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VERSITA

Redescription of *Neobrachiella spinicephala* (Ringuelet, 1945) parasitic on *Pinguipes brasilianus* Cuvier, 1829 from Argentina, with the first description of the male

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Abstract

Neobrachiella spinicephala (Ringuelet, 1945) (Copepoda, Siphonostomatoida, Lernaeopodidae) is redescribed based on newly collected material from the Brazilian sandperch, *Pinguipes brasilianus* Cuvier, 1829, (the type host) from Mar del Plata, Argentina (the type locality). A description of the male is given for the first time. Although some differences were observed between the original description and the specimens examined in this study, these differences do not warrant a change in the taxonomic status of this species. Indeed, the generic status of the species is confirmed, especially based on characteristics of the male.

Key words

Copepoda, Lernaeopodidae, *Neobrachiella spinicephala*, fish, *Pinguipes brasilianus*, Argentina

Introduction

Lernaeopodidae (Copepoda, Siphonostomatoida) is a vast family of parasitic copepods, with a long history of synonymies, misidentifications, and status changes of its members (see Kabata 1979). A clear example of the problematic systematics of this group is *Neobrachiella spinicephala* (Ringuelet, 1945). This species was poorly described as *Parabrachiella spinicephala* from 2 females recovered from a Brazilian sandperch, "*Pinguipes fasciatus*", (valid name *Pinguipes brasilianus* Cuvier, 1829) from Mar del Plata, Argentina (Ringuelet, 1945). Kabata (1970) suppressed *Parabrachiella* Wilson, 1915 and transferred its species to *Brachiella* Cuvier, 1830. Finally Kabata (1979) erected genus *Neobrachiella* to accommodate some species belonging previously to *Brachiella* and to other lernaeopodid genera such as *Parabrachiella*, *Probrachiella*, *Epibrachiella* and *Brachiellina*. The newly erected genus could be differentiated chiefly based on small morphological details. Many old descriptions are very superficial and inadequate. Consequently a correct assignment of an old nominal species to *Neobrachiella* can often be difficult or even impossible because of insufficient data, especially of male morphology. Males are unknown in many species, and their overall structure is the first differentiating feature between two major lernaeopodid groups such as *Clavella* or *Brachiella* group (Kabata 1979). Thus detailed redescriptions of some species are needed in order to assess their generic status (Piasecki 1993).

Since its original description, and with the exception of its mention in both Yamaguti (1963), and Castro Romero and Baeza Kuroki (1987), no further report of *N. spinicephala* has hitherto been made. The finding of some females and males of this species on the type host and from the type locality created an opportunity to reveal a number of morphological features not provided by Ringuelet (1945). Such redescription would not only allow to confirm the generic status of the parasite but it would also constitute a future comparative material for phylogenetic studies within the family.

Materials and methods

A total of 34 specimens of Brazilian sandperch, *Pinguipes brasilianus* Cuvier, 1829, (Actinopterygii, Perciformes), captured in the coastal area of Mar del Plata, Buenos Aires Province, Argentina (38°08´S, 57°32´W) in May of 2006 were

