

Case 3472***Cetiosaurus* Owen, 1841 (Dinosauria, Sauropoda): proposed conservation of usage by designation of *Cetiosaurus oxoniensis* Phillips, 1871 as the type species**

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Abstract. The purpose of this application, under Article 81.1 of the Code, is to preserve stability in the taxonomy of sauropod dinosaurs by designating *Cetiosaurus oxoniensis* as the type species of *Cetiosaurus*. The genus *Cetiosaurus* (including the species *C. medius* and *C. oxoniensis*) was established during the earliest period of research on sauropod dinosaurs, and is historically significant. The name *Cetiosaurus* was fixed to the type species *Cetiosaurus medius*, a sauropod of indeterminate affinities; however, the fragmentary nature of the type material of *C. medius*, combined with the subsequent description of much more complete Middle Jurassic sauropod material as *Cetiosaurus oxoniensis*, has meant that subsequent literature has overwhelmingly adopted *C. oxoniensis* over *C. medius* as the primary exemplar of *Cetiosaurus*. Stability would be best served by designating *Cetiosaurus oxoniensis* as the type species of the genus *Cetiosaurus* in place of the current type species, *C. medius*.

Keywords. Nomenclature; taxonomy; Dinosauria; Sauropoda; CETIOSAURIDAE; *Cetiosaurus*; *Cetiosaurus oxoniensis*; *Cetiosaurus medius*; England; Europe; Middle Jurassic.

1. The generic name *Cetiosaurus* was first published by Owen (1841, p. 457) without any associated specific name. It was based primarily on material found by John Kingdon in 1825, but no specimen numbers were given. *Cetiosaurus* was among the first named sauropod dinosaurs and, as a result, has become a 'wastebasket' taxon, with much material indiscriminately referred to it. As detailed by Upchurch & Martin (2003, p. 208), the stratigraphic range of *Cetiosaurus*, if all referrals were supported, would extend from the Bajocian (Middle Jurassic) to the Barremian (Early Cretaceous), a range of about 45 million years.

2. The first published species of *Cetiosaurus* were *C. hypoolithicus* Owen, 1842 and *C. epioolithicus* Owen, 1842, both published in the same report (Owen, 1842a, p. 12). The type material was not specified for either species, and neither was illustrated or diagnosed; therefore both species are nomina nuda, and are ineligible for fixation as the type species (Upchurch & Martin, 2003, p. 209).

3. The next published species of *Cetiosaurus* were *C. brevis*, *C. brachyurus*, *C. medius* and *C. longus*, all described in a single report by Owen (1842b, pp. 94, 100a, 100b, 101). Since descriptions of all four species were furnished, they are not nomina nuda and are thus available names for fixation as the type species. Although Owen did not explicitly designate any of these species as the type, he did note of the *C. medius* material that 'it is principally on these bones, with others subsequently discovered and in the collection of Mr. Kingdon, that the characters of the *Cetiosaurus* were first determined' (Owen, 1842b, pp. 100–101). *C. medius* is thus the type species of *Cetiosaurus* under Article 69.1.1 of the Code (Type species by subsequent designation), an interpretation endorsed by, for example, Steel (1970, p. 64).

4. *Cetiosaurus oxoniensis* was described by Phillips (1871, p. 291) from a large series of remains from the Forest Marble (Bathonian, Middle Jurassic of Oxfordshire), among which no type specimen was formally designated. Phillips (1871, pp. 290–291) wrote only 'I propose for the species found in the immediate vicinity of Oxford and elsewhere, the only one for which sufficient materials are collected to serve for determining its characters, the title Oxoniensis', so that Phillips's specimens found in this area form a syntype series. Among these specimens, the largest of three individuals from Bletchington Station, near Enslow Bridge, is the most complete and diagnostic; it was therefore designated as the lectotype (OUMNH J13605–13613, J13615–16, J13619–J13688, J13899 in the Oxford University Museum of Natural History) by Upchurch & Martin (2003, p. 216). The material represents a non-neosauropod eusauropod. It is important due to its historical significance as the first sauropod known from adequate remains, illustrating the basic sauropod body plan, and also because of the light it casts on the evolution of sauropods, being one of the most derived taxa outside the clade Neosauropoda (Upchurch, 1998, fig. 19; Upchurch et al., 2004, fig. 13.18). *Cetiosaurus* is the type genus of the family CETIOSAURIDAE Lydekker, 1888 and was used as a specifier in the phylogenetic definition of the clade CETIOSAURIDAE (Upchurch et al., 2004, p. 301).

