

HABITAT OF THE PINK-TAILED WORM-LIZARD *APRASIA PARAPULCHELLA* IN ALBURY, NSW

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ABSTRACT

The nationally threatened Pink-tailed Worm-lizard *Aprasia parapulchella* was first discovered on Nail Can Hill Flora Reserve in Albury during August 2002 (8 individuals) and subsequently, during September (1 individual) and October 2003 (58 individuals), representing one of the largest known populations in NSW. Animals were found sequestered beneath shallowly embedded rhyodacitic rocks and within the brood chambers of dolicherine ants, *Iridomyrmex* sp., in the endangered grassy White Box *Eucalyptus albens*, Yellow Box *E. melliodora* and Blakely's Red Gum *E. blakelyi* woodland community. Lizard sites were similar in terms of aspect, rock type, ant species and disturbance histories, but differ in stand structure, abundance and composition of ground cover. Management may be necessary to control exotic annual plants that may affect thermal conditions available to the lizards. Additionally, the illegal use of motorbikes in some areas may threaten the lizards' habitat through soil erosion and compaction, spreading of invasive weeds and displacement of surface rocks.

INTRODUCTION

The Pink-tailed Worm-lizard *Aprasia parapulchella* was described from specimens collected in the ACT (Kluge, 1974) but received scant attention until the 1990s (McKergow, 1990, Osborne *et al.*, 1991, Osborne & McKergow, 1993). In NSW, it has been recorded from Burra (Robinson, 1996), Bathurst, West Wyalong, Tarcutta (Swan *et al.*, 2004) and Goombargana Hill near Walbundrie (N. Jones, pers. comm. 2001) and in Victoria it is known from a population in the Bendigo region (Wilson & Swan, 2003). It is listed as endangered in Victoria under the

Flora and Fauna Guarantee Act 1998, vulnerable in NSW under the Threatened Species Conservation Act 1995 and nationally vulnerable under the Commonwealth Environmental Protection and Biodiversity Conservation Act 2000.

The Pink-tailed Worm-lizard, although not considered a grassland specialist, has been recorded in areas with little tree cover or leaf litter and a good cover of native grasses (Robinson, 1996) but more often from small rocky clearings in open woodland, tall shrubland and disclimax native grasslands (Osborne *et al.*, 1993). A relationship between Kangaroo Grass *Themeda australis* and Pink-tailed Worm-lizard sites has been suggested (McKergow, 1990; Jones, 1992), as has shallowly embedded rhyodacitic and weathered granite rocks (Cogger, 2000; Jones, 1992; Kluge, 1974; Osborne *et al.*, 1991).

It is a cryptozoic, fossorial ant specialist and is known to feed on the various life stages of at least five species of ant and although these species extend beyond the known distribution of the lizard (Jones, 1992; Robinson, 1996), the composition of ant species may play a crucial role in its patchy distribution (Osborne & McKergow, 1993). Soil disturbance has been identified as being a potential limiting factor in its distribution (Osborne *et al.*, 1991). However, the species' ecology, distribution, full range of habitats and responses to disturbance patterns are poorly understood.

We describe the habitat of the Pink-tailed Worm-lizard on Nail Can Hill Flora Reserve in Albury, with the aim of: (1) establishing local baseline habitat data on a threatened species; and (2) facilitating the recognition of potential Pink-tailed Worm-lizard sites in other parts of south-eastern Australia.

METHODS

Records of Pink-tailed Worm-lizards were obtained from: (1) incidental observations by the authors during surveys at site 1, (2) area and time constrained active searches conducted by the authors during a local community biodiversity survey at site 2, and (3) an impact assessment conducted by a local environmental consultant (I Davidson, pers. comm. 2003) with additional active searches by the main author at site 3. Only presence data was collected, during mid morning and afternoon surveys, on warm clear days in spring months.

Specimens were identified using the keys provided in Cogger (2000). Voucher specimens have not yet been lodged with the Australian Museum; however photographic evidence was taken (Fig 1). Statistical analysis was not performed on the data but instead descriptive interpretation of the sites is provided. Floristic composition and structural data were recorded during October 2003 along 100 m transects bisecting the sites and percentage cover of the ground layer was visually estimated from 20 m x 20 m quadrats placed randomly within the sites.

