

## A large pterosaur femur from the Kimmeridgian, Upper Jurassic of Lusitanian Basin, Portugal

Filippo Bertozzo, Bruno Camilo Da Silva, David Martill, Elsa Marlene Vorderwuelbecke, Tito Aureliano, Remmert Schouten, and Pedro Aquino

*Acta Palaeontologica Polonica* 66 (4), 2021: 815-825 doi:<https://doi.org/10.4202/app.00858.2020>


The pterosaur fossil record in Portugal is scarce, comprising mainly isolated teeth and rare postcranial material. Here, we describe a well-preserved right proximal femur of a pterodactyloid pterosaur from the Kimmeridgian, Upper Jurassic Praia da Amoreira–Porto Novo Formation of Peniche, Portugal. It is noteworthy for its relatively large size, compared to other Jurassic pterosaurs. It shows affinities with dsungaripteroids based on a combination of features including the bowing of the shaft, the mushroom-like cap of the femoral head, and the distinctly elevated greater trochanter. The femur has a relatively thinner bone wall compared to dsungaripterids, and is more similar to basal dsungaripteroids. A histological analysis of the bone cortex shows it had reached skeletal maturity. The preserved last growth period indicates fast, uninterrupted growth continued until the final asymptotic size was reached, a growth pattern which could best be compared to pterodactyloid femora from the Early Cretaceous. The specimen is the second confirmed report of a dsungaripteroid from the Jurassic, and it is the first record of this group from the Iberian Peninsula.

**Key words:** Pterosauria, Dsungaripteroidea, histology, Late Jurassic, Kimmeridgian, Portugal.

Filippo Bertozzo [[fbertozzo01@qub.ac.uk](mailto:fbertozzo01@qub.ac.uk)], School of Natural and Built Environment, Queen's University Belfast, Belfast, UK; CI2Paleo, Sociedade de Historia Natural, Travessa Florêncio Augusto Chagas nº8B, R/C, 2560-230 Torres Vedras, Portugal. Bruno Camilo da Silva [[laboratorio@alt-shn.org](mailto:laboratorio@alt-shn.org)], CI2Paleo, Sociedade de Historia Natural, Travessa Florêncio Augusto Chagas nº8B, R/C, 2560-230 Torres Vedras, Portugal; European Centre of Paleontology, Institute of Biology, Laboratory of Paleobiology, University of Opole, ul. Oleska 48, 45-052 Opole, Poland; Associação Geoparque Oeste. Rua João Luis de Moura nº95, 2530-158 Lourinhã, Portugal. David Martill [[david.martill@port.ac.uk](mailto:david.martill@port.ac.uk)], School of the Environment, Geography and Geosciences, University of Portsmouth, PO1 3QL, UK. Elsa Marlene Vorderwuelbecke [[emvorderwuelbecke@gmail.com](mailto:emvorderwuelbecke@gmail.com)], Division of Paleontology, Institute of Geosciences, University of Bonn, Bonn, Germany. Tito Aureliano [[aureliano.tito@gmail.com](mailto:aureliano.tito@gmail.com)], Institute of Geosciences, University of Campinas, Campinas, Brazil; Dinosaur

Ichnology and Osteohistology Laboratory, Federal University of Rio Grande do Norte, Natal, Brazil; CI2Paleo, Sociedade de Historia Natural, Travessa Florêncio Augusto Chagas nº8B, R/C, 2560-230 Torres Vedras, Portugal. Remmert Schouten [[remmertschouten@gmail.com](mailto:remmertschouten@gmail.com)], CI2Paleo, Sociedade de Historia Natural, Travessa Florêncio Augusto Chagas nº8B, R/C, 2560-230 Torres Vedras, Portugal. Pedro Aquino [[pedro@micronsense.com](mailto:pedro@micronsense.com)], Micronsense, Metrologia Industrial, Ida Doroana Park, Ponte da Pedra, Leiria, Portugal.

This is an open-access article distributed under the terms of the Creative Commons Attribution License (for details please see [creativecommons.org](https://creativecommons.org)), which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.

 [Full text \(1,512.7 kB\)](#) |

 [Supplementary file \(160.1 kB\)](#)