Reinstatement of the Lancelet Name *Asymmetron lucayanum*, Recently Proposed as a Junior Synonym of *Branchiostoma pelagicum* (Cephalochordata)

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A recent proposal to reduce the binomen *Asymmetron lucayanum* Andrews, 1893 to the synonymy of *Branchiostoma pelagicum* Günther, 1889 lacked supporting evidence, and is considered flawed due to the uncertain taxonomic status of the latter. Examination of the holotype of *B. pelagicum* was hindered by its highly deteriorated state, to the extent that gonad condition and hence generic affinity could not be unequivocally determined. However, the description of gonads on both sides of the body in the original description suggests correct placement of the species in *Branchiostoma*. Furthermore, a published figure of a likely syntype (pelagic larva) of *A. lucayanum* showed the specimen to possess an elongated urostylid process, such being absent in the (pelagic) holotype of *B. pelagicum* comparable in size and morphology with the former. It is proposed that *Asymmetron lucayanum* Andrews, 1893 be reinstated as a valid species.

**Key Words**: Nomenclature, valid name, synonymy, *Asymmetron lucayanum*, *Branchiostoma pelagicum*.

Igawa et al.'s (2017) molecular phylogenetic study of lancelets (= Cephalochordata), included a proposal that "*Asymmetron pelagicum* Günther, 1889 [sic], —should be used as the correct binominal name—, replacing the junior synonym *Asymmetron lucayanum* Andrews, 1893—" (p. 10). Such a nomenclatural act would have far-reaching effects in lancelet nomenclature, since usage of the binomen *A. lucayanum* is currently well established. Nevertheless, such a change, if based on a clear taxonomic judgement, might well be entertained. Unfortunately, however, Igawa et al. (2017) overlooked the uncertain taxonomic status of the holotype of "*A. pelagicum*".

**Nomenclatural and taxonomic premises.** Because the two taxa concerned have different name-bearing types, Igawa et al.'s (2017) synonymy of *Asymmetron lucayanum* under "*A. pelagicum*" is subjective (see Glossary in International Commission of Zoological Nomenclature (1999)). However, the fact remains that "*A. pelagicum*" is of uncertain taxonomic identity, and may in fact belong to the genus *Branchiostoma*, rather than to *Asymmetron*.

Lancelets are presently classified into three genera (*Branchiostoma*, *Asymmetron* and *Epigonichthyys*) from both morphological and molecular perspectives, supported by Nishikawa (2004, 2017), Nohara et al. (2005), Kon et al. (2007), Li et al. (2014), and Igawa et al. (2017). The genus *Branchiostoma* has a longitudinal series of gonads on both sides of the body, whereas the other genera have gonads on the right side only.

**Brief historical review.** *Branchiostoma pelagicum* Günther, 1889 was established for a single 10 mm long (holotype) specimen (Fig. 1A), "captured in open sea, at a great distance from land—a few degrees north of Honolulu [Hawaii]" in a “deep haul, 1,000 fathoms, July 26, 1875” during the Challenger Expedition (Günther 1889: 43). Günther's (1889) original description clearly stated "gonads not fully developed, extending from the first to the twenty-sixth myomere [=myomere], and forming two series in the middle" (p. 44, author's italics). This description alone indicated that the species belonged to *Branchiostoma*, as currently recognized.

Subsequently, Gill (1895) established a new genus *Amphioxides* in the "Brachiostomidae" (=Branchiostomatidae), being a fifth genus apparently represented by *B. pelagicum* Günther and defined as "branchiostomids [sic] with bilaterally (?) gonads,—" (p. 458), but gave no explanation for questioning the gonad condition. However, the binomen *Branchiostoma pelagicum* was retained by Tattersall (1903) and Parker (1904), due to the presence of gonads on both sides fitting their definitions of the genus. Parker (1904) reported a well-preserved 9 mm-long specimen collected "between one hundred and fifty fathoms and the surface" off the Maldives as having 33 gonads on each side. However, the possibility cannot be excluded that, as suggested by Goldschmidt (1905a), the above-cited “gonads” may have been another organ (e.g., gill pouches), but this remains equivocal as Wickstead (1973, 1975) detected incipient gonads in 8.8 mm- and 9.1 mm-long pelagic larvae from the Indian Ocean by examining sections microscopically.

