A new species of *Neaxius* Borradaile, 1903 from the Gulf of Guinea (Crustacea, Decapoda, Thalassinidea, Strahlaxiidae)

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ABSTRACT
The genus *Neaxius* Borradaile, 1903 of the family Strahlaxiidae Poore, 1994 includes five species. A new species, *N. mclaughlinae* n. sp., from the Gulf of Guinea, and the first record of the genus from the Atlantic, is herein presented. The new species is similar to *N. vivesi* (Bouvier, 1895) in having the lateral carinae of the gastric region bearing teeth on the anterior part; the second article of the antennal peduncle with upper and lateral spines; the telson approximately as broad as long with three carinae the distal one being well apart from the posterior border. The new species can be differentiated from *N. vivesi* by the unarmed upper border of the carpus and propodus of pereopod 1 as well as the unarmed lower border of the merus of pereopod 2 (all borders have spines in *N. vivesi*); the telson carinae straight and of the same length (distal carina shorter than the others in *N. vivesi*). Differentiating characters of the six species of *Neaxius* are presented.

KEY WORDS
Crustacea,
Decapoda,
Thalassinidea,
Strahlaxiidae,
Neaxius,
Gulf of Guinea,
new species.

RÉSUMÉ
Une nouvelle espèce de Neaxius *Borradaile, 1903 du Golfe de Guinée (Crustacea, Decapoda, Thalassinidea, Strahlaxiidae).*
Le genre *Neaxius* Borradaile, 1903 de la famille Strahlaxiidae Poore, 1994 comprend cinq espèces auxquelles s'ajoute maintenant une nouvelle du Golfe de Guinée qui est aussi le premier signalement de ce genre dans l'Atlantique : *N. mclaughlinae* n. sp. Le nouveau taxon ressemble à *N. vivesi* (Bouvier, 1895) par la présence d'épines sur la partie antérieure des carènes latérales de la région gastrique, le deuxième article du pédoncule antennaire armé d'épines dorsales et latérales, le telson à peu près aussi large que long avec trois carènes dont la distale est éloignée du bord postérieur. Il se distingue de *N. vivesi* par l'absence d'épines au bord dorsal du carpe et du propode du péréipode 1 ainsi qu'au bord ventral du mérus du péréiopode 2 (bords munis d'épines chez *N. vivesi*) et par les trois carènes du telson rectilignes et de même longueur (carène distale plus courte chez *N. vivesi*). Les caractères distinctifs des six espèces de *Neaxius* sont présentés.

MOTS CLÉS
Crustacea,
Decapoda,
Thalassinidea,
Strahlaxiidae,
Neaxius,
golfe de Guinée,
espèce nouvelle.

INTRODUCTION

The subgenus *Axius* (*Neaxius*) Borradaile, 1903 was elevated to generic rank by Sakai & de Saint Laurent (1989: 29) for three species: *Axia acantha* A. Milne-Edwards, 1878, type species, from New Caledonia, *Axius glyptocercus* von Martens, 1868 from Australia and *Eiconaxius vivesi* Bouvier, 1895 from Lower California.

Poore (1994: 100) placed *Neaxius* in his new family Strahlaxiidae Poore, 1994 and subsequently two species were described, *Neaxius frankeae* Lemaitre & Ramos, 1992 from the Pacific coast of Columbia and *N. trondlei* Ngoc-Ho, 2005 from the Marquesas Islands. The new species treated herein represents the first record of the genus in the Atlantic.

The material studied belongs to the collection of the Muséum national d'Histoire naturelle, Paris (MNHN).

The measurements given in the description are: carapace length (cl) measured from the tip of the rostrum to the posterior border of the carapace, and total length (tl) measured from the tip of the rostrum to the posterior border of the telson.

Figured specimens and appendages were stained with a weak solution of chlorazol black. The anterior part of carapace, the telson and uropods are figured in dorsal view while the whole specimen and appendages are figured in lateral view.