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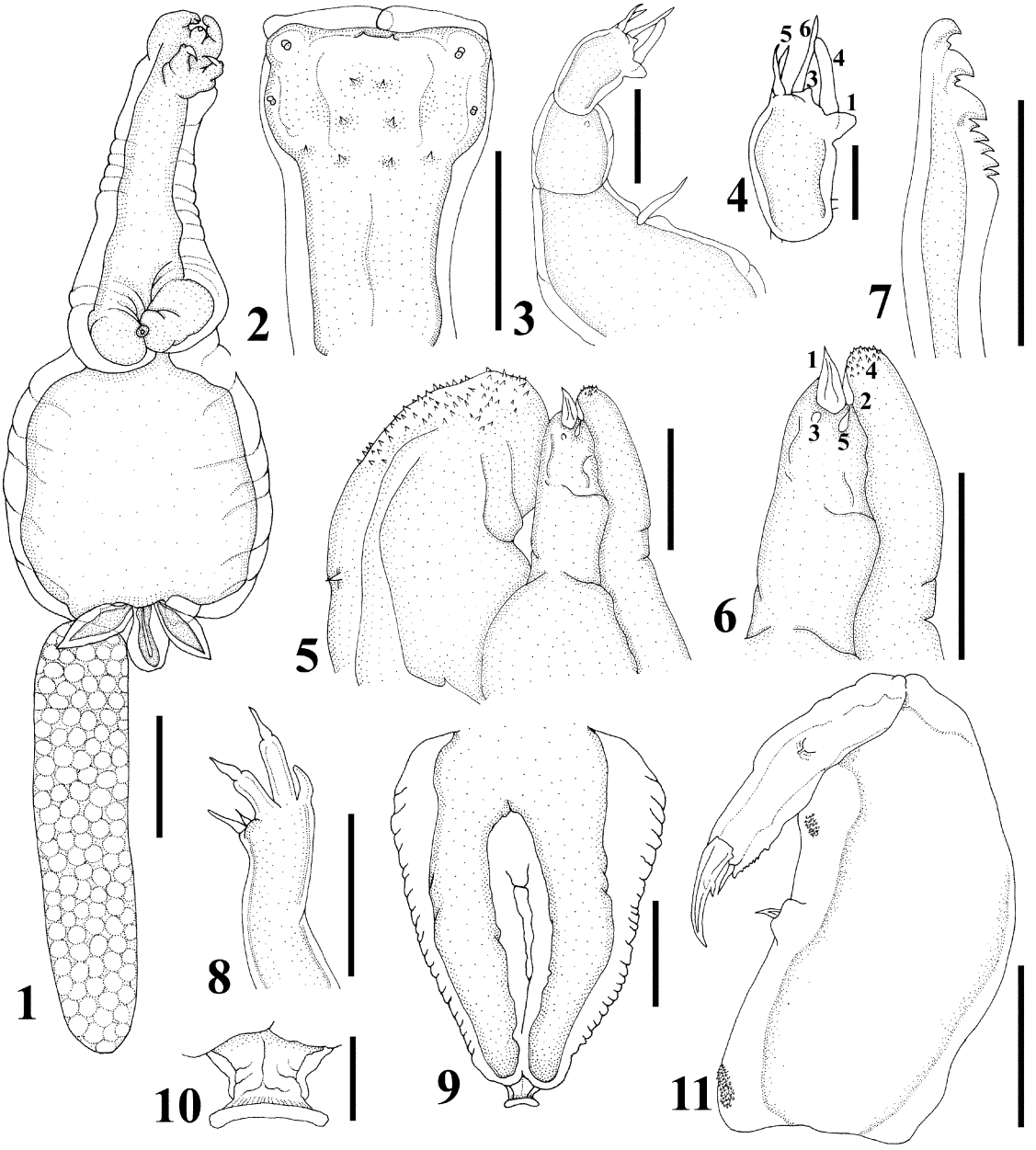
examined for parasitic copepods. The parasites were removed, fixed in 5% formalin, and stored in 70% ethanol; the appendages were dissected, cleared in lactic acid, and examined with a light microscope. Measurements of females, in millimetres, include the mean ± standard deviation followed by the range in parentheses. Measurements of males (based on two specimens), in millimetres, include only the range. Terminology follows Kabata (1979).

