Abstract: Stimson's python (Antaresia stimsoni) is a small nocturnal python (Pythonidae) that occurs throughout Australia's arid zone. Despite its wide distribution and localised abundance, no field-based studies have been undertaken on this species. We investigated activity patterns, habitat use, diet, and body sizes of A. stimsoni in the MacDonnell Ranges bioregion of the Northern Territory. Data were collected at night by road-cruising along a sealed road transect over 12 consecutive months. We found that the species copes with the extreme weather variability of arid Australia by remaining active over a broad range of air temperatures and maximising activity following rainfall when relative humidity is high and ground-dwelling frogs, a significant prey source, are likely to be abundant. A. stimsoni ceased activity only during the coldest months of the year. The species occurs in a range of vegetation types, with an apparent preference for riparian woodland, and its ability to thrive in the MacDonnell Ranges may be related to the abundance of rock-outcrops for refuge. Our results for diet and body size support previous research based on museum specimens, confirming that A. stimsoni feeds on a range of terrestrial vertebrates and is not sexually dimorphic.
Ecology of Stimson’s python (*Antaresia stimsoni*) in the MacDonnell Ranges of central Australia

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Abstract

Stimson’s python (*Antaresia stimsoni*) is a small nocturnal python (Pythonidae) which occurs throughout Australia’s arid zone. Despite its widespread distribution and localised abundance, no field-based studies have been undertaken on this species. We investigated activity patterns, habitat use, diet, and body sizes of *A. stimsoni* in the MacDonnell Ranges bioregion of the Northern Territory. Data were collected at night by road-cruising along a sealed road transect over 12 consecutive months. We found that the species copes with the extreme weather variability of arid Australia by remaining active over a broad range of air temperatures and maximising activity following rainfall when relative humidity is high and ground-dwelling frogs, a significant prey source, are likely to be abundant. *Antaresia stimsoni* ceased activity only during the coldest months of the year. The species occurs in a range of vegetation types, with an apparent preference for riparian woodland, and its ability to thrive in the MacDonnell Ranges may be related to the abundance of rock-outcrops for refuge. Our results for diet and body size support previous research based on museum specimens, confirming that *A. stimsoni* feed on a range of terrestrial vertebrates and are not sexually dimorphic.

Introduction

The genus *Antaresia* consists of four species of small, nocturnal pythons distributed across mainland Australia. Stimson’s python (*Antaresia stimsoni*) is the arid representative of the genus and occurs throughout inland Australia, from west of the Great Dividing Range across to the coast of Western Australia (Barker and Barker
In parts of its distribution, particularly in association with mountain ranges, *A. stimsoni* is among the most frequently encountered snake species (Barker and Barker 1994; P. McDonald *pers. obs.*) and is likely to be an important predator in these areas. However, despite its widespread distribution and localised abundance, there have been only three published studies on the species. One of these examined the ecological traits of museum specimens, presumably collected over a long time period and throughout the snake’s distribution (Shine and Slip 1990), while the other two investigated metabolic physiology and digestive efficiency of captive specimens (Bedford and Christian 1998; Bedford and Christian 2000).

Shine and Slip (1990) demonstrated that *A. stimsoni* exhibits no sexual size dimorphism and feeds on a range of vertebrate prey, including frogs, lizards and small terrestrial mammals. Although studies of museum specimens provide valuable insights into the morphology and natural history of species, they have the potential to overlook important intraspecific variation in species’ characteristics (Trembath *et al.* 2009). They are also unable to provide reliable information on fundamental aspects of snake ecology and behaviour, including patterns of activity and habitat use, which can be determined only from field-based research.

Here, we present the first field-based study of *A. stimsoni*. We examined activity patterns in response to climatic variation, habitat use, diet, and measured body sizes to test for gender differences in morphology. We employed the novel sampling technique of long-distance systematic road-cruising. This technique has been used successfully in the Northern Hemisphere (Rosen and Lowe 1994; Sullivan 2000) and, although road-cruising is increasingly being adopted by Australian researchers, the
sampling has tended to be opportunistic or carried out over short distances (e.g. Webb et al. 2002; Freeman and Bruce 2007). We believe long-distance systematic road-cruising has great scope for effective and efficient sampling of snakes in arid Australia.