SYSTEMATICS

Family STRAHLAXIIDAE Poore, 1994
Genus *Neaxius* Borradaile, 1903

Neaxius mclaughlinae n. sp.
(Figs 1; 2)

? "Axiidae new species" – Wirtz & Debelius 2003: 137, fig.

TYPE MATERIAL. — Holotype: **Gulf of Guinea.** Principe Island, Praia Pequena, CALYPSO 1956, stn P 18, diving, 3-4 m, 3.VII.1956, ♂ cl 23.5 mm, tl 65 mm (MNHN-Th 1196).
Paratype: *idem*, stn P 13, *ibidem*, diving, 3 m, 28.VI.1956, ♂ cl 18 mm, tl 49 mm (MNHN-Th 1195).

MATERIAL OF *NEAXIUS VIVESI* (BOUVIER, 1895) EXAMINED. — **Lower California.** L. Diguet leg., 202-1894, ♂ lectotype (present designation) cl 35 mm, tl 98 mm (MNHN-Th 194); 2 ♂ paralectotypes cl 28 and 27 mm, tl 81 and 75 mm (MNHN-Th 193).
Gulf of California. South of San Jose Island, L. Diguet leg., 118-97, 1 ♂, partly dried, cl 27 mm (MNHN-Th 510).

ETYMOLOGY. — The new species is named for Pat McLaughlin honouring her valuable contributions to the study of cirripeds and decapod Crustacea. The dedication is fitting as material of this new species was first separated by the late Michèle de Saint Laurent, a good friend of Pat McLaughlin.

DISTRIBUTION. — Known only from the type locality.

DIAGNOSIS. — Carapace with rostral border continuous with anterior part of lateral carina of gastric region, altogether with seven or eight teeth. Anterolateral border with four to six spines; cervical groove with seven to nine spines laterally. Telson approximately as broad as long with three prominent tranverse carinae equally long and distant from one another, distal carina well separated from posterior border.
Article 2 of antennal peduncle with three or four upper and two lateral spines; acicle large with four to six lower spines. Maxilliped 3 merus with four lower and one upper distal spines; carpus with three lower spines.
Major pereopod 1 with two lower spines on basis and four lower spines on ischium; merus with four to seven spines on upper border and 11 on lower border, those on distal half placed at a slightly higher level; carpus bearing large lower distal spine and three lower lateral distal spines, upper border unarmed, propodus unarmed; fixed finger with large conical tooth near middle of cutting edge. Pereopod 2 unarmed except for two lower spines on ischium; pereopod 4 propodus and dactylus carrying spiniform setae.

DESCRIPTION

Carapace (Fig. 1A, B) with bifid and slightly depressed rostrum reaching beyond eyes; lateral rostral border continuous with anterior part of lateral carina of gastric region, altogether with seven or eight teeth; median rostral carina with four tubercles. Anterolateral border of carapace with four to six spines. Eyestalks nearly reaching distal border of second article of antennular peduncle, cylindrical; cornea hemispherical, distal, weakly pigmented. Epistome with two lateral spines. Gastric region weakly convex; cervical groove well defined with seven to nine spines laterally. Pleuron of abdominal