RESULTS

Site 1. At 1748 hrs, on 17 August 2002, a subadult Pink-tailed Worm-lizard was recorded from a rocky clearing on Nail Can Hill Flora Reserve. The temperature was 15°C. Between 1530-1630 hrs the following day a further seven individuals were recorded sequestered individually beneath small surface rocks covering an area of 1 hectare. The site is steep (12°), rocky with a south-westerly aspect (240° SW) and is situated 320 m above sea level (Fig 2). It is bordered above and below by two unsealed service roads and to either side by a gully and an undesignated, eroding walking track.

The vegetation is dominated by Blakely's Red Gum *Eucalyptus blakelyi* with sparse cover of native shrubs and forbs. Kangaroo Grass constitutes approximately 25% of the ground

cover composition (Appendix 1). The average height of the canopy was uniformly 8 m, average canopy width of only 1.2 m, average diameter at breast height was 8 cm and the stem density was approximately 200/ha. Trees were spatially distributed every 2-3 m and the amount of shaded ground from the projected foliage cover was low compared to nearby southerly aspects (15-30%).

The area has been subject to extensive timber removal, grazing and gold mining in the past and has since regenerated in response to reservation in 1915. Hence, the area contains few remnant mature trees and consists mainly of coppice and seed regenerated stands (Fig 1). Many trees are stunted with signs of stress and insect attack and natural thinning is occurring. Fire events are common but are usually small, low intensity outbreaks started under suspicious circumstances.

Site 2. At 0845 hrs on 20 September 2003, during the Albury community biodiversity survey, a single subadult Pink-tailed Worm-lizard was found beneath a small surface rock on a rocky, western facing slope of a drainage line on Nail Can Hill Flora Reserve. The temperature was 16.5°C. The site is moderately steep (9°), rocky with a south-westerly aspect (225° SW) and is situated 220 m above sea level. It is 1.5 km from site 1 and 250 m from site 3. As it may constitute the tail end of site 3 its site description has been included below.

Site 3. During October 2003 a small cluster of Pink-tailed Worm-lizards was recorded adjacent to a proposed development site on Nail Can Hill Flora Reserve. Subsequent investigations between 1330 and 1630 hrs on 25 October 2003 revealed 58 individuals spread across a 1 km ridge line (Fig. 3). The maximum temperature was recorded at 22.5°C. Most animals were found individually but pairs were recorded on eight occasions and groups of three were recorded on four occasions with a range of size cohorts observed in aggregation. The site is steep (14°), westerly facing (280° W) and is situated between 235-265 m above sea level.

The vegetation is dominated by Blakely's Red Gum with patchy cover of native shrubs and Kangaroo Grass. This site is particularly rich in native forbs in parts but intergrades with areas dominated by swards of introduced pasture species (Appendix 1). The height of the canopy ranged from 12-22 m, the canopy width ranged from 10-20 m and the average diameter at breast height was 40 cm. The stem density along the ridge was approximately 10/ha and all trees appeared to be healthy with natural levels of mistletoe. Trees were spatially distributed every 25 m and the amount of shaded ground from the projected foliage cover was low compared to the southerly and northern aspects (15-30%).

This site is mostly located on land managed by the Albury water treatment plant and has been exposed to moderate levels of clearing in the past and recent grazing events. This site is adjacent to site 2 and is separated by an ephemeral creek and small grassy valley (200 m) and is dominated by a mix of native and introduced grasses, although surface rocks are absent.

Rocks and Ants

All sites contain shallowly embedded surface rock and intrusive porphyritic granite outcrops. However, the lizards were only found beneath small, flaky rhyodacitic surface rocks, comprised of granitised schist (C. Michael, pers. comm. 2003). Specimens were found beneath rocks with diameters less than 30 cm and mean widths of 5 cm (very large and deeply embedded rocks were not surveyed). Site 1 contained approximately 50 suitable rocks aggregated within 1 ha, site 2 contained 20 rocks whereas site 3 contained approximately 300 rocks scattered along the ridge. Noticeably, lizards were detected beneath rocks that were situated in open areas away from both the canopy of trees and dense exotic grass cover.

The most abundant ant species, and the ones which appeared to be associated with the lizard beneath the rocks, were small aggressive dolicherine ants of the genus

Iridomyrmex. Other species were present on all sites but were absent beneath rocks used by the lizards. During the survey periods *Iridomyrmex* sp. contained large broods which were visible within excavated chambers beneath the rocks.

