

**Case 3487*****Megalosaurus crenatissimus* Depéret, 1896 (currently *Majungasaurus crenatissimus*; Dinosauria, Theropoda): proposed replacement of the holotype by a neotype**

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**Abstract.** The purpose of this application, under Articles 75.5 and 75.6 of the Code, is to replace the existing, non-diagnostic holotype of *Megalosaurus crenatissimus* Depéret, 1896 (currently *Majungasaurus crenatissimus*) by a neotype. The designation of a neotype is necessary to conserve the prevailing usage and concept of the species.

**Keywords.** Nomenclature; taxonomy; Reptilia; Archosauria; Dinosauria; Theropoda; ABELISAUROIDAE; *Majungasaurus*; *Megalosaurus*; *Megalosaurus crenatissimus*; *Majungatholus atopus*; Madagascar; Cretaceous.

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1. Charles Depéret (1896, p. 188) named the theropod dinosaur species *Megalosaurus crenatissimus* based on isolated and fragmentary fossils from the Upper Cretaceous Maevarano Formation near Berivotra, Mahajanga Province, Madagascar. These materials had been collected in 1895 by French military personnel, and were eventually repositied in the collections of the Faculté des Sciences (FSL) at the Université Claude Bernard, Lyon (Krause et al., 2007). Although Depéret did not explicitly designate any one of these specimens as the holotype, they nonetheless collectively represent the name-bearing type specimens for the species *crenatissimus*.

2. René Lavocat (1955, p. 259) erected a new genus *Majungasaurus* for the theropod species *crenatissimus*, based on a new specimen (Muséum National d'Histoire Naturelle specimen MNHN.MAJ 1) that he designated as the neotype. This material consisted of an incomplete right dentary that came from the same stratum and general area as the specimens described by Depéret (Article 75.3.6 of the Code), and which was sufficient to distinguish the species from other members of the genus *Megalosaurus*.

3. Subsequently, the putative pachycephalosaurian dinosaur *Majungatholus atopus* Sues & Taquet, 1979 was named, based on a partial skull roof from the Maevarano Formation in the Mahajanga area (MNHN.MAJ 4) (Sues & Taquet, 1979, p. 634).

4. Later discoveries of more complete specimens from the same stratum and area demonstrated that *Majungatholus atopus* was not a pachycephalosaur, but rather an unusual theropod belonging to the family ABELISAUROIDAE (Sampson et al., 1998).

5. Restudy of MNHN.MAJ 1 has confirmed that it is diagnostic, and belongs to the same taxon as the holotype braincase of *Majungatholus atopus*, making the latter a junior synonym of *Majungasaurus crenatissimus* (Krause et al., 2007, pp. 6–7; Sampson & Witmer, 2007, p. 85).

6. However, the original name-bearing type specimens of *Megalosaurus crenatissimus* were neither lost nor destroyed, and they remain in the collections of the Faculté des Science, Université Claude Bernard, Lyon (FSL specimens 92.289, 92.290, 92.306, 92.343). Lavocat's only justification for creating a neotype was the insufficiently diagnostic nature of the original name-bearing materials (Lavocat, 1955). This violates Article 75.3.4 of the Code and invalidates the neotype designation for *Majungasaurus crenatissimus*.

7. As several authors have confirmed (Sampson et al., 1996, 1998; Krause et al., 2007), the original Depéret type specimens are indeed indeterminate as to genus and species, although they can be identified as belonging to the family ABELISAUROIDAE. Thus the taxonomic identity of the species *Megalosaurus crenatissimus* as a nominal species-group taxon cannot be determined from the existing name-bearing type materials.

8. The theropod species *Megalosaurus crenatissimus* has been referenced for more than a century (e.g. Thevenin, 1907; Huene, 1926; Piveteau, 1926; Depéret & Savornin, 1928; Stromer, 1931; Steel, 1970; Russell et al., 1976; Molnar, 1990; Bonaparte, 1991; Sampson et al., 1996; Krause et al., 2007), and remains the only large theropod species from the Upper Cretaceous Maevarano Formation of Madagascar. The genus *Majungasaurus* has been in use continually since 1955 for this species (e.g. Lavocat, 1955; Huene, 1959; Romer, 1966; Steel, 1970; Molnar, 1980, 1990; Carroll, 1988; Bonaparte, 1991; Sampson et al., 1996; Krause et al., 2007), with all of the cited authors referring to MNHN.MAJ 1 as the neotype specimen. Thus the (incorrectly designated) neotype defines the 'accustomed meaning' of this 'long-accepted name' (Introduction to the Code).

