

## A NEW SPECIES OF *CALANOPIA* (COPEPODA, CALANOIDA) FROM THE CENTRAL RED SEA

BY

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### ABSTRACT

A new species of calanoid copepod, *Calanopia kideysi*, has been found in the central Red Sea. An adult female and a young male of the 5<sup>th</sup> copepodite stage are described. Comparisons are made between the new species and the other similar Indo-Pacific forms from the Red Sea: *Calanopia minor* A. Scott, 1902, and *Calanopia* n. sp. A (Uysal & Shmeleva, submitted). The new copepod is without lateral cephalic hooks and can be distinguished from these other small *Calanopia* species by the shape of its genital somite and by the structure of the fifth legs in female specimens. The proximal segment of the fifth leg of the female of *C. kideysi* n. sp. is without seta on the posterior surface, whereas *C. minor* and *C. n. sp. A* both have a seta on the proximal segment of the fifth leg.

### RÉSUMÉ

Une nouvelle espèce de Copépode Calanoïde, *Calanopia kideysi*, a été trouvée au centre de la Mer Rouge. Une femelle adulte et un copépodite 5 mâle sont décrits. La nouvelle espèce est comparée aux autres formes indo-pacifiques similaires de la Mer Rouge: *Calanopia minor* A. Scott, 1902 et *Calanopia* n. sp. A (Uysal & Shmeleva, soumis). Ce copépode nouveau est dépourvu de crochets latéraux céphaliques et se distingue de ces autres petits *Calanopia* par la forme de son somite génital et par la structure des P5 femelles. Le segment proximal de la P5 de la femelle de *C. kideysi* n. sp. est dépourvu de soie sur la surface postérieure, tandis que *C. minor* et *C. n. sp. A* ont toutes les deux une soie sur le segment proximal de la P5.

### INTRODUCTION

During a re-examination of plankton samples collected by the Institute of Biology of the Southern Seas (IBSS) in the Red Sea, an undescribed species of *Calanopia* has been found. This species is not abundant in the Red Sea samples.

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A total of fourteen valid species of *Calanopia* have been recorded until now (Mulyadi & Ueda, 1996). Dana (1849) described the first species of *Calanopia*, namely *C. elliptica*, in the genus *Pontella*. Dana (1852) later established the name *Calanopia* for this species and added *Pontella brachiata*, which was later transferred (SI-NMNH, 2000) to *Centropages* as *C. brachiatus* by Brady (1883). The following species were subsequently added: *Calanopia americana* Dahl, 1894, *Calanopia aurivillii* Cleve, 1901, *Calanopia minor* A. Scott, 1902, *Calanopia herdmani* A. Scott, 1909, and *Calanopia thompsoni* A. Scott, 1909. Früchtl (1924) mentioned a new variety, *Calanopia herdmani* var. *mertoni*, in a publication on copepods from the Aru Archipelago in Indonesia, but there is no recorded picture or drawing of this variety (SI-NMNH, 2000). Further species are *Calanopia media* Gurney, 1927, *Calanopia sarsi* C. B. Wilson, 1950, *Calanopia biloba* Bowman, 1957, *Calanopia australica* Bayly & Greenwood, 1966, *Calanopia sewelli* Jones & Park, 1967, *Calanopia seymouri* Pillai, 1969, *Calanopia parathompsoni* Gaudy, 1969, and *Calanopia asymmetrica* Mulyadi & Ueda, 1996. Recently, Uysal & Shmeleva (submitted) found an additional new species in the Levantine Sea, *C. n. sp. A*. With the new species described here, the total number of *Calanopia* species has increased to sixteen.

Most members of this genus are Indo-Pacific species, namely *C. aurivillii*, *C. australica*, *C. elliptica*, *C. herdmani*, *C. minor*, *C. parathompsoni*, *C. sarsi*, *C. thompsoni*, *C. sewelli*, *C. seymouri* (cf. Silas & Pillai, 1973), and finally *C. asymmetrica* (cf. Mulyadi & Ueda, 1996), a total of eleven species. Since *C. media* has first been reported from the Suez Canal (Gurney, 1927), its presence in the Red Sea (Pesta, 1941) and in the eastern Mediterranean region (Berdugo, 1968) versus its lack of presence in the western Mediterranean (Lakkis, 1976) have to be validated to confirm its Indo-Pacific origin. Of the remaining species, *C. biloba* and *C. americana* are known from the Atlantic Ocean (Bowman, 1957), whereas *C. n. sp. A* has recently been found the eastern Mediterranean (Uysal & Shmeleva, submitted). Among all these species, only *Calanopia elliptica*, *C. minor* and *C. media* were previously reported for the Red Sea (Halim, 1969). Recently, *Calanopia n. sp. A* has also been identified in Red Sea samples (A. Shmeleva, unpubl. obs.). So, with *C. kideysi n. sp.*, the total number of species of this genus also inhabiting the Red Sea comes to five.

