Trabajo

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Variation in feeding ecology of five cnemidophorine lizard species along Brazilian eastern coast

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ABSTRACT
Feeding ecology of a particular species is associated to population dynamics and contributes for the understanding of natural history and trophic interactions in ecosystems. We investigated changes in the feeding habits of 16 populations belonging to five cnemidophorine lizard species (being four bisexual and one unisexual) along approximately 4000 km extension of the Brazilian eastern coast. Fieldwork was carried out in 15 areas of restinga habitats and for each cnemidophorine population, the composition of the diet was analyzed based on the number, volume (mm^3) and frequency of each prey category or plant material.The arthropods were categorized in the taxonomic level of Order or Family (e.g.Formicidae). Cnemidophorine populations/species studied were mainly carnivorous and had, in general, a diet consisting predominantly of larvae and/or termites, with few instances of plant material consumption. The availability of termites locally at each restinga habitat was not a determinant factor in the increase of termite consumption by the local cnemodophorine population. However, differences in diet composition among populations partially resulted from differential consumption of termites, leading to the formation of two distinct groups depending on higher or lesser consumption of termites. Some populations had onthonegetic variation in diet, but males and females of different populations/species tended to have similar diet composition. The head width of lizards affected significantly the volume and the length of the largest prey ingested in 60% (3/5) of the species studied, indicating that adults tended to consume larger food items compared to coespecifics juveniles. The high level of importance of termites and larvae in almost all populations/species probably contributed to the low intra-and interspecific differences in food habit. The diet of cnemidophorine species studied in restinga habitats in general, tended to be similar to that found to other cnemidophorines, regardless its geographic distribution. Invertebrates were the dominant prey on cnemidophorines diet, but predation on vertebrates was also registered.

Key Words: Diet; Restinga; Teiidae; Whiptail Lizard; Sand Dune.

RESUMO
A ecologia alimentar de uma determinada espécie está associada à dinâmica da população e contribui para a compreensão da história natural e das interações tróficas nos ecossistemas. No presente estudo, investigamos mudanças nos hábitos alimentares de 16 populações pertencentes a cinco espécies de lagartos cnemidophorines (quatro bissexuais e uma unissexual) ao longo de aproximadamente 4000 km da costa leste brasileira. O trabalho de campo foi realizado em 15 áreas de restinga. A composição da dieta de cada população foi baseada no número, volume (mm3) e frequência de cada categoria de presa e de material vegetal. Os artrópodes foram categorizados no nível taxonômico de Ordem ou Família (por exemplo, Formicidae). As populações/espécies de cnemidophorines estudadas foram principalmente carnívoras com uma dieta constituída predominantemente por larvas e/ou cupins, com pouco consumo de material vegetal. A disponibilidade de cupins localmente em cada restinga não foi um fator determinante no aumento do consumo de cupins pela população do lagarto cnemidophorino local. No entanto, as diferenças na composição da dieta entre as populações resultaram do consumo diferencial de cupins, levando à formação de dois grupos distintos, dependendo do consumo maior ou menor de cupins. Algumas populações apresentaram variação ontogenética na dieta, mas machos e fêmeas tenderam a ter uma composição alimentar semelhante em cada população/espécie. A largura da cabeça afetou significativamente o volume e o comprimento da maior presa ingerida

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em 60% (3/5) das espécies estudadas, indicando que os adultos tendem a consumir itens alimentares maiores que os jovens coespecíficos. O elevado índice importância de cupins e larvas em quase todas as populações/espécies provavelmente contribuiu para as baixas diferenças intra e interespecíficas no hábito alimentar. A dieta das espécies estudadas, em geral, tendeu a ser semelhante à encontrada para outros cnemidophorinos, independentemente de sua distribuição geográfica. Os invertebrados foram as presas predominantes na dieta, mas a predação em vertebrados foi também registrada.

Palavras-chave: Dieta; Restinga; Teiidae; Whiptail lizard; Sand Dune.

Introduction

Feeding ecology of a particular species is associated to population dynamics and contributes for the understanding of natural history and trophic interactions in ecosystems, being essential to the comprehension of the amounts of energy allocated to growth (body size and mass), maintenance, reproduction and storage (e.g. Doughty and Shine, 1997; Huey *et al.,* 2001). Parameters of prey consumption of a species or related group of lizard species may vary along space, including the energy balance of each population (Flynn et al., 2020). To keep an appropriated energy balance, active foraging lizards tend to consume prey with low mobility (e.g. insect larvae), with an aggregated distribution in the environment (like termites) and usually in large numbers per unit of time spent foraging compared to sit-and-wait lizards (e.g. Huey and Pianka, 1981; Pianka, 1986; Bergallo and Rocha, 1994).