**Materials and methods**

*Study site*

This study was conducted in the MacDonnell Ranges bioregion which covers an area of 39 300 square kilometres of upland to the east, west and south-west of Alice Springs. The bioregion is dominated by hummock grassland (mostly spinifex, *Triodia* spp.) and mulga (*Acacia aneura*) shrubland, with smaller areas of chenopod shrubland and riparian woodland. The climate of the region is characterised by extended periods of low rainfall punctuated by infrequent high rainfall events. Mean annual rainfall in Alice Springs is 276.4mm (Alice Springs airport, station # 15590, Australian Bureau of Meteorology climate data); however, the extreme variability in rainfall means that this figure is of limited relevance. The majority of rain falls over summer (December – January) and is generally associated with tropical low pressure systems originating from Australia’s north-west coast. Air temperatures vary from cool in winter (overnight minimum frequently < 0° C) to hot in summer (daytime maximum frequently > 40° C). The difference between daily maximum and overnight minimum temperatures regularly exceeds 20° C throughout the year.

*Sampling procedure*
We selected 77 km of sealed road, including part of Namatjira Drive (23°48'33"S 133°13'16"E to 23°40'1"S 132°38'8"E) and all of the Ormiston Gorge access road (23°41'5"S 132°42'34"E to 23°37'57"S 132°43'39"E) west of Alice Springs, to act as our sampling transect (Figure 1). This transect runs through a mosaic of the four main vegetation type of the bioregion. One of us (PMcD) drove the transect at night over 12 months from August 2009 to July 2010, with a minimum of four and a maximum of 10 nights driven each month. Field work was limited to night time because *A. stimsoni* is nocturnal (Wilson and Swan 2010). Each night, the transect was driven twice (east and west) commencing within one hour of sunset and ending at variable times depending on the number of snakes encountered. The start point of the transect was alternated between the east and west ends in order not to bias against a particular end in case *A. stimsoni* are most active at a particular stage of the night (e.g. immediately after dusk). All of the work was carried out with a Toyota landcruiser utility or a Nissan patrol station wagon fitted with twin 100 Watt driving lights and driven at between 40-60 km/h. The position of all *A. stimsoni* observed on the transect was marked with a handheld Global Positioning System. Live snakes were hand-caught, identified, measured for snout-to-vent length (SVL), and marked with scale clipping (Brown and Parker 1976) on-site to avoid including the same individual twice in the habitat use assessments. Individuals were released on the road verge within 10 metres of the point of capture. Road-kill snakes were identified and removed from the road surface. The sex of all individuals encountered was determined by probing. Individuals were considered sexually mature if they exceeded the minimum size recorded for sexually mature individuals by Shine and Slip (1990) (> 552mm for males, > 650mm for females).
Weather variables

To assess climate variation during the course of the study, we recorded weather variables from a Heavy Weather™ WS-3610 weather station located at Ormiston Gorge Ranger Headquarters, on the northern edge of the study area. Multiple-scale consideration of weather variables is important because fauna activity can vary at different temporal scales (Milne et al. 2005). At the monthly scale, we recorded the mean maximum temperature (° C) and the mean minimum temperature (° C) calculated from the days of sampling only. Monthly totals of rainfall (mm) were also recorded and calculated from all days in each month. At the hourly scale, we recorded air temperature (° C), relative humidity (%), and rainfall (mm) from the middle of each hour sampled (to the nearest half-hour, as variables were recorded by the weather station at half-hour intervals).