The new species is named in honour of Dr. Ahmet Erkan Kideys. Type material is deposited in the collections of the National Academy of Sciences of Ukraine.

#### TAXONOMY

##### *Calanopia kideysi* sp. nov. (figs. 1-4)

**Material examined.** — A sample from 19°19'0"N 38°35'7"E in the central Red Sea, taken during a cruise of the R/V "Academic Kovalevsky" in October and December 1963. The sample

was obtained using an ichthyoplankton net (80 cm in diameter with a mesh size of 336  $\mu\text{m}$ ) at station 43 on 21 October 1963 at 19:40 h by a vertical haul in the layer of 120-53 m. The surface temperature was 31.4°C, surface salinity 39 ppt, and the total depth 710 m at this station.

Types. — Holotype: adult female, body length 1.00 mm. Paratypes: three females (0.96-1.05 mm) and a young male of the 5<sup>th</sup> copepodite stage (0.9 mm). The holotype and the paratypes are all recorded from the same station.

Measurements of the total length were made from the frontal margin of the head to the end of the caudal furca. The cephalothorax of the female was measured from the anterior margin of the head to the base of the genital somite.

Description. — Female (figs. 1-3). Total length of the holotype 1.00 mm. Range for 3 female paratypes 0.96-1.05 mm. The cephalothorax is composed of the head and 4 thoracic somites (fig. 1a). The abdomen is 2-segmented (fig. 1b). The head is separated from the first thoracic somite; the rostrum is small (fig. 1c, e). Cephalic hooks are absent on the lateral margins of the head. The fourth and fifth thoracic somites are fused. The postero-lateral ends of the fifth thoracic somite are symmetrical and do not reach half the length of the genital somite (fig. 1a).

The length ratio of cephalothorax and abdomen is 2.0 : 1.0. The cephalothorax is about 1.7 times as long as wide. The postero-lateral margins of the prosomal and genital somites are without setae. The genital somite is symmetrical in dorsal view (fig. 1b) and the ventral surface is without processes, with lateral swellings on either side (fig. 1c). The symmetrical and equal caudal rami are 2.4 times as long as wide (fig. 1b). The distal portion of the inner margin of each ramus bears a patch of fine hairs and six setae. The fourth seta from the outside is about three times the length of the others. The sixth seta is a small, non-plumose seta.

Antennule (fig. 1d) 17-segmented, almost reaching the posterior margin of the genital somite when pressed against the body.

Antenna and mouthparts similar to those of other members of this genus as illustrated by Giesbrecht (1892) for *C. elliptica*. Antenna (fig. 2a) with distinctly separated coxa and basis, bearing one and two setae, respectively. Endopod much larger than exopod; exopod 5-segmented. Endopod 2-segmented, proximal segment with two setae, compound distal segment with eight setae on lateral lobe and six setae apically. Inner margins of proximal and distal endopodal segments each with a patch of fine hairs.

Mandibular blade (fig. 2b) with two large, sharp spines, three blunt projections with bifid tips, and two slender spines. The exopod of the mandibular palp bears six setae, the endopod has nine setae of similar size.

Maxillule (fig. 2c) with a large first inner lobe with fourteen spines and setae; second inner lobe as long as the first and with two setae, third inner lobe short, with two setae. Proximal endopodal segment fused with second basipod; endopod and

