PECKHAMIA 312.1, 10 January 2024, 1–8

LSID urn:lsid:zoobank.org:pub:01DC20B1-6AB9-40FF-9D2F-43E9A3F7B9F5 (registered 9 JAN 2024)

ISSN 2161-8526 (print) ISSN 1944-8120 (online)

New synonymy for the jumping spider *Cosmophasis thalassina* (C. L. Koch 1846) (Araneae: Salticidae: Chrysillini)

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Recently, in a review of the known species of the salticid genus *Cosmophasis* Simon 1901 (Hurni-Cranston & Hill 2021), we had difficulty separating the type species of this genus, *C. thalassina* (C. L. Koch 1846), from the most-studied member of this genus, *C. umbratica* Simon 1903. Although the latter species has been the subject of a series of important behavioral studies in Singapore (e.g., Lim & Li 2004, 2013), virtually all (994 of 996) of the recent reports of either species in *iNaturalist*, including those from Singapore, have been associated with *C. thalassina* (Figure 1).



Figure 1 (continued on next page). Recent photographs of *Cosmophasis thalassina*. **1-2**, ♂ identified as *C. umbratica* from Laha Datu, Sabah (13 DEC 2023, iNaturalist observation 193936017 by dolceamore, <u>CC BY-NC 4.0</u>). **3**, ♂ from Singapore (28 NOV 2021, iNaturalist observation 102076072 by Soh Kam Yung, <u>CC BY-NC 4.0</u>). **4-5**, ♂ from Singapore (22 AUG 2021, iNaturalist observation 92067288 by Soh Kam Yung, <u>CC BY-NC 4.0</u>). **6**, ♂ from Hervey Bay, Queensland (11 FEB 2021, iNaturalist observation 69464426 by Ted Johansen, <u>CC BY-NC 4.0</u>).



Figure 1 (continued from previous page, continued on next page). Recent photographs of *Cosmophasis thalassina*. **7**, \mathcal{J} from Prieah Sihanouk, Cambodia (31 JUL 2021, iNaturalist observation 89323173 by Don Snow, <u>CC BY-NC 4.0</u>). **8**, \mathcal{J} from Eumundi, Queensland (10 DEC 2021, iNaturalist observation 102810225 by Bruce Cathie, <u>CC BY-NC 4.0</u>). **9**, \mathcal{J} from Magnetic Is., Queensland (9 NOV 2020, iNaturalist observation by valyr, <u>CC BY-NC 4.0</u>). **10**, \mathcal{Q} from Indonesia (JUL 2019, iNaturalist observation 28602801 by Franz Anthony, <u>CC BY-NC 4.0</u>). **11**, \mathcal{Q} from Indonesia (FEB 2020, iNaturalist observation 38355097 by Franz Anthony, <u>CC BY-NC 4.0</u>). **12**, \mathcal{Q} from Bali (11 MAR 2022, iNaturalist observation 108354502 by Bali Wildlife, <u>CC BY-NC 4.0</u>). **13**, \mathcal{Q} from Indonesia (JAN 2020, iNaturalist observation 38080785 by Franz Anthony, <u>CC BY-NC 4.0</u>). **14**, \mathcal{Q} from Singapore (9 OCT 2022, iNaturalist observation 142041221 by Julian F, <u>CC BY-NC 4.0</u>). **15**, \mathcal{Q} from Townsville, Queensland (9 OCT 2022, iNaturalist observation 142267189 by deemc, <u>CC BY-NC 4.0</u>). **13**, Photographs have been cropped and otherwise enhanced.

The original description of *Cosmophasis thalassina* was brief (C. L. Koch 1846), with a colored drawing of an iridescent yellow-green male (Figure 2.1) from a site that has been assumed to be Bintan Island, near Singapore. The female was not described, but we now have recent update of the description of that species that includes a detailed examination of the remains of the type specimen, as well as several females (Żabka & Waldock 2012). For *C. umbratica*, we have only a brief description of one male from Sumatra by Simon (1903). Prószyński (1984) later published drawings of this specimen (Figure 2.3), to include two views of the male pedipalp. These did not reveal any substantial differences from the male of *C. thalassina*, and the female *C. umbratica* has never been described.



Figure 1 (continued from previous page). Recent photographs of *Cosmophasis thalassina*. **16-17,** Courting and mating by a pair from Singapore (DEC 2023, by Alan Young, used with permission).



Figure 2. Older drawings of *Cosmophasis*. **1**, *∂ Plexippus thalassinus* of C. L. Koch (1846). **2**, *∂ Amycus micans* of L. Koch (1880). **3**, Simon's *∂* type specimen for *C. umbratica* by Prószyński (1984), drawings used with permission (after Hurni-Cranston & Hill 2021).

Cosmophasis thalassina

Recently we have been able to examine male and female *Cosmophasis thalassina* from Ben Tre Province, located in the delta of the Mekong River, Vietnam (Figures 3-5). These agree with previous descriptions of male *C. thalassina* (C. L. Koch 1846; Żabka & Waldock 2012) and *C. umbratica* (Simon 1903; Prószyński 1984), and the female *C. thalassina* (Żabka & Waldock 2012). The latter is particularly important, as we have found that the detailed structure of the female epigynum is an important character for the identification of species in this genus. Here we also provide more illustrations of the male pedipalp of *C. thalassina*, based on specimens collected in Java (Figure 6).



Figure 3 (continued on next page). *Cosmophasis thalassina* in Ben Tre Province, Vietnam. **1-6**, \bigcirc . The median stripe on the dorsal opisthosoma of these males was off-white. In other populations of this species this stripe may be iridescent gold or blue-green. **7-10**, Colorful \bigcirc with red-orange scales instead of black bands across the dorsal opisthosoma.



