

**Ecology, Life History and Conservation Status of
Westralunio carteri IREDALE 1934, an Endemic Freshwater
Mussel of South-western Australia**



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This thesis is presented for the degree of Doctor of Philosophy (Agricultural, Biological
& Environmental Sciences) to the School of Veterinary&Life Sciences, Murdoch
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DECLARATION

I declare that this thesis is my own original account of my research and contains as its main content, work which has not previously been submitted for a degree at any tertiary education institution and as author, I reserve the right of copyright under the *Copyright Act 1968*, Commonwealth of Australia.






MICHAEL W. KLUNZINGER

Frontispiece: Lindsay Marshall

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Abstract

Westralunio carteri, the only hyriid in south-western Australia, was nominated ‘Vulnerable’ (IUCN) in 1994. The aims of this study were to update the species’ range and determine factors limiting its distribution, quantify tolerance to threats, quantify reproduction, describe glochidia morphology, identify host fishes to support the species’ life cycle and estimate growth and age.

Extent of Occurrence (EOO) of *W. carteri* is currently 16,011.9 km², a 63.3% decline from the historic EOO of 43,579.8 km², suggesting that the species should be classified as ‘Endangered’ under IUCN guidelines. Multivariate analysis identified flow and drying as explaining most of the variation in the distribution data, while the difference between historic and current distribution was explained principally by salinity. Salinity tolerance experiments indicated LC₅₀ values of 1.3 - 3.0 and LC₉₅ of 3.2 - 4.3 g L⁻¹. Artificial water removal suggested *W. carteri* is intolerant of drying for more than five days during summer without shade or moist sediments.

Westralunio carteri spawns during winter; embryos are brooded in the gills of females to become glochidia and released on mucus strings in September – December, when they attach to fins of fishes. Glochidia morphology (size and larval teeth) is distinctive in *W. carteri*, compared to other Australian hyriids.

Glochidia were found on fins of seven native and three alien fish species from 18 populations. Prevalence was 0.0 - 41.0% and 9.2 - 90.5% and intensity 1.0 - 6.0 and 2.3 - 7.1 in alien and native fishes, respectively. Four native and one alien fish species were confirmed as competent hosts in the laboratory. Time to metamorphosis was 21-27 days.

Growth rates were ~12.0 to <0.1 mm yr⁻¹ in the smallest (<30 mm long) and largest (>75 mm long) sizes. Calcein validated growth rings as annuli and ages were 3 – 51 years at shell lengths of 12.6 - 82.5 mm, respectively, from five populations. Growth rates and ages-at-length were highly variable between populations.

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