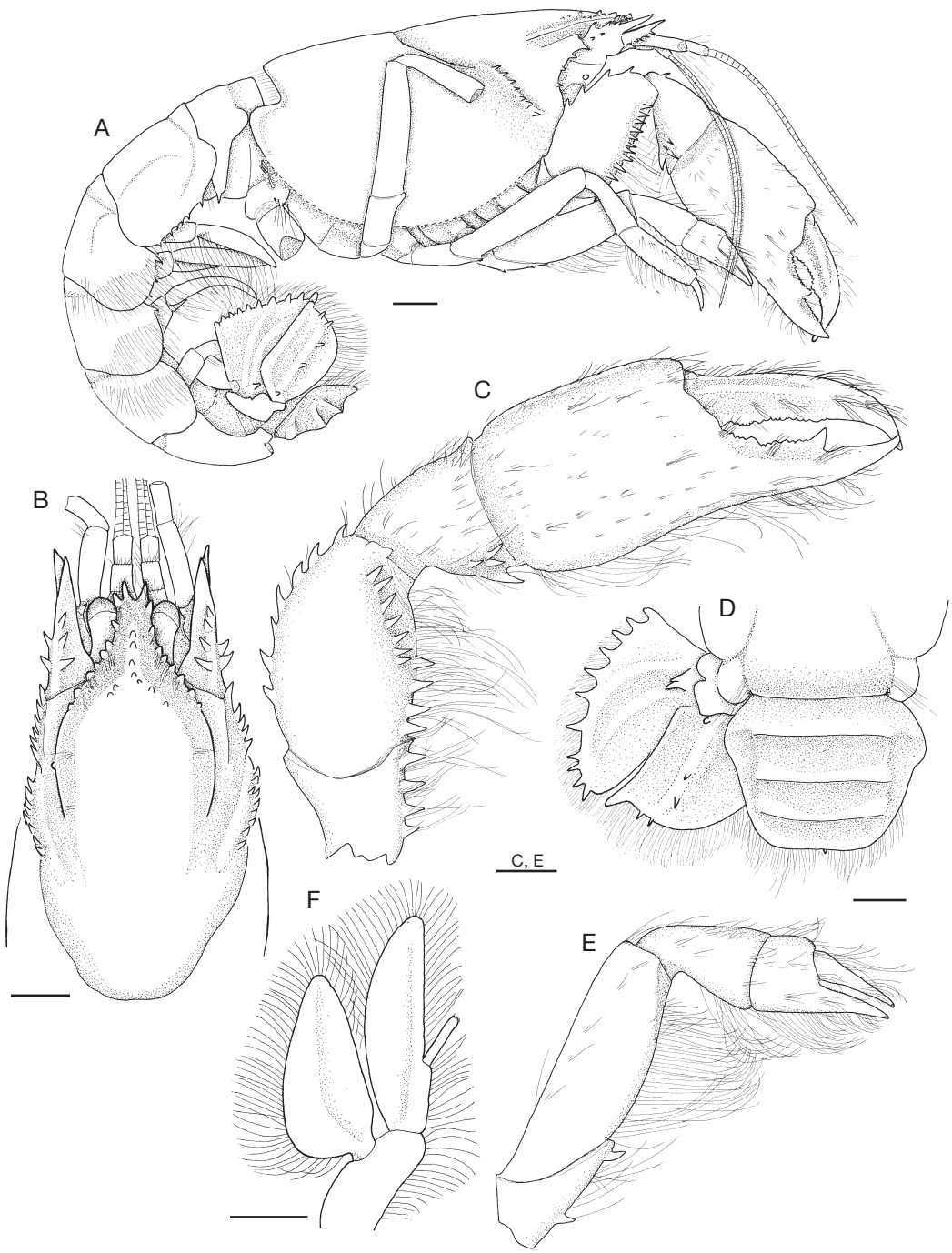

FIG. 1. — *Neaxius mclaughlinae* n. sp., Gulf of Guinea: **A**, **F**, ♂ paratype, carapace partly damaged (MNHN-Th 1195); **B**-**E**, ♂ holotype (MNHN-Th 1196); **A**, whole animal; **B**, anterior part of carapace; **C**, major pereopod 1; **D**, telson and left uropods; **E**, pereopod 2; **F**, pleopod 2. Scale bars: 2 mm.

TABLE 1. — *Neaxius mclaughlinae* n. sp., gill formula.