9. Because the taxonomic identity of the nominal species *Megalosaurus crenatissimus* Depéret, 1896 cannot be determined from its existing name-bearing type series, the stability of the species and genus names, both long entrenched in the scientific literature, are threatened (Article 75.5 of the Code). The specimen MNHN.MAJ 1 is available and diagnostic (Krause et al., 2007; Sampson & Witmer, 2007), and would maintain prevailing usage both of the name *Majungasaurus crenatissimus* and of the

particular specimen as its neotype (Article 75.6 of the Code and Recommendation 75D). MNHN.MAJ 1 is well known to researchers and has been illustrated previously in publications (Lavocat, 1955, fig. 1; Krause et al., 2007, fig. 7). If a neotype is not designated, the name *Majungasaurus crenatissimus* will be restricted to the original type series, which would (a) not reflect the currently understood concept of this taxon, but also (b) effectively eliminate the name from functional use.

10. The lack of a neotype exacerbates an ongoing difficulty associated with understanding dinosaur diversity by preventing resolution of the question of synonymy between *Majungasaurus crenatissimus* and *Majungatholus atopus*. Without a neotype the two taxa cannot be synonymised with certainty, as has been recently suggested by Krause et al. (2007), because the holotype of *Megalosaurus crenatissimus* is indeterminate. Maintaining them as distinct taxa inadequately reflects present understanding of theropod diversity in the Maevarano Formation, and has led to the incorrect assessment of multiple large theropod taxa solely because of these taxonomic difficulties (e.g. Weishampel et al., 2004).

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

- (1) to use its plenary power to set aside all previous type fixations for the nominal species *crenatissimus* Depéret, 1896, as published in the binomen *Megalosaurus crenatissimus*, and to designate the specimen MNHN.MAJ 1 as the neotype;
- (2) to place on the Official List of Generic Names in Zoology the name *Majungasaurus* Lavocat, 1955 (gender: masculine), type species through designation by Lavocat (1955) *Megalosaurus crenatissimus* Depéret, 1896;
- (3) to place on the Official List of Specific Names in Zoology the name *crenatissimus* Depéret, 1896, as published in the binomen *Megalosaurus crenatissimus* and as defined by the neotype designated in (1) above (specific name of the type species of *Majungasaurus* Lavocat, 1955).

## References

- Bonaparte, J.F.** 1991. The Gondwanian theropod families Abelisauridae and Noasauridae. *Historical Biology*, **5**(1): 1–25.
- Carroll, R.L.** 1988. *Vertebrate Paleontology and Evolution*. 698 pp. W.H. Freeman & Company, New York.
- Depéret, C.** 1896. Note sur les dinosauriens sauropodes & théropodes du Crétacé supérieur de Madagascar. *Bulletin de la Société Géologique de France*, (3)**24**: 176–194.
- Depéret, C. & Savornin, J.** 1928. La faune de reptiles et de poissons albiens de Timimoun (Sahara algérien). *Bulletin de la Société Géologique de France*, (4)**27**: 257–265.
- Huene, F.v.** 1926. The carnivorous Saurischia in the Jura and Cretaceous formations, principally in Europe. *Revista del Museo de La Plata*, **29**: 35–167.
- Huene, F.v.** 1959. Saurians in China and their relations. *Vertebrata Palasiatica*, **3**(3): 119–123.
- Krause, D.W., Sampson, S.D., Carrano, M.T. & O'Connor, P.M.** 2007. Overview of the history of discovery, taxonomy, phylogeny, and biogeography of *Majungasaurus crenatissimus* (Theropoda: Abelisauridae) from the Late Cretaceous of Madagascar. Pp. 1–20 in Sampson, S.D. & Krause, D.W. (Eds.), *Majungasaurus crenatissimus (Theropoda: Abelisauridae) from the Late Cretaceous of Madagascar. Society of Vertebrate Paleontology Memoir 8. Journal of Vertebrate Paleontology*, **27**(2, supplement).
- Lavocat, R.** 1955. Sur une portion de mandibule de théropode provenant du Crétacé supérieur de Madagascar. *Bulletin du Muséum National d'Histoire Naturelle, Paris*, (2)**27**(3): 256–259.

