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Diets of two species of horned lizards (*Phrynosoma modestum* and *P. solare*) from Mexico

Most previous observations on the diets of lizards in the genus *Phrynosoma* have indicated that ants comprise the majority of prey items eaten (Pianka and Parker, 1975; Lemos-Espinal et al., 2004), although there is apparent plasticity in diets among populations of some species of *Phrynosoma* (e.g., *P. coronatum*, Suarez et al., 2000) and some species that include more non-ant insects in their diet (e.g., *P. taurus*, Lemos-Espinal et al., 2004). Such variability appears limited given present observations, but there remain some species of *Phrynosoma* for which diet observations are lacking, particularly species and populations from Mexico. One such species is *P. solare*, and we report on the diet of individuals from Sonora. In addition, expanding the number of populations of various species would allow a better understanding of the potential for interpopulation diet variation. To that end, we also report on the diets of *P. modestum* from Coahuila.

We examined specimens of *P. solare* ($n = 14$; 5 males, 9 females) and *P. modestum* ($n = 11$; 5 males, 6 females) from the collection of the Laboratorio de Ecología, UBIPRO-FES-Iztacala, UNAM (see Smith et al., 2005a,b for details of collection). *Phrynosoma solare* were collected from several localities in Sonora during the summer and fall of 2004 and the summer of 2005 (see Appendix). *Phrynosoma modestum* were collected from several localities in Coahuila during the summer and fall of 2004 (see Appendix). Specimens were preserved in formalin within 30 minutes of collection; thus, the effect of digestion on stomach contents was assumed to be minimal.

We dissected specimens to examine stomach contents. Diet items were identified to the lowest taxonomic level possible and counted. We measured the length and width of each prey item using a digital caliper (to nearest 0.01 mm) and calculated prey volume using the volume of a prolate spheroid. We used BugRun software to calculate niche breadth based on prey number and prey volume (Vitt and Zani, 2005). Sample sizes were low (11 or 14 stomachs) for both species. However, a rarefaction analysis conducted by Winemiller et al. (2001) suggested that samples of ≥ 10 include $> 90\%$ of a species' total diet.

The diet of *P. modestum* consisted primarily of ants, both numerically and volumetrically (Table 1). The only non-ant diet items we found were Coleopteran adults and larvae. Niche breadth based on number was 1.63, and based on volume was 2.78. Previous studies on the diets of *P. modestum* also found that ants predominate (e.g., Barbault et al. 1978; Shaffer and Whitford 1981), although this can vary seasonally (Barbault and Maury 1981).

The diet of *P. solare* was dominated by ants, both volumetrically and numerically (Table 2). Coleopteran adults and isopteran were present but relatively uncommon in the diet. We found a single unidentified seed in one stomach, which was likely accidentally ingested. Based on the number of prey items, niche breadth was 3.19, and on prey volume 1.73.

As expected, the diets of *P. solare* and *P. modestum* were dominated by ants, but did include other prey, especially beetles. These observations are consistent with those found by Pianka and Parker (1975) and Lemos-Espinal et al. (2004). We should note that *P. solare* is not an obligate ant specialist, since captive individuals fed a diet lacking ants were able to survive and grow (Sherbrooke, 1987).

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Table 1. Diet of *Phrynosoma modestum* from Coahuila, Mexico (n = 11).

Prey Taxon	Number of Stomachs	Number of Items	Percent of Diet by Number	Percent of Diet by Volume
Coleoptera				
Adult	5	13	7.74	20.02
Larvae	2	2	1.19	2.28
Hymenoptera				
Formicidae				
Morphospecies A	4	21	12.5	29.3
Morphospecies B	3	129	76.79	48.4
Morphospecies C	2	3	1.79	0.05

Table 2. Diet of *Phrynosoma solare* from Sonora, Mexico (n = 14).

Prey Taxon	Number of Stomachs	Number of Items	Percent of Diet by Number	Percent of Diet by Volume
Coleoptera Adult	4	4	3.23	6.47
Hymenoptera				
Formicidae				
Morphospecies A	4	60	48.4	74.9
Morphospecies B	2	16	12.9	6.55
Morphospecies C	2	9	7.26	0.17
Morphospecies D	1	29	23.39	0.54
Morphospecies E	1	4	3.23	0.07
Isoptera	1	1	0.81	3.09
Unidentified seed	1	1	0.81	8.17

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