NOTES AND NEWS

A CURIOUS TAXONOMY OF THE COMMON JAPANESE CALLIANASSIDS BY TAMAKI. A REBUTTAL

BY

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Recently Tamaki (2003) rebutted me on a case of callianassid taxonomy. Apparently, his view of taxonomy does not account for sexual dimorphism in the variation of *Callianassa japonica* (Ortmann, 1891) and *C. harmandi* (Bouvier, 1901), and he thus concludes erroneously that the common Japanese callianassids, *Callianassa japonica* and *C. harmandi* are to be classified as species by the size of the cornea **alone**. In neither the Insecta nor the Crustacea such an approach has ever been practised, and it might reflect the present, serious situation where professional taxonomists have been reducing in number, which is also pointed out by UNEP under the title of the Global Taxonomy Initiative. This says "Governments, through the Convention on Biological Diversity, have acknowledged the existence of a "taxonomic impediment" to the sound management of biodiversity. The purpose of the Global Taxonomic Initiative (GTI) is to remove or reduce this taxonomic impediment – in other words, the knowledge gaps in our taxonomic system (including those associated with genetic systems), the shortage of trained taxonomists and curators, and the impact these deficiencies have on our ability to conserve, use and share the benefits of our biological diversity". (UNEP, United Nations Environment Program, http://www.biodiv.org/programmes/cross-cutting/taxonomy/default.asp).

Tamaki's (2003) article is found in Crustaceana, **76** (1): 115-124, and is entitled "A rebuttal to Sakai (2001): "A review of the common Japanese callianassid species, *Callianassa japonica* and *C. petalura* (Decapoda, Thalassinidea)" ". The author insists that two Japanese callianassid forms, *Nihonotrypea japonica* and *N. harmandi*, occurring in intertidal habitats in Japan, are to be recognized as valid species. I synonymized, however, *Nihonotrypea* with *Callianassa* (cf. Sakai, 1999), and *Callianassa harmandi* is synonymous with *C. japonica*.

REBUTTAL

1. Tamaki is inaccurate and apparently somewhat confused as regards the callianassid taxa. He mentioned (Tamaki, 2003: 117) "It must be said, therefore, that his methodology, with the use of the syntypes in Paris, was in vain". However, it was inevitable for me to establish a neotype for *Callianassa subterranea* var. *japonica* Ortmann, 1891 for the reason that (1) I tried to examine the type specimen and visited Strasbourg on 25-27 September 2000, but could not find it in the Museum, because it had been taken out by the late Dr. R. B. Manning. So Dr. E. Lang, director of the Museum, and Dr. M.-D. Wandhammer, curator of the Museum, asked Dr. B. Kensley of the Smithsonian Institution about the type specimen. However, I had not received any response from him about the type up to 14 October 2000. Dr. Wandhammer promised me to send me the type when it was returned from Washington, but since then I had not heard from her about the type. A year later the holotype of *Callianassa japonica* was found and returned to Strasbourg on 09 January 2001 by Dr. R. Lemaitre (cf. Tamaki, 2003: 117) three months later than the first submission of my manuscript, on 04 November 2000, to Dr. P. Y. Noël, Muséum national d'Histoire naturelle, Paris, who was editor of the Special Issue for Prof. Forest. Later on, my manuscript was transferred to a regular issue of Crustaceana and accepted on 20 February 2001, and the final version on 22 May 2001. So, Tamaki's (2003) rebuttal is unfounded, because he cannot blame me for the choice of a neotype, which, moreover, now becomes invalid due to the Art. 75.8 of the new International Code of Zoological Nomenclature, saying that if a neotype is designated and later the original type material is found, the neotype loses its standing and the old holotype takes its place, since the type was brought back after a long absence [without any information about where it was kept in the meantime].

2. My re-examination of the returned holotype during my stay in Strasbourg on 19 September 2003 shows that there are differences in morphology between the returned holotype and the figures of Ortmann (1891). These will be treated below under item (8) in detail.