Habitat use

To determine if _A. stimsoni_ was more commonly recorded in a particular vegetation type, we considered the following four major vegetation associations: acacia shrubland, chenopod shrubland, hummock grassland, and riparian woodland. These vegetation types are structurally different and the boundaries between them are generally well defined (Nano and Clarke 2008). At each point where live or road-killed _A. stimsoni_ were located along the road transect, we recorded the dominant vegetation type (> 50% cover) in a 50 metre radius circle centred on the sample point. We then recorded the dominant vegetation type at 100 randomly selected locations.
along the transect using the same methods. Because *A. stimsoni* distribution appears to be largely tied to mountain ranges (Barker and Barker 1994), we predicted that rock-outcrops would be an important habitat feature for the species. Therefore, we also recorded the distance to the nearest rock-outcrop at python locations and at the 100 randomly selected locations using Google™ Earth imagery. Rock-outcrop was defined as surface rock (bedrock or boulder) clearly visible on Google™ Earth imagery.

*Diet*

All road-kill *A. stimsoni* encountered during sampling were measured for snout-to-vent length (SVL, mm), frozen within four hours and later thawed and fixed in formaldehyde. Road-kill pythons were also collected opportunistically from other parts of the MacDonnell Ranges bioregion outside of the study area, though these specimens were used only for dietary data. Through careful dissection, the stomach contents of all road-kill *A. stimsoni* were examined and identified to species where possible.

*Statistical analysis*

Q-Q plots and frequency histograms of the body size data showed no considerable departures from normality. Accordingly, we compared the mean SVL of male and female *A. stimsoni* for all individuals and for sexually mature individuals only using independent sample t-tests.
For monthly weather variables, encounter rates were standardised to number of *A. stimsoni* per 100 km to account for variation in sampling effort. These encounter rates were graphed against monthly rainfall and mean monthly minimum and maximum air temperature, and any trends were examined visually. We tested for any significant variation in the number of male and female pythons encountered each month using a chi-square 2 x 10 contingency table (the two months where no pythons were encountered were not included in this analysis).

The relationship between hourly relative humidity and air temperature was examined using the Pearson correlation coefficient for all hours of fieldwork. In order to determine the relationship between activity patterns and weather, we grouped air temperatures into 5° C temperature categories and relative humidity into 20% categories. We then calculated Bonferroni simultaneous (95%) confidence intervals (Byers *et al.* 1984; Alldredge and Ratti 1992) to test whether *A. stimsoni* activity was in proportion to sampling effort only, or varied as a factor of the recorded weather variables (i.e. because sampling effort and number of individuals was positively correlated, we needed to account for variation in sampling effort when testing for weather effects).

Bonferroni confidence intervals were calculated as follows:

\[ p_i - Z_{a/2k} \sqrt{p_i(1-p_i)/n} \leq p_i \leq Z_{a/2k} \sqrt{p_i(1-p_i)/n} \]

where \( p_i \) is the proportion of *A. stimsoni* encountered in the \( i \)th weather variable category, \( k \) is the number of weather variable categories, \( Z_{a/2k} \) is the upper standard
normal table value corresponding to a probability tail area of $\frac{\alpha}{2k}$, and $n$ is the total number of $A. \text{stimsoni}$. If the confidence intervals of the proportion of individuals encountered in each weather category encompassed the proportion of hours driven in that category then it was not possible to conclude that encounter rate was related to weather variability independent of sampling effort. However, if the upper bound of the confidence interval was less than the proportion of hours driven then the encounter rate was lower than expected given the sampling effort, and if the lower bound of the confidence interval was greater than the proportion of hours driven then the encounter rate was higher than expected.

We also calculated Bonferroni simultaneous (95%) confidence intervals to determine whether $A. \text{stimsoni}$ was more commonly encountered in a particular vegetation type using the formula above, where $p_i$ is the proportion of $A. \text{stimsoni}$ encountered in the $i$th vegetation type, and $k$ is the number of vegetation types. If the proportion of habitat (i.e. vegetation type) availability fell above or below the confidence levels estimated for the proportion of $A. \text{stimsoni}$ encountered in a particular vegetation type, then we concluded that animals were exhibiting a preference for (proportional availability less than the lower bound of the confidence interval for actual use) or against (proportional availability more than the upper bound of the confidence interval for actual use) that vegetation type.

