



Molecular phylogeny of Australian *Gehyra* (Squamata: Gekkonidae) and taxonomic revision of *Gehyra variegata* in south-eastern Australia

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Abstract

We provide the first phylogenetic hypothesis for the Australian species of the gekkonid genus *Gehyra*, based on 1044bp of the mitochondrial *ND2* gene. Species representing the Asian, Melanesian and Australian radiations are resolved as separate clades, indicating relative isolation and independence of each of these evolutionary lines. Within the Australian radiation, the arid zone species form a monophyletic subgroup distinct from the remaining species found in tropical and warm mesic habitats. Extensive chromosome variation and highly variable external morphology have made species recognition difficult within *Gehyra*, exacerbated by the likely presence of numerous undescribed cryptic species. Three species of *Gehyra* are currently recognized in the southeastern inland of Australia, *G. variegata*, *G. montium* and *G. purpurascens*. We re-describe a fourth species, *G. lazelli*, to include those populations long referred to informally as the $2n=44$ chromosome 'race' of *Gehyra variegata*. *Gehyra lazelli* widely overlaps the distribution of *G. variegata* in South Australia and the southern inland of New South Wales, with no suggestion of intergradation in morphology, mitochondrial DNA, allozyme variation or karyotype.

Key words: Lizards, speciation, Australia, phylogeny, taxonomy, mitochondrial DNA

Introduction

Gehyra is a large genus of climbing geckoes, ranging across Asia and into the Pacific and with a large centre of endemism in Australia (Mitchell 1965). *Gehyra* is a member of the clade traditionally treated as the subfamily Gekkoninae (Kluge 1987), more recently treated as a family Gekkonidae, distinct from several other gekkonoid families (Han *et. al.* 2004; Gamble *et. al.* 2007). *Gehyra* species share a distinctive toe morphology, possessing elliptical, subterminal, adhesive toe pads and clawless first digits on the fore and hind feet. Eighteen species are currently recognised from Australia. The genus is conservative in morphology and many of its species differ only subtly in external appearance. Nevertheless the group shows considerable chromosomal heterogeneity and the present tally of species is probably an underestimate.

King (1979) published the first of a series of studies on chromosomal variation within *Gehyra*, addressing populations referred to the species *Gehyra punctata* (Fry 1914) and *G. variegata* (Duméril and Bibron 1836). Six chromosome groups were recognised within the two nominal species. Populations of '*G. variegata*' included a $2n=44$ karyotype and two $2n=40$ (40a and 40b) karyotypes, while *G. 'punctata'* included populations with diploid numbers of 44, 42 and 38. King further expressed the view that disjunct populations of some chromosome groups had diverged in morphology to the point where they may represent distinct species. Thus there were two allopatric $2n=42$ populations (central Northern Territory (NT) and central west