Bryocyclops caroli sp.n. (Crustacea, Copepoda, Cyclopoida), the first representative of the genus in South America

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Abstract

Bryocyclops caroli sp.n. is described and recorded as the first representative of this genus in South America. It is a leaf-mould dweller and has been collected in humid litter, a habitat unknown until now for the genus.

Introduction

The following species of *Bryocyclops* Kiefer, 1927 have been recorded in other regions than South America: *Bryocyclops* (*Bryocyclops*) *absalomi* Por, 1981; *B.* (*B.*) *africanus* Kiefer, 1932; *B.* (*B.*) *ankaratranus* Kiefer, 1954; *B.* (*B.*) *anninae* Menzel, 1926); *B.* (*B.*) *apertus* Kiefer, 1935; *B.* (*B.*) *bogoriensis* (Menzel, 1926); *B.* (*B.*) *chappuisi* Kiefer, 1928; *B.* (*B.*) *constrictus* Lindberg, 1947; *Bryocyclops* (*Haplocyclops*) *correctus* Kiefer, 1959; *B.* (*B.*) *difficilis* Kiefer, 1935; *B.* (*B.*) *elachistus* Kiefer, 1935; *B.* (*B.*) *fidjiensis* Lindberg, 1953; *B.* (*H.*) *gudrunae* (Kiefer, 1952); *Bryocyclops* (*Palaeocyclops*) *jankowskajae* Monchenko, 1972; *B.* (*B.*) *mandrakanus* Kiefer, 1954; *B.* (*H.*) *monodi* Kiefer, 1959; *B.* (*B.*) *muscicola* (Menzel, 1926); *B.* (*H.*) *neuter* (Kiefer, 1955); *B.* (*B.*) *pauliani* Lindberg, 1954; *B.* (*B.*) *parvulus* Kiefer, 1928; *B.* (*B.*) *phyllopus* Kiefer, 1935; *B.* (*B.*) *travancoricus* Lindberg, 1947.

Using the Sahara as a reference point, two species have been reported from the North (Israel, U.S.S.R.) and nineteen from the South (Africa, Madagascar, India, Indonesia, Melanesia), and only one from both North (Iran) and South (Madagascar). Among these, fifteen are muscicolous and bromelicolous, four are interstitial, and three are cavern dwelling species.

The copepod to be described here is the first record of the genus in South America, and is also the first species found in a different habitat, that is, leaf-mould in humid litter.

Material and methods

The material was collected by removing the upper 2 cm of humid litter with a little shovel. From this litter many males, females (including ovigerous ones), nauplii and copepodites were sorted and fixed in 4% formaldehyde.

Specimens were measured along the mid-dorsal line from the frontal margin to the end of the furcal rami, furcal setae excluded.

The following abreviations have been used in the descriptive text: MZUSP - Museu de Zoologia, Universidade de São Paulo, Brazil; $P_1 \ldots P_6$ - first . . . sixth pair of legs.

CYCLOPIDAE

Bryocyclops (Kiefer, 1927)

Bryocyclops caroli sp.n. (Figs 1-24)

Type material: Holotype (1 female, MZUSP5429).