The distribution of data for distances to rock outcrops was examined with normal Q-Q Plots and frequency histograms, for $A. \text{stimsoni}$ and random locations, and both were non-normal and could not be improved with data transformations. Therefore, we
compared the distances between the two samples using the non-parametric Mann-Whitney U test. All analyses were run in SPSS Version 17.0 (PAWS Statistics 17.0).

Results

In total, 102 *A. stimsoni* were encountered, with 91 live captures and 11 road-kills. Measures of SVL were recorded for 46 male and 46 female pythons, including 39 adult males and 31 adult females (Table 1). Other pythons encountered but not measured (*n* = 10) were either in an agitated state (not relaxing to allow accurate measurement) or too disfigured from road traffic (road-kill). There was no significant difference in mean SVL between the two sexes based on adults only (*t* = 1.049, *p* = 0.298) or all individuals (*t* = 0.084, *p* = 0.934).

There were two distinct peaks in *A. stimsoni* activity at the monthly scale, the first in September (1.2 pythons/100km) and the second larger peak in January (2.1 pythons/100 km; Figure 2). The first peak appears to be independent from the three recorded weather variables while the second peak coincides with the first significant rainfall event (78.9mm) of the study period (Figure 2). Python activity declined from April to June over the same period that mean maximum temperatures dropped from 28.1°C to 19.0°C and overnight lows dropped from 15.1°C to 6.3°C (Figure 2). No *A. stimsoni* were encountered in June and July, the only two months where the mean maximum temperature was < 20.0°C and the mean minimum temperature was < 10.0°C.
The number of male and female *A. stimsoni* encountered each month varied significantly ($\chi^2 = 17.79$, d.f. = 9, $p < 0.05$). The single month where this difference was most pronounced was in September where 10 male pythons and a single female python were encountered (Figure 3). Over the remaining nine months, the difference in encounter rates between male and female *A. stimsoni* was less than seven individuals.

No *A. stimsoni* were encountered when air temperatures were $< 15^\circ$ C, though sampling effort during these times was relatively low (Figure 4). Individuals were significantly less likely to be encountered when air temperatures were 16-20$^\circ$ C, based on the Bonferroni confidence intervals. Although the proportion of records was greater relative to sampling effort when air temperatures were 21-25$^\circ$ C or 26-30$^\circ$ C, and lower when air temperatures were 31-35$^\circ$ C, these differences were not significant (Figure 4). *Antaresia stimsoni* were also significantly less likely to be encountered when humidity was 0-20% and significantly more likely to be encountered when humidity was 21-40% (Figure 4). A negative correlation existed between humidity and air temperature (Pearson correlation = -0.618, $p = < 0.001$), whereby a large proportion of the hours sampled when humidity was relatively high (> 40%), also experienced low air temperatures (< 20$^\circ$ C).

The species was recorded in each of the four main vegetation types. However, individuals were encountered in riparian woodland more frequently and in hummock grassland less frequently than expected given the availability of these vegetation types (Figure 5). The mean distance to the nearest rock-outcrop for *A. stimsoni* locations ($n$
= 102) was 161.2 metres (s.e. ± 11.6) and for random locations (n = 100) it was 286.6 metres (s.e. ± 21.9). This difference was significant (Z = -3.99, p < 0.001).

A total of 11 prey items were obtained from the stomachs of 10 A. stimsoni. The stomachs of a further 12 individuals contained no food items. Pythons ate a variety of nocturnal terrestrial vertebrate prey (Table 2).