	Maxillipeds			Pereopods				
	1	2	3	1	2	3	4	5
Epipods	1	1	1	1	1	1	1	
Podobranchs			1	1	1	1	1	
Arthrobranchs			2	2	2	2	2	
Pleurobranchs					1	1	1	1

somite 1 (Fig. 1A) tapering with one or two ventral spinules; pleuron of abdominal somite 2 overlapping that of somite 1 and 3, rounded ventrally with six to 10 ventral spinules; pleura of somite 3 and 4 with three and one spinule respectively, both as well as pleuron of somite 5 bearing lateral setae. Telson (Fig. 1D) slightly shorter than greatest breadth; three prominent tranverse carinae of approximately same length, equally distant from one another, with distal one well apart from posterior border; lateral border convex near proximal third, tapering posteriorly; posterior border approximately straight with median spinule.

Antennular peduncle (Figs 1B; 2A) unarmed, with article 2 about as long as article 3. Antennal peduncle (Figs 1B; 2B) with article 2 pointed distally carrying three or four upper spines and two lateral spines, article 3 with lower spine; acicle large, distally acute with mesial spine (Fig. 1B) and four to six lower spines; article 4 nearly twice as long as article 5.

Mandible, maxillule, maxille, maxilliped 1 and 2 similar to that of *Neaxius trondlei*, maxille without posterior seta (see Ngoc-Ho 2005: figs 6C, 7E, F, I).

Maxilliped 3 (Fig. 2C) coxa with lower spine, ischium unarmed on lower border, with mesial toothed crest as in *N. trondlei* (see Ngoc-Ho 2005: fig. 7H); four lower spines, larger distally, and one small upper distal spine on merus; three lower spines on carpus; exopod not reaching distal border of merus.

Major pereopod 1 (Fig. 1A, C) on right side in both holotype and paratype, stouter than minor (Fig. 2D) with two lower spines on basis, four spines on ischium; merus with four to seven upper spines and 11 spines on lower border, four of them on proximal half and seven distally placed at slightly higher level; carpus bearing dorsal proximal spinule in paratype (Fig. 1A) absent in holotype, large lower distal spine and three lower lateral distal spines present in both types; propodus with palm slightly longer than fingers, unarmed; fixed finger with small rounded teeth on proximal half of cutting edge and large conical tooth near middle; dactylus with curved tip and obscure round teeth on cutting edge. Pereopod 2 (Fig. 1E) unarmed except for two lower spines on ischium. Pereopod 3 (Fig. 2E), pereopod 4 (Fig. 2F) and pereopod 5 (Fig. 2G) unarmed; pereopod 4 propodus and dactylus carrying spiniform setae; pereopod 5 subchelate.

Gill formula as in Table 1.

Thoracic sternite of pereopod 4 with lateral spine; pereopods 1-4 with coxal spines.

Male pleopod 1 absent, pleopods 2-5 (Fig. 1F) with broad rami and digitiform *appendix interna.*

Uropod (Fig. 1D) exopod nearly triangular in shape with simple or bifid proximal spine, two curved unarmed carinae and 11-13 spines on posterior border; suture absent; endopod with large obtuse spine on posterolateral angle, two spines on median longitudinal carina and two spines on posterior border.

REMARKS

The gill formula of *Neaxius mclaughlinae* n. sp. is the same as that of *N. acanthus* and *N. vivesi* given by Sakai & de Saint Laurent (1989: 31), and of *Neaxius trondlei*. The formula presented by Ngoc-Ho (2005: table 2) for the latter species, however, contains errors: single podobranchs are actually present on maxilliped 3 and pereopods 1-4 (instead of pereopods 1-3); and single pleurobranchs are on pereopods 2-5 (instead of pereopods 1-4).

Borradaile (1903: 537) considered species of *Neaxius* as having no pleurobranchs, however a single small pleurobranch is present on each segment. Except for *N. glyptocercus* and *N. frankeae* (of which no material was examined), pleurobranchs are present on pereopods 2-5 in other species of *Neaxius*.