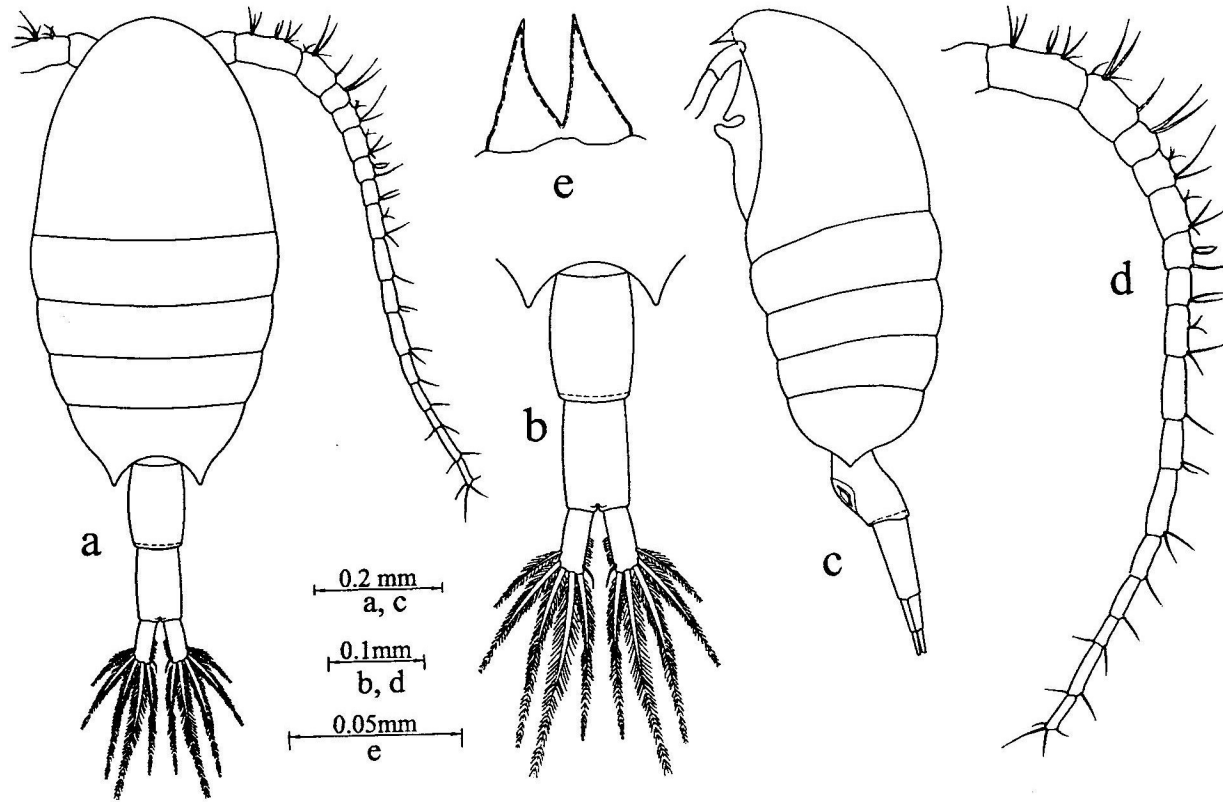


Fig. 1. *Calanopia kideysi* n. sp., adult female. a, whole body, dorsal view; b, abdomen, dorsal view; c, whole body, lateral view; d, antennule; e, rostrum.

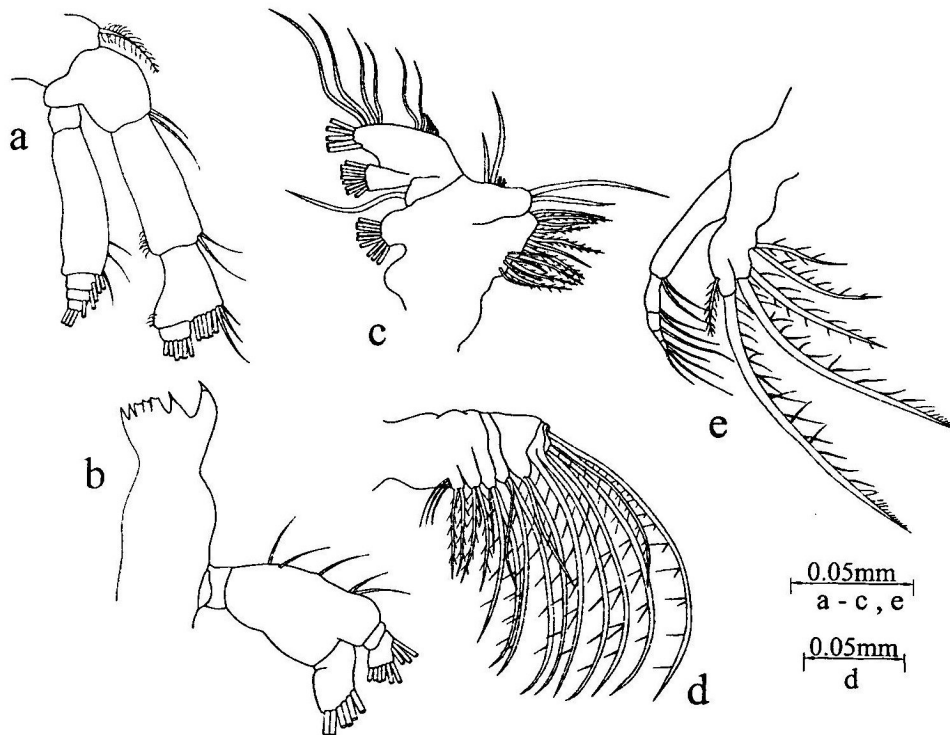


Fig. 2. *Calanopia kideysi* n. sp., adult female. a, antenna; b, mandible; c, maxillule; d, maxilla; e, maxilliped.