**Discussion**

Systematic road-cruising was an effective and efficient means of sampling and allowed us to increase our understanding of the ecology of A. stimsoni. In our regional-scale study, A. stimsoni had a broad tolerance of air temperatures and increased activity following rainfall, when relative humidity was higher and ground-dwelling frogs, a significant prey source, were more likely to be abundant. Individuals occurred in a range of vegetation types, with an apparent preference for riparian woodland and were frequently found in close proximity to rock-outcrops. Our results for diet and body size support previous research based on museum specimens, confirming that A. stimsoni feed on a range of terrestrial vertebrates and are not sexually dimorphic.

The lack of pronounced sexual size dimorphism in A. stimsoni agrees with the study of museum specimens by Shine and Slip (1990). Although not statistically significant, adult females were slightly larger than males in our study and this supports the trend observed in most other species of Australian pythons (Shine and Slip 1990). However, it contrasts with the pattern observed in Australian carpet pythons (Morelia spilota)
and snakes from the Families Elapidae and Colubridae, where males tend to be larger in oviparous species with male-male combat (Shine 1994; Pearson et al. 2002). Male-male combat occurs in the closely related *A. childreni* and *A. maculosus* and has been presumed to also occur in *A. stimsoni* (Shine 1994). In our study, adult male and female *A. stimsoni* were on average considerably shorter in SVL (> 130 mm and > 80 mm smaller for males and females, respectively) than those measured by Shine and Slip (1990). However, the rudimentary method of determining sexual maturity that we used may have resulted in immature animals being included in the adult dataset, resulting in lower means. Apart from variation in SVL between sub-species of *Morelia spilota* (Pearson et al. 2002), intraspecific variation in body size has not previously been reported for any species of Australian python.

By systematically sampling *A. stimsoni* over the duration of a year, we were able to collate data on activity patterns not available to researchers relying on museum specimens (Shine and Slip 1990) or conventional trapping methods (Goodyear and Pianka 2008). Activity at the monthly scale showed considerable between-month variation in encounter rates was likely driven by several factors. First, although encounter rates fluctuated mostly independently of mean overnight low and daytime maximum temperatures, there was a temperature threshold below which snake activity ceases. This is evidenced by the decline in encounter rates of *A. stimsoni* from April to June, coinciding with consistent drops in both minimum and maximum temperatures. A low temperature threshold is also supported by the hourly temperature data, with snakes significantly less likely to be encountered during hours where the air temperature was 16-20° C and with no individuals encountered when air temperatures were < 16° C.
Under captive conditions, *A. stimsoni* have a preferred body temperature of 31.5° C throughout the year (Bedford and Christian 1998). Individuals in our study were encountered active in hours with air temperatures ranging from 18.0° C to 34.1° C, possibly suggesting an ability to maintain body temperatures higher than ambient air temperatures. This is not surprising given that night-time road temperatures average > 4.0° C warmer than air temperatures in the study area (P. McDonald *unpub. data*). Lying on the road or on rock substrate that has been warmed during the day (by direct solar radiation) would allow pythons to elevate their body temperatures considerably (Shine 1999). It is also possible that *A. stimsoni* exhibit a degree of plasticity in body temperature tolerance. This may be an important adaptation to Australia’s arid-zone; maximising activity in a region where daily variation in air temperature frequently exceeds 20° C throughout the year.

Second, inter-monthly variability in *A. stimsoni* activity may be influenced by rainfall during warmer months. Substantial rainfall (78.9 mm) occurred in January (almost all falling prior to sampling in this month) and coincided with a dramatic increase in python encounter rates. Although the following month received even more rain, this rain fell over the last days of February after we had completed our monthly sampling.

We tentatively propose two possible underlying causes for the response of *A. stimsoni* to increased monthly rainfall, recognising that we only have evidence from one month of the survey. The first is that the species responds to the rainfall events through the resulting increases in humidity. The influence of humidity on increasing snake activity has been demonstrated in tropical regions and this behaviour may be related
to dehydration avoidance (Henderson and Hoevers 1977; Daltry et al. 1998). The role of humidity in increasing *A. stimsoni* activity is supported by data collected at the hourly scale. Individuals were less likely to be found active when the relative humidity was 0-20% and significantly more likely to be active when the humidity was 21-40%. Although *A. stimsoni* were not significantly more likely to be encountered when the relative humidity was > 40%, this is probably an artefact of the negative correlation between air temperature and humidity, whereby a large proportion of hours sampled when the humidity was high also experienced ambient air temperatures < 18° C that were probably too cold for activity. Although arid-adapted snakes may experience reduced rates of water loss compared to tropical species (Gans et al. 1968), there could still be considerable physiological benefits for *A. stimsoni* by increasing activity at times when water loss would be reduced.

