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ORIGINAL PAPER

Towards the conservation of Borneo's freshwater mussels: rediscovery of the endemic *Ctenodesma borneensis* and first record of the non-native *Sinanodonta lauta*

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Abstract

The freshwater mussel fauna of Borneo is highly endemic, with at least 11 species being unique to that island. Most of these species have not been recorded for at least 50 years owing to a lack of sampling effort and large-scale habitat destruction and degradation. Surveys conducted in 2016 across much of Malaysian Borneo failed to locate four out of five native species historically recorded in the study area. The present study aimed to determine the diversity and distribution of freshwater mussels of Brunei and adjacent Limbang Division, Malaysia. In 2018, we conducted interviews with locals, recorded environmental data and surveyed mussels at 43 sites, and conducted interviews at a further 38 sites. Only one population of native mussels, i.e. *Ctenodesma borneensis*, was found in a small tributary of the Limbang River situated in a patch of intact rainforest, representing the first record of this Bornean endemic genus since 1962. In addition, *Sinanodonta lauta* was found in a pond in Lawas district, representing the first record of this species outside its native East Asian distribution. Our data suggest that *C. borneensis* can sustain populations in relatively undisturbed habitats and is likely to have suffered population losses across northern Borneo. The first molecular phylogenetic analysis (COI + 28S) including an endemic Bornean freshwater mussel genus revealed that *Ctenodesma* is phylogenetically divergent from all other previously sampled lineages, rendering it a particularly valuable conservation target.

Keywords Endemic species · Freshwater biodiversity · Non-native species · Threatened species · Tropics · Unionida

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