second basipod collectively bearing eleven setae. Exopod relatively small, with nine setae. Second outer lobe with a single seta; first outer lobe with nine setae.

Maxilla (fig. 2d) typical of the genus, with long, spiny bristles on both proximal and distal portions. It is composed of five basipodal lobes and four endopodal segments. Basipodal lobes with 5, 3, 3, 3, 2 setae and endopodal segments with 1, 1, 2, 2 setae, respectively; setae becoming rudimentary on the proximal part of the limb.

Maxilliped (fig. 2e) composed of a large first basipod and a second basipod followed by four small endopodal segments. The first basipod has a lobed inner border and 0, 2, 2, 2 setae. The second basipod and the endopod are short, second basipod with two setae and endopod with 2, 1, 1, 3 setae.

The legs of the first to fourth pairs (fig. 3a-d) have two basipodal, three exopodal, and two endopodal segments. The first basipodal segment of the first to third pairs has a single seta on the internal margin. The second basipodal segment is without setae on the first four pairs. The first and the second exopodal segments of the first to fourth pairs have one external spine each. The third exopodal segment of the first pair of legs has two external spines, those of the second to fourth pairs have

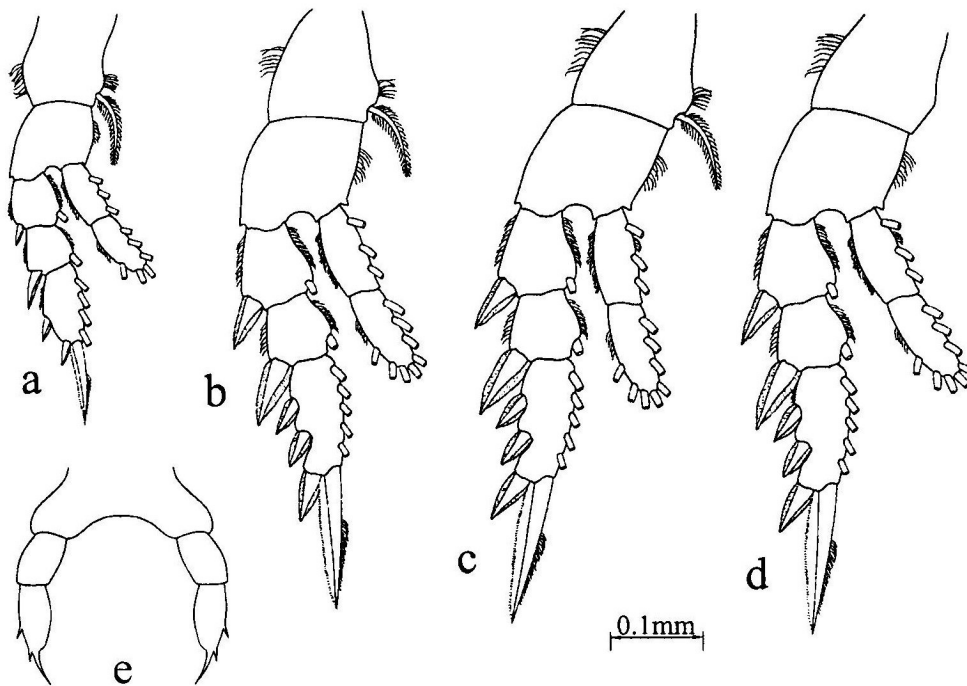


Fig. 3. *Calanopia kideysi* n. sp., adult female. a, first leg; b, second leg; c, third leg; d, fourth leg; e, fifth legs.

three external spines each. All of the external spines on the exopodal segments of the first four pairs of legs have serrated hyaline margins. The proximal endopodal segments of the first four pairs have three setae each. The distal endopodal segment of the legs of the first pair has six setae, and those of the second to fourth pairs have eight setae each. The external margins of the proximal basipodal segments of all four pairs have groups of hairs. The female fifth legs (fig. 3e) are both 3-segmented (including one distal segment of the basipod) and symmetrical. The proximal and distal segments are without setae on the posterior surface. The distal segment is a little longer than the previous segment and bears three spines, the distal spine being longer than the other two.

