Wildlife Research 2018, **45**, 185–192
doi:10.1071/WR17117_AC

Supplementary material

Barking up the right tree: comparative use of arboreal and terrestrial artificial refuges to survey reptiles in temperate eucalypt woodlands

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Table S1. List of reptile species recorded and the total number of detections between 2013 and 2016 (four surveys) using three different survey methods: arboreal artificial refuges, actives searches and terrestrial artificial refuges (corrugated steel, timber railway sleepers and terracotta roofing tiles). Note: individual animals were not marked, so numbers for some species may represent multiple detections over survey years.

Common Name	**Species**	**Lifeform**	**Arboreal bark refuges**	**Active searches**	**Corrugated Steel**	**Railway sleepers**	**Roofing tiles**
Gekkonidae							
Southern Marbled Gecko	*Christinus marmoratus*	Arboreal	142	7	1	0	0
Thick-tailed Gecko	*Underwoodisaurus milii*	Terrestrial	0	1	0	0	0
Pygopodidae							
Pink-tailed Worm-lizard	*Aprasia parapulchella*	Fossorial	0	1	0	0	0
Olive Legless Lizard	*Delma inornata*	Terrestrial	0	1	0	0	0
Scincidae							
Southern Rainbow Skink	*Carlia tetradactyla*	Terrestrial	0	5	3	2	1
Ragged Snake-eyed Skink	*Cryptoblepharus pannosus*	Arboreal	4	11	0	0	0
Eastern Striped Skink	*Ctenotus spaldingi*	Terrestrial	0	6	8	4	5
Cunningham's Skink	*Egernia cunninghami*	Terrestrial	0	1	1	1	1
Tree Skink	*E. striolata*	Arboreal	1	0	0	0	0
Three-toed Earless Skink	*Hemiergis talbingoensis*	Fossorial	0	0	1	0	0
South-eastern Slider	*Lerista bougainvillii*	Fossorial	0	0	1	0	0
Dwarf Skink	*Menetia greyii*	Terrestrial	0	2	0	0	0
Boulenger's Skink	*Morethia boulengeri*	Terrestrial	1	65	123	15	43
Typhlopidae							
Blackish Blind Snake	*Anilios nigrescens*	Fossorial	0	0	1	0	0
Elapidae							
Dwyer's Snake	*Parasuta dwyeri*	Terrestrial	0	1	0	0	0
Total number of species			4	11	8	4	4

Table S2. Abundance per site estimates of *Christinus marmoratus* by survey method and relative differences of survey methods. The upper part of the table gives the posterior estimates of the probability of detection and the associated 95% credible limits. The lower portion of the table, gives relative ratios and their associated 95% credible limit for comparison of rates between any two years. Note, that if the 95% credible limit does not include 1, we conclude there is evidence of a difference between the two detection rates being compared.

Group	Estimated abundance per site	Lower 95% credible interval	Upper 95% credible interval
Active searches	0.126	0.047	0.277
Terrestrial refuges	0.019	0.002	0.087
Bark refuges	2.585	1.508	3.982
Relative Differences			
Terrestrial refuges vs active searches	0.156	0.011	0.837
Bark refuges vs active searches	20.594	9.267	52.375
Bark vs terrestrial refuges	132.005	29.323	1695.457

Table S3. Detection rates of *Christinus marmoratus* by survey method and odds ratios comparing survey methods. The upper part of the table gives the posterior estimates of the probability of detection and the associated 95% credible limits. The lower portion of the table, gives the odds ratios and their associated 95% credible limit for comparison of odds ratios between any two years. Note, that if the 95% credible limit does not include 1, we conclude there is evidence of a difference between the two detection rates being compared.

Group	Probability of detection per site	Lower 95% CI	Upper 95% CI
Active searches	12.9%	4.5%	26.7%
Terrestrial refuges	1.8%	0.1%	8.0%
Bark refuges	75.5%	58.1%	88.9%
Comparisons (Odds Ratio Scale)			
Terrestrial refuges vs active searches	0.13	0.01	0.72
Bark refuge vs active searches	21.86	7.11	78.67
Bark vs terrestrial refuge	174.00	30.74	2988.32

Table S4. Detection rates per tree of *Christinus marmoratus* by year and odds ratios comparing yearly detection rates. The upper part of the table gives the posterior estimates of the probability of detection and the associated 95% credible limits. The lower portion of the table, gives the odds ratios and their associated 95% credible limit for comparison of odds ratios between any two years. Note, that if the 95% credible limit does not include 1, we conclude there is evidence of a difference between the two detection rates being compared.

Survey Year	Probability of detection per tree	Lower 95% CI	Upper 95% CI
2013	8.1%	2.9%	17.4%
2014	31.4%	17.1%	48.8%
2015	28.5%	14.7%	45.6%
2016	26.2%	12.8%	43.0%
Comparisons (Odds Ratio Scale)			
2014 v 2013	5.16	2.32	13.24
2015 v 2013	4.49	1.98	11.67
2016 v 2013	4.03	1.67	10.53
2015 v 2014	0.86	0.43	1.71
2016 v 2014	0.77	0.36	1.58
2016 v 2015	0.90	0.41	1.92

Table S5. Summary of models used to explain *Christinus marmoratus* abundance beneath bark refuges and tree characteristics. We used the following short hand to specify the models in the table: SY = survey year, TS = tree species, SC = size class, BA = log basal area, BT = log bark thickness, D = log tree diameter and LOOIC = leave one out information criteria.

Model No	Model	No Terms	LOOIC
1	SY	1	541.40
2	SY + TS	2	541.93
3	SY + SC	2	459.44
4	SY + TS + SC	3	459.82
5	SY + TS + BA	3	536.35
6	SY + TS + BT	3	500.09
7	SY + TS + BA + BT	4	499.83
8	SY + TS + D	3	441.14
9	SY + TS + D + BA	4	438.11
10	SY + TS + D + BT	4	437.01
11	SY + BA	2	535.08
12	SY + BT	2	504.18
13	SY + BA + BT	3	502.26
14	SY + D	2	441.05
15	SY + D + BA	3	438.14
16	SY + D + BT	3	435.33
17	SY + D + BA + BT	4	**433.14**
18	SY + TS + D + BT + BA	5	433.77

Table S6. Best fitting model for the abundance per tree estimates of *Christinus marmoratus* for the bark refuge. Note, that the continuous variables have been standardized (on the log scale). We also present the estimated abundance per tree by year assuming tree with the continuous covariates set at their mean value.

Parameter	Estimate	Lower 95% CI	Upper 95% CI
Intercept (2013)	-2.95	-3.88	-2.11
2014	1.32	0.70	2.04
2015	1.46	0.82	2.16
2016	1.65	1.03	2.34
Log tree diameter	1.06	0.77	1.36
Log bark thickness	0.28	0.09	0.48
Log stand basal area	0.23	0.01	0.47
Random effect SE	1.08	0.62	1.84
Year estimates	Abundance per tree	Lower 95% CI	Upper 95% CI
2013	0.05	0.02	0.12
2014	0.20	0.09	0.39
2015	0.23	0.11	0.44
2016	0.28	0.13	0.53
Relative differences			
2014 v 2013	3.72	2.00	7.71
2015 v 2013	4.25	2.27	8.67
2016 v 2013	5.14	2.80	10.34
2015 v 2014	1.14	0.74	1.74
2016 v 2014	1.39	0.90	2.12
2016 v 2015	1.21	0.80	1.86