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# SHORT NOTE: A NOTE ON THE FEEDING HABITS OF *AMEIVA FUSCATA* FROM DOMINICA, LESSER ANTILLES

D. J. BULLOCK AND H. M. JURY

David Attenborough Laboratories, Department of Applied Biology and Biotechnology, Scraptoft Campus, Leicester Polytechnic, Leicester LE79SU, U.K.

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## INTRODUCTION

All but one of the Lesser Antillean islands or island groups, has (or once had) its own species of macroteiid 'ground lizard' (*Cnemidophorus* or *Ameiva*) (Baskins and Williams, 1966; Schwartz and Henderson, 1985). Ground lizards favour dry coastal habitats which, in the Lesser Antilles, have been subject to much development for housing, tourism and cultivation. Probably as a result of such habitat destruction, and possibly also due to predation by introduced mongoose (*Herpestes herpestes*), ground lizards are now rare or extinct on several islands (Underwood, 1962; Corke, 1987; Johnson, 1988).

Dominica (15° 25' N, 61° 25' W) is unusual in the Lesser Antilles in having retained between 60 per cent and 75 percent of its original forest cover, including its coastal woodlands (Evans, 1986). The latter support populations of *Ameiva fuscata*, confined to Dominica. There have been few published reports of the diets of *Ameiva*, and none for *A. fuscata* or other Lesser Antillean species. Hirth (1963), Hillman (1969) and Echternacht (1983) described the diet and feeding behaviour of several Costa Rican species and more recently Vega *et al.* (1988) described the diet of *A. ameiva* in Argentina.

As part of a long term study of Dominica's forests, including the reptile and amphibian communities, data were collected on the diet and feeding behaviour of *A. fuscata* in one of the two types of coastal woodland, Dry Scrub Woodland.

## STUDY AREA AND METHODS

Fieldwork in the Cabrits Peninsula, north-east Dominica, was conducted in March-April 1988 and December-January 1989; these dates corresponded approximately to dry and wet seasons respectively. More trees were in fruit or flower in the dry season than in the wet season, and the mean litter layer was significantly deeper at that time ( $\bar{X} = 2.76\text{cm}$ ,  $N = 5$  composite samples, dry season;  $\bar{X} = 0.98\text{cm}$ ,  $N = 5$  composite samples, wet season ( $t_{4,4} = 3.98$ ,  $p < 0.02$ ).

Prey availability at ground level was estimated using pitfall (can) traps (78mm deep, 73mm diameter filled to c.30mm depth with water plus detergent). During both the dry and wet season visits five lines of 10 pitfall traps were set for 48h on two dates separated by at least 14 days. The catch was sorted to order/family and prey length. Pitfall traps do not necessarily provide representative samples of species composition and species diversity (Southwood, 1978). Thus comparison between invertebrate availability and prey taken must be viewed with caution, and only large differences are described here.

*A. fuscata*, whilst not threatened, is a protected species in Dominica, and large scale destructive sampling principally for stomach contents was undesirable. Non-destructive live capture and stomach flushing (Pietruszka, 1987) proved very difficult with this species and all but seven out of a total of 19 specimens were killed. Thus the sample size for diet analysis was small. Nevertheless, specimens from most

of the size range (maximum snout-vent of c.250mm (D. J. Bullock unpublished)) were represented as follows: seven with snout-vent lengths of  $\leq 70$ mm; four with snout-vent lengths between 71 and 140mm and eight with snout-vent length  $\geq 141$ mm. Stomach contents were sorted to order/family and dimensions of prey measured to 0.1mm accuracy.

Quantitative observations of foraging behaviour of *A. fuscata* consisted of timed watches (minimum of 5 minutes duration) of undisturbed focal individuals between 0700h and 1700h in clear, sunny weather, periods when this species was known to be active (D. J. Bullock and P. G. H. Evans unpublished). Attempts at hand capture and sessions of undisturbed observations were incompatible so the former were mainly restricted to the dry season and the latter to the wet season visits respectively. Snout-vent length, initial microhabitat (litter, rock, soil), distance moved (m), number of bask sites and number of prey capture attempts (successful and unsuccessful) were recorded.