Neaxius mclaughlinae n. sp. shows some similarities to *N. vivesi* (Bouvier, 1895). Three type specimens of the latter species, all males and in fair condition, are in the collection of the MNHN. The paralectotype of cl 28 mm, tl 81 mm is likely to

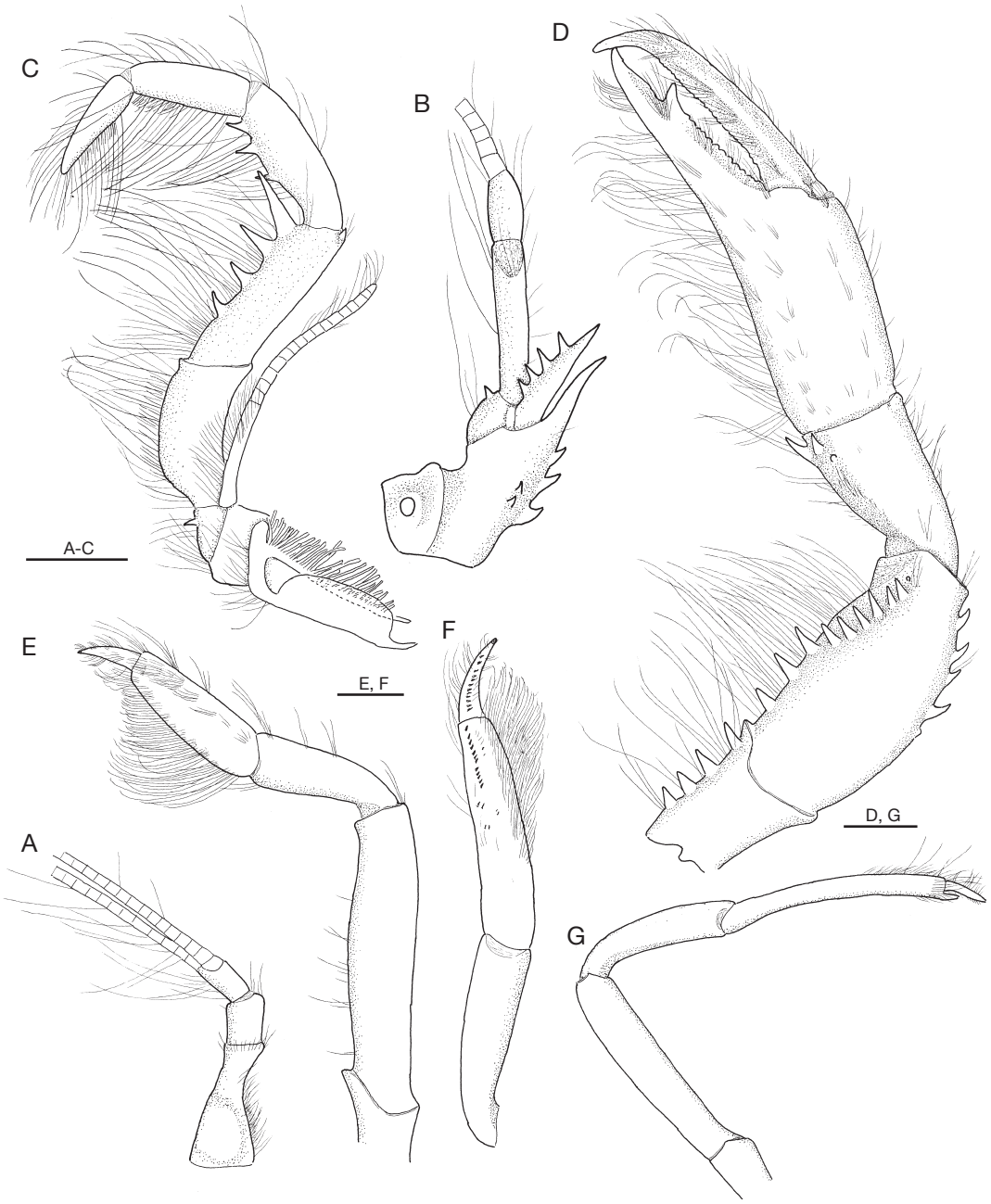

FIG. 2. — *Neaxius mclaughlinae* n. sp., Gulf of Guinea; **A**-**D**, **G**, ♂ paratype (MNHN-Th 1195); **E**, **F**, ♂ holotype (MNHN-Th 1196); **A**, antennule; **B**, antenna; **C**, maxilliped 3; **D**, minor pereopod 1; **E**, pereopod 3; **F**, anterior part of pereopod 4; **G**, pereopod 5. Scale bars: 2 mm.