- Molnar, R.E.** 1980. Australian late Mesozoic continental tetrapods: some implications. *Mémoires de la Société Géologique de France, Nouvelle Série*, **139**: 131–143.
- Molnar, R.E.** 1990. Problematic Theropoda: “carnosaurs.” Pp. 306–317 in Weishampel, D.B., Dodson, P. & Osmólska, H. (Eds.), *The Dinosauria*. University of California Press, Berkeley.
- Piveteau, J.** 1926. Contribution a l'étude des formations lagunaires du nord-ouest de Madagascar. *Bulletin de la Société Géologique de France*, (4)**26**: 33–38.
- Romer, A.S.** 1966. *Vertebrate Paleontology*, Edition 3. 468 pp. University of Chicago Press, Chicago.
- Russell, D.A., Russell, D.E., Taquet, P. & Thomas, H.** 1976. Nouvelles récoltes de Vertébrés dans les terrains continentaux du Crétacé supérieur de la région de Majunga (Madagascar). *Compte Rendu Sommaire de la Société Géologique de France*, **5**: 205–208.
- Sampson, S.D., Krause, D.W., Dodson, P. & Forster, C.A.** 1996. The premaxilla of *Majungasaurus* (Dinosauria: Theropoda), with implications for Gondwanan paleobiogeography. *Journal of Vertebrate Paleontology*, **16**(4): 601–605.
- Sampson, S.D., Witmer, L.M., Forster, C.A., Krause, D.W., O'Connor, P.M., Dodson, P. & Ravoavy, F.** 1998. Predatory dinosaur remains from Madagascar: implications for the Cretaceous biogeography of Gondwana. *Science*, **280**: 1048–1051.
- Sampson, S.D. & Witmer, L.M.** 2007. Craniofacial anatomy of *Majungasaurus crenatissimus* (Theropoda: Abelisauridae) from the Late Cretaceous of Madagascar. Pp. 32–102 in Sampson, S.D. & Krause, D.W. (Eds.), *Majungasaurus crenatissimus (Theropoda: Abelisauridae) from the Late Cretaceous of Madagascar. Society of Vertebrate Paleontology Memoir 8. Journal of Vertebrate Paleontology*, **27**(2, supplement).
- Steel, R.** 1970. *Saurischia. Handbuch der Paläoherpetologie I Encyclopedia of Paleoherpetology, Part 14*. 87 pp. Gustav Fischer Verlag, Stuttgart.
- Stromer, E.** 1931. Ergebnisse der Forschungsreisen Prof. E. Stromers in den Wüsten Ägyptens. II. Wirbeltier-Reste der Baharijstufe (unterstes Cenoman). 10. Ein Skelett-Rest von *Carcharodontosaurus* nov. gen. *Abhandlungen der Bayerischen Akademie der Wissenschaften Mathematisch-naturwissenschaftliche Abteilung, Neue Folge*, **9**: 1–23.
- Sues, H.-D. & Taquet, P.** 1979. A pachycephalosaurid dinosaur from Madagascar and a Laurasia-Gondwanaland connection in the Cretaceous. *Nature*, **279**: 633–635.
- Thevenin, A.** 1907. Paléontologie de Madagascar. IV. – Dinosauriens. *Annales de Paléontologie*, **2**: 121–136.
- Weishampel, D.B., Barrett, P.M., Coria, R.A., Le Loeuff, J., Xu, X., Zhao, X.-J., Sahni, A., Gomani, E.M. & Noto, C.R.** 2004. Dinosaur distribution. Pp. 517–606 in Weishampel, D.B., Dodson, P. & Osmólska, H. (Eds.), *The Dinosauria, second edition*. University of California Press, Berkeley.

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