The second possibility is that rainfall triggers increases in the availability of food resources, particularly ground-dwelling frogs, and *A. stimsoni* responds to this resource pulse by increasing hunting activity. The inclusion of frogs in the diet of *A. stimsoni* was previously established (Shine and Slip 1990) and is supported by the results of our study, with the terrestrial frog *Platyplectrum spenceri* identified as a prey item. As with other ground-dwelling frogs of arid Australia, this species aestivates underground during dry periods (Heatwole 1984). Given that drought conditions predominate over most years in central Australia, this effectively ensures that this species would be unavailable as a prey item most of the time (Shine 1999). However, terrestrial frogs in Australia’s arid-zone emerge in large numbers following major rainfall events and may even become the most dominant component of the vertebrate biomass at that time (Predavec and Dickman 1993). Large numbers of *P.*
were observed active on the road during the January sampling and, while our dataset does not offer definitive evidence of the factors directly influencing *A. stimsoni* activity, it is likely that by increasing activity on warm, wet nights and at times when relative humidity is higher, snakes are more likely to encounter frogs.

In addition to responding to climatic variability, there was a peak in snake activity in September that cannot be readily explained by the recorded variables. A probable explanation for this peak can be found in the biased sex ratios encountered for this month, with 10 males and a single female observed. Increased activity associated with mate searching behaviour by male snakes has been reported in a variety of taxa (Shine and Bonnet 2009), including in Australian pythons (Brown *et al.* 2002). Although reproductive data are limited for *A. stimsoni*, the capture of a heavily gravid female in the first week of February in our study corresponds well to the period of 100 days between the last observed copulation and egg deposition reported in the closely related *A. childreni* (Barker and Barker 1994). More insight into the reproductive biology of wild *A. stimsoni* will probably require an intensive radio-tracking study.

In terms of vegetation structure, *A. stimsoni* can be regarded as a habitat generalist, being found in considerable numbers in areas dominated by each of the four vegetation types. The preference for riparian woodland may be related to food availability (e.g. more frogs in riparian woodland) or to the proximity of this vegetation type to rock-outcropping. A comparison of the distance to nearest outcrop for python and random locations showed that pythons were significantly more likely to be found in closer proximity to outcrops. Although the reasons behind this association are not clear, there was a general trend for *A. stimsoni* to be crossing the
road earlier in the night in the opposite direction to nearby rock-outcropping. This observation suggests that the association of this species with outcrops is related to the suitability of this landscape feature as a diurnal retreat site rather than as habitat for hunting. This is supported by the dietary data, with no saxicolus (rock-dwelling) species identified as food items (although sample size was small). Rock crevices and caves offer a considerable thermal buffer against the extreme fluctuations in air temperatures experienced across arid Australia (Geiser and Pavey 2007). The reliance on outcrops for retreat sites would also explain the apparent scarcity or absence of *A. stimsoni* from the vast sandy deserts of inland Australia (Barker and Barker 1994), where prey availability is probably not a limiting factor (Predavec and Dickman 1993, James and Shine 2000).

The generalist nature of *A. stimsoni* diet reported here supports the findings of Shine and Slip (1990) with both studies recording a range of frog, reptile and mammal food items. The majority of prey items in this study were nocturnal species, consistent with an ambush mode of foraging (Shine 1988). However, given that *A. stimsoni* was the most frequently encountered nocturnal snake in the study area, this suggests that it may move more regularly than other ambush predators that occur in the study area (e.g. only two centralian pythons (*Morelia bredli*) were encountered on the road during the study). Alternatively, this pattern may simply be related to differences in abundances of snakes using ambush predation.