3. *Nihonotrypaea* Manning & Tamaki, 1998, in my opinion, is not acceptable. Tamaki usually follows Manning and thus uses the genus *Nihonotrypaea* for the Japanese callianassids. However, as I pointed out in 1999, the genus should not be defined by the form of the 3rd maxilliped, because maxilliped 3 shows variable and intermediate forms in the genus *Callianassa*, and it is difficult to distinguish one type from the other by its form. So, I deliberately treated it as a synonym of *Callianassa*. For example, maxilliped 3 in *Callianassa tyrrhena* (Petagna, 1792)[1])

[1]) Ngoc-Ho (2003: 479) recently treated *Callianassa tyrrhena* (Petagna, 1792) under the name of *Pestarella tyrrhena*. However, it is difficult to accept the new genus *Pestarella*, because the varying morphology of Plp1-2, of the rounded telson, and of Mxp3 all fall well within the range of variation of the genus *Callianassa*.

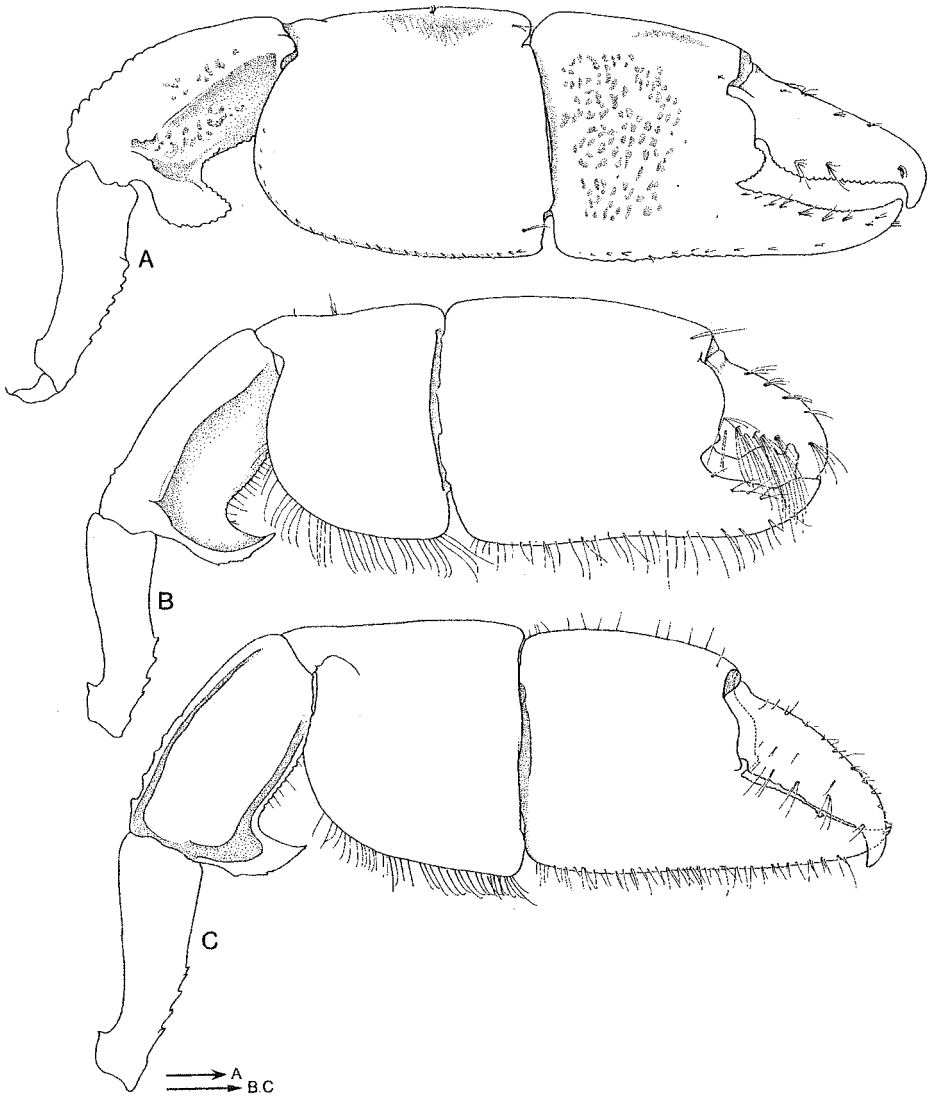

Fig. 1. A, Larger cheliped of *Callianassa subterranea* var. *japonica* (Ortmann, 1891), MZS 340, alleged "holotype", Tokyo Bay, leg. L. Döderlein, 1880-1881, lateral view (can **not** be the type: not female but male larger cheliped); B, male larger cheliped of *Callianassa subterranea* (Montagu, 1808), SMF 21879, German Bight, North Sea, 54°39′90″N 6°0′00″E, 42.5 m, F. K. "Senckenberg", 24 May 1987, lateral view; C, female larger cheliped of *C. subterranea*, SMF 18046, German Bight, North Sea, 54°01′000″N 07°45′000″E, 35 m, KG, R/V "Valdivia", 03 February 1989, mesial view (dotted lines in the figure indicate lateral aspect). All scales 2 mm.