Figure 3 (continued from previous page). *Cosmophasis thalassina* in Ben Tre Province, Vietnam. **11-14**, Dark \bigcirc with black bands across the dorsal opisthosoma.



Figure 4. Ventral (1,3) and lateral (2,4) views of the left pedipalp of two male *Cosmophasis thalassina* from Ben Tre Province, Vietnam. The angular index shown for orientation of the origin of the embolus follows Hurni-Cranston & Hill (2021). Although this measurement from photographs can vary somewhat based on orientation of both the specimen and the camera, we have found that this is a useful character. Measurements shown here are not far from those for Prószyński's (1984) drawing of the pedipalp of the male type for *C. umbratica* (~240°, Figure 2.3), and the photograph (210°) and drawing (200°) of the pedipalp of the type for *C. thalassina* (Żabka & Waldock 2012). The detailed structure of the RTA, with a thin and acute ventral process (c), and a wider lateral flange (l) also agrees with published descriptions of both species.



Figure 5. Ventral (external) views of the epigynum of three female *Cosmophasis thalassina* from Ben Tre Province, Vietnam. (2) is a detail from (3). In details, and particularly in the presence of an anterior (a) and posterior (p) lobe, on either side of the epigynum, these agree closely with females described by Żabka & Waldock (2012).



Figure 6. Male *Cosmophasis thalassina* from Java. **1-2**, Ventral and lateral views of the left pedipalp of a male from Bantul, Java. **3**, Large and small males from Yogyakarta, Java. **4-5**, Ventral and lateral views of the left pedipalp of the small male shown in (3). **6-7**, Ventral and lateral views of the large male shown in (3). Photographs by Naufal Urfi Dhiya'ulhaq, used with permission.

Here we propose that *Cosmophasis umbratica* should be treated as a synonym of *C. thalassina*.

Cosmophasis Simon 1901

type species C. thalassina (C. L. Koch 1846)

Cosmophasis thalassina (C. L. Koch 1846)

Plexippus thalassinus C. L. Koch 1846
Cosmophasis thalassina Simon 1901
Cosmophasis umbratica Simon 1903, new synonymy
not Cosmophasis umbratica Dyal 1935
Cosmophasis umbratica Prószyński 1984, new synonymy
not Cosmophasis thalassina Prószyński 1984
Cosmophasis thalassina Żabka1988 (figs. 62-63)
Cosmophasis thalassina Żabka & Waldock 2012 (figs. 1A-1E, 3A-3B, NOT 4D-4F, NOT 60A-60B)
Cosmophasis thalassina Hurni-Cranston & Hill 2021
Cosmophasis umbratica Hurni-Cranston & Hill 2021, new synonymy

Males have a distinctive appearance with iridescent colors that vary from yellow-green (or bronze and green) to blue-green. In Australia, they resemble male *C. micarioides* (L. Koch 1880), but lack the black stripe that extends ventrolaterally below each ALE of that species. To a lesser extent, they resemble male *C. bandaneira* Hurni-Cranston & Hill 2021, but the orientation of the embolus in that species is altogether different. Females are speckled ("salt and pepper") in appearance, with variable coloration that may include many brightly colored, iridescent scales, and dark bands across the dorsal opisthosoma. These tend to be less colorful and much less iridescent toward the southern part of their range, in Australia (see Donovan & Hill 2017, fig. 1).

The identity of *Cosmophasis micans* L. Koch 1880 (Figure 2.2) has been problematic (Hurni-Cranston & Hill 2021). In reviewing a new and improved English translation of Koch's description of this species ($\stackrel{\circ}{\supset}$ only, $\stackrel{\circ}{\hookrightarrow}$ not known) it appears that Koch's assertion that the AME are *fast in der doppelten Breite ihres Durchmessers über dem Kopfrande stehend* refers to the distance between the bottom of the AME and the lateral margins of the carapace (not the ventral margin of the clypeus). With this interpretation of the text, and the fact that Koch's drawing of his $\stackrel{\circ}{\supset}$ *C. micans* (Figure 2.2) is very stylish and not at all accurate, this might be a rubbed *C. thalassina*. Given the fact that Koch's drawing was based on a specimen from Cape York, Australia, this is a reasonable assumption. The dorsal opisthosomal stripe of the latter species is lacking in the drawing, however. A single observation in iNaturalist (from Brisbane) has been tentatively identified as this species, but it has the dorsal opisthosomal stripe and cannot be distinguished from a male *C. thalassina*. It is noteworthy that the *Arachne.org.au* site reports that *C. micans does not exist* in Australia, and that *C. thalassina* has been misidentified as *C. micans* in the past.

It has also been suggested that *C. modesta* (L. Koch 1880) and *C. obscura* (Keyserling 1882), both known from Queensland, represent misidentified *C. thalassina* (Whyte & Anderson 2017). However, as figured, the *C. modesta* male has a prominent spine on the anterior surface of each paturon, overlapping the base of the respective fang. Żabka & Waldock (2012) redescribed the latter species (*C. obscura*) with a female specimen (90043, Laloki, Central Province, PNG), not unlike Keyserling's drawing of the epigynum of a female from Cape York, and quite different from the epigynum of of *C. thalassina*. As we noted previously (Hurni-Cranston & Hill 2021) the *Cosmophasis* species of New Guinea and other islands associated with tropical Sahul need further study, preferably in the field.

Acknowledgements

We thank Naufal Urfi Dhiya'ulhaq, Alan Young, and respective iNaturalist contributors for allowing us to use their photographs, and Jerzy Prószyński for allowing us to use his drawings.

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