5. Several further species of *Cetiosaurus* have also been erected. As summarised by Upchurch & Martin (2003, p. 215), of the thirteen named species, three are nomina nuda, two are junior objective synonyms, four are nomina dubia, and four are diagnosable taxa (*C. brevis*, *C. oxoniensis*, *C. glymptonensis* Phillips, 1871, p. 291 and *C. humerocristatus* Hulke, 1874, p. 17). These last four cannot be congeneric as they represent several different sauropod groups.

6. Under a strict application of the Code, *Cetiosaurus medius* is the type species of *Cetiosaurus*. However, the name *Cetiosaurus* has invariably been associated with the species *C. oxoniensis*, and specifically the Bletchington Station material (e.g. Owen, 1875; Hatcher, 1903; Huene, 1904, 1927; Fraas, 1908; Janensch, 1914, 1929; Matthew, 1915; Coombs, 1975; Wild, 1978; Bonaparte, 1986, 1999; Martin, 1987; Upchurch, 1998; Casanovas et al., 2001; Upchurch & Martin, 2002, 2003; Liston, 2004; Day et al., 2004; Upchurch et al., 2004; Sánchez-Hernández, 2005; Wedel, 2005,

2007; Yates, 2006, 2007; Galton & Knoll, 2006; Moser et al., 2006; Naish & Martill, 2007; Taylor & Naish, 2007). The stability of use of this species in the literature as representing *Cetiosaurus* is indicated by the fact that no other generic name has ever been proposed for *C. oxoniensis*; nor has it ever been referred to as '*Cetiosaurus*' *oxoniensis*. Enforcing the strict application of the Code would lead to considerable nomenclatural confusion and inconsistency.

6. For this reason, Upchurch & Martin (2003, p. 215) informally treated *Cetiosaurus oxoniensis* as the type species of *Cetiosaurus* pending a promised petition to the Commission.

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

- (1) to use its plenary power to set aside all previous fixations of type species for the nominal genus *Cetiosaurus* Owen, 1841 and to designate *Cetiosaurus oxoniensis* Phillips, 1871 as the type species;
- (2) to place on the Official List of Generic Names in Zoology the name *Cetiosaurus* Owen, 1841 (gender: masculine), type species *Cetiosaurus oxoniensis* Phillips, 1871, as ruled in (1) above;
- (3) to place on the Official List of Specific Names in Zoology the name *oxoniensis* Phillips, 1871, as published in the binomen *Cetiosaurus oxoniensis* (specific name of the type species of *Cetiosaurus* Owen, 1841), as ruled in (1) above.