**Acknowledgments**
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References


Table 1. Mean body size of male and female *A. stimsoni*.

<table>
<thead>
<tr>
<th>Sex</th>
<th>Dataset</th>
<th>Sample size</th>
<th>Mean SVL (± s.e.) (mm)</th>
<th>SVL Range (mm)</th>
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<tbody>
<tr>
<td>Male</td>
<td>Adult</td>
<td>39</td>
<td>739.4 (± 87.6)</td>
<td>565-1050</td>
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<td></td>
<td>All</td>
<td>46</td>
<td>694.6 (± 20.9)</td>
<td>420-1050</td>
</tr>
<tr>
<td>Female</td>
<td>Adult</td>
<td>31</td>
<td>767.3 (± 85.2)</td>
<td>669-956</td>
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<tr>
<td></td>
<td>All</td>
<td>46</td>
<td>689 (± 20.3)</td>
<td>363-956</td>
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</table>
Table 2. Dietary items encountered in the stomachs of road-kill *A. stimsoni* (*n* = 22).

<table>
<thead>
<tr>
<th>Prey type</th>
<th>No. records</th>
</tr>
</thead>
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<td>AMPHIBIA-spp.</td>
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</tr>
<tr>
<td>Limnodynastidae</td>
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<tr>
<td><em>Platyplectrum spenceri</em></td>
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<tr>
<td>REPTILIA-spp.</td>
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</tr>
<tr>
<td>Scincidae</td>
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</tr>
<tr>
<td>Gekkonidae</td>
<td></td>
</tr>
<tr>
<td><em>Diplodactylus conspicillatus</em></td>
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</tr>
<tr>
<td><em>Rhyynchoedura ornata</em></td>
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</tr>
<tr>
<td>MAMMALIA-spp.</td>
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<tr>
<td>Muridae</td>
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</tr>
<tr>
<td><em>Mus musculus</em></td>
<td>3</td>
</tr>
<tr>
<td>Total</td>
<td>11</td>
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**Figure 1.** Inset map showing the location of the study area in the Northern Territory. Main map showing the study area enlarged with the position of the road transect west of Alice Springs.

**Figure 2.** Monthly encounter rates of *A. stimsoni* (*n* = 91) and: (a) mean minimum and maximum air temperatures; and (b) rainfall totals.

**Figure 3.** Number of male (*n* = 46) and female (*n* = 45) *A. stimsoni* encountered per month between August 2009 and July 2010.

**Figure 4.** Proportion of hours (*n* = 210) driven and *A. stimsoni* (*n* = 91) encountered (+ Bonferroni 95% confidence intervals) in: (a) air temperature categories of 5°C; and (b) relative humidity categories of 20%.

**Figure 5.** Proportion habitat (i.e. vegetation type) availability and use by *A. stimsoni* (*n* = 102; ± Bonferroni 95% confidence intervals).
Figure 1
Figure 2

(a) No. individuals/100km vs. Ambient temperature (°C)
- Stimson’s pythons
- Mean minimum temperature
- Mean maximum temperature

(b) No. individuals/100km vs. Rainfall (mm)
- Stimson’s pythons
- Total rainfall
Figure 3
Figure 4

(a) Proportion of hours driven and individuals encountered at different air temperatures (°C).

(b) Proportion of hours driven and individuals encountered at different relative humidities (%).

- Dark bars represent hours driven.
- Lighter bars represent individuals encountered.
Figure 5

![Bar chart showing the proportion of habitat types available versus used by a species. The x-axis represents different habitat types: Acacia shrubland, Chenopod shrubland, Hummock grassland, and Riparian woodland. The y-axis represents the proportion, ranging from 0 to 0.6. The chart includes error bars for each habitat type, indicating variability.](image-url)