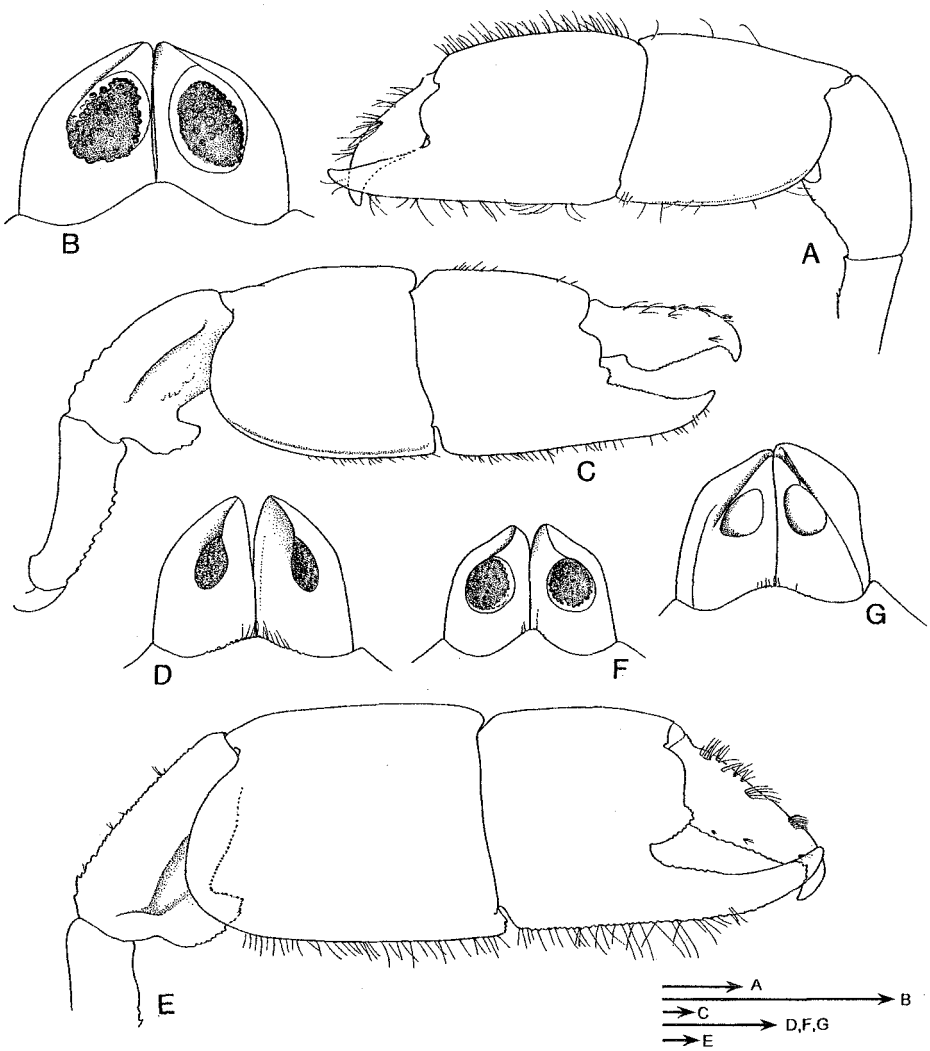

Fig. 2. *Callianassa*, male larger chelipeds, *japonica* type, and corresponding eyestalks: A, B, ZLF 8047, CL 22.0 mm, cornea 67%, male larger cheliped of *japonica* type, estuary of Muromi River, K. Sakai, K. Baba & Y. Miya leg., 07 April 1963; C, D, ZLF 3002, CL 40.5 mm, cornea 34%, male larger cheliped of *japonica* type, Kanazawa-Hakkei, Tokyo Bay, K. Sakai leg., 05 January 1961; E, F, ZLF 12638, TL 35.0 mm, cornea 67%, male larger cheliped of *japonica* type, Arasaki, Sagami Bay, H. Kurata leg., 08 May 1964; G, MZS 340, holotype, damaged, cornea ca. 50%, Tokyo Bay, leg. L. Döderlein, 1880-1881. All scales, 1 mm.

