Flinders UNIVERSITY

Transactions of the Royal Society of South Australia (2014), **138**(2): 257–266

DYNAMICS OF A TEMPERATE GRASSLAND REPTILE COMMUNITY IN THE MID-NORTH OF SOUTH AUSTRALIA

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Abstract

Temperate native grasslands are listed as a critically endangered ecological community in South Australia, yet very little is known about the associated faunal communities. This study aims to provide information on the temporal dynamics of a native grassland reptile community in the mid-north of South Australia. During the study we made 335 reptile captures in pitfall traps, of 248 different individuals, from 13 species, representing five families. These data were used to investigate seasonal trends in trapping rate, age demographics and movement of individuals from marked recaptures. The results of the study provide baseline information on species assemblages that might be used in the recovery and management of the remaining fragments of temperate native grasslands and the endangered pygmy bluetongue lizard that relies on those fragments for its persistence.

Key Words: *Tiliqua adelaidensis*, endangered communities, lizards, Scincidae.

Introduction

Temperate grasslands are considered to be one of the world's most threatened ecosystems (Kirkpatrick *et al*., 1995). Iron-grass (*Lomandra* sp.) temperate native grasslands are endemic to South Australia, and primarily occur in the Flinders-Lofty block bioregion (mid-north) of South Australia (Hyde, 1995; Turner, 2012). Although they are listed as a critically endangered ecological community under the Environment Protection and Biodiversity Conservation Act, 1999 (EPBC Act, 1999), most of the remaining areas of temperate native grassland in South Australia are on private agricultural land and grazed by domestic livestock, primarily sheep (*Ovis aries*) (Hyde, 1995). Only about 780 ha have been set aside for conservation (Turner, 2012). Temperate native grasslands, which once covered an estimated 750,000 to 1,000,000 ha in South Australia, are now highly fragmented and by 1995 only 0.33% of their original extent remained (Hyde, 1995). Despite the former wide range and the current critically endangered status of temperate native grasslands, very little is known about their associated faunal communities (Turner, 2012).

In Australia several endangered taxa rely on native grasslands for their persistence including birds (e.g., plains wanderer, *Pedionomus torquatus;* Baker-Gabb *et al*., 1990), invertebrates (e.g., golden sun moth, *Synemon plana*; Clarke & O'Dwyer, 2000) and reptiles (e.g., grassland earless dragon, *Tympanocryptis pinguicolla*; Stevens *et al*., 2010). In South Australia, temperate native grasslands are home to the endangered pygmy bluetongue lizard (*Tiliqua adelaidensis*) (EPBC Act, 1999). Pygmy bluetongue lizards are restricted to a few isolated remnant patches of native grassland in the mid-north of South Australia (Milne, 1999; Souter, 2006). This lizard species was thought to be extinct after not being seen for over 30 years (Ehmann, 1982; Hutchinson et al. 1994) until they were re-discovered in 1992, after one was found in the stomach of a road killed eastern brown snake (*Pseudonaja textilis*) (Armstrong & Reid, 1992). Since its rediscovery, the pygmy bluetongue lizard has been the focus of a number of studies investigating its behaviour and habitat preferences (Milne *et al*., 2003; Souter, 2006; Fellows *et al*., 2009; Fenner & Bull, 2010). However, very little is known, either about the other reptile species co-occurring in the same temperate grassland habitat, or about the dynamics of the combined native grassland reptile community. Specifically little is known about the potential interactions among the co-existing reptiles and whether those interactions might influence the conservation of the endangered pygmy bluetongue lizard.

This study provides information on the temporal dynamics of native grassland reptile communities in the mid-north of South Australia in two native grassland patches. We had two aims. The first was to provide baseline information on species assemblages that might be used in the recovery and management of the remaining fragments of temperate native grasslands. The second was to understand interactions of pygmy bluetongue lizards with other potential competitors among co-existing reptiles.