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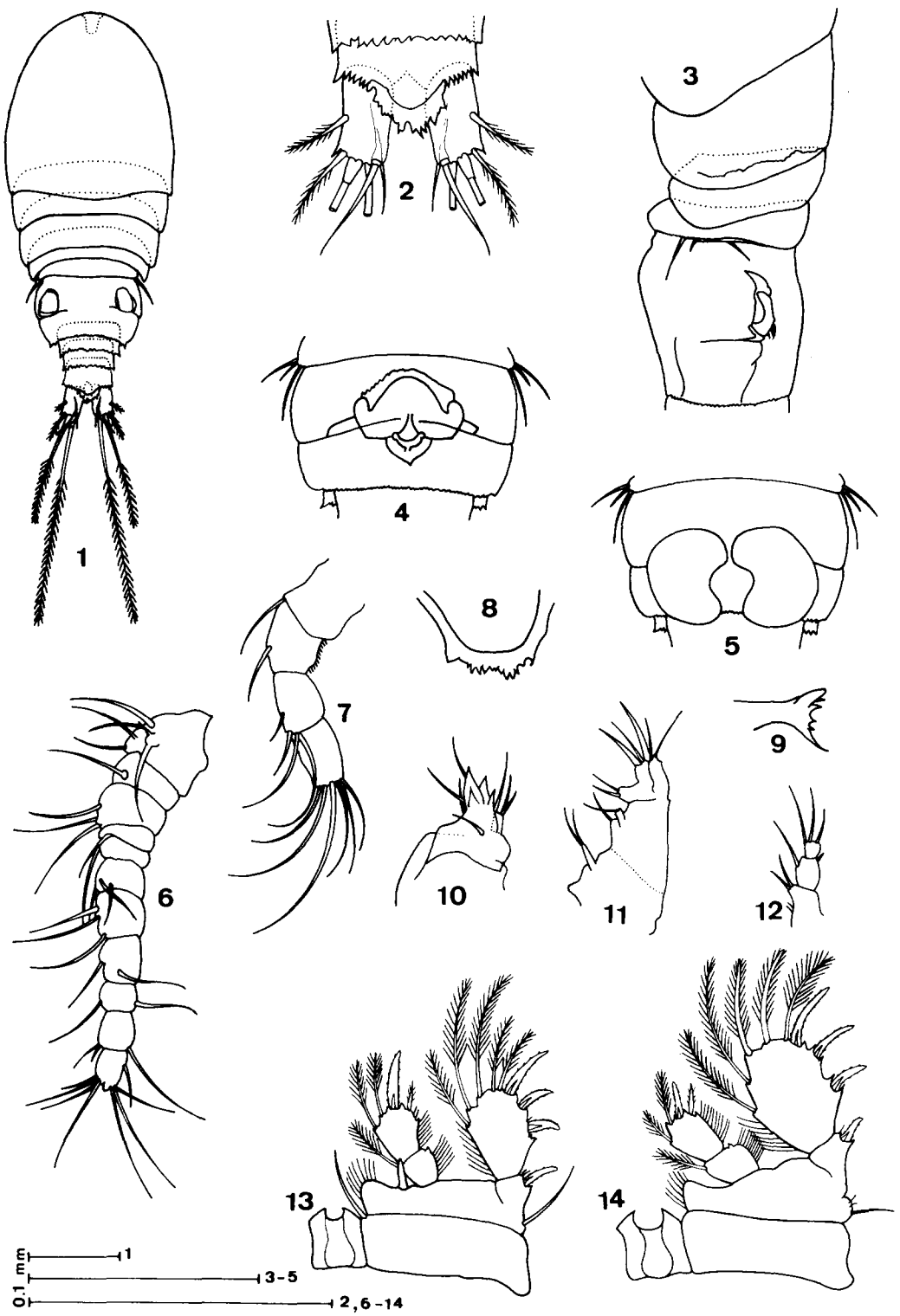


Figs. 1–14. Bryocylops caroli sp.n.

Female 1. habitus (dorsal), 2. anal segment and furcal rami (dorsal), 3. last three metasomal and genital segment (lateral), 4. receptaculum seminis (ventral), 5. spermatophores (ventral), 6. antennule (ventral), 7. antenna (dorsal), 8. labrum (dorsal), 9. mandibule, 10. maxillule, 11. maxilla, 12. maxilliped, 13. P_1, 14. P_2.

Paratypes (1 male, 4 females, MZUSP5431) from the University of São Paulo campus, São Paulo, SP, Brazil, Gisela Y. Shimizu, coll., Feb. 1980.

Description

FEMALE: 0.421–0.489 μm. Body flattened. Cephalosome anteriorly oval and longer than wide. Prosome about twice longer than urosome (Fig. 1). Second metasomal segment with a linear crenulated ornamentation near its posterior margin (Fig. 3). Genital segment strongly developed, 1.5 times wider than long with a pair of dorsal sclerotized and rounded structures (Fig. 1), a ventral receptaculum seminis (Fig. 4) and frequently spermatophores attached on its ventral side (Fig. 5). Posterior margins of genital and first two abdominal segments irregularly indented, the indentation stronger dorsally than ventrally. Postero – lateral margins of anal segment with denticles as far as the anal operculum (Fig. 2). Operculum prominent, semi – circular with the tip reaching the middle of the furcal rami (Fig. 2). The opercular border is characteristically serrated in an irregular way in all specimens examined.