which is distributed from the North Sea to the Mediterranean Sea; in *Callianassa lewtonae* Ngoc-Ho, 1944 from Queensland, Australia; in *C. poorei* Sakai, 1999 from the east coast of Tasmania; and in *C. acanthura* Caroli, 1946 from the Bay of Naples, the Adriatic Sea, the Ionian Sea, and the Aegean Sea, all show a form

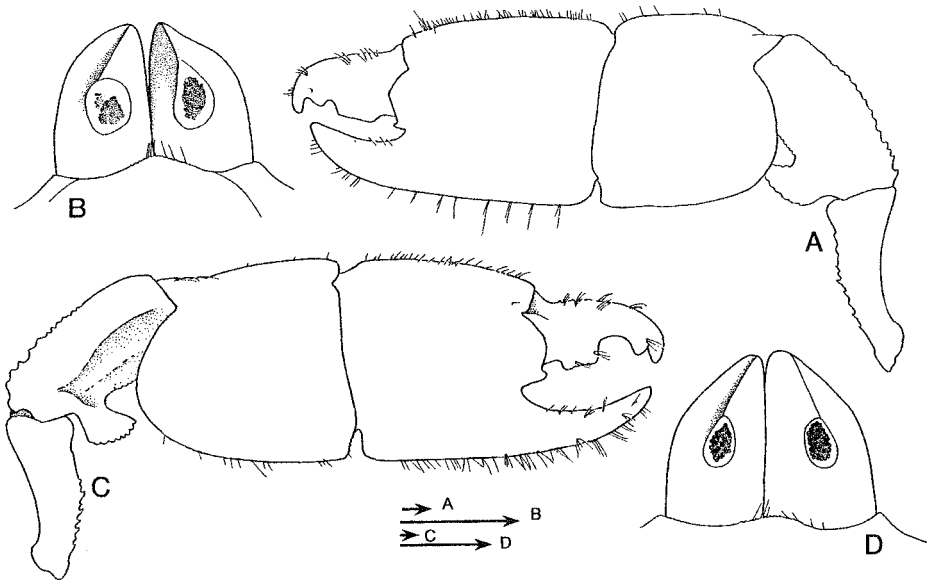

Fig. 3. *Callianassa*, male larger chelipeds, *harmandi* type, and corresponding eyestalks: A, B, ZLF 9035, TL 48.0 mm, cornea 51%, male larger cheliped of *harmandi* type, estuary of Muromi River, K. Sakai leg., 09 April 1963; C, D, ZLF 9050, CL 13.5 mm, cornea 37%, male larger cheliped of *harmandi* type, estuary of Muromi River, K. Sakai leg., 09 April 1963. All scales, 1 mm.

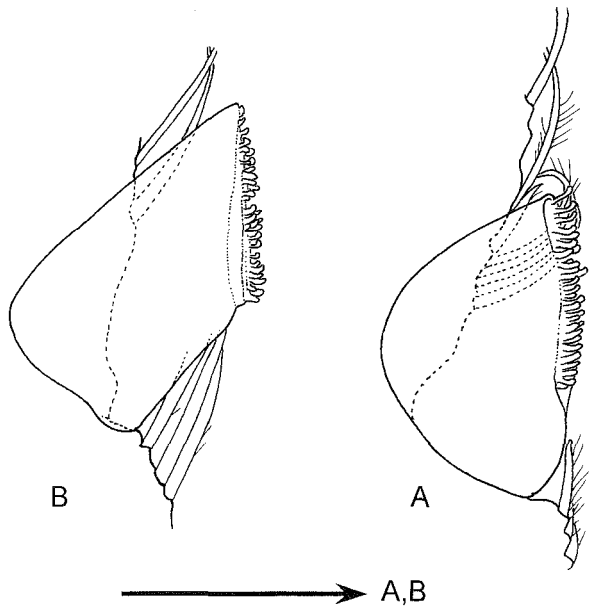

Fig. 4. A, *Callianassa japonica* Ortmann, 1891, ZLF 9050, appendix interna on pleopod 3, anterior view; B, *Callianassa subterranea* (Montagu, 1808) SMF 18046, appendix interna on pleopod 3, anterior view. Scale, 0.5 mm.

similar to that of *C. japonica*, but those are classified as members of the genus *Callianassa*.