Cnemidophorine lizards are active foragers and occur only in America (e.g. Wright, 1993; Reeder *et al.,* 2002; Harvey *et al.,* 2012). They are usually found in open habitats with sandy soil (e.g. Schall and Ressel, 1991; Dias and Rocha, 2007), high temperatures (e.g. Menezes and Rocha, 2011) and relative low humidity (e.g. Pianka, 1970; Vitt *et al.,* 1993). Although cnemidophorines species apparently have a diverse diet, prey like insect larvae and/or termites generally predominate in their diets, which seems to result from active foraging strategy (e.g. Pianka, 1977, 1986; Magnusson *et al.,* 1985; Bergallo and Rocha, 1994; Menezes *et al.,* 2006; 2008). Only two insular species (*Cnemidophorus arubensis* - Schall and Ressell, 1991 and *C. murinus* - Dearing and Schall, 1992) are known to have preference for ingesting plant material (flowers, fruits and leaves).

The geographical variation in environmental conditions is an important factor that can influence some ecological patterns of lizards' populations/species like food habit (e.g. Vitt *et al.,* 1998; Siqueira *et al.,* 2013). The diet of brazilian cnemidophorine lizards is known primarily for isolated populations of bisexual species (e.g. Vitt, 1991; Magnusson and Silva, 1993; Mesquita and Colli, 2003; Teixeira-Filho *et al.,* 2003; Menezes *et al.,* 2006; 2011; Dias and Rocha, 2007) with few studies addressing geographical variation in diet composition for populations/species, especially parthenogenetic ones (e.g. Bergallo and Rocha, 1994; Mesquita and Colli, 2003; Menezes *et al.,* 2008). It is expected that different populations of a particular species , despite having a same foraging strategy, might differ in their diet composition especially for those with broad geographic distribution as a result of local differences in prey availability (Cooper and Vitt, 2002).

In Brazil, some fragments of restinga habitats (plain sand-dunes) are found along approximately 4000 km of the coast. Five cnemidophorines species (see Pyron *et al.,* 2013 and Goicoechea *et al.* 2016 for a nomenclature review) (*Ameivula ocellifera, Glaucomastix abaetensis, Ameivula nativo, Glaucomastix littoralis* and *Contomastix lacertoides*) are distributed along these remnants (Menezes and Rocha, 2013), being good models to study geographical variation in diet among populations and species. In this study, we investigated changes in feeding strategies and diversity of diet of 16 populations belonging to these five cnemidophorine species (being four bisexual and one unisexual - *A. nativo*) along the coast of Brazil. Specifically, we aimed to (1) evaluate the diet composition of the different bisexual and unisexual populations/species throughthout its geographic distribution along Brazilian coast, (2) determine to what extent the consumption of termites and larvae would be similar among species/populations, (3) to evaluate if the preference by termites of a local cnemidophorine population is related to the frequency of termite nests locally at each restinga, (4) to evaluate if the diversity of prey consumed follows a latitudinal pattern.

Materials and methods

Study area

Fieldwork was carried out in 15 areas of restinga habitats along approximately 4000 km of the Brazilian eastern coast (Fig. 1). Restingas are coastal sandy dune habitats located between the sea and the mountains of the Brazilian eastern coast and are part of the Atlantic Forest biome. This habitat originated in the Quaternary as a result of successive marine regressions which occurred throughout the Holocene and Pleistocene periods (Suguio and Tessler, 1984).

Figure 1. Distribution of cnemidophorine species occurring in the restinga habitats along the eastern coast of Brazil.

Sampling Methods and Analysis

All samples were carried out during the rainy season (October-May) along three years (2004-2006, depending on the area), excepting for Guaratiba, where we also included data from the dry season to expand the sample size, since we did not find differences in diet between seasons.

We followed the procedures of the Society for the Study of Amphibians and Reptiles outlined in the *Guidelines for Use of Life of Amphibians and Reptiles in Field Research,* which recommend the use of anesthetics prior to euthanizing the animals. Lizards were collected during their activity period (09:00-16:00 h) with rubber bands or pellet rifles, euthanized with ether and immediately fixed in 10% formalin.