Furcal rami (Fig. 2) 2.5 times longer than wide, slightly divergent, with a chitinous crest dorsally. Each furcal ramus bears one lateral seta at its terminal third, a dorsal seta at the end of the crest and an outer terminal one, both of them, twice longer than the inner terminal. It also has an inner medial terminal seta, about twice the length of the outer medial terminal seta.

Antennule 11 – segmented (Fig. 6). Antenna and mouth appendages as on Figures 7 to 12. Swimming legs (P_1 to P_4) biramous, all rami (except for endopodite of P_4) two- segmented. Spinal formula for exopodites II of P_1 to P_4: 3-3-3-3 and setal formula for the same: 5-5-5-4. Intercoxal plates with prominent pointed tubercles (Figs 13–16). Endopodites with a single internal seta on proximal segment. Size of apical spine on distal segment decreases from P_1 to P_4. Number of internal setae on distal segment of endopodite in P_1 to P_4 as on Figs 13 to 16. P_5 coalesced with the thoracic segment and reduced to three setae (Fig. 4). P_6 represented by three minute setae (Fig. 3).

The final number of eggs (Fig. 17) varies from 16 to 22 on the females observed.

MALE: 351–362 μm. Slightly smaller and more slender than the female. Urosome as usual with one more segment than in female. Geniculate antennule, 15-segmented with aesthetascs (Fig. 21). Antenna, mouth appendages and furcal rami as in female. Swimming legs P_3 and P_4 differ from female's in the following: endopodite II in P_3 with only 3 setae, the third inner marginal one smaller and glabrous under the apical modified spine (Fig. 22); and endopodite of P_4 two – segmented with the inner median seta shorter than in the female (Fig. 23). P_5 as in female. P_6 ventrally on the genital segment with three setae (Fig. 20).

Etimology

The species is named after Carlos E. F. Rocha, a friend who teaches at the University of São Paulo.