Copepodite V, male (fig. 4). — The total length of this paratype is 0.9 mm. The cephalothorax is like that of the female in most respects (fig. 4a). The rostrum is very similar in both sexes. The abdomen is symmetrical and without processes (fig. 4b). The second and third urosomal somites are of equal length. The fourth urosomal somite is longer than the third. The caudal rami are symmetrical and about three times as long as wide; they have straight inner margins (fig. 4b). The caudal setae are as in the female. The right antennule of this male is not geniculate. Other appendages except the fifth legs are as in the female. The fifth legs (fig. 4d)

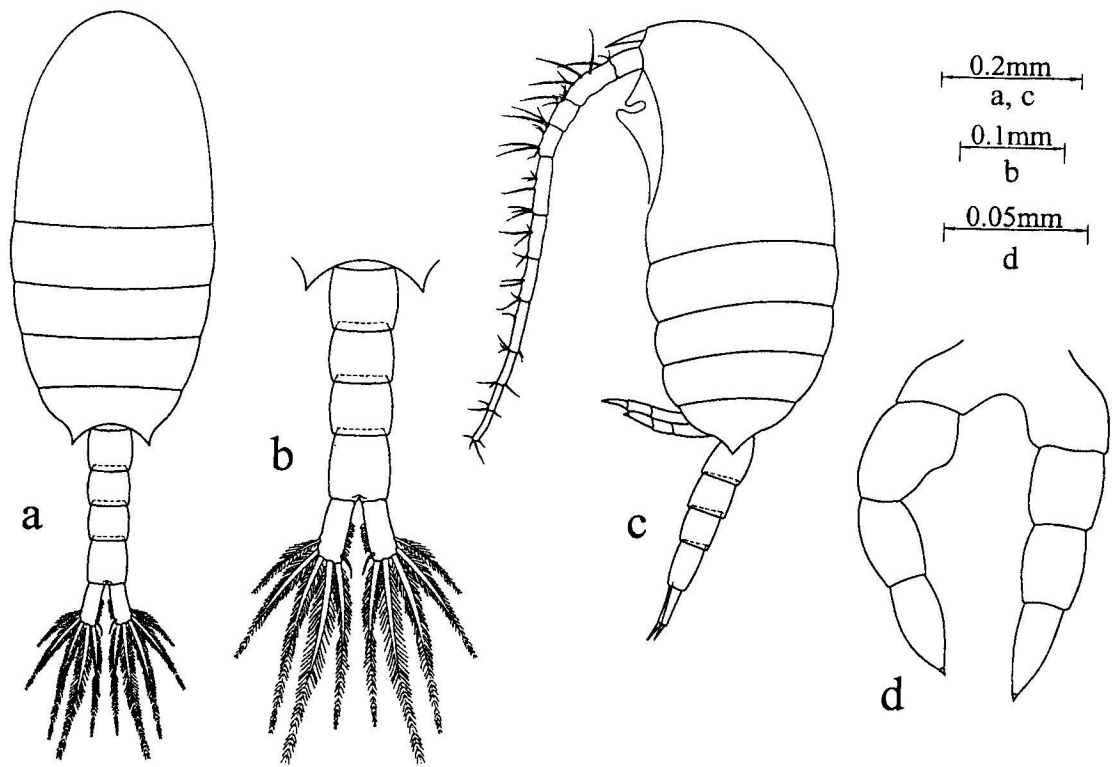


Fig. 4. *Calanopia kideysi* n. sp., copepodite V, male. a, whole body, dorsal view; b, abdomen, dorsal view; c, whole body, lateral view; d, fifth legs.

are both 3-segmented, but they differ in length, the left leg being shorter. There is a single small spine at the distal segment of both fifth legs.

