



Correcting a 135-year error: *Limulidae* Leach, 1819 (Chelicerata, Xiphosura) is the proper authority, not *Limulidae* Zittel, 1885

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The horseshoe crab *Limulus polyphemus* (Linnaeus, 1758) is a famous species, renowned as a ‘living fossil’ (Owen, 1873; Barthel, 1974; Kin and Błażejowski, 2014) for its apparently little-changed morphology for many millions of years. The genus *Limulus* Müller, 1785 was used by Leach (1819, p. 536) as the basis of a new family *Limulidae* and synonymized it with *Polyphemus* Lamarck, 1801 (Lamarck’s proposed but later unaccepted replacement for *Limulus*, as discussed by Van der Hoeven, 1838, p. 8) and *Xyphotheca* Gronovius, 1764 (later changed to *Xiphosura* Gronovius, 1764, another junior synonym of *Limulus*). He also included the valid modern genus *Tachypleus* Leach, 1819 in the family. The primary authority of Leach (1819) is widely recognized in the neontological literature (e.g., Dunlop et al., 2012; Smith et al., 2017). It is also the authority recognized in the World Register of Marine Species (WoRMS Editorial Board, 2021).

The family *Limulidae* was listed by Zittel in the 1881–1885 part of his multivolume *Handbuch der Palaeontologie* (Zittel, 1885), but without including an authority. He listed the family name, again without attribution, in his recapitulated 1895 *Grundzüge der Palaeontologie* and 1903 revision (Zittel, 1895, rev. 1903). In both publications, Zittel diagnosed the family using only the genus *Limulus*. It is unclear whether Zittel was aware of Leach’s earlier usage or whether he intended this as a new family name. Whether considered a homonym—in which case the Rule of Priority defers to Leach, 1819—or an assumed attribution to Leach’s original name, the use of *Limulidae* Zittel, 1885 is unambiguously invalid.

The influential English translation of Zittel’s *Grundzüge* was published in 1900 by Charles R. Eastman of Harvard University (Zittel, 1900). This translation included “such far-ranging modifications as to render the volume for practical purposes an almost entirely new work” (Kitchen, 1904, p. 93), albeit “with [Zittel’s] consent” (Eastman’s preface to Zittel, 1900, p. v). The section on the now-disused *Acerata* (including horseshoe crabs, eurypterids, and arachnids) was co-authored by John M. Clarke, New York State Paleontologist. For reasons not stated, the English translation placed Zittel’s name to the right of the family name: “Family 3: *Limulidae*. Zittel. (King or Horseshoe Crabs)” (Zittel, 1900, p. 672). This is not the only instance in which the family was explicitly attributed to Zittel. Based apparently on personal correspondence at the time of publication, Packard (1885, p. 150, 152) also attributed the family *Limulidae* to Zittel’s 1885 *Handbuch*.

This incorrect attribution appears to have persisted in the paleontological literature for over a century to the present. For example, the section on *Limulidae* in the *Treatise on Invertebrate*

Paleontology (Størmer et al., 1955, p. P22) lists Zittel, 1885 as the authority. (Several paleontological publications alternatively use *Limulidae* Zittel, 1881, the year that Zittel started the relevant mollusk and arthropod volume, although its publication did not occur until 1885.) Aside from these 1885, 1900, and 1955 publications, the other oldest publications attributing the family name to Zittel we can locate include Eller (1940), Størmer (1952), and Boada and de Villalta Comella (1966), all of which are paleontological publications, the last one citing the *Treatise* volume as their source reference for the family. Størmer (1952, p. 636), co-author of the 1955 *Treatise* volume, explicitly wrote that “[t]he family *Limulidae*, [was] erected by Zittel (1885).” Dozens of paleontological publications henceforth (e.g., Allen and Feldmann, 2005; Błażejowski et al., 2017; Lamsdell, 2020; Bicknell et al., 2021) have continued to cite Zittel (1885) as the original authority for *Limulidae*.

Given the wide early-twentieth century influence of Zittel’s translated text among English-speaking paleontologists, at the least, and its later codification in the even-more-influential *Treatise on Invertebrate Paleontology*, it appears these texts are the reason that essentially all paleontological publications have mis-attributed family *Limulidae* to Zittel, 1885 instead of Leach, 1819. To clarify the proper authority for this well-known family, we encourage paleontologists to recognize *Limulidae* Leach, 1819 as the proper authority, and that the attributions *Limulidae* Zittel, 1885 and *Limulidae* Zittel, 1881 no longer be used.

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