Methods

The study was conducted over the austral spring-summer (September – March) of 2009–2010, in two native grassland patches located 11 km apart, each occupied by a separate genetically discrete population of pygmy bluetongue lizards (Smith *et al.* 2009). These sites have been previously described by Fenner and Bull (2007) and Schofield *et al*. (2012). Both are located in a remnant of native grassland habitat in the mid north of South Australia, within 13 km of Burra (33°42´S; 138°56´E), and they were separated from each other by ploughed cereal cropping fields. The region has cool moist winters and hot dry summers with an average annual rainfall between 400–500 mm (Fenner & Bull, 2007).

We used pitfall trapping to survey the species of reptiles present in each grassland and to monitor their temporal patterns of movement and activity. We constructed three trapping grids, one (site 1) within one native grassland, and the other two (sites 2 and 3) 1 km apart within the other native grassland. Each grid had four 110 m long trap lines set as the edges of a square (thus enclosing an area of 1.2 ha), and two additional 110 m long trap lines parallel to one edge of the square, 50 m from it, and arranged as a 270 m long line with a 50 m central break. Each of the six trap lines at each site had a 15 cm high black-plastic drift fence and 16 bucket traps (20 litre, 38 cm deep, and 28.5 cm diameter), placed immediately under the drift fence, and spaced at 7 m intervals along its length. Thus there were 288 traps used in the study, 96 at each site. Bucket traps were divided in half with a plastic divider to differentiate between captures of reptiles approaching the drift fence from either side. Traps remained open over 12 individual trapping sessions that each lasted from 8 – 11 days (total 110 days; 31,680 trap days), and were inspected each morning and evening in those sessions. The study was conducted over one spring-summer period during which reptiles could be expected to be active. Trapping started on 3 September 2009 and ended on 11 March 2010, with trapping sessions regularly spaced every 2–3 weeks over the six months of the study. We used plastic lids to close the traps and left fences in place between trapping sessions.

For each newly captured reptile, the species, sex (when possible), mass and snout-to-vent length (SVL) were recorded. Individuals were uniquely marked, scincid, gekkonid and agamid lizards by toe-clip, and pygopodid lizards and elapid snakes by marker pen on the ventral surface. As it was not possible to reliably determine the sex of all species, or of all captured individuals within those species where there were some sexually diagnostic features, we have omitted sex as a factor in the analyses of the study. We categorised individuals as either adults (sexually mature) or non-adults if their SVL fell within or below the published range of SVL values for sexually mature individuals of that species (Kluge 1974, Houston 1978, Greer 1980, Shine 1988, Greer 1989, Shine 1989, Shea 1992, Hutchinson *et al.* 1994, Hutchinson *et al.* 2009). After processing, reptiles were released on the opposite side of the fence line to reflect the direction they had been travelling when trapped. In the analysis, data were grouped into trapping periods, according to the time of trapping, early (Sep – Nov), middle (Dec-Jan) and late (Feb – March) in the season, and we estimated trapping rate as the number of captures per 1000 trap days (Schofield *et al.,* 2012). Due to the low number of captures in September (n=16) we pooled September and October captures in the analyses.

The three sites were each 1 km or more apart which we considered beyond the normal short-term movement range of any of the reptiles captured. No reptile marked at one site was found at any of the other two sites over the study, and we treated the sites as independent replicates.

We explored two trends from the trapping data: a) seasonal trends (early, middle, late trapping periods) in numbers of each species captured, and b) distance moved between captures for those individuals that were recaptured. For seasonal trends, we first used a repeated measures analysis of variance to determine whether there was a difference in the overall trapping rate for all reptiles between study sites and trapping periods. We then used repeated measures analyses of variance to determine whether there was an effect of trapping period on the trapping rates of individual species. We also considered any differences in the proportions of adults and juveniles among the species that we captured. Finally we included species as a factor to examine any seasonal difference in the trapping rate of pygmy bluetongue lizards compared to all other species, and compared to all other commonly captured (≥20 individuals captured) species. Where the data were non-spherical in repeated measures analysis of variance, we used the Greenhouse-Geisser correction (Field 2005). To consider whether distance moved between captures varied among species, we used an analysis of covariance, where time between captures was the covariate, species was a factor, and the distance moved was the dependent variable. Our specific question was whether pygmy bluetongue lizards differed in their movement distance compared with co-occurring reptile species. Although species size (SVL) may also influence dispersal capability, we did not include that as a factor, as the results (see below) showed no significant species difference.