References

- Bonaparte, J.F.** 1986. Les dinosaures (Carnosaures, Allosauridés, Sauropodes, Cétiosauridés) du Jurassique moyen de Cerro Cóndor (Chubut, Argentina). *Annales de Paléontologie*, **72**: 325–386.
- Bonaparte, J.F.** 1999. Evolucion de las vertebras presacras en Sauropodomorpha. *Ameghiniana*, **36**: 115–187.
- Casanovas, M.L., Santafé, J.V. & Sanz, J.L.** 2001. *Losillasaurus giganteus*, un nuevo saurópodo del tránsito Jurásico-Cretácico de la cuenca de 'Los Serranos' (Valencia, España). *Paleontologia i Evolució*, **32–33**: 99–122.
- Coombs, W.P.** 1975. Sauropod habits and habitats. *Palaeogeography, Palaeoclimatology, Palaeoecology*, **17**: 1–33.
- Day, J.J., Norman, D.B., Gale, A.S., Upchurch, P. & Powell, H.P.** 2004. A Middle Jurassic dinosaur trackway site from Oxfordshire, UK. *Palaeontology*, **47**: 319–348.
- Fraas, E.** 1908. Ostafrikanische Dinosaurier. *Palaeontographica*, **55**: 105–144.
- Galton, P.M. & Knoll, F.** 2006. A saurischian dinosaur braincase from the Middle Jurassic (Bathonian) near Oxford, England: from the theropod *Megalosaurus* or the sauropod *Cetiosaurus*? *Geological Magazine*, **143**: 905–921.
- Hatcher, J.B.** 1903. Osteology of *Haplocanthosaurus* with description of a new species, and remarks on the probable habits of the Sauropoda and the age and origin of the *Atlantosaurus* beds. *Memoirs of the Carnegie Museum*, **2**: 1–72, pls. I–V.
- Huene, F.v.** 1904. *Dystrophaeus viaemalae* Cope in neuer Beleuchtung. *Neues Jahrbuch für Mineralogie, Geologie, und Paläontologie Abhandlungen*, **19**: 319–333.
- Huene, F.v.** 1927. Sichtung der Grundlagen der jetzigen Kenntnis der Sauropoden. *Eclogae Geologicae Helvetiae*, **20**: 444–470.
- Hulke, J.W.** 1874. Note on a very large saurian limb-bone adapted for progression upon land, from the Kimmeridge Clay of Weymouth, Dorset. *Quarterly Journal of the Geological Society*, **30**: 16–17 and Plate II.
- Janensch, W.** 1914. Übersicht über der Wirbeltierfauna der Tendaguru-Schichten nebst einer kurzen Charakterisierung der neu aufgeführten Arten von Sauropoden. *Archiv für Biontologie*, **3**: 81–110.

