

Cryptic diversity within two widespread diadromous freshwater fishes (Teleostei: Galaxiidae)

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Abstract

Aim Identification of taxonomically cryptic species is essential for the effective conservation of biodiversity. Freshwater-limited organisms tend to be genetically isolated by drainage boundaries, and thus may be expected to show substantial cryptic phylogenetic and taxonomic diversity. By comparison, populations of diadromous taxa, that migrate between freshwater and marine environments, are expected to show less genetic differentiation. Here we test for cryptic diversity in Australasian populations (both diadromous and non-diadromous) of two widespread Southern Hemisphere fish species. Location Throughout both their Australian ranges (including Lord Howe Island) and localities in New Zealand (including the Subantarctic Islands and Chatham Island). Taxon *Galaxias brevipinnis* and *Galaxias maculatus*. Methods mtDNA and nuclear markers were used to assess the presence of cryptic species and to determine if differences in species ecology could influence the degree of cryptic diversity. Results Both mtDNA and nuclear markers reveal putative cryptic species within these taxa. The substantial diversity detected within *G. brevipinnis* may be explained by its strong climbing ability which allows it to form isolated inland populations. In island populations, *G. brevipinnis* similarly show deeper genetic divergence than those of *G. maculatus*, which may be explained by the greater abundance of *G. maculatus* larvae in the sea allowing more ongoing dispersal. Main conclusions Our study highlights that even widespread, 'high-dispersal' species can harbour substantial cryptic diversity and therefore warrant increased taxonomic and conservation attention.

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