Results

Summary of reptile captures

During the study we made 335 reptile captures of 248 different individuals from 13 species, representing five families of small to medium sized reptile species (Table 1) (Figure 1). Although 61% of reptile captures were from Site 2, the repeated measures analysis of variance showed no significant difference in the mean trapping rate between sites ($F_{2,3}$ = 3.953; P = 0.144) (Figure 2) or trapping periods ($F_{2,6}$ = 1.010; P = 0.389), and no significant interaction effect of site x trapping period ($F_{4,6}$ = 0.216; P = 0.817). For subsequent analyses, we pooled data over the three sites. The five most commonly trapped species, for which there were more than 20 different individuals captured, were *Tiliqua adelaidensis, Aprasia pseudopulchella, Lerista bouganvillii*, *Menetia greyii,* and *Morethia adelaidensis*. The temporal patterns of captures of these species are shown in Figure 3. In individual analyses, we found no significant effect of trapping period on the trapping rate of any of these five most common species (Table 2).

Table 1. Summary of trap captures, including re captures, for the 13 species of reptile caught during the study, from each of the three study sites.

Family	Species	Site 1	Site 2	Site 3	Total Sites Combined
Gekkonidae	*Diplodactylus furcosus*	1	0	0	1
Pygopodidae	*Aprasia pseudopulchella*	9	20	12	41
	Delma molleri	0	9	0	9
Scincidae	*Lerista bougainvillii*	5	44	1	50
	Menetia greyii	22	78	18	118
	Morethia adelaidensis	2	20	11	33
	Tiliqua adelaidensis	4	22	5	31
	Tiliqua rugosa	6	0	1	7
Agamidae	*Ctenophorus decresii*	2	1	0	3
	Pogona vitticeps	20	0	2	22
	Tympanocryptis lineata	3	10	3	16
Elapidae	*Parasuta spectabilis*	2	0	0	2
	Pseudonaja textilis	1	1	0	2
TOTAL		77	205	53	335

Age demographics

Among the 248 individual animals captured, 197 (79.4%) were adults and 51 (20.6%) were non-adult animals (Table 3). Overall, significantly more adults were captured than non-adults (X^2 = 33.64, d.f. = 1, *P* = <0.001). For pygmy bluetongue lizards only 52% of the captures were adults, significantly lower than the proportion of adults for all other species combined (82.8%; X^2 = 14.1, d.f. = 1, *P* = 0.0001), for all the other skink species (91.5%); X^2 = 27.7, d.f. = 1, *P* <0.001) and for the four other commonly caught reptile species (≥20 individual captures) species (91.8%; X^2 = 28.6, d.f. = 1, *P* <0.001).