Manning & Tamaki (1998: 890) actually mentioned as the only difference between *Nihonotrypaea* and *Callianassa* that in *Nihonotrypaea* the appendices internae of pleopods 3-5 are projecting from the margin of the endopod, while in *Callianassa* they are embedded in the margin of the endopod. However this difference is difficult to distinguish, as it is hard to say whether the appendices are embedded or projected, as shown in the present fig. 4. In *C. subterranea*, the type species of the genus *Callianassa*, the appendix interna of pleopod 3 is projected and not embedded in the margin of the endopod in anterior view (fig. 4A), and in *C. japonica* it is also projected and not embedded in the margin of the endopod (fig. 4B).

4. Tamaki himself did not examine the type specimens of *Callianassa japonica* Ortmann, 1891, or *Callianassa harmandi* Bouvier, 1901: he apparently thought that *Nihonotrypaea harmandi* and *N. japonica* could be distinguished by the size of their cornea **alone.** It is said that in *C. harmandi* the cornea is "at least half the width of the stalk" and in *C. japonica* it "is much smaller, one third to one fifth of the width of the stalk" (Manning & Tamaki, 1998: 891; Wardiatno & Tamaki, 2001: 1042; Tamaki, 2003: 116). In the specimens available to me, the male specimens ZLF 3002 and ZLF 12638 bear a larger cheliped of the *japonica*-type, however, the cornea is large, more than half the width of the stalk, in fact both 67% (fig. 2, A, F; see also Sakai, 2001, table I). The male holotype bears a larger cheliped of the *japonica* type (fig. 1A), however, the cornea is about 50% the width of the stalk (fig. 2G). Finally, the male specimens ZLF 9035 and 9050 bear a larger cheliped of the *harmandi*-type, though they have a small cornea, 51 and 37%, respectively (fig. 3B, D; see also Sakai, 2001, table I). Those sizes are not always according to Tamaki's concept. This is why I handled both taxa as synonyms. Even though Wardiatno & Tamaki (2001) have shown that there are two well separable groups of specimens in reference to the cornea width and rostrum angle, in these statistically detectable units there is a slight overlap not allowing the determination of every single specimen. I fear that a problem might arise, and that the cornea morphology is not congruent with the cheliped types. Tamaki (2001: 115) solved this problem simply by saying that De Man (1928) had mixed up the two species and applied the name *C. harmandi* in the wrong way. Tamaki (2003) also criticized my measurements of the cornea width (Sakai, 2001, table I), which show that a male specimen with a cheliped of the *japonica* type (ZLF 9022) has a large cornea (Sakai, 1969). However, the callianassid taxa have never been considered extensively with regard to cornea size, so Tamaki's method should not be applied all on its own in distinguishing taxonomic categories without

more substantial support. This is, because, the result is that now that author can not distinguish sexual dimorphism in the variation pattern of *C. japonica* and *C. harmandi* (cf. Tamaki, 2003: 118). Neither did he describe the morphology of both sexes of *C. japonica* and *C. harmandi* separately, nor did he show any illustrations of both species, especially so of the form of the larger cheliped as shown by me (Sakai, 1969, figs. 3-5). He examined about 540 specimens, and merely separated these into two groups, assigned to two species, *C. japonica* and *C. harmandi*, by the size of their cornea **alone** (Wardiatno & Tamaki, 2001: 1042). What is even more problematical, Tamaki did never report on the size of the cornea in the female type of *C. japonica* Ortmann, 1891, nor in the male type of *C. harmandi* Bouvier, 1901.

5. Tamaki (2003) insisted that *Callianassa californiensis* Dana var. *japonica* Bouvier, 1901 is a synonym of *Nihonotrypaea harmandi* (cf. Memoranda of R. B. Manning used to prepare Manning & Tamaki, 1998, and in files of A. Tamaki; see Tamaki, 2003: 116, 119), which was, however, not published in the paper and not valid as a reference, and thus located outside of the criteria of publication (ICZN, 1999). He also ignored *Callianassa* (*Trypaea*) *californiensis* Dana var. *bouvieri* Makarov, 1938.

6. The differences in ecology and biology are interesting, but they do not contribute to resolve the taxonomic and nomenclatural problems. Cryptic species occurring in this group have still morphologically to be defined on a broader basis and not only by the cornea width. Tamaki's (2003: 119-117) rebuttal items 6-7 and Wardiatno & Tamaki (2001: 1042) show a linear discriminant function given to *Nihonotrypea harmandi* and *N. japonica* and its result, the CoW/EsW ratio value, which is meaningless, because the specimens used are not classified by taxonomic methodology.

