mandible ; 52. maxilla ; 53. maxilliped ; 54. pylopod ; 55. pereopod ; 56. pleopod 1.

20 : 1-5), and confirm the distinguishing characters mentioned above.

All specimens of the new species collected at La Réunion were found associated with dead coral substratum in more or less exposed reef locations. None was available from the sheltered lagoons, where extensive sampling has also been carried out.

Distribution : La Réunion, France.

ACKNOWLEDGMENTS

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