A CRESTED RHAMPHORHYNCHOID PTEROSAUR FROM THE LATE TRIASSIC OF AUSTRIA

FABIO M. DALLA VECCHIA¹, RUPERT WILD², HAGEN HOPF³, and JOACHIM REITNER³

¹Museo Paleontologico Cittadino, Via Valentinis 134, I-34074 Monfalcone (Gorizia), Italy, fabdalla@tin.it;
²Staatliches Museum für Naturkunde Stuttgart, Rosenstein 1, D-70191 Stuttgart, Germany;
³Institut und Museum für Geologie und Paläontologie, Universität Göttingen, Goldschmidtstrasse 3, D-37077 Göttingen, Germany

The earliest pterosaurs are represented by rare, incomplete specimens from the Upper Triassic (Norian) of Italy (Wild, 1978, 1984, 1994; Dalla Vecchia et al., 1989; Dalla Vecchia, 1994, 1995, 1998) and Greenland (Jenkins et al., 1993). The almost complete skeleton of a new rhamphorhynchoid pterosaur is reported from the Upper Triassic of Austria. It comes from the Seefelder Schichten, which has also yielded marine fishes and terrestrial plants (Kner, 1867; Dobruskina, 1993). The environment of deposition of the Seefelder Schichten was a marine, anoxic and partially hypersaline basin on a very shallow carbonate platform (Hopf, 1997). The main features of the specimen are the presence of a sagittal cranial crest and a peculiar heterodont dentition with multicusped teeth. The bony sheath, consisting of very elongated caudal zygaphyses and hemal arches, so typical of the long-tailed pterosaurs, is not present in the new taxon. Cranial crests are common in Late Jurassic and Cretaceous pterodactyloids but have never been unambiguously reported in rhamphorhynchoid pterosaurs. The new specimen shows that these structures appeared very early in the history of pterosaurs and must have reappeared later in pterodactyloids. Also, *Eudimorphodon* has multicusped teeth but the denticulation and pattern of dentition are different from the new taxon. The taxonomic and morphologic diversity of Triassic rhamphorhynchoids is as high as or even higher than in the succeeding Jurassic period.

SYSTEMATIC PALEONTOLOGY

REPTILIA Linnaeus, 1758
PTEROSAURIA Kaup, 1834
AUSTRIADACTYLUS CRISTATUS, gen. et sp. nov. (Figs. 1–3)

Etymology—Austria, the country where the specimen was found; dactylus (Greek): finger; crista tus (Latin), crested.

Holotype—SMNS 56342, Staatliches Museum für Naturkunde Stuttgart, Germany.

Locality and Horizon—Abandoned mine near Ankerschlag, Tyrol, NW Austria; Seefelder Schichten, late Alumian (middle Norian).

Diagnosis—Sagittal cranial crest extending from the tip of the snout back to at least the middle of the orbit and deepest anterior to the naris; heterodont dentition; tall, slender conical teeth in the premaxilla; 1–2 very large, finely denticulated, blade-like teeth in the middle maxilla opposite the ascending process; triangular multicusped teeth with up to 12 denticles along each cutting edge in the posterior part of the maxilla; anterior mandibular teeth similar to the premaxillary teeth, the subsequent teeth (about 25) small, leaf-shaped with 4–6 cusps on each cutting edge; anterior multicusped teeth taller than long and bearing small cusps, posterior multicusped teeth longer than tall and with larger cusps, tooth size decreasing slightly posteriorly; tail very long without the bony sheath formed by the enormously elongated pre- and postzygaphyses and hemal arches of the caudal vertebrae in other long-tailed pterosaurs (shared with *Eudimorphodon*).

DESCRIPTION

The specimen is a nearly complete articulated skeleton (Fig. 1) preserved on a slab of black calcareous laminites. The bones are preserved partly on the slab and partly on the counterslab (unavailable because it was destroyed). The skull and lower jaws broke along the sagittal plane and parts of these bones are missing.

The specimen is large for a Triassic pterosaur; the skull measures 110 mm long and the estimated wing span is about 120 cm. The skull is long and low, but the tip of the snout is not pointed (Fig. 2). The thin sagittal crest arises from the very tip of the snout and reaches its maximum height (about 20 mm) anterior to the narial fenestra. The height of the crest decreases posteriorly, as suggested by the curvature of its anterior margin and the distribution of the preserved fragments posteriorly. The crest seems to end on the frontal directly above the orbit. It becomes extremely thin at the distal (dorsal) margin, practically fading into the rocky matrix. Radial ridges are present in the anterior, highest portion.

The narial fenestra is elongated anteroposteriorly. The antorbital fenestra is triangular and higher than it is long. Both are large openings as in *Preondactylus*.

The dentition is strongly heterodont (Fig. 3). The premaxilla probably bears five teeth (Fig. 3A). One or, possibly, two large teeth (10 mm high) (Fig. 3B) are present beneath the ascending process of the maxilla. They have about 18 denticles over a distance of 5.5 mm along the cutting edge. The posterior maxillary teeth (Fig. 3C) are triangular and reduced in height (4–6 mm) compared with the blade-like middle maxillary teeth. The anterior teeth of the lower jaw were probably conical and tall. The subsequent mandibular teeth are much smaller than those of the upper jaw. Seventeen multicusped teeth can be counted on the right ramus and the total number was probably 25. The anterior multicusped teeth (Fig. 3D) have 4 or 5 small cusps on each cutting margin. The middle mandibular teeth are slightly smaller, leaf-shaped, and bear 6 larger cusps. The posterior mandibular teeth (Fig. 3E) have 4–6 cusps on each cutting edge.

Although most of the skeleton is preserved, few useful data can be discerned from the postcrania. Wing phalanx 3 is only slightly longer than wing phalanx 2 (103.5 mm and 101 mm respectively) and the ratio of their lengths (1.02) is similar to