7. Indeed, it will be interesting to see the results of genetic studies. It is only hoped that other groupings than the one based on the eyestalks will be tested in order to get firm conclusions on the taxonomy. Only after such a study will have been performed, the absolute rank of the taxa under consideration can be determined.

8. The returned type of *C. subterranea* var. *japonica* compared with Ortmann's figure in 1891 as follows:

(i) Ortmann (1891) established *Callianassa subterranea* var. *japonica* Ortmann, 1891 in separating it from the European species, *Callianassa subterranea*, however in his comparison he did not make clear a sexual dimorphism of the larger chelipeds in *C. japonica* (cf. Sakai, 1969) and *C. subterranea* (fig. 1B, C), so that his comparison of the larger chelipeds between the two species is problematic: Ortmann (1891) did not mention the sexual difference of the larger cheliped in

C. subterranea. I compared the male (fig. 1B) and female chelipeds (fig. 1C; see also De Man, 1928, pl. 1 fig. 1d; De Saint Laurent & Božié, 1976, fig. 17a; Manning & Felder, 1991, fig. 8a) in the European species, *C. subterranea*, and it turned out that Ortmann used a female appendage of *C. subterranea*, because the dactylus of the female larger cheliped has a simple cutting edge, as in Ortmann's (1891) pl. 1 fig. 10, just as in *C. californiensis* var. *japonica* (cf. Sakai, 2001, fig. 2c), whereas the male one is dentate as in the *harmandi* type (Sakai, 1969).

(ii) Tamaki (2003: 118) mentioned that "the examination of 99 males and 101 females for *N. harmandi* and 190 males and 150 females for *N. japonica* has shown no sexual dimorphism in the variation pattern of this ratio for each species". However, his statement is wrong, because the male and female chelipeds are clearly differentiated as shown for *Callianassa japonica* by Sakai (1969: 209, figs. 2-5, based on 153 males and 72 females from various locations). [In this respect, it is quite puzzling to me that I found in my investigation that most of those specimens used for my paper in 1969, except those confirmed by me (Sakai, 2001, table I), were, and are still, missing, although they were once located in Kyushu University, and then apparently in the Kitakyusyu Museum.] Thus, sexual dimorphism ought be considered taking into account a comparison of the chelipeds of the two species.

(iii) Ortmann's holotype of *C. japonica* from Tokyo Bay is indeed a male, as it shows such male characteristics as a large meral ventral tooth and the incurved dorsal margin of the carpus (Ortmann, 1891, pl. 1 fig. 10a). It is concluded that Ortmann compared the male larger cheliped of the Japanese species, *C. japonica*, with the female one of the European species, *C. subterranea.*

(vi) Ortmann (1891: 56) described that the Japanese species, *Callianassa subterranea* var. *japonica*, is distinguished from the European species, *C. subterranea*, on three points: (a) the carpus of the larger cheliped in the Japanese subspecies is slightly broader and longer than that in the European species ("Carpus der grossen Scheere unterwärts etwas stärker in der Längsrichtung verbreitet"); (b) the palm is slightly shorter than that of the European species ("Palma verhältnismässig etwas kürzer"); and (c) the posterior margin of the telson is straight in comparison with that of the European species ("Mittelstück der Schwanzflosse fast abgestutzt und etwas ausgerandet (bei den europäischen Exemplaren abgerundet)"). However, those references, other than (c), are not sufficient to separate the two species, because the male larger cheliped of *Callianassa japonica* is similar to the female larger cheliped of *C. subterranea* in morphology.

(v) Unfortunately, the returned male holotype of *Callianassa subterranea* var. *japonica* in Strasbourg, is too heavily damaged to be defined as the type, and broken into three pieces: (a) the detached male larger cheliped from the right side, showing such male morphological characters as a large meral ventral tooth, and the incurved dorsal margin of carpus equipped with denticles; (b) the carapace,

lacking altogether antennae 1-2, maxilliped 3, the smaller cheliped on the left side, pereiopods 2-3, pereiopod 4 on the left side, and dactylus and propodus of pereiopod 4 on the right side, and finally also abdominal somite 1 with pleopod 1 are missing; and (c) the abdominal somites 2-6 and the tail fan, with pleopod 2 absent. In addition, the carapace, the abdominal somites 2-6 with the tail fan (without abdominal somite 1), are so decalcified as to be almost transparent and hence fragile.

