



Feeding habits of *Dermatonotus muelleri* (Anura, Microhylidae) from a semiarid region in Pernambuco state, Northeastern Brazil

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Anurans control a great diversity of prey populations presenting an important role in the control of insects (including pest proliferation), and also as preys in the reptiles, birds, and mammals diet (Bernarde, 2012), being also considered generalists and opportunists predators (Duellman and Trueb, 1994). However, some anuran species have wide distribution and their diet might vary according to the physiognomy (Pacheco et al., 2017), thus, it is crucial to understand the feeding preferences in each habitat and the changes according to the environmental differences.

Among the Microhylidae species, *Dermatonotus muelleri* (Boettger, 1885) is a widely distributed semi fossorial frog considered a forelimbs-head-first burrower (Nomura et al., 2009). In Brazil, this species' feeding habits were recorded for the Central-Western (Vaz-Silva et al., 2003), Southeastern (Menin et al., 2015), and Northeastern Regions (Leite-Filho et al., 2015; Caldas et al., 2019), but data from the semi-arid was still missing. Here, we present the feeding habits of *D. muelleri* from a semiarid region in Pernambuco state, Northeastern Brazil and discussed the classification of a “specialized diet” for this species.

We analyzed the stomach contents of 33 individuals of *Dermatonotus muelleri* collected in 12 April 2012 during the wet season in a semiarid region, in Exú municipality (39°45'20"W, 7°34'31"S), Pernambuco state, Northeastern Brazil. Voucher specimens are housed the herpetological collection of the Universidade Regional do Cariri, being 30 males and three females (URCA-H 2206, 3223,

2701, 3225, 2709, 2203, 1585, 2710, 2207, 1582, 1451, 3212, 2201, 2211, 2215, 2209, 2213, 2210, 2208, 2205, 8653, 8787, 5401, 8651, 5399, 5405, 5402, 5409, 5408, 8652, 5400, 8650, 8646). Each stomach was analyzed under a stereo microscope, and the preys registered were identified to the lowest possible taxonomic level (usually order). We measured also the length and width of the intact preys, when they were present in the stomach tract, using a digital caliper (precision 0.01 mm). Prey volume was calculated using the Ellipsoid formula: $V=4/3.\pi(L/2).(B/2)^2$, where V= volume, L = length and W = width (Griffiths and Mylotte, 1987). We used the Relative Importance Index (RII) as a measure of the relative contribution of each prey category (Pinkas et al., 1971). $RII = (F\%+N\%+V\%)/3$, where F%, N% and V% are the percentages of prey frequency, number and volume, respectively.

Among the 33 specimens examined, just one individual did not have preys in the stomach contents. The diet of *Dermatonotus muelleri* was composed of six prey categories, being Isoptera the most abundant item both numerically (95%), volumetrically (99.7%), and in frequency (51.2%). Isoptera also had the highest relative importance index, contributing with 82% of its diet. Formicidae presented the second-highest frequency (22%) (Table 1).

We also registered amounts of plant material (frequency of 9.8%), and others prey categories, such as Coleoptera (frequency of 4.9%), Dermaptera, Ixodida, and Orthoptera (frequency of 2.4% each one) (Table 1). Regarding the plant material, some studies suggest food items with a

Table 1. Diet of *Dermatonotus muelleri* from a semiarid region in Pernambuco state, Northeastern Brazil.

Prey Category	N%	RII	V%	F%
Isoptera	95.0	82.0	99.7	51.2
Formicidae	3.2	8.5	0.1	22.0
Plant material	0.4	3.4	0.0	9.8
Coleoptera	0.2	1.7	0.0	4.9
Ixodida	0.1	0.8	0.0	2.4
Dermaptera	0.1	0.8	0.0	2.4
Orthoptera	0.1	0.8	0.0	2.4
Not identified	0.9	2.0	0.2	4.9

N% = relative number of prey items; RII = relative importance index; V% = relative volume; and F% = relative frequency.

low frequency of occurrence (<3.5%) could have been accidentally ingested during the prey capture or were sporadically available (e.g., Sabagh et al., 2010; Piatti and Souza, 2011). However, Nomura and Rossa-Feres (2011) found that *D. muelleri* can shift the search for prey according to prey distribution. Thus, as the frequency of plant material and Coleoptera occurrences, for example, were 9.8% and 4.9%, respectively, it is possible that *D. muelleri* presents an opportunistic diet depending on the availability of food items in the environment.

Previous research on *Dermatonotus muelleri* diet indicates a specialization in ants and termites (Vaz-Silva et al., 2003; Leite-Filho et al., 2015; Menin et al., 2015; Caldas et al., 2019). Considering that *Dermatonotus muelleri* presents explosive reproductive behavior (Nomura, 2003), and once the termites are also most abundant in the wet season (Pinheiro et al., 2002), the great number of Isoptera in its stomach content may be attributed to the high abundance of this prey in the environment during this season. On the other hand, herein, we report a wide variety of food items consumed, in the wet season, adding five more types of prey in its diet list. Our results suggest the feeding habits of *D. muelleri* depends on the variety and availability of resources. Thus, the short period of activity of *D. muelleri*, during the reproductive period in semiarid regions, may indicate that opportunistic behavior, including a wide variety of food items, is best for species with explosive reproductive behavior. However, future studies assessing the seasonality and the availability of prey in the environment may respond more precisely to the opportunistic or specialized habits of this species.

Here, we analyzed the *Dermatonotus muelleri* diet, a species considered specialized in ants and termites, and reported five new prey categories, contributing to a better comprehension about the feeding habits this species from a semiarid region, Northeastern Brazil.

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