In the laboratory, we measured the snout–vent length (SVL) and head width of each individual collected, with a Vernier caliper (accuracy of 0.1 mm) and tested the morphological differences between sexes by ANOVA (Zar, 1999). The stomach contents of lizards were counted and identified. The arthropods were categorized in the taxonomic level of Order or Family (in the case of Formicidae). Unidentified arthropod remains were grouped in a separate category ("unidentified parts of arthropods") and were considered only for volumetric analyses. For each cnemidophorine population, the composition of the diet was based on the number, volume (mm^3) and frequency of each prey category. Each food item was measured in its length and width with a Vernier caliper (to the nearest 0.1 mm), and its volume was estimated by the ellipsoid formula: $4/3\pi$ (length/2) $(\text{width}/2)^2$ (Dunham, 1983). The number of food items was counted and the mean length and the mean volume of the five largest prey were estimated for each lizard. We used the largest prey length and higher prey volume for regression statistics and analysis of variance with the morphological variables of lizards. To perform statistical analysis, data were tested for normality (Kolmogorov-Smirnov test, Lilliefors´ correction) and homoscedasticity (Zar, 1999). Due to the great variation in length, volume, and number of items found in stomachs, these variables were converted to their decimal logarithm.

The differences in prey consumption based on the number, volume and length of the largest prey (log transformed) among different populations/species and, within the same population, between males and females and between juveniles and adults, were tested by analysis of variance for one factor (One-Way ANOVA) (Zar, 1999). For each lizard population, the value of the relative importance index (I_x) for each category of prey in the diet of the lizards was estimated by the sum of the proportional values of volume, number and frequency of occurrence of prey in the diet divided by three (see Howard *et al.,* 1999).

To estimate an index of density of termites (one of the most consumed prey type by cnemidophorine species) in each area sampled, we established straight-line transects of 500m. We recorded termite nests within 5 m to each side of the observer, totaling 0.5 ha sampled area (500 m length x 10 m width of transect). For each area, the relative availability of termite nests was expressed as the number of termite nests recorded per hectare. The association between the relative availability of termite nests in the environment and number (percentage) and frequency of termites found in the diet of each population studied (arcsine transformed) was tested using Spearman rank correlation analysis (Zar, 1999). The relationship between the number/volume of termites and larvae consumed in each population was tested by Spearman rank correlation (Zar, 1999). Latitudinal variation in the comsumption of termites was tested by linear regression analysis after removing the effect of SVL.

To assess differences in the feeding patterns among the populations and species studied, similarity analysis was performed by Non-Metric Multidimensional Scaling (NMDS) (McCune and Grace, 2002), applying the Bray-Curtis distance. The lines (objects) of the NMDS matrix were the populations, the columns (variables) were food categories, and cells contained numeric percentage of prey values. These data were reduced to one dimension and related with the latitude by simple regression analysis (Zar, 1999). Descriptive statistics are presented throughout the text as mean ± standard deviation. Statistical analyses were performed using Systat 11.0 (Wilkinson, 1990) and R program.

Results

A total of 566 individuals of cnemidophorines were analyzed in this study, ranging from 23 specimens of *Glaucomastix abaetensis* to 241 specimens of *A. nativo* (Table 1 and 2). Lizard species varied significantly in body size (SVL of adults) (ANOVA, $F_{4,342} = 55.581$, $R^2 = 0.394$, $P < 0.001$), being *A. ocellifera* the smallest and *G. littoralis* the largest one (Table 1). Intraspecifically, the populations of *Ameivula nativo* differed in SVL (ANOVA, $F_{5,122} = 7.256$, $R^2 = 0.229$, $P < 0.001$), with individuals from Setiba (ES) differing from other populations (Table 1). *Ameivula ocellifera* populations also varied in SVL (ANOVA, $F_{4,138} = 5.077$, $R^2 = 0.128$, $P = 0.001$), with Genipabu individuals being, in average, larger than individuals from Piaçabuçu (AL) and Praia do Porto (SE) (Post hoc Scheffe $P < 0.05$) (Table 1). *Glaucomastix littoralis* populations did not vary in SVL (ANOVA, $F_{2,61} = 2.544$, $R^2 = 0.077$, $P = 0.087$). Males, in general, had larger head width than females (pooled data for each species, Table 1).

Only 4.2% (24/567) of the lizards analysed had empty stomachs, being the population of *G. littoralis* in Grussaí (BA) the one with the highest proportion of empty stomachs (Table 2). In general, prey types consumed varied from eight to 16 (Table 2) among populations/species. The diet of cnemidophorines was composed mainly of arthropods, especially insect larvae and termites (Table 2, see attached material). The population of *C. lacertoides* in the restinga of Joaquina (SC) was the only one in which larvae and/or termites did not constitute one of the most important items in the diet of coastal cnemidophorine lizards (Table 2). Lizards from Comboios, ES (*A. nativo*) and from Barra dos Coqueiros, SE (*A. ocellifer*) consumed few termites, but larvae were the most important prey in the diet (Table 2, see attached material).

