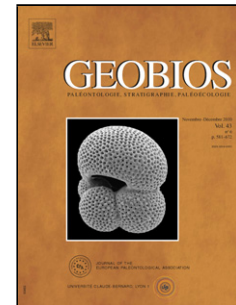


## Accepted Manuscript

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PII: S0016-6995(17)30043-8  
DOI: <https://doi.org/doi:10.1016/j.geobios.2017.12.006>  
Reference: GEOBIO 806

To appear in: *Geobios*

Received date: 24-3-2017  
Accepted date: 20-12-2017

Please cite this article as: Mayr, G., Goedert, J.L., First record of a tarsometatarsus of *Tonsala hildegardae* (Plotopteridae) and other avian remains from the late Eocene/early Oligocene of Washington State (USA), *Geobios* (2017), <https://doi.org/10.1016/j.geobios.2017.12.006>

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First record of a tarsometatarsus of *Tonsala hildegardae* (Plotopteridae) and other avian remains from the late Eocene/early Oligocene of Washington State (USA)

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## Abstract

New bird fossils from the late Eocene/early Oligocene Makah Formation and the Oligocene Pysht Formation on the Olympic Peninsula (Washington State, USA) are described. A partial skeleton from the Pysht Formation includes the first reported tarsometatarsus of *Tonsala hildegardae* Olson, 1980, a wing-propelled diving bird of the taxon Plotopteridae. It shows that *Tonsala* had a tarsometatarsus that was morphologically intermediate between that of the late Eocene *Phocavis* and more derived plotopterids. We introduce the new taxon Tonsalinae nov. subfam. for a clade including all named plotopterids except *Phocavis*, *Plotopterum*, and the recently described *Stemec*. We furthermore describe a partial plotopterid pelvis and a sternum from the Makah Formation. The sternum shows a close resemblance to that of extant Phalacrocoracoidea (cormorants and darters) and may be the earliest North American record of this taxon.

**Keywords:** Aves; Plotopteridae; Phalacrocoracoidea; Paleogene; Makah Formation; Pysht Formation; North America

Corresponding editor: Antoine Louchart.

## 1. Introduction

Paleogene strata of the Olympic Peninsula (Washington State, USA) have yielded a number of avian fossils that shed light on the poorly known early Cenozoic avifaunas of the North American Pacific coast. Most of these specimens stem from the late Eocene/early Oligocene Jansen Creek Member of the Makah Fm. (Snively et al., 1980; Prothero et al., 2009) and the overlying Pysht Fm., which is of late early or late Oligocene age (Prothero et al., 2001;

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