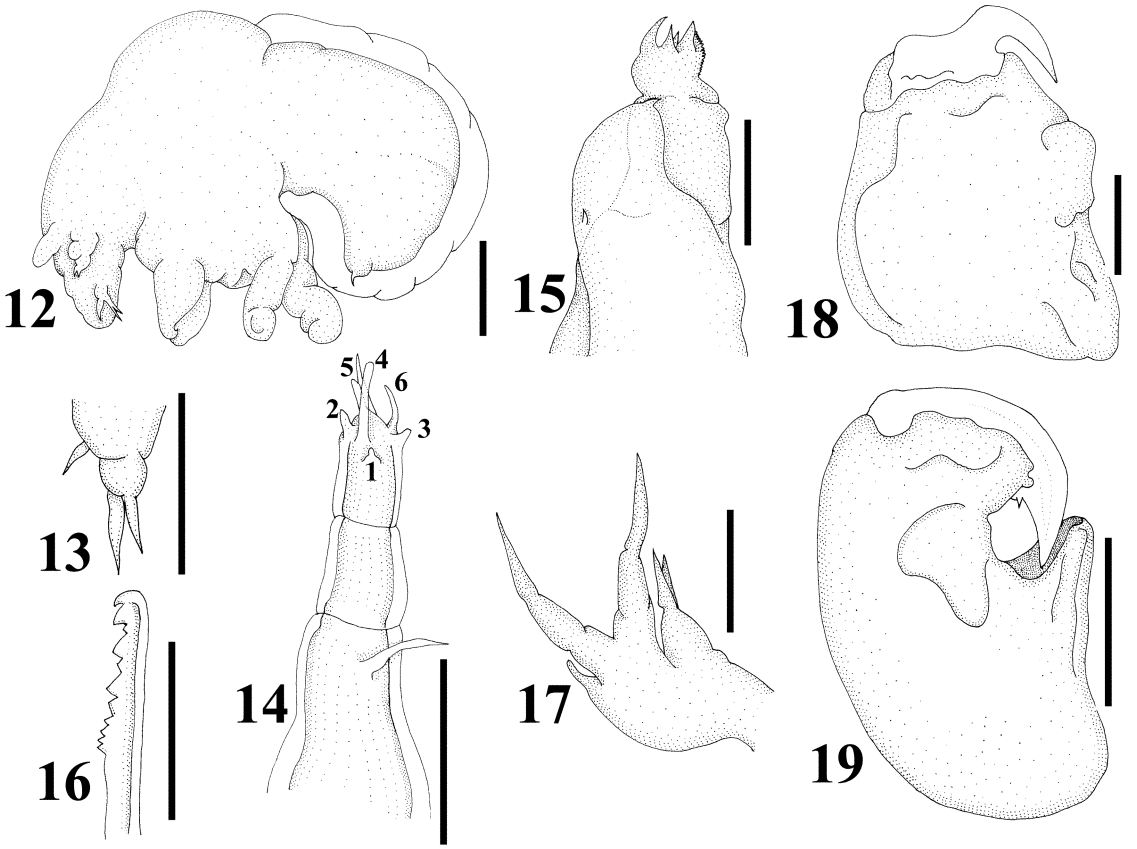
Results

***Neobrachiella spinicephala* (Ringuelet, 1945)** (Figs 1–19)

Redescription. Female (measurements based on 13 specimens): Cephalothorax (Fig. 1) subcylindrical, 2.91 ± 0.28 (2.40–3.60) mm long, 0.97 ± 0.25 (0.64–1.32) mm width at base of second maxillae. Dorsal shield (Fig. 2) subrectangular,



Figs 1–11. *Neobrachiella spinicephala*. Female: **1**. Habitus, ventral view. **2**. Dorsal shield of cephalotorax, dorsal. **3**. First antenna, dorsal. **4**. Tip of first antenna, dorsal. **5**. Second antenna, ventral. **6**. Second antenna, tip of endopod. **7**. Mandible. **8**. First maxilla, lateral. **9**. Second maxilla, ventral. **10.** Bulla, ventral. **11**. Maxilliped, ventral. Scale bars = 1 mm (Fig. 1), 0.5 mm (Figs 2 and 9), 0.05 mm (Figs 3, 7 and 8), 0.025 mm (Fig. 4), 0.1 mm (Figs 5, 6, 10 and 11)



Figs 12–19. *Neobrachiella spinicephala*. Male: **12.** Habitus, lateral view. **13.** Caudal ramus, dorsal. **14.** First antenna, dorsal. **15.** Distal half of second antenna, lateral. **16.** Mandible. **17.** First maxilla, lateral. **18.** Second maxilla, ventral. **19.** Maxilliped, ventral. Scale bars = 0.125 mm (Fig. 12), 0.05 mm (Figs 13–19)