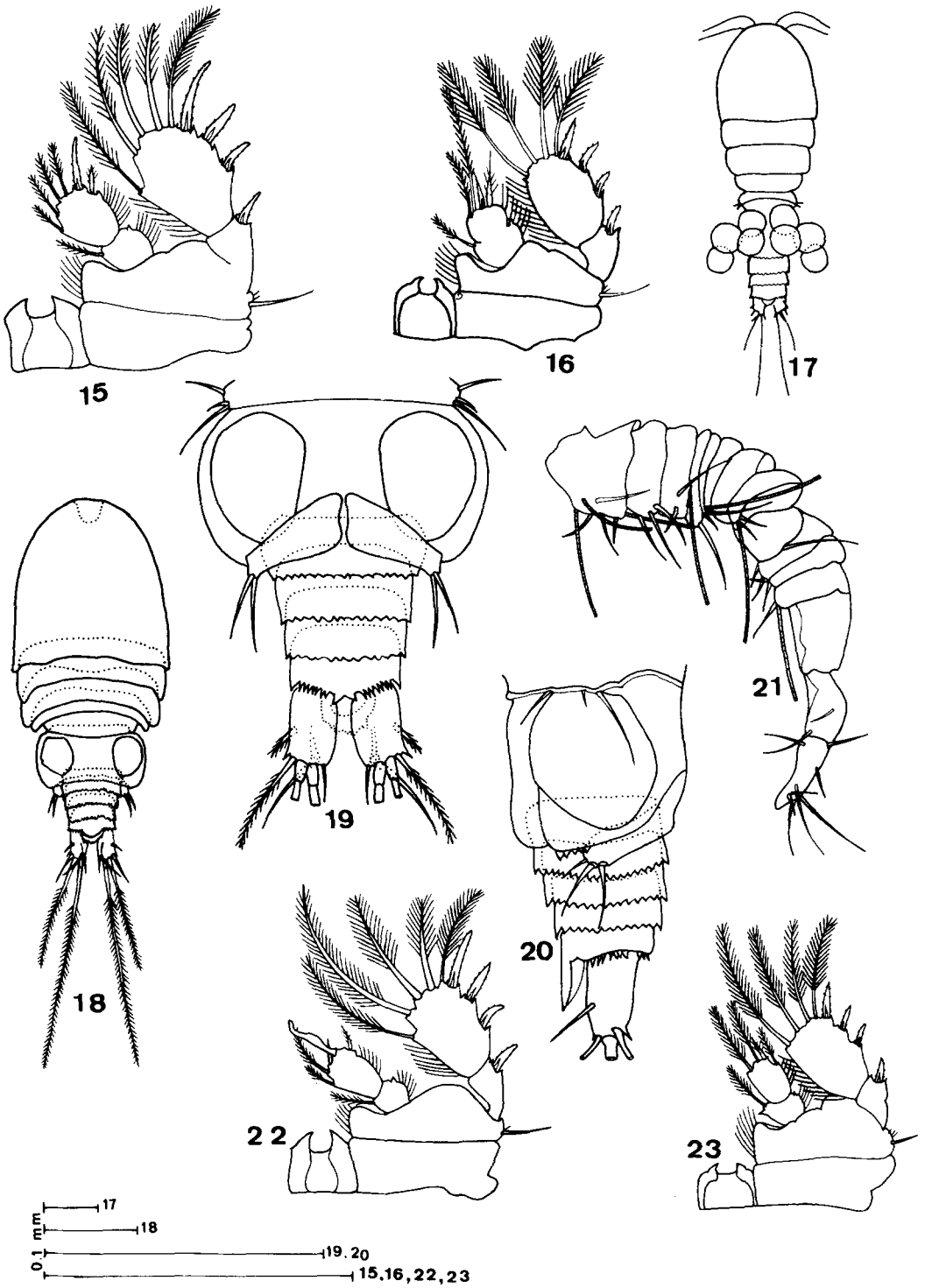
Diagnosis

The shape of the receptaculum seminis, the mid-terminal seta on the female endopodite of P_4 which is 4 times longer than the terminal spine, the two outer marginal setae on the tenth segment of female antennules, the crenulated linear ornamentation on the second metasomal segment in both sexes differentiate *B. caroli* from all other representatives of the genus.

Discussion

The scarce number of specimens of almost all the known species of *Bryocyclops* is due to the fact that these copepods have probably been collected on the boundaries of their habitats. Judging from its abundance, *Bryocyclops caroli* was certainly collected in its optimum habitat, and is the first record of this genus for South America. Its optimum habitat is leaf-mould, an environment completely different from those of the other known species (muscicolous, bromelicolous, interstitial, and cavernicolous).

If the uniarticulated P_4 endopodite of the female is taken into consideration, the Indonesian species *B. bogoriensis* and *B. muscicola* constitute the two closest related species to *B. caroli*, according to Kiefer's (1929), Lindberg's (1954), and Monchenko's (1972) keys. Nevertheless, the characteristic used by Kiefer to separate these species is not the same used by Lindberg and Monchenko. Kiefer bases his identification on the shape of the receptaculum seminis, while the other two use the pres-



Figs 15–17. Bryocyclops caroli sp.n.
Female 15. P_3, 16. P_4, 17. female dorsal with egg disposition. Male 18. habitus (dorsal), 19. urosome (ventral), 20. urosome (lateral) 21. antennule (dorsal), 22. P_3, 23. P_4.

ence of tubercles in the intercoxal plate of P_4 to separate the species. As *B. muscicola* and *B. caroli* have pointed tubercles on their coxal plates, Kiefer's key is the only suitable one for separating these two species.

According to the structure and ornamentation of the swimming legs, Lindberg (1953) created for the genus six groups of species. He had however admited that this separation was inadequate because of the scarcity of complete descriptions and the fact that the males of 5 species and the female of a sixth species were unknown. The species *B. bogoriensis* and *B. muscicola* were placed in Lindberg's second group because of the following characteristics: (1) dimorphism in the apical spine of the distal segment of the endopodite of P_3; (2) endopodite of female P_4 uniarticulated; (3) tubercles of the intercoxal plate of P_4 rounded or pointed and (4) presumable formulae of spines and setae of the swimming legs should be 3-3-3-3 and 5-5-5-4. All these characteristics are also present in *B. caroli,* including the last mentioned formulae, which are now confirmed, because owing to the lack of information Lindberg only presumed them.

Acknowledgements

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