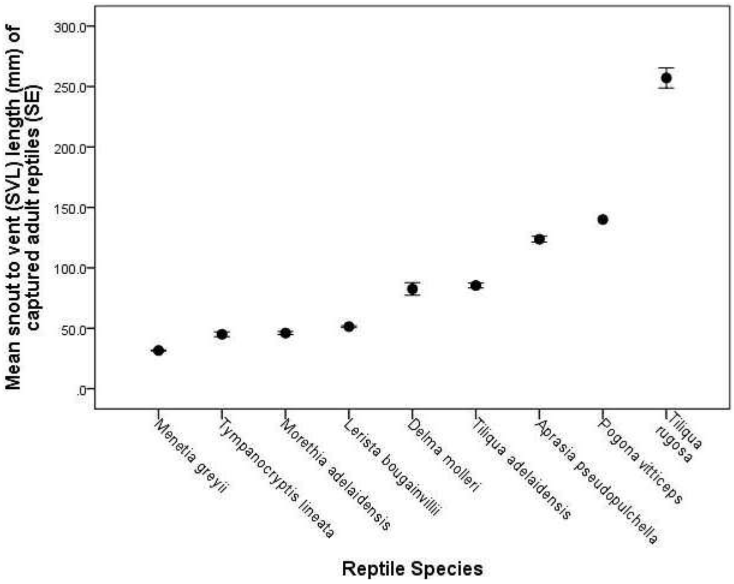

Figure 1. Mean snout to vent (SVL) length (mm) of all adult reptiles for each species that had adult specimens captured. Note, that only nine of the thirteen species were recorded as adults and that *Pogona vitticeps* had only one adult capture.

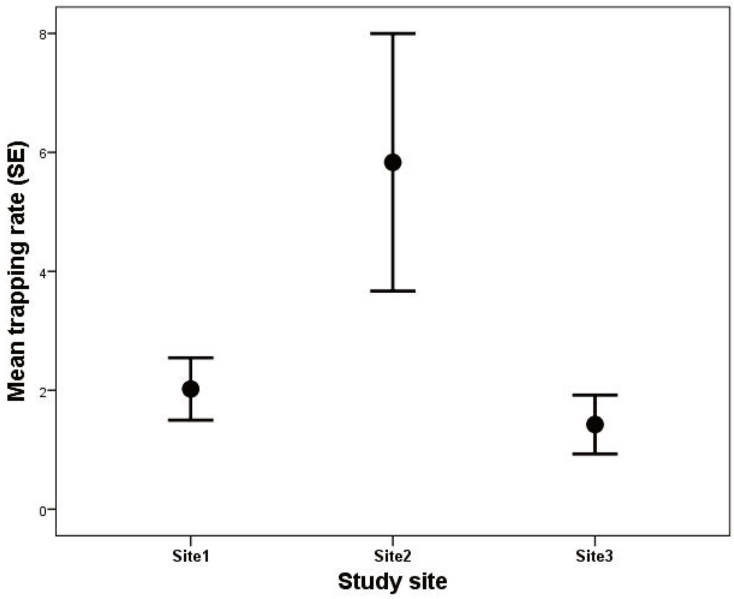

Figure 2. Mean trapping rate of all reptiles (N = 3 trapping periods) at each of the three study sites. Trapping rate given as number of reptile captures per 1000 trap days.

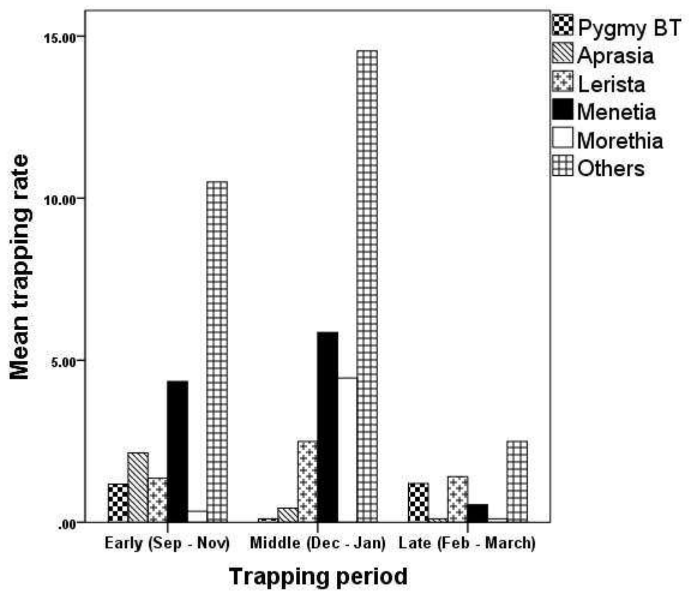

Figure 3. The number of pygmy bluetongue lizards (pygmy BT) and common co-occurring reptile species which were captured in each trapping period, early, middle and late in the season. Species with < 20 individual captures were pooled and included in the figure under others.

