

## New Pleistocene bird fossils in Taiwan reveal unexpected seabirds in East Asia


Siao-Man Wu, Trevor H. Worthy, Chih-Kai Chuang and Chien-Hsiang Lin  
*Acta Palaeontologica Polonica* 68 (4), 2023: 613-624 doi:10.4202/app.01091.2023

The island of Taiwan, with its diverse microclimates and key position on the East Asian-Australasian Flyway, attracts numerous bird enthusiasts due to its diverse avian fauna. Nevertheless, due to the scarcity of fossil records, there is a significant knowledge gap between modern and ancient avifaunas in Taiwan. Currently, there is only a single described Pleistocene fossil; it is attributed to Phasianidae. To address this gap, this study describes two new bird fossils, a left humerus and a left tibiotarsus, and discusses them in detail herein. The fossils were collected from the Liuchungchi Formation (Early Pleistocene, 1.95–1.35 Ma) in Niubu, Chiayi, southwestern Taiwan, which represents a neritic environment. The fossils are identified as from species of Gaviidae (loons), with the humerus belonging to an undetermined species of *Gavia* and the tibiotarsus to *Gavia stellata*. Loons are seabirds that are primarily distributed in high- and middle latitudes of the Northern Hemisphere. In addition, these birds are extremely rare in modern Taiwan: records are scarce and most are limited to northern and northeastern Taiwan since the 1860s, indicating that the modern *Gavia* birds only occasionally visit Taiwan. All known Pleistocene fossils of species of *Gavia* from the northern West Pacific come from Japan. The Taiwan fossils of *Gavia* provide valuable bird evolutionary and paleobiogeographic information for the subtropical West Pacific and may imply the presence of a distinct avifauna in the region during the Early Pleistocene.

**Key words:** Aves, *Gavia*, loon, seabird, Early Pleistocene, Taiwan.

Siao-Man Wu [[smallmmmm@gmail.com](mailto:smallmmmm@gmail.com); ORCID: <https://orcid.org/0009-0004-3702-1996>],  
Chih-Kai Chuang [[tnupast@gmail.com](mailto:tnupast@gmail.com); ORCID: <https://orcid.org/0009-0001-1289-9442>]  
] and Chien-Hsiang Lin [[chlin.otolith@gmail.com](mailto:chlin.otolith@gmail.com); ORCID: <https://orcid.org/0000-0002-9843-9729>]  
] (corresponding author), Biodiversity Research Center, Academia Sinica, Taipei, 11529, Taiwan. Trevor H. Worthy [[trevor.worthy@flinders.edu.au](mailto:trevor.worthy@flinders.edu.au);  
ORCID: <https://orcid.org/0000-0001-7047-4680>], Palaeontology Group, College of Science and Engineering, Flinders University, Adelaide, 5001, Australia.

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 \(1,399.7 kB\)](#) |

 [Supplementary file \(162.6 kB\)](#)