

## Case 3122

***Ichthyosaurus cornalianus* Bassani, 1886 (currently *Mixosaurus cornalianus*; Reptilia, Ichthyosauria): proposed designation of a neotype**

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**Abstract.** The purpose of this application is to designate a neotype for the Middle Triassic ichthyosaur *Mixosaurus cornalianus* (Bassani, 1886), the type species of *Mixosaurus* Baur, 1887 (family MIXOSAURIDAE). The original specimens no longer exist, and a previous neotype designation is not only probably invalid but the specimen chosen does not show the diagnostic features of the species as originally described. Proper typification of *M. cornalianus* is essential for studies of the MIXOSAURIDAE.

**Keywords.** Nomenclature; taxonomy; Ichthyosauria; *Mixosaurus*; *Mixosaurus cornalianus*; Triassic; Grenzbitumenzone; Besano Formation; Monte San Giorgio/Besano Basin.

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1. Bassani (1886, pp. 20–21) briefly described small (50–90 cm long) ichthyosaurs from the 240 My-old (Anisian/Ladinian) Middle Triassic ‘Grenzbitumenzone’ or Besano Formation of the Monte San Giorgio/Besano basin on the Swiss/Italian border between Ticino and Lombardia. He mentioned five specimens in the Museo Civico di Storia Naturale in Milan, of which four were almost complete. Although his description was short it included important information on the heterodontous dentition which unequivocally characterizes this species, for which Bassani (p. 20) established the name *Ichthyosaurus cornalianus*. The statement by Maisch & Matzke (1997, p. 725) that ‘... since Besmer (1947), it is generally recognised that the true *Mixosaurus cornalianus* has a quite isodontous dentition’ is not relevant or correct. The proper application of the name was beyond the scope of Besmer’s short work (a dental surgeon’s dissertation), and the original information (Bassani, 1886 and Repossi, 1902) about the heterodontous dentition has been quoted repeatedly (e.g. Mazin, 1983, p. 409; Carroll, 1993, p. 269) and was cited by Besmer himself (p. 7) without comment.

2. In 1887, the year after Bassani’s original report, Baur realized that the ichthyosaur described by Bassani differed from others in important respects and he (Baur, 1887a, p. 19) established for *I. cornalianus* the nominal genus *Mixosaurus*, which he placed in its own family MIXOSAURIDAE; see also Baur (1887b, p. 839). Several other species (and fragmentary remains) from various parts of the world have subsequently been placed in *Mixosaurus*, which is the most studied genus of Triassic ichthyosaurs (see for example Callaway (1997) and Motani (1997)).



3. Repossi (1902) described *M. cornalianus* in considerable detail and illustrated (pls. 8 and 9) one of Bassani's complete specimens and also parts of it and of others. These figures show clearly the heterodontous dentition and a characteristic postcranial element, the Y-shaped interclavicle, which are mentioned in the descriptions.

4. The type material of *M. cornalianus* in the Museo Civico di Storia Naturale in Milan was destroyed by bombing in 1943 (Pinna, 1967, p. 182). Pinna (p. 188) referred to one of the destroyed specimens as having been the holotype of *M. cornalianus*, but this is incorrect because (see para. 1 above) the species was based on several syntypes. Pinna (1967, p. 186) designated a specimen which had been given to the museum in 1965 as the 'Neoholotypus' of *M. cornalianus*; he gave a photograph (fig. 6) of this specimen, which he noted [in translation] had been 'neither studied nor published'. The type designation seems to have been made only as a 'matter of curatorial routine' in connection with cataloguing (see Pinna, 1967, footnote on p. 183) and it can be regarded as invalid under Article 75 of the then current and subsequent editions of the Code. The specimen, an articulated individual of 80 cm length, can be seen only from the dorsal aspect and shows no feature characteristic at the species-level (such as the dentition and interclavicle) as mentioned by Bassani (1886) and Repossi (1902) and repeatedly referred to by later authors, none of whom have used Pinna's neotype in the interpretation of *M. cornalianus*.

5. Maisch & Matzke (1997) and I (Brinkmann, 1998) have reported abundant *Mixosaurus* material, in the collections of Zürich and Tübingen Universities, from the Middle Triassic 'Grenzbitumenzone' or Besano Formation of the Monte San Giorgio/Besano basin which, in contrast to *M. cornalianus*, shows an isodontous dentition and a non-Y-shaped interclavicle. This belongs to more than one species, and I (Brinkmann, 1998) further reported the presence of two morphotypes of '*M. cornalianus*' which represent distinct species. As noted by Maisch & Matzke (1997, p. 726), it is absolutely necessary to fix the identity of the nominal species *M. cornalianus* (Bassani, 1886) before the taxonomy of the genus *Mixosaurus* can be discussed with any clarity. Although, if the previous designation of a neotype by Pinna (1967; see para. 4 above) is regarded as invalid, it would be possible to designate a neotype under Article 75 of the Code, the case is referred to the Commission in the interests of stability and taxonomic progress.

6. One of the rare individuals which show the relevant features of *M. cornalianus* described by Bassani (1886) and Repossi (1902) is specimen T2420 in the Paläontologisches Institut und Museum der Universität Zürich (PIMUZ); this has been figured by Brinkmann (1998, figs. 10–12). The almost complete fossil is seen from the right side and is in a good state of preservation. The dentition is heterodontous (fig. 10) and the interclavicle (fig. 11) has the shape mentioned by Repossi. The designation of this specimen as the neotype of *M. cornalianus* would be in accord with the original description and subsequent understanding of the species and would facilitate future studies of the MIXOSAURIDAE.

7. The International Commission on Zoological Nomenclature is accordingly asked:

- (1) to use its plenary powers to set aside all previous fixations of type specimens for the nominal species *Ichthyosaurus cornalianus* Bassani, 1886 and to



designate as neotype the specimen T2420 in the Paläontologisches Institut und Museum der Universität Zürich mentioned in para. 6 above;

- (2) to place on the Official List of Generic Names in Zoology the name *Mixosaurus* Baur, 1887 (gender: masculine), type species by original designation *Ichthyosaurus cornalianus* Bassani, 1886;
- (3) to place on the Official List of Specific Names in Zoology the name *cornalianus* Bassani, 1886, as published in the binomen *Ichthyosaurus cornalianus* and as defined by the neotype designated in (1) above (specific name of the type species of *Mixosaurus* Baur, 1887).

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Brinkmann, Winand. 1999. "Ichthyosaurus Cornalianus Bassani, 1886 (Currently Mixosaurus Cornalianus; Reptilia, Ichthyosauria): Proposed Designation Of A Neotype." *The Bulletin of zoological nomenclature* 56, 247–249. <https://doi.org/10.5962/bhl.part.23086>.

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