Table 2. Repeated measures analysis of variance examining the effect of trapping period on trapping rate of the five most commonly captured species (≥20 individual captures).

Effect		*T. adelaidensis*		*A. pseudopulchella*		*L. bouganvillii*		*M. greyii*		*M. adelaidensis*	
	d.f	*F*	*P*	*F*	*P*	*F*	*P*	*F*	*P*	*F*	*P*
Trapping period	2,2	0.618	0.618	1.303	0.434	0.226	0.815	1.014	0.497	1.265	0.442

Table 3. Age demographics of individual animals captured in the pit fall study.

Family	Species	Non-adult	Adult	Total
Gekkonidae	*Diplodactylus furcosus*	1	0	1
Pygopodidae	*Aprasia pseudopulchella*	3	38	41
	Delma molleri	3	6	9
Scincidae	*Lersita bougainvillii*	1	30	31
	Menetia greyii	6	74	80
	Morethia adelaidensis	3	17	20
	Tiliqua adelaidensis	13	14	27
	Tiliqua rugosa	0	6	6
Agamidae	*Ctenophorus decresii*	2	0	2
	Pogona vitticeps	12	1	13
	Tympanocryptis lineata	3	11	14
Elapidae	*Parasuta spectabilis*	2	0	2
	Pseudonaja textilis	2	0	2
TOTAL		51	197	248

Comparisons of capture rates among species

Analyses that compared trapping rates either among the five most commonly captured reptile species (including pygmy bluetongue lizards), or among the other four common species (excluding pygmy bluetongue lizards) showed no significant main effect for species or trapping period, and no significant interaction effect of species x trapping period (Table 4).

Table 4. Repeated measure analysis of variance comparing the trapping rate of pygmy bluetongue lizards with common co-occurring species and comparing all common co-occurring species with each other excluding pygmy bluetongue lizards between trapping periods.

Effect	PBT and all common sp.			All common sp.excluding PBT.		
	d.f	*F*	*P value*	*d.f*	*F*	*P value*
Species	4,5	1.767	0.272	3,4	1.525	0.338
Trapping period	2,10	1.703	0.231	2,8	1.983	0.200
Trapping period x species	8,10	6.351	0.574	6,8	0.744	0.631

Two further analyses, when we either pooled the four other common species or pooled all of the other species, and compared trapping rates between pygmy bluetongue lizards and the other pooled species, showed no significant main effect of trapping period or interaction effect of trapping period x species (Table 5). However, we did find a significant effect of species in both cases (Table 5). Trapping rates were higher for both the pooled species groups than for the single species of pygmy bluetongue lizards. This result was not unexpected since we were comparing one species with many. Similar analyses when we considered only capture rates of adult reptiles produced similar results (Table 5). There was no significant main effect of trapping period or interaction effect of trapping period x species on trapping rates, comparing pooled trappings of the adults of the other four common species, or of the adults of all other species compared to adult pygmy bluetongue lizards (Table 5). However, in both those analyses there was, as before, a significant main effect of species with pygmy bluetongue lizard adults having lower capture rates than the combined totals of adults of the other species.

Table 5. Repeated measures analysis of variance comparing the trapping rate of pygmy bluetongue lizards (PBT) to pooled common species and pooled all co-occurring species (both for all captured individuals, and only adult PBT, common and all co-occurring sp) between trapping periods. Significant values are in bold.

