

## A new loon (Aves: Gaviidae) from the middle Miocene of Austria

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(With 2 plates)

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### Summary

A new loon species, *Gavia schultzi*, was described from the Badenian, middle Miocene, of St. Margarethen, Burgenland, Austria. It represents the second oldest record of the genus.

**Key words:** Aves, Miocene, Austria.

### Zusammenfassung

Eine neue Seetaucherart, *Gavia schultzi*, wurde aus dem Badenien (Mittel-Miozän) von St. Margarethen im Burgenland, Österreich, beschrieben. Es handelt sich um den zweitältesten Beleg dieser Gattung.

**Schlüsselwörter:** Vögel, Miozän, Burgenland, Österreich.

### Introduction

The loons or divers (family Gaviidae) are ichthyophagous and insectivorous diving birds, which inhabit lakes and seas of the northern Holarctic (HÖHN 1982). Their fossil record goes back to the late Eocene (OLSON 1985), and is increasingly rich in younger deposits (see below).

In the present paper, I will describe a new loon species from the locality Sankt Margarethen in Burgenland, Austria (46.51 N, 14.48 E). The locality is marine deposits, dated at the middle part of the middle Miocene (Badenian), MN-zone 7 (O. SCHULTZ, pers. communication). It yielded numerous fish remains (O. SCHULTZ, pers. communication) and a few bird bones, which are described below.

The avian remains were excavated in 1986 by the private collector K. WEISS, who donated it to the Department of Geology and Paleontology of the Naturhistorisches Museum (NHMW) in Wien, Austria, where they are deposited since (NHMW 1986/92).

### Acknowledgements

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### Systematic paleontology

Order Gaviiformes WETMORE & MILLER, 1926

Family Gaviidae ALLEN, 1897

Genus *Gavia* FORSTER, 1788

#### *Gavia schultzi* n. sp.

(Pls. 1–2)

**H o l o t y p e:** right coracoid in a slab (slab A); NHMW 1986/92.

**M a t e r i a l:** slab A: right coracoid (holotype), cranial part of left coracoid; slab B: partial skeleton in a slab, including both humeri (lacking proximal ends), distal part of left ulna, proximal parts of both radii, both phalanges digiti majoris, and phalanx digiti minoris; slab C: fragment of proximal part of right humerus, fragment of the shaft of left(?) ulna; slab D: fragments of shafts of right(?) ulna; and (free bone): cranial part of left ulna. It is probable, though not certain, that all of these bones originated from a single individual.

**A g e a n d l o c a l i t y:** Upper Badenian, middle Miocene, MN 7 (O. SCHULTZ, pers. communication) of Sankt Margarethen, Burgenland, Austria.

**D i a g n o s i s:** A *Gavia*, larger than *Gavia egeriana* and smaller than *Gavia moldavica*.

**D e s c r i p t i o n:** Direct comparisons were possible only on the distal end of humerus. Here, *Gavia schultzi* differs from the older and smaller *Gavia egeriana* in having: (1) tuberculum supracondylare ventrale larger, and its borders less distinct, and (2) ligamental attachments on epicondylus ventralis larger and less distinct. On the other hand, *Gavia schultzi* agrees with *Gavia egeriana* and differs from the modern *Gavia* species in having the overall distal end of humerus relatively slender. No comparisons were possible with the larger *Gavia moldavica*, because its illustrations are very poor.

**M e a s u r e m e n t s:** coracoid (holotype): external length = 41.5 mm, internal length = 36.9 mm, length of facies articularis sternalis = 19.8 mm, distance between processus acrocoracoideus and the sternal end of facies articularis humeralis = 16.0 mm; greatest width of extremitas cranialis scapulae = 6.8 mm; distal width of humerus = 11.4 mm; greatest length of phalanx proximalis digiti majoris = 16.2 mm; greatest length of phalanx distalis digiti majoris = 12.5 mm.

**E t y m o l o g y:** I name this species in honor of Dr. Ortwin SCHULTZ (Wien) for his outstanding contributions to the paleontology of Austria.

### Fossil record of the Gaviidae

The latest summaries of the fossil record of the family Gaviidae were presented by DELLE CAVE et al. (1984) and OLSON (1985). OLSON (1985, and references cited therein) excluded from the family most of the earliest supposed gaviids, including *Enaliornis barretti* SEELEY, 1864 and *Enaliornis sedgwicki* SEELEY, 1864 from the Cretaceous of

England, *Lonchodytes estesi* BRODKORB, 1963a and *Lonchodytes pterygius* BRODKORB, 1963a from the Cretaceous of Wyoming, *Eupterornis remensis* LEMOINE, 1878 from the Paleocene of France, and *Gaviella pusilla* (SHUFELDT, 1915) from the Tertiary (exact age unknown) of Wyoming. The same applies to the alleged record of a *Gavia* from the middle Eocene of Germany (MLÍKOVSKÝ in DELLE CAVE et al. 1984). During my early study of the middle Eocene birds of the Geisel Valley in Germany (MLÍKOVSKÝ, unpub. observations), I believed that a distorted and abraded proximal part of a tibiotarsus (?) can be identified as belonging to *Gavia* (J. MLÍKOVSKÝ in DELLE CAVE et al. 1984). Further study led me to consider that specimen indeterminate. In consequence, the alleged record of an Eocene *Gavia* should be deleted from avifaunal lists.