RESULTS AND DISCUSSION

Comparison of the prey size distribution in pitfall traps between dry and wet seasons showed that there were more large prey and a fewer number of large prey items available in the dry season than wet season. As the majority of stomach samples were obtained in the dry season, only pitfall data from the dry season were used to compare availability with diet.

One of the stomachs contained only soil and mites (Acari) that had probably been ingested unintentionally, and so was excluded from computations. Oligochaeta, and adult Coleoptera (mainly a large, brown species) were the most abundant prey items. In volumetric terms, adult Coleoptera were by far the most important prey, followed by Oligochaeta (Table 1). Comparison between the percentage volumes of each prey type in pitfall traps and stomachs gave a tentative indication of the degree to which *A. fuscata* selected certain invertebrates. Thus adult Coleoptera and Oligochaeta were selected. Opilionids however were not taken. This apparent avoidance was probably because the species concerned was nocturnally active; during the day it was inactive under rocks where it would have been inaccessible to *A. fuscata*. Dictyoptera and Orthoptera were also apparently avoided, probably again because the most abundant species were nocturnal. The occurrence of a large amount of leaves in the stomach of one individual indicates that *A. fuscata* is not exclusively insectivorous (Table 1). Casual observations revealed that this species also ate carrion and fallen crop fruits such as avocado (*Persea* sp.), soursop (*Annona muricata*) and banana (*Musa* sp.).

Maximum arthropod prey length was positively correlated with lizard head width ( $r = 0.708$ ,  $df = 18$ ,  $p < 0.001$ ) and snout-vent length ( $r = 0.573$ ,  $df = 18$ ,  $p < 0.01$ ). Comparison of the prey length distribution in pitfall traps and stomachs suggested that *A. fuscata* took relatively large ( $> 5$ mm length) prey and tended to

Prey type	Pitfall		Stomach		
	Volume		Volume	Number	
	%	$\bar{X}$	%	$\bar{X}$	%
Annelida					
Oligochaeta	0.0	134.9	9.6	4.6	24.9
Arthropoda					
Araneae	1.0	24.8	1.8	0.2	0.9
Opiliones	41.1	0.0	0.0	0.0	0.0
Isopoda	0.0	1.1	0.1	0.7	3.6
Diplopoda	0.4	8.0	0.6	0.1	0.3
Chilopoda	1.2	0.0	0.0	0.0	0.0
Collembola	0.1	0.0	0.0	0.0	0.0
Dermaptera	4.0	21.1	1.5	1.3	7.2
Dictyoptera	22.0	0.0	0.0	0.0	0.0
Orthoptera	18.3	15.5	1.1	0.2	0.9
Psocoptera	tr	0.0	0.0	0.0	0.0
Hemiptera (nymph)	0.1	0.0	0.0	0.0	0.0
Thysanoptera	0.1	0.0	0.0	0.0	0.0
Diptera	2.0	0.1	tr	0.1	0.3
Hymenoptera (Ants)	1.7	2.2	0.2	0.7	3.6
(Others)	0.0	4.9	0.3	0.6	3.0
Coleoptera (Adults)	7.4	526.2	37.5	3.1	16.8
(Larvae)	0.0	15.9	1.1	1.4	7.8
Mollusca					
Gastropoda	0.0	3.1	0.2	0.8	4.5
Others	0.5	5.1	0.4	0.5	2.7
Seed and Vegetation	—	53.9	3.8	3.8	20.7

TABLE 1: Summary of the stomach contents of *Ameiva fuscata*. Volumes measured in mm<sup>3</sup>. 'Others' includes empty Gastropoda shells, Myrmeleontidae, Acari and unidentified items.

avoid relatively small ( $<2$  mm length) prey ( $X^2_1 = 548.07$ ,  $P < 0.001$ ).