Effect		**PBT v Common sp.**		**PBT v All sp.**		**Adult PBT Adult Common sp**		**Adult PBT v Adult All sp.**	
	d.f	*F*	*P*	*F*	*P*	*F*	*P*	*F*	*P*
Species	1,2	25.487	**0.037**	45.007	**0.022**	79.094	**0.012**	111.888	**0.009**
Trapping Period	2,4	0.687	0.554	0.650	0.570	0.662	0.564	0.775	0.520
Trapping period x species	2,4	0.783	0.516	0.81	0.506	0.671	0.561	0.777	0.519

Recaptures

We made 87 recaptures of 56 individuals from eight species over the study. The mean time between recaptures and the mean distance between pit fall traps for successive captures are shown in Table 6. The five species with four or more recapture cases were included in the analysis of covariance to examine whether pygmy bluetongue lizards differed in their movement distance compared with co-occurring reptile species. We found no significant effect of time between captures on the distance moved ($F_{1,46}$ = 2.638; P = 0.11), nor was there a significant difference between pygmy bluetongue lizards and other species in distance moved ($F_{1,4}$ = 0.381; P = 0.821).

Table 6. Summary of the eight recaptured species showing the number of recaptured individuals (N), mean time (days) and range between initial/previous capture and recapture and the mean distance (m) and range of distances (m) moved between initial/previous capture and subsequent recapture.

Species	**N**	**Mean time (days)**	**Range (days)**	**SE**	**Mean distance (m)**	**Range (m)**	**SE**
Lerista bougainvillii	15	32.67	1-91	7.18	47	0-162	13.61
Menetia greyii	18	15.61	1-43	3.60	22.78	0-147	8.21
Morethia adelaidensis	9	4.28	1-15	1.16	30.17	0-99	10.65
Tiliqua adelaidensis	4	10	1-20	5.774	24.75	0-50	11.07
Tiliqua rugosa	1	45	-	-	182	-	-
Ctenophorus decresii	1	1	-	-	50	-	-
Pogona vitticeps	6	3.17	1-12	1.80	32.67	0-134	21.05
Tympanocryptis lineata	2	1.5	1-2	0.5	59.5	0-119	59.5

Discussion

The level of reported survey and trapping effort for reptiles in temperate grasslands to date has been relatively low (Brandle 2008). From the few surveys that have been reported, only the Flinders worm lizard, *Aprasia pseudopulchella*, and pygmy bluetongue lizard, *Tiliqua adelaidensis*, have been shown to strongly favour grasslands (Brandle 2008, Turner 2012). Other species such as *Lerista bouganvillii*, *Menetia greyii, Pogona vitticeps* and *Tiliqua rugosa*, have also been frequently reported from surveys in temperate grasslands (Brandle 2008), but occupy other habitat types as well. From the current study, as well as the above mentioned species, we report *Morethia adelaidensis*, *Tympanocryptis lineata* and *Delma molleri* to be commonly captured in the grassland study sites. The relatively low number of captures in our study of some other species can possibly be explained by their previously reported preferences for non-grassland habitat. For example the tawny dragon, *Ctenophorus decresii*, is a rock specialist (Gibbons and Lillywhite 1981) and mainly inhabits the rocky creek lines (<100 m from the closest trap lines in this study) surrounding the grassland (A. Fenner pers. obs). In our study sites *Parasuta spectabilis* and *Diplodactylus furcosus* also tend to prefer areas with cracking soils or rocky creek lines within our grassland study site, where more shelter is available to them (A. Fenner pers. obs.). The eastern brown snake, *Pseudonaja textilis*, although quite commonly observed in the study sites (Fenner et al., 2008a,b), is a large elapid (adults up to >1.5 m total length; (Shine 1989)) capable of escaping pitfall traps unaided, hence its abundance is likely to be underestimated by the pit fall trap survey. We saw no evidence that these larger predators were using pitfall traps to capture smaller reptiles or other prey. Similarly, the abundance of large species, *Tiliqua rugosa* may be underestimated by pitfall trap rates, and the high proportion of non-adult captures of *Pogona vitticeps* may be because the large adults can escape from the traps. Other herpetofauna, not recorded from the pitfalls, but that have been caught opportunistically at the study sites include three frog species (*Neobatrachus pictus*, *Limnodynastes tasmaniensis* and *Crinia signifera*) (Fenner 2007), two additional skink species (*Tiliqua scincoides* and *Hemiergis decresiensis*), two additional gecko species (*Gehyra lazelli* and *Underwoodisaurus milii*), and one additional snake species (*Anilios bicolor*) (Fenner, unpublished data).