TABLE 2. — Differentiating characters of *Neaxius acanthus* (A. Milne-Edward, 1878), *N. glyptocercus* (von Martens, 1868), *N. vivesi* (Bouvier, 1895), *N. frankeae* Lemaitre & Ramos, 1992, *N. trondlei* Ngoc-Ho, 2005 and *N. mclaughlinae* n. sp. Abbreviations: **A2**, antenna; **P1**, **P2**, pereopods 1 and 2.

	N. acanthus	*N. glyptocercus*	*N. vivesi*	*N. frankeae*	*N. trondlei*	*N. mclaughlinae* n. sp.
Lateral carinae of gastric region	unarmed	unarmed	with spines on distal part	unarmed	unarmed	with spines on distal part
Lateral spines on cervical grooves	3-5	absent	7-8	absent	2-3	7-9
Article 2 of A2	with upper and lateral spines	unarmed	with upper and lateral spines	with upper spines	with upper spines	with upper and lateral spines
Upper border:						
– P1 carpus	unarmed	unarmed	with spines	few spinules	unarmed	unarmed
– P1 propodus	unarmed	unarmed	with spines	few spinules	unarmed	unarmed
Lower border:						
– P2 merus	with spines	unarmed	with spines	not known	unarmed	unarmed
Telson	broader than long	broader than long	about as broad as long	about as broad as long	broader than long	about as broad as long
– carinae	3, distal faint apart from others	2, distal absent	3, distal shorter than others	3, distal shorter than others	3, same length, distal near posterior border	3, same length, distal apart from posterior border

be the one studied and figured by de Man (1925: 56, fig. 2).

Neaxius mclaughlinae n. sp. and *N. vivesi* (see de Man 1925: 56, fig. 2) are similar in having: 1) lateral border of rostrum and anterior part of lateral carina of gastric region bearing teeth; 2) second article of antennal peduncle with upper and lateral spines; 3) merus of pereopod 1 with spines on whole upper and lower borders; and 4) telson nearly as long as broad with three carinae, distal one apart from posterior border.

They differ by: 1) upper border of pereopod 1 carpus and propodus with spines in *N. vivesi* (unarmed in *N. mclaughlinae* n. sp.); 2) lower border of pereopod 2 merus with spines in *N. vivesi* (unarmed in *N. mclaughlinae* n. sp.); and 3) distal carina of telson shorter than the others and slightly curved in *N. vivesi* (all three carinae of telson straight and of same length in *N. mclaughlinae* n. sp.).

Of the six known *Neaxius* species, *N. acanthus* was figured by Kensley *et al.* (2000: figs 5, 7F); comparison of *N. acanthus* and *N. glyptocercus* was given by de Man (1925: 54) and Poore & Griffin (1979: 235). The latter two were compared with *N. trondlei* in Ngoc-Ho (2005: 61); *N. frankeae* (see Lemaitre & Ramos 1992: 346) and *N. mclaughlinae* n. sp. herein are compared with *N. vivesi*. The main characters differentiating species of *Neaxius* are summerized in Table 2.

Wirtz & Debelius (2003: 137, fig.) reported an "Axiidae new species" from Sao Tomé Island and gave a coloured photograph. The pictured specimen in lateral view shows similarities with *Neaxius mclaughlinae* n. sp. and was collected from a locality near the type locality of this new species. Nevertheless, no material is available for examination at present, and a definite identification cannot be obtained from a photograph.

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