DISCUSSION

The discovery of this significant population of Pink-tailed Worm-lizards in Albury suggests that it may occur in similar habitat in parts of Wodonga in north-eastern Victoria, and may constitute one of the largest known populations on public land in NSW. Much of Nail Can Hill Flora Reserve and surrounding lands have been extensively surveyed for reptiles during different climatic conditions and seasons, with a diverse community having been recorded (e.g. Davidson, 2000; Michael, 2004a,b). Nevertheless, it is possible that the lizard will be detected in other parts of Albury and regional areas in the future. This species is not known to occur in the region based on the distribution maps of current field guides (Cogger, 2000; Wilson & Swan, 2003). However, the Albury population occurs between two disjunct populations occurring in NSW and Victoria, highlighting the need for further research into the distribution of threatened fossorial species.

The population occurs mostly on public land and in areas predominately managed by the Albury City Council for conservation hence, the long-term survival of the Pink-tailed Worm-lizard in Albury would appear secure. This will largely depend on excluding activities that may destroy the integrity of the soil or alter the spatial distribution and thermal properties of the rocks, ant species and associated vegetation. Measures may be necessary to ensure genetic communication is not interrupted and individuals are free to disperse between sites such as: (1) excluding potential development between the sites, (2) preventing damage by motorbikes, and (3) controlling the spread of exotic plant species. Active management to control invasive pasture plants would be beneficial and tools

such as fire and time controlled grazing regimes could be experimentally tested in certain areas.

It would also be of some benefit to monitor the population in a non destructive way before any management activities were undertaken. Substrates such as roofing tiles and fence posts have been used to monitor pygopodids such the Striped Legless Lizard *Delma impar* and Olive Legless Lizard *D. inornata* in Victoria (Michael *et al.*, 2004c; O'Shea, 1996; O'Shea & Hocking, 1997) and NSW (M. Crane, pers. comm. 2002). Data on the conservation value of introducing such substrates is generally lacking for fossorial lizards, although a recent observation of a Pink-tailed Worm-lizard thermoregulating beneath a piece of corrugated iron near site 3 suggests that it may be worthwhile trialling (Fig. 1, D. Michael, pers. obs. 2005). Such substrates may have the potential to increase the carrying capacity of an area, enhance movement patterns, dispersal behaviour and facilitate in monitoring cryptic species without interfering with natural microhabitats through rock-rolling.

Broad similarities have been recognised among the three Pink-tailed Worm-lizard sites, especially in relation to aspect, rock type and companion ant species, but noticeable differences in ground cover composition and stand structure are evident. These differences in part reflect the varying amounts of timber removed, fire histories and grazing patterns in the past. It is encouraging to think, given the complex layers of disturbance the Albury population has experienced, that other populations may exist in similar environments in the region.

ACKNOWLEDGMENTS

We thank our partners for fostering an environment for the often endless discussions. To Craig Michael for examining the rocks, Wayne Robinson for help in identifying the ant species. Also to Mason Crane, Craig Grabham, Greg Slade and Mihkel Proos for assisting with various surveys and the Albury

City Council, Riverina T.A.F.E, Louise Bull, Paul Scannell, the Albury Wodonga Field Naturalists and the passionate members of the community who assisted with the biodiversity surveys. We also thank Glenn Shea and two anonymous referees who greatly improved an earlier version of this paper.

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Appendix 1. Dominant flora and percent cover abundance data from Pink-tailed Worm-lizard sites on Nail Can Hill Flora Reserve in Albury, October 2003. * = Introduced native species.

Common Name	Botanical Name	Site 1	Sites 2 & 3
Overstorey Species			
Lightwood	<i>Acacia implexa</i>		1
Drooping Sheoak	<i>Allocasurina verticillata</i>		10
White Cypress Pine	<i>Callitris glaucophylla</i>		1
Blakely's Red Gum	<i>Eucalyptus blakelyi</i>	95	75
White Box	<i>Eucalyptus albens</i>	2	5
Red Box	<i>Eucalyptus polyanthemos</i> ssp. <i>vestita</i>		5
Red Stringybark	<i>Eucalyptus macrorhyncha</i>	3	1
Apple Box	<i>Eucalyptus bridgesiana</i>		1
Yellow Box	<i>Eucalyptus melliodora</i>		1