Adult animals made up the majority of the captured animals during this study. The only commonly captured species that differed from this pattern was the pygmy bluetongue lizard, for which there was a significantly greater proportion of non-adults (sub-adults and juveniles) than for other species in the pit fall captures. One possible explanation for this is that pygmy bluetongue lizard populations have a higher proportion of non-adults in the overall population than do the other co-occurring species. A more likely explanation is that adult pygmy bluetongue lizards are excessively immobile for much of the year and move so infrequently from their burrows and the immediate area surrounding their burrows that they are unlikely to be captured by pitfalls. Adult pygmy bluetongue lizards have previously been shown to be more mobile during particular times of the year, with activity of adult males restricted mainly to the spring breeding season as they seek out mates (Oct – Nov) (Fenner and Bull 2009, Schofield *et al.* 2012), while neonates and sub-adults seek to establish new burrows later in the season. For the other reptile species in our study sites, perhaps neonates and juveniles are either less inclined to disperse, disperse shorter distances, or disperse under different pressures or at a different time of year. We had inadequate recaptures of non-adults to address these question with our data. However, a key difference identified by this study was the relatively low incidence of captures of adult pygmy bluetongue lizards by pitfall traps. This reinforces other studies that have suggested a predominantly sedentary life style for this species, and that pitfall trapping will be of limited value in assessing its population status.

Our analyses were designed to detect any ecological differences within the reptile community, and specifically between pygmy bluetongue lizards and other co-existing species. Those analyses showed no temporal differences in trapping rates across the season, nor any interaction effects that might indicate that one species showed a different temporal pattern to the others. This was despite an apparent decline in capture rates of pygmy bluetongue lizards in the middle period relative to the other species (Figure 3). Possibly the lack of statistical significance resulted from an overall low capture rate of most individual species. However, because of their similar thermoregulatory requirements, it is likely that the activity periods of all of the co-existing reptiles, with the exception of the two nocturnal species *Parasuta spectabilis* and *Diplodactylus furcosus*, overlapped substantially.

The species may also interact over food resources, and competition from other reptiles may be a concern in any conservation management program for pygmy bluetongue lizards. Previous observations of lizards feeding and analyses of scat contents (Fenner *et al.* 2007), have established that pygmy bluetongue lizards have a largely insectivorous diet. The groups of insects that are used by reptiles is limited by their gape width (Pianka 1986, Vitt and Zani 1998), with larger lizards commonly having wider heads and feeding on larger prey taxa. In our study site only *Tympanocryptis lineata* has a similar gape width to the pygmy bluetongue lizard (Pelgrim 2010) Because pygmy bluetongue lizards have a size (SVL) category intermediate between a group of smaller and a group of larger co-existing reptiles (Figure 1), it is unlikely that there will be strong adverse competitive interactions over food. Only *Delma molleri* is comparable to pygmy bluetongue lizards in SVL, but this is an elongate snake-like pygopodid with a tiny head relative to the pygmy bluetongue (Kluge 1974, Pelgrim 2010) and there is unlikely to be any major dietary overlap.
We also used the recapture data to compare short-term dispersal distances among species. Overall we found no significant effect on the mean distance, of either the number of days between captures, or of the reptile species. Previous studies found that pygmy bluetongue lizards will make occasional movements of between 5–30 m, but up to 80 m on rare occasions (Milne 1999). This study found comparable distances for that species, and for most of the co-occurring reptile species.

This study provides baseline information on the composition and temporal dynamics of grassland reptile communities in the mid-north of South Australia that will aid in the recovery plans and ongoing management of temperate grassland ecosystems. For the pygmy bluetongue lizard, the study has provided understanding about potential competitors for resources, such as food and shelter. Maintaining natural species assemblages will be an important consideration for the management of pygmy bluetongue lizard populations.