- Janensch, W.** 1929. Material und Formengehalt der Sauropoden in der Ausbeute der Tendaguru-Expedition. *Palaeontographica (Suppl. 7)*, **2**: 1–34.
- Liston, J.J.** 2004. A re-examination of a Middle Jurassic sauropod limb bone from the Bathonian of the Isle of Skye. *Scottish Journal of Geology*, **40**: 119–122.
- Lydekker, R.** 1888. *Catalogue of the fossil Reptilia and Amphibia in the British Museum (Natural History), Cromwell Road, S.W. Part 1. Containing the orders Ornithosauria, Crocodylia, Dinosauria, Squamata, Rhynchocephalia, and Proterosauria*. British Museum (Natural History), London.
- Martin, J.** 1987. Mobility and feeding of *Cetiosaurus* (Saurischia: Sauropoda) – why the long neck? *Occasional Papers of the Tyrrell Museum of Palaeontology (Fourth Symposium on Mesozoic Terrestrial Ecosystems)*, **3**: 154–159.
- Matthew, W.D.** 1915. *Dinosaurs, with special reference to the American Museum collections*. American Museum of Natural History, New York.
- Moser, M., Mathur, U.B., Fürsich, F.T., Pandey, D.K. & Mathur, N.** 2006. Oldest camarasauromorph sauropod (Dinosauria) discovered in the Middle Jurassic (Bajocian) of the Khadir Island, Kachchh, western India. *Paläontologische Zeitschrift*, **80**: 34–51.
- Naish, D. & Martill, D.M.** 2007. Dinosaurs of Great Britain and the role of the Geological Society of London in their discovery: basal Dinosauria and Saurischia. *Journal of the Geological Society, London*, **164**: 493–510.
- Owen, R.** 1841. A description of a portion of the skeleton of the *Cetiosaurus*, a gigantic extinct saurian reptile occurring in the oolitic formations of different portions of England. *Proceedings of the Geological Society of London*, **3**: 457–462.
- Owen, R.** 1842a. Second rapport sur les reptiles fossiles de la Grande-Bretagne. *L'Institut, Journal général des Sociétés et Travaux Scientifique de la France et de l'Étranger*, **10**: 11–14.
- Owen, R.** 1842b. Report on British fossil reptiles, Part II. *Reports of the British Association for the Advancement of Science*, **11**: 60–204.
- Owen, R.** 1875. Monograph of the Mesozoic Reptilia, part 2: Monograph on the genus *Cetiosaurus*. *Palaeontographical Society Monograph*, **29**: 27–43.
- Phillips, J.** 1871. *Geology of Oxford and the valley of the Thames*. Clarendon Press, Oxford.
- Steel, R.** 1970. *Handbuch der Paläoherpetologie*. Part 14. *Saurischia*. Gustav Fischer Verlag, Stuttgart.
- Sánchez-Hernández, B.** 2005. *Galveosaurus herreroi*, a new sauropod dinosaur from Villar del Arzobispo Formation (Tithonian-Berriasian) of Spain. *Zootaxa*, **1034**: 1–20.
- Taylor, M.P. & Naish, D.** 2007. An unusual new neosauropod dinosaur from the Lower Cretaceous Hastings Beds Group of East Sussex, England. *Palaeontology*, **50**: 1547–1564.
- Upchurch, P.** 1998. The phylogenetic relationships of sauropod dinosaurs. *Zoological Journal of the Linnean Society*, **124**: 43–103.
- Upchurch, P. & Martin, J.** 2002. The Rutland *Cetiosaurus*: The anatomy and relationships of a Middle Jurassic British sauropod dinosaur. *Palaeontology*, **45**: 1049–1074.
- Upchurch, P. & Martin, J.** 2003. The anatomy and taxonomy of *Cetiosaurus* (Saurischia, Sauropoda) from the Middle Jurassic of England. *Journal of Vertebrate Paleontology*, **23**: 208–231.
- Upchurch, P., Barrett, P.M. & Dodson, P.** 2004. Sauropoda. Pp. 259–322 in Weishampel, D.B., Dodson, P. & Osmólska, H. (Eds.), *The Dinosauria, 2nd edition*. University of California Press, Berkeley and Los Angeles.
- Wedel, M.J.** 2005. Postcranial skeletal pneumaticity in sauropods and its implications for mass estimates. Pp. 201–228 in Wilson, J.A. & Curry Rogers, K. (Eds.), *The sauropods: evolution and paleobiology*. University of California Press, Berkeley.
- Wedel, M.J.** 2007. What pneumaticity tells us about ‘prosauropods’, and vice versa. Pp. 207–222 in Barrett, P.M. & Batten, D.J. (Eds.), *Special Papers in Palaeontology 77: evolution and palaeobiology of early sauropodomorph dinosaurs*. The Palaeontological Association, U.K.
- Wild, R.** 1978. Ein Sauropoden-Rest (Reptilia, Saurischia) aus dein Posidonienschiefer (Lias, Toarcium) von Holzmaden. *Stuttgarter Beiträge zur Naturkunde, Serie B (Geologie und Paläontologie)*, **41**: 4–15.

- Yates, A.M.** 2006. Solving a dinosaurian puzzle: the identity of *Aliwalia rex* Galton. *Historical Biology*, **19**: 93–123.
- Yates, A.M.** 2007. The first complete skull of the Triassic dinosaur *Melanorosaurus* Haughton (Sauropodomorpha: Anchisauria). Pp. 9–55 in Barrett, P.M. & Batten, D.J. (Eds.), *Special Papers in Palaeontology 77: Evolution and palaeobiology of early sauropodomorph dinosaurs*. The Palaeontological Association, U.K.

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Comments on this case are invited for publication (subject to editing) in the *Bulletin*; they should be sent to the Executive Secretary, I.C.Z.N., c/o Natural History Museum, Cromwell Road, London SW7 5BD, U.K. (e-mail: iczn@nhm.ac.uk).