The number of prey consumed by individuals varied among the populations/species (ANCOVA, $R^2 = 0.17$, $F_{14,1,400} = 5.690$, $P < 0.001$), however only the population of Joaquina, SC (*C. lacertoides*) differed from others (*A. ocellifera* in Guarajuba, BA; *A. ocellifera* in Piaçabuçu, AL; *A. nativo* in Guriri, ES and *G. littoralis* in Maricá, RJ - Post hoc Scheffe $P < 0.05$) (Table 2). For most populations, there were no sex or ontogenetic variation in the mean number of prey consumed by individuals, except for *A. nativo* from Maraú, where juveniles consumed a smaller number of prey, and for *A. ocellifera* from Barra dos Coqueiros, where females consumed a greater number of prey (Table 3).

The volume of the largest prey consumed varied among populations/species (ANCOVA, $R^2 = 0.31$, $F_{14,1,400} = 4.625$, $P < 0.001$), but the post hoc test was significant only between populations of Comboios, ES (*A. nativo*) and of Joaquina, SC (*C. lacertoides*) (Post hoc Scheffe, $P < 0.05$). Males and females did not vary regarding prey volume consumed (Table 3) in each population. For some populations, juveniles ingested a smaller volume of prey than adults did, but it is not a rule for most populations/species (Table 3).

The mean length of the largest prey consumed by lizards varied among populations/species (ANCOVA, $R^2 = 0.25$, $F_{15,1,380} = 5.610$, $P < 0.001$), but the Post Hoc Scheffe showed no differences between populations/species (Table 2). Males and females

Table 1. Morphological measurements (snout-vent length and head width, in mm) of cnemidophorines in the coast of Brazil. Data are presented as mean + SD (in bold), range in parenthesis and N is the sample size. The columns ANOVA have the results of the variation in snout-vent length and in head width between sexes (adults).