0.77 ± 0.10 (0.62–0.98) long, 0.60 ± 0.30 (0.54–0.65) wide, bearing four pairs of spinules, one behind the other, near midline of anterior part of shield. In addition, single spinules lateral to posterior pair and 2 pairs of small structures, probably sensory papillae. Trunk (Fig. 1) subquadrate in ventral view, slightly shorter than cephalothorax, 2.06 ± 0.22 (1.64–2.40) long, 1.95 ± 0.33 (1.28–2.28) wide, dorsoventrally flattened, with nearly parallel lateral margins and rounded posterior corners. Genital process 0.56 ± 0.05 (0.50–0.65) long, 0.34 ± 0.08 (0.24–0.46) wide, flanked by pair of fusiform posterior processes, ventral to egg sacs. Egg sac cylindrical, 3.30 ± 0.51 (2.60–4.10) long, 0.75 ± 0.10 (0.60–0.90) in diameter. First antenna (Figs 3 and 4) apparently 3-segmented (large basal segment bearing only indistinct traces of separation), second segment armed with seta (whip) on medioventral margin, third with short spine (solus) on distoventral margin. Apical armature consisting of tubercles 1 and 3, tubercle 2 absent, seta 4 digitiform, situated between tubercles 1 and 3, seta 6 slender and long, giber 5 with bifid seta. Second antenna (Figs 5 and 6), exopod prominent, longer than endopod, with spinules on apical surface and dorsomedial spine; endopod 2-segmented, armed with apically spinulated ventral process 4 and bearing distal claw 1, spines 2 and 5, and blunt tubercle 3 at tip. Mandible (Fig. 7) with dental formula P1, S1, P1, S1, P1, S1, B4. First maxilla (Fig. 8) with short ventral exopod armed with 2 spines of different length; endopod with two large subcylindrical papillae, each bearing prominent seta, and third reduced papilla. Second maxilla (Fig. 9) short, about one third of cephalothorax length, fused at tip. Fusion comprising approximately 11% of second maxilla length, without distinct collars; ducts of maxillary glands evident, with inconspicuous openings; bulla (Fig. 10) small, with short manubrium. Maxilliped (Fig. 11) with strong, slightly elongate corpus and distinctly elongate subchela. Inner margin of corpus with centrally located myxa – consisting of swelling surmounted by single seta – and two spinulate patches located proximally and distally. Subchela subcylindrical; shaft with centrally located small swelling with minute seta and distomedial dentiferous margin and auxiliary seta at base of claw. Claw slightly curved and sharp with two secondary denticles.

Male (measurements based on 2 specimens): Body (Fig. 12), 0.60–0.81 mm long. Cephalothorax about half of total length, oval in dorsal view, dorsal shield not visible. Trunk subcylindrical, tapering and bending forward posteriorly. Caudal rami sunking into pit; each ramus tipped with 3 setae (Fig. 13). First antenna (Fig. 14) apparently 3-segmented, with long

basal segment, armed with seta (whip) on medioventral margin. Apical armature consisting of tubercles 1, 2, and 3 well developed, seta 4 long and digitiform, seta 6 slender and long, giber 5 composed of bifid seta. Second antenna (Fig. 15); exopod shorter than endopod, cylindrical with round apex, armed with two denticles, one apical and other subapical; endopod 2-segmented, with well developed apical armature, consisting of strong dorsal hook 1, ventral wall of distal segment expanded and denticulate, with hook-like process 4. Mandible (Fig. 16) with dental formula P1, P1, S1, P1, S1, P1, S1, B4. First maxilla (Fig. 17) with ventral exopod armed with 2 spines of different length; endopod with two large subcylindrical papillae, each bearing prominent seta, third papilla reduced to seta. Second maxilla (Fig. 18) with subquadrangular corpus, bearing prominent tubercular myxa on medial margin; subchela with robust base and slender tip, sharply bent at midlength, claw not delimited. Maxilliped (Fig. 19) with strong corpus, myxal area with prominent subtriangular and concave outgrowth; subchela with broad base and slender tip; claw not delimited; small secondary tooth on inner margin. No thoracic legs, no external genitalia.

Host: *Pinguipes brasilianus* Cuvier, 1829.

Site of infection: Bases of pectoral and pelvic fins, and edges of operculum.

Locality: Mar del Plata, Buenos Aires Province, Argentina (38°08´S; 57°32´W).

Number of copepods collected: 15 females (3 carrying males).

Prevalence: 32.3%.

Mean intensity (range): 1.36 (1–3).

Material deposited: Voucher specimens (5 females and 2 males) are deposited in the Collection of the Museo de La Plata, La Plata, Argentina. Collection No. 26.106.

Discussion

It is evident from the presently reported examination of the new material, that the majority of overall morphological characteristics of the newly found females are identical with those originally described by Ringuelet (1945). Many details of appendages, however, were misidentified or overlooked by that original author, and are herein given. Those details include: the distribution and the number of spines on the dorsal shield, the armature and segmentation of first antenna, second antenna, first maxilla, maxilliped, mandible, and bulla.

The observed morphological differences between the original description and the presently reported study could be due to the species was erected based on only 2 specimens, both with broken second maxillae. These differences do not warrant a change in the taxonomic status of the species. Indeed, the inclusion of the species within *Neobrachiella* is confirmed, especially by characteristics of the male such as the well developed apical armature of first antenna, the length of endopod of second antenna in relation to exopod, the armature of subchela of maxilliped, and the absence of external genitalia. All these features clearly assure the identity of the redescribed copepod species as a member of the genus *Neobrachiella*.

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