The fossil record of the Gaviidae is thus confined to two genera: *Colymboides* LYDEKKER, 1891, and *Gavia* FORSTER, 1788. In the extinct genus *Colymboides*, only two species have been discerned as yet. The older of them, *Colymboides anglicus* LYDEKKER, 1891, is known only from the late Eocene of England thus far (LYDEKKER 1891, STORER 1956, HARRISON 1976, HARRISON & WALKER 1976). The younger species, *Colymboides minutus* MILNE-EDWARDS, 1867 (incl. *Hydrornis natator* MILNE-EDWARDS, 1867 – see STORER 1956), is confined to the early Miocene of continental Europe, ranging from the MN-zone 2 in France (STORER 1956, CHENEVAL 1984) to the MN-zone 4 in Czechland (ŠVEC 1980, MLÍKOVSKÝ in prep.). There is thus far no indication, that the genus survived the border between the early and the middle Miocene, and that it occurred outside of Europe.

The genus *Gavia* has a much more rich fossil record. Its earliest representative, *Gavia egeriana* ŠVEC, 1982 was described from the early Miocene (MN 4) of Dolnice in Czechia (see also ŠVEC 1985, MLÍKOVSKÝ in prep.). The next oldest records are *Gavia* spp. from the earliest middle Miocene of Maryland, Virginia and New Carolina (OLSON 1985, BECKER 1987). Somewhat younger are *Gavia schultzi* n.sp. from the middle Miocene (MN 7) of Austria (MLÍKOVSKÝ, this paper), and the three *Gavia* species from the middle Miocene (MN 7) of Steinheim in Germany (A. HESSE, pers. communication). Contemporaneous to them, or slightly younger, is *Gavia moldavica* KESSLER, 1984 from Chişinau in Moldavia. Late Miocene finds are limited to *Gavia paradoxa* UMANS'KAJA, 1981 from Ukraine (MN 10?), *Gavia brodkorbi* HOWARD, 1978 from California (approximately MN 10), and *Gavia* sp. (HOWARD 1982; approximately MN 11–12) from California.

Relatively rich record received the genus *Gavia* from the early Pliocene deposits (approximately MN 14–15). They include *Gavia portisi* (REGALIA, 1902) and *Gavia concinna* WETMORE (DELLE CAVE et al. 1984) from Italy, *Gavia* sp. from Crimea in Ukraine (E.N. KUROČKIN in DELLE CAVE et al. 1984), *Gavia palaeodytes* WETMORE, 1943 and *Gavia concinna* WETMORE (BECKER 1987) from Florida, three different, as yet unidentified species from North Carolina (OLSON 1985), and *Gavia concinna* WETMORE, 1940 and *Gavia howardae* BRODKORB, 1953 from California. Interestingly enough, no *Gavia* remains were recorded thus far from the late Pliocene (MN 16–17). The Quaternary record of the genus is rather rich (BRODKORB 1963b, DELLE CAVE et al. 1984, and references cited therein). All of the Quaternary finds have been referred to the extant species.

Summarizing this evidence, it can be hypothesized that the Gaviidae have not occurred outside of Europe until the end of the early Miocene. In the middle Miocene they reached the eastern coasts of North America, and, in the late Miocene, also the western coasts of North America. There are no records of the Gaviidae from the southern hemisphere. If

OLSON (1985) is right in assuming close phylogenetic relations between the Gaviidae and the Spheniscidae, then the distributional history of the two groups is of considerable interest: Gaviidae were never recorded south of the equator, while the Spheniscidae north of it. The fossil record of both of these families goes back to the Eocene (OLSON 1985).

### Discussion

The find of *Gavia schultzi* n.sp. is of considerable interest from the stratigraphical and phylogenetic points of view (see above). However, it gives no clue to the taphonomy of the remains, or the ecology of the then vicinity of St. Margarethen. Similarly, the biogeographical information is meagre, because loons of the genus *Gavia* still visit central Europe, incl. Austria, in winter (CRAMP & SIMMONS 1977).

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Note added in proof:

OLSON (1992) identified *Neogaeornis wetzeli* LAMBRECHT, 1929 and two other bone fragments from the late Cretaceous of Chile and Seymour Island as a member of the family Gaviidae. This is thus currently the oldest record for the family.

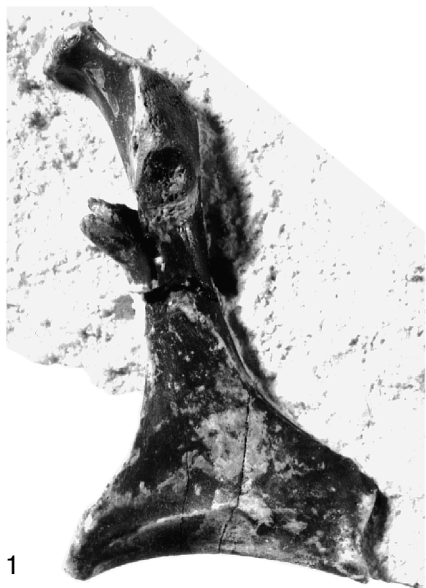
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## Plate 1

*Gavia schultzi* n. sp. from the Upper Badenian, middle Miocene, of St. Margarethen, Austria.

1–2: holotype coracoid (from plate A, enlarged), photographed from two different inclinations,  
3: plate A (natural size).



## Plate 2

*Gavia schultzi* n. sp. from the Upper Badenian, middle Miocene, of St. Margarethen, Austria (all figures in natural size.

- a: plate B,
- b: plate C,
- c+d: scapula.

Photographs: A. SCHUMACHER (NHM Wien).