#### DISCUSSION

The adult female *Calanopia kideysi* resembles its Red Sea congeners bearing symmetrical fifth legs, i.e., *Calanopia* n. sp. A (cf. Uysal & Shmeleva, submitted) and *C. minor* (cf. A. Scott, 1902). *C. kideysi* appears to be more similar to *C. n. sp. A* than to any other described *Calanopia* species, especially with respect to body shape. However, the new species is easily distinguished by its smaller body size (0.95-1.05 mm) as compared to *C. n. sp. A* (1.10-1.27 mm) and by the different shape of the fifth legs. In fact, *C. kideysi* is the smallest species of the genus. Other discriminating characters are as follows: the female fifth leg in *C. n. sp. A* has two segments and has a relatively long and a short spine on the outer margin of the terminal segment, whereas in *C. kideysi* it has three segments with a terminal spine and two small lateral spines. The anal segment of *C. kideysi* is 1.5 times as long as wide, whereas that of *C. n. sp. A* is 3.3 times as long as wide. Both *C. n. sp. A* and *C. minor* have a seta on the posterior surface of the distal segment of the fifth leg, whereas *C. kideysi* does not. The two other Red Sea congeners, *C. elliptica* and *C. media* differ by their larger size (body length ranges of 1.7-2.2 mm and 1.6-2.0 mm, respectively, cf. Dana, 1849; Gurney, 1927).

The first record of *Calanopia* species from the Red Sea is provided by Giesbrecht (1896) with the description of *C. elliptica* (Dana, 1849). Subsequently, A. Scott (1902) reported *C. minor* from the Red Sea, which is well distributed in coastal and oceanic waters of the Indian Seas. *C. media* was first described by Gurney (1927) from the Suez Canal where it constituted an important part of the plankton and it was first recorded in the Red Sea by Pesta (1941). Some specimens of *C. media* were later collected from the Red Sea by B. Kimor in 1967 and sent to E. G. Silas for confirmation of their identification (Silas & Pillai, 1973). Finally, *C. n. sp. A* is reported from the eastern Mediterranean and *C. kideysi* n. sp. is found in the Red Sea samples. *C. kideysi* is also found in the Indian Ocean (Shmeleva, unpubl.), which confirms its Indo-Pacific origin. However, *C. n. sp. A* has never been found in Indian Ocean samples. Still, the structural and geographical relationship between *C. kideysi* n. sp. and *C. n. sp. A* is striking.

The genus *Calanopia* can generally be divided into two groups based on the presence of one or two segments distal to the seta-bearing basal segment of the female fifth legs as stated by Bayly & Greenwood (1966), the first group having a three-segmented fifth leg, whereas the second group has four-segmented fifth legs. *C. americana*, *C. aurivillii*, *C. minor*, and *C. kideysi* n. sp., therefore, belong to the



first group with three-segmented fifth legs and all remaining species belong to the second group.

Silas & Pillai (1973) divided the *Calanopia* species into three groups, according to the structure of the rostrum, the presence of cephalic side hooks and the structure of the chela of the terminal segment of the male right fifth leg. The first is the "aurivillii" group including *C. aurivillii*, *C. minor*, and *C. americana*, without cephalic side hooks, with three-segmented female fifth legs, without (or with rudimentary) subterminal notch on the rostrum, and with a distinct thumb on the chela of the male right fifth leg. The second group is the "elliptica" group including *C. elliptica*, *C. herdmani*, and *C. media*, with distinct cephalic hooks, with four-segmented female fifth legs, with rudimentary subterminal notch on the rostrum, and a thumb on the chela of the male right fifth leg. The third group is the "thompsoni" group containing *C. thompsoni*, *C. australica*, *C. seymouri*, and *C. parathompsoni*, with distinct cephalic hooks, four-segmented female fifth legs, a distinct subterminal notch on the rostrum, and without a thumb on the chela of the male right fifth leg.

However, Mulyadi & Ueda (1996) did not completely agree with the "elliptica" group, stating that the fifth legs of both sexes vary considerably within the group. According to these authors, two additional species groups can be recognized instead of the "elliptica" group, one group consisting of *C. elliptica* and *C. biloba*, with tooth-like processes on the inner margin of the chela of the male fifth leg, and the other consisting of *C. herdmani* and *C. asymmetrica*, without processes on the inner margin of the chela of the male fifth leg. They found the remaining three species, *C. media*, *C. sarsi*, and *C. sewelli*, too diverse to be regarded as a species group. They also presented a key for the species groups.

In any case, *Calanopia kideysi* n. sp. seems to belong to the smallest-sized group, together with *C. minor*, *C. americana*, and *C. aurivillii*, with three-segmented female fifth legs, without cephalic hooks, and without subterminal notch on the rostrum. Unfortunately, we cannot compare the characters related to the male fifth legs, as we do not have an adult male specimen at our disposal. However, the comparison presented here seems to confirm that *C. kideysi* belongs to the "aurivillii" group.

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