(vi) It is certain that the holotype is a male. However, the returned type shows that the coxa of pereiopod 3 bears a pore-like a structure only on the right side, which is different from a real female genital pore, and bears an indistinct pore-like structure on the left side, which is completely different from a normal genital pore of females in alcohol. Abdominal somite 2 is evidently devoid of a female pleopod 2, as usual in males, and indeed bears no trace of a detached pleopod 2 on the body. Though abdominal somite 1 and a simple, two-segmented pleopod 1 usually ought to be present in a male, those are here lost, but the coxa of pereiopod 5 bears a pair of male genital pores, so that the holotype is clearly defined as a male. It is certain that the male larger cheliped belongs to the decalcified carapace and the abdominal parts.

(vii) Yet, comparison of the male larger cheliped of the returned type with that of Ortmann's figure, revealed that: (a) the male larger cheliped of the returned type is almost the same as that of the neotype, which was handled as *Callianassa californiensis* var. *japonica* Bouvier, 1901 (cf. Sakai, 2001: 940, fig. 2c); (b) the carpus of the larger cheliped (fig. 1C) in the returned male type is much less broad, but it is much longer than that in Ortmann's male figure (Ortmann, 1891, pl. 1 fig. 10a); (c) the palm in the returned male type is almost the same as that figured by Ortmann (pl. 1 fig. 10a); (d) but in the returned male type, the distal margin of the palm bears a distinct, rounded outgrowth with marginal denticles above the proximal notch of the ventrodistal angle, whereas in Ortmann's male figure it bears a simple, rounded tooth above a small triangular notch of the ventroproximal angle (Ortmann's (1891) pl. 1 fig. 10a), though this is a litte larger than that in *C. subterranea* (cf. Ortmann, 1891, pl. 1 fig. 10); (e) in the returned male type the cutting margin of dactylus is armed with a row of denticles, and strongly curved down distally, whereas in Ortmann's figure it is unarmed and slightly concave in its distal half, as indeed seen more often in some males of this species (Sakai, 1969: 217, fig. 4c, from the collection of Higashi-hama, Amakusa).

CONCLUSION

Tamaki (2003, etc.) applied an ecological method to classify the common Japanese callianassids, *Callianassa japonica* and *C. harmandi*. The differences

in ecology and biology are interesting, but they do not contribute to resolve the taxonomic and nomenclatural problems. Cryptic species occurring in this group have still to be defined morphologically on a broader basis, not only by, e.g., the width of the cornea. Indeed, it will be interesting to see the results of genetic studies. It is only hoped that other groupings than the one based on the eyestalks will be tested in order to get firm conclusions on the taxonomy. Only after that the absolute rank of the forms under consideration can be determined.

It is in fact difficult to discuss this issue, because it is impossible to define the Japanese species of callianassids by the size of the cornea alone, while concurrently neglecting the sexual dimorphism in the variation pattern on the larger cheliped. As a result, *Callianassa harmandi* can safely be considered to be a synonym of *C. japonica*. However, it is uncertain whether or not the type returned to Strasbourg is the real type, for the above-mentioned reasons. Confronted with these inconsistencies, I am convinced that the specimen returned to Strasbourg is not Ortmann's type specimen.

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NOTES

Author's note. —

Abbreviations used in text and captions. Anatomical: CL, carapace length; TL, total length. Sampling gear: KG, [(Grosser) Kasten Greifer =] (Big) Box corer (50 × 50 × 50 cm). Institutions: MZS, Musée zoologique de l'Université Louis Pasteur & de la Ville de Strasbourg, Strasbourg; SMF, Senckenbergs Museum, Frankfurt am Main; ZLF, Zoological Laboratory, Kyushu University, Fukuoka.

Editorial note. —

Both K. SAKAI and A. TAMAKI have now had an opportunity to extensively explain their respective views on the taxonomic position of the nominal species, *Callianassa japonica* Ortmann, 1891 and *Callianassa harmandi* Bouvier, 1901. As the interpretation of the value of morphological

characters will always be dependent on the approach of a zoologist to taxonomy, there is no point in reiterating arguments, whence the Editorial Board is of the opinion that, with the above contribution by K. SAKAI, the discussion in these columns should now be closed. It will not be reopened unless indeed novel data can be advanced by either author, or by any other carcinologist who has made a detailed, specific study with respect to this issue.

THE EDITORIAL BOARD

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