

Systematics of Sphagnum Frogs of the Genus *Phyloria* (Anura: Myobatrachidae) in Eastern Australia, With the Description of Two New Species

ROSS KNOWLES¹, MICHAEL MAHONY¹,
JAN ARMSTRONG² AND STEPHEN DONNELLAN*²

¹ Department of Biological Sciences, University of Newcastle NSW 2308, Australia
bimjm@cc.newcastle.edu.au

² Evolutionary Biology Unit and Centre for Evolutionary Biology and Biodiversity, The South Australian
Museum, North Terrace, Adelaide SA 5000, Australia
Donnellan.Steve@saugov.sa.gov.au

ABSTRACT. Analyses of allozyme and mitochondrial nucleotide sequence variation in *Phyloria* from northeastern NSW and southeastern Queensland revealed that there are more species than the three that are currently recognized. In addition to the three species presently recognized *P. kundagungan*, *P. loveridgei*, and *P. sphagnicolus*, another two species *P. pughi* n.sp. and *P. richmondensis* n.sp. were recognized under the evolutionary species concept. All species are allopatric. Each of the five species had two or more fixed genetic differences with all other species. Additionally, each species possessed two or more unique allozyme characters (apomorphies). Each species had strongly supported reciprocally monophyletic mitochondrial haplotypes in comparison with each of the other species. Multivariate morphometric analysis was able to distinguish *P. sphagnicolus* from the remaining four northern taxa but was unsuccessful in reliably distinguishing the two new species. Mating call analysis identified two distinct call groups: *P. sphagnicolus* and the remaining species, the latter showing little discrimination between species. The distribution of *Phyloria* in NSW and Queensland shows a strong association with high rainfall rainforest at mid to high altitudes (above 600 m elevation). The habitat of all species is remarkably similar, all are found predominantly in the headwaters of rainforest streams or soaks on the forest floor. All species lay their eggs in nests in the ground, where the larvae remain throughout their entire development until they emerge post metamorphosis. It was confirmed that nests where the embryos were at an early stage of development were of two types: foaming egg masses, and nests containing a non-foaming jelly substance. All species are limited in their distribution. In particular *P. richmondensis* is in need of special conservation consideration, as it is known from only three localities within a very small range. A number of populations in southeastern Queensland and northern NSW await molecular analysis to be identified with certainty.

KNOWLES, ROSS, MICHAEL MAHONY, JAN ARMSTRONG & STEPHEN DONNELLAN, 2004. Systematics of sphagnum frogs of the genus *Phyloria* (Anura: Myobatrachidae) in eastern Australia, with the description of two new species. *Records of the Australian Museum* 56(1): 57–74.