Acknowledgements

This research was supported by funds from the Australian Research Council, the Holsworth Wildlife Research Endowment, and the Nature Foundation of South Australia. Thanks to the landholders Richard Sawyers and Chris and Maria Reed, for access to their property. The study was conducted according to the guidelines of the Flinders University Animal Welfare Committee in compliance with the Australian Code of Practice for the Use of Animals for Scientific Welfare committee permit number E260.

Appendix 1

The published range of snout-vent lengths (SVL) of sexually mature individuals from primary and non-primary literature for the species captured during the study, including the maximum SVL used to categorised immature animals for each species. Note (TL) = total length.

Species	**Wilson & Swan, 2010**	**Cogger, 2000**	**Primary literature**	**Maximum immature SVL this study**
Diplodactylus furcosus	51 mm	Not listed	Full range of SVL, not discriminating between juvenile & adult: 37-58, mean = 50.7 mm (Hutchinson *et al.*, 2009. *Zootaxa* 2167: 25-46)	41 mm
Aprasia pseudopulchella	143 mm	No SVL (stated to be similar to *A. parapulchella*) 140 mm	Maximum SVL: 143.5mm (Kluge, 1974. *Misc. Publ. Mus. Zool. Univ. Michigan* 147: 1-221)	<=93 mm
Delma molleri	111 mm	100 mm	Maximum SVL: 111.2mm (Kluge, 1974. *Misc. Publ. Mus. Zool. Univ. Michigan* 147: 1-221).	<=65 mm
Lerista bougainvilli	70 mm	70 mm	SVL range for gravid females: 52-70 mm (Greer, 1989. *Biology and Evolution of Australian Lizards*).	<=37 mm
Menetia greyii	38 mm	30 mm	SVL range for gravid females 27-37 mm (Greer, 1989. Biology and Evolution of Australian Lizards)	<=17 mm
Morethia adelaidensis	53 mm	45 mm	SVL range for gravid females 44-58mm (Greer, 1980. *Rec. Aust. Mus*. 33: 89-122).	<=30 mm
Tiliqua adelaidensis	90 mm	90 mm	Mature SVL: females 96 mm, males >85 mm, reproductive in second spring (~ 20 months of age) (Hutchinson *et al.* 1994. *TRSSA* 118:217-226). Mature SVL: based on gravid females 78 mm, and mating males 80 mm (Fenner, unpublished data).	<=70 mm
Tiliqua rugosa	260-310 mm	250 mm	Mature SVL range for SA: males 235-324 mm, mean = 271 mm, females 241-313 mm, mean = 272 mm (Shea, 1992. PhD, University of Sydney (see: http://setis.library.usyd.edu.au/shesyst/index.html)	None <235 mm, all mature
Ctenophorus decresii	82 mm	75 mm	Maximum SVL for northern (larger) population: 82mm (Houston, 1978. *Dragon Lizards and Goannas of South Australia*)	<=43 mm
Pogona vitticeps	250 mm	20 cm	Maximum for SA population: 230 mm (Houston, 1978. *Dragon Lizards and Goannas of South Australia*)	<=115 mm
Tympanocryptis lineata	58 mm	50 mm	Maximum for SA population: 58mm (Houston, 1978. *Dragon Lizards and Goannas of South Australia*)	<=40 mm
Parasuta spectabilis	400 mm TL	40 cm TL	Mature males: 24-35.6 cm SVL, mean = 29.9 mm; mature females 25-28.9 cm SVL, mean = 26.7 cm (Shine, 1988. *J. Herp* 22: 307-315)	<=200 mm
Pseudonaja textilis	2.2 m TL	1.5 m TL	SA+Vic: mature males: 56-127 cm SVL, mean = 96.1 cm; mature females 45.4-157 cm SVL, mean = 89.0 cm (Shine, 1989. *Herpetologica* 45: 195-207)	<=400 mm

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