Goldschmidt (1905a, b) detected gonads only on the right side in 7.5 to 10 mm-long pelagic specimens identified as *Amphioxides pelagicus* and *A. valdiviae* Goldschmidt, 1905. Subsequently, Goldschmidt (1906) rejected the validity of *Amphioxides*, recognizing that it had been based on planktonic (sometimes neotenic) larvae. Gibson (1910) seems to have been the first to suggest that *Branchiostoma pelagicum* may have been based on a larval *Asymmetron lucayanum*.
due to the similarity in myomere numbers and right side-
only disposition of gonads. This view was followed by Bone
(1957), Wickstead and Bone (1959), Wickstead (1964, 1971,
1975), Nishikawa (1981), and Gibbs and Wickstead (1996),
who all failed to consider the original description of the for-
mer (mentioning gonads in two series), or subsequent de-
scriptions in Tattersall (1903) and Parker (1904).

Poss and Boschung (1996) were first to explicitly regard
Branchiostoma pelagicum as a senior synonym of Asymmetron
dayanum, stating that the former “is in all likelihood based on larvae of
E[pigonichthys], lucayanus [= A. lucayanum]” (p. S38), but
without supporting evidence. Nevertheless, they continued to refer to
lucayanus and referred to an application for plenary suppression of pelagicum due to priority granted
to the latter “severely disrupt[ing] contemporary usage” (p.
S38). However, pelagicum is not included in the “Official
Index of Rejected and Invalid Specific Names in Zoology” (see International Commission on Zoological Nomenclature,
2012 and subsequent volumes of the Bulletin of Zo-
logical Nomenclature), possibly because their application to
the International Commission on Zoological Nomenclature
was not completed or was rejected. These considerations
were overlooked by Igawa et al. (2017), although they were
aware of the article by Poss and Boschung (1996). Further-
more, Igawa et al. gave no supporting evidence for their own
nomenclatural act, omitting any mention of previous taxo-
nomic or nomenclatural studies.

Uncertain taxonomic identity of Branchiostoma pelagicum. The
holotype of Branchiostoma pelagicum was “mounted in glycerin for the
microscope at the time of its capture” (Günther 1889: 43).
Subsequently, Kirkaldy (1895: 320) stated, “After Dr. Gün-
ther’s description and figure were published it [= the ho-
lotype] was examined by Professor Lankester by means of
transverse sections, but the state of preservation was such as
to render any satisfactory observation impossible”. In fact,
those sections are now mounted on 7 slides, each with the
label “Amphiopsus pelagicus, [18]92.6.25.1, Type”, in the In-
vertebrates Division, Department of Life Sciences, Natural
History Museum, London, with the new registration num-
ber NHMUK: ecatalogue 3118289. A photograph of the
7 slides clearly showed the sectioned and mounted pieces

to be too deteriorated for effective close examination, the
precise nature of the gonads of the holotype (and therefore
clarification of its generic affiliation) being unable to be de-
termined. Accordingly, but for the description of gonads on
both sides of the body by Günther (1889), the status of Branchiostoma pelagicum might well be considered incertae sedis.

In addition, the only figure of the pelagic larva of Asymmetron lucayanum comparable in size and morphology to the holotype of Branchiostoma pelagicum is that published by Andrews (1893: pl.
XIII, fig. 5) and reproduced here (Fig. 1B), indicating that both the figured specimen and Branchiostoma pelagicum holotype pos-
sessed a paddle-shaped caudal fin and lacked buccal ten-
tacles. The figured specimen, “one of the youngest larvae,
—6 mm long with 22 gill-slits, and—64 myomeres” (An-
drews 1893: 245) is likely to be a syntype of Asymmetron lucayanum. At 6 mm in length, the specimen had a markedly elongated
urostyloid process at the tail end, one of the diagnostic fea-
tures of the genus Asymmetron (see, e.g., Nishikawa 2004).
However, the 10 mm long holotype of Branchiostoma pelagicum (Fig. 1A)
lacks such a conspicuous process and it seems highly unlike-
ly that larval development in Asymmetron—6 mm long with 22 gill-slits, and—64 myomeres—would result in
the urostyloid process diminishing in proportional length
to such an extent. Unfortunately, Holland and Holland’s (2010)
detailed description of early development in Asymmetron lucayanum did not cover stages from 6–10 mm length.

In conclusion, synonymization of Branchiostoma pelagicum with Asymmetron lucayanum is without basis, being unsupported by the original descriptions or the type material, and Asymmetron lucayanum should continue to be recognized as a valid species.

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References