Understorey Species

Cat's Claw Grevillea	<i>Grevillea alpina</i> 'Albury form'	70	5
Box-leaf Wattle	<i>Acacia buxifolia</i>		1
Varnish Wattle	<i>Acacia verniciflua</i>	15	55
* Ovens Wattle	<i>Acacia pravissima</i>		1
* Cootamundra Wattle	<i>Acacia baileyana</i>		1
Sweet Bursaria	<i>Bursaria spinosa</i>	5	
Narrow-leaf Hopbush	<i>Dodonea viscosa</i> ssp. <i>angustissima</i>		20
Grey Guinea Flower	<i>Hibbertia obtusifolia</i>		5
Small-leaf Bush Pea	<i>Pultenea foliolosa</i>		2
Small-leaf Parrot Pea	<i>Dillwynia retorta</i>	10	5
Sheep's Burr	<i>Acaena ovina</i>		1
Honey-pots	<i>Actrotriche serrulata</i>		1
Wire Grass	<i>Aristida ramosa</i>		5
Chocolate-Lily	<i>Arthropodium strictum</i>	10	15
Rough Spear Grass	<i>Austrostipa scabra</i>		5
Daphne Heath	<i>Brachyloma daphnoides</i>	5	2
Sticky Everlasting	<i>Bracteantha viscosa</i>		5
Yellow Bulbine-Lily	<i>Bulbine bulbosa</i>	5	5
Milkmaids	<i>Burchardia umbellata</i>	5	15
Rock Fern	<i>Cheilanthes austrotenuifolia</i>	5	4
Long-leaf Flax-lily	<i>Dianella longifolia</i>	2	1
Black-anther Flax-lily	<i>Dianella revoluta</i>	5	4
Plume Grass	<i>Dichelachne</i> sp.	3	5
Tall Sundew	<i>Drosera peltata</i>	10	2
Native Geranium	<i>Geranium solanderi</i>	5	2
Common Raspwort	<i>Gonocarpus tetragynus</i>	15	15
Wattle Lomandra	<i>Lomandra filiformis</i>	4	
Urn Heath	<i>Melichrus urceolatus</i>		2
Common Onion Orchid	<i>Microtis unifolia</i>		1
Wood Sorrel	<i>Oxalis perennans</i>	5	1
Cotton Fireweed	<i>Senecio quadridentatus</i>	5	2

Plain Sun Orchid	<i>Thelymitra nuda</i>		1
Kangaroo Grass	<i>Themeda australis</i>	25	5
Tall Bluebell	<i>Wahlenbergia stricta</i>		1
Early Nancy	<i>Wurmbia dioica</i>		1

Exotic Species

Hair Grass	<i>Aira sp.</i>	5	5
Sheep Sorrel	<i>Acetosella vulgaris</i>		5
Scarlet Pimpernal	<i>Anagallis arvensis</i>	5	2
Sweet Vernal Grass	<i>Anthoxanthum odoratum</i>	10	20
Capeweed	<i>Arctotheca calendula</i>		2
Wild Oats	<i>Avena fatua</i>	5	20
Sweet Briar	<i>Rosa rubiginosa</i>		1
Great Broom	<i>Bromus diandrus</i>	5	15
Blowfly Grass	<i>Briza maxima</i>	25	15
Lesser Quaking Grass	<i>Briza minor</i>	5	5
Slender Thistle	<i>Cardus pycncephalus</i>		1
Mouse-eared Chickweed	<i>Cerastium glomeratum</i>	5	5
Patterson's Curse	<i>Echium plantagenium</i>		2
Common Stork's Bill	<i>Erodium cicutarium</i>	3	5
Flatweed	<i>Hypochaeris radicata</i>	10	2
French Lavender	<i>Lavendula stoechas</i>		1
Pellisar's Toadflax	<i>Linaria pelisserana</i>	1	1
Perrenial Rye Grass	<i>Lolium perenne</i>		5
Common Bartsia	<i>Parentucellia latifolia</i>	1	5
Curled Dock	<i>Rumex crispus</i>		2
Clover species	<i>Trifolium spp.</i>	20	5
Rats-tail Fescue	<i>Vulpia myuros</i>		5

Figure 1. Adult Pink-tailed Worm-lizard *Aprasia parapulchella* found the moregulating beneath discarded corrugated iron on Nail Can Hill Flora Reserve, less than 50 m from a newly established housing estate in West Albury, October 2005.



Figure 2. Site 1 - Pink-tailed Worm-lizard *Aprasia parapulchella* habitat on Nail Can Hill Flora Reserve, Albury, October 2003.



Figure 3. Site 3 - Pink-tailed Worm-lizard habitat on Nail Can Hill Flora Reserve, Albury, October 2003.