*A. fuscata* were invariably wary and very difficult to observe undisturbed. The majority of individuals (89 per cent) were observed foraging amongst litter, in a grubbing fashion as do other members of the genus (Hirth, 1963), poking their snouts into cavities or holes, or under litter. The large forked tongue was flicked constantly and, occasionally, one or both forefeet were used to remove litter or loosen surface soil to expose a prey item. Mean rate of movement was 7.1 m per 10 minutes ( $SD = 7.65$ ,  $N = 29$ ) during which time a mean of 3.4 bask sites ( $SD = 2.68$ ,  $N = 29$ ) were used. Of 58 prey capture attempts, 19 (22 per cent) were successful. One large lizard ( $SVL = 180$  mm) was observed for 20 minutes feeding on a land crab (*Gegarcinus* sp.) that it had apparently killed in its burrow; it withdrew parts of the crab's body to devour above ground.

On basis of our limited observations and analyses, it is clear that *A. fuscata* is predominantly insectivorous, but that some individuals (1 in 19 sampled) ingest large quantities of vegetation. Janzen (1973) suggested that island *Ameiva* species may ingest more vegetation than mainland counterparts and that this is related to a dearth of both large insects and native terrestrial predators. Island *Ameiva* could thus spend more time basking and fermenting vegetation, than those on the mainland. Pough (1973) argued that for scincid and iguanid lizards adoption of herbivory was more likely to occur above a mass of 100 g, provided that sufficient time was devoted to basking. Within the genus *Ameiva*, *A. fuscata* is exceptionally large, reaching 250 mm snout-vent length and a mass of 600 g. In censuses approximately 44 per cent of *A. fuscata* had a snout-vent length of  $>140$  mm and a corresponding mass of  $>100$  g (D. J. Bullock unpublished). Thus on the basis of lizard size and island location, *A. fuscata* could be expected to be at least partly herbivorous. However, basking times were short and clearly more related to maintenance of active body temperature (several degrees above air temperature) (Brooks, 1968) than to fermenting vegetation.

Highest densities of *A. fuscata* are in coastal woodland (D. J. Bullock and P. G. H. Evans unpublished), in the litter layer of which most of its prey are located. With the exception of in coconut plantations, the litter layer is typically absent from areas which were previously of coastal woodland but now have been replaced by cultivation or pasture. Observed lower densities of *A. fuscata* in many cultivated areas may be related to the reduced litter layer and consequent reduction in food supply. In the face of continued and escalating development of coastal woodlands in Dominica, we may therefore

expect the population to decline and become more fragmented.

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ERRATUM: Corrected Table 1 from Bullock, D. J. and Jury, H. M., Vol. 1, No. 11, pages 532-534.

Prey type	Pitfall		Stomach		
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Hemiptera (nymph)	0.1	0.0	0.0	0.0	0.0
Thysanoptera	0.1	0.0	0.0	0.0	0.0
Lepidoptera	0.0	30.7	2.1	0.4	2.4
Diptera	2.0	0.1	tr	0.1	0.3
Hymenoptera (Ants)	1.7	2.2	0.2	0.7	3.6
(Others)	0.0	4.9	0.3	0.6	3.0
Coleoptera (Adults)	7.4	526.2	37.5	3.1	16.8
(Larvae)	0.0	15.9	1.1	1.4	7.8
Mollusca					
Gastropoda	0.0	3.1	0.2	0.8	4.5
Reptilia					
Anolis oculatus	—	555.6	39.6	0.1	0.3
Others	0.5	5.1	0.4	0.5	2.7
Seed and Vegetation	—	53.9	3.8	3.8	20.7

TABLE 1: Summary of the stomach contents of *Ameiva fuscata*. Volumes measured in mm<sup>3</sup>. ‘Others’ includes empty Gastropoda shells, Myrmeleontidae, Acari and unidentified items.