Species	Localities	Snout-vent length (mm)					Head width (mm)			
		Juveniles	Adults	Males	Females	ANOVA between sexes	Juveniles	Males	Females	ANOVA between sexes
Contomastix lacertoides	Joaquina, SC	50.0 N =1	**58.7 ± 4.4** (44.8 - 65.8) N = 39	**56.0 ± 4.4** (44.8 - 62.6) N = 25	**57.9 ± 4.2** (51.1 - 65.8) N = 14	$F_{1,37} = 1.827$ $R^2 = 0.047$ $P = 0.185$	8.3 N = 1	**8.8 ± 0.9** (7.4 -10.5) N = 25	**8,1 ± 0,5** (7,4 a 8,9) N = 14	$F_{1,36} = 22.827$ $R^2 = 0.544$ $P < 0.001$
Glaucomastix littoralis	Maricá, RJ	**39.1 ± 3.0** (34,9 - 43,1) N = 9	**66.4 ± 5.2** (56.7 - 74.8) N = 16	**69.0 + 4.1** (64.4 - 74.8) N = 8	**63.9 + 5.2** (56.7 - 74.3) N = 8	$F_{1,14} = 4.782$ $R^2 = 0.255$ $P < 0.05$	**6.5 ± 0.4** (5.9 - 6.9) N = 9	**12.6 ± 1.5** (9.9 -14.2) N = 8	**9.5 ± 0.9** (8.6 -10.6) N = 8	$F_{1,14} = 23.708$ $R^2 = 0.629$ $P < 0.001$
	Jurubatiba, RJ	**43.6 ± 7.5** (37,4 - 52,0) N = 3	**62.7 ± 6.5** (48.0 - 76.1) N = 29	**63.4 + 7.7** (48.0 -76.1) N = 19	**61.1 + 2.7** (57.7 - 66.0) N = 10	$F_{1,27} = 0.809$ $R^2 = 0.029$ $P = 0.377$	**6.2 ± 0.4** (5.9 - 6.7) N = 3	**9.1 ± 1.2** (7.0 - 11.0) N = 16	**8.5 ± 0.7** (8.0 - 9.9) N = 8	$F_{1,22} = 1.348$ $R^2 = 0.058$ $P = 0.258$
	Grussaí, RJ	**37.9 ± 6.5** (31,5 - 52,4) N = 8	**62.0 ± 6.9** (48.6 - 71.6) N = 19	**60.9 + 7.8** (48.6 -71.6) N = 9	**62.9 + 6.1** (54.1 - 69.2) N = 10	$F_{1,17} = 0.396$ $R^2 = 0.023$ $P = 0.537$	**6.1 ± 0.6** (5.5 - 7.6) N = 8	**9.2 ± 1.4** (7.6 - 11.6) N = 9	**8.9 ± 0.9** (7.4 - 10.6) N = 10	$F_{1,17} = 0.342$ $R^2 = 0.020$ $P = 0.566$
	Pooled data	**39.3 ± 5.4** (31.5 - 52.4) N = 20	**63.7 ± 6.3** (48.0 - 76.1) N = 64	**39.3 ± 5.4** (31.5 - 52.4) N = 20	**62.6 ± 4.8** (54.1 - 74.3) N = 28	$F_{1,62} = 0.814$ $R^2 = 0.013$ $P = 0.370$	**6.3 ± 0.5** (5.5 - 7.6) N = 20	**10.0 ± 2.0** (7.0 - 14.2) N = 33	**9.0 ± 0.9** (7.4 - 10.6) N = 26	$F_{1,56} = 5.146$ $R^2 = 0.533$ $P < 0.05$
Ameivula nativo	Setiba, ES	**39.2 ± 49.7** (39.2 - 49.7) N = 7	**61.7 ± 8.0** (50.6 - 79.5) N = 35		**61.7 ± 8.0** (50.6 - 79.5) N = 35		**7.2 ± 0.5** (6.2 - 7.6) N = 7		**8.6 ± 0.9** (7.1 - 10.4) N = 35	
	Comboios, ES	**43.3 ± 4.1** (33.6 - 49.7) N = 27	**57.3 ± 5.8** (47.2 - 63.7) N = 16		**57.3 ± 5.8** (47.2 - 63.7) N = 16		**6.3 ± 0.6** (5.0 - 7.3) N = 30		**8.3 ± 0.7** (7.4 - 9.5) N = 13	
	Guriri, ES	**42.2 ± 3.6** (36.3 - 46.6) N = 14	**54.1 ± 5.8** (46.9 - 65.1) N = 20		**54.1 ± 5.8** (46.9 - 65.1) N = 20		**6.1 ± 0.4** (5.5 - 6.9) N = 14		**7.5 ± 0.6** (6.8 - 8.6) N = 21	
	Guaratiba, BA	**40.0 + 5.4** (30.9 - 48.3) N= 53	**56.1 ± 4.5** (48.8 - 67.4) N = 48		**56.1 ± 4.5** (48.8 - 67.4)		**6.3 ± 0.7** (4.6 - 7.4) N = 53		**8.1 ± 0.6** (6.6 - 9.4) N = 48	
	Prado, BA	**38.3 ± 3.1** (33.7 - 43.0) N = 8	**64.7 ± 1.0** (63.6 - 65.4) N = 3		**64.7 ± 1.0** (63.6 - 65.4) N = 3		**6.2 ± 1.1** (4.9 - 8.0) N = 8		**9.7 ± 0.2** (9.5 - 9.8) N = 3	

	Maraú, BA	**33.5 ± 1.4** (32.6 - 35.9) N = 5	**60.1 ± 1.7** (57.7 - 62.2) N = 8		**60.1 ± 1.7** (57.7 - 62.2) N = 8		**5.5 ± 0.2** (5.2 - 5.7) N = 5		**8.6 ± 0.4** (7.9 - 8.9) N = 8	
	Pooled data	**40.9 ± 5.1** (30.9 - 49.7) N = 117	**58.1 ± 10.7** (46.9 - 79.5) N = 130		**58.1 ± 6.4** (46.9 - 79.5) N = 128		**6.3 ± 0.7** (4.6 - 8.0) N = 117		**8.2 ± 0.8** (6.6 - 10.4) N = 128	
Glaucomastix abaetensis	Guarajuba, BA	**39.7 ± 4.3** (34.4 - 45.5) N = 9	**64.1 ± 5.3** (54.0 - 73.3) N = 14	**65.4 ± 5.2** (57.8 - 73.3) N = 9	**61.6 ± 5.0** (54.0 - 65.1) N = 5	$F_{1,12} = 1.779$ $R^2 = 0.129$ $P = 0.207$	**6.2 + 0.5** (5.7 - 6.9) N = 9	**9.5 + 0.7** (8.5 - 10.6) N = 8	**8.7 + 0.7** (7.7 - 9.4) N = 5	$F_{1,10} = 7.353$ $R^2 = 0.918$ $P < 0.05$
Ameivula ocellifera	Guarajuba, BA	**39.0 ± 3.4** (32.9 - 45.7) N = 14	**50.2 ± 4.4** (41.3 - 61.8) N = 41	**50.1 ± 5.6** (41.3 - 61.8) N = 21	**50.3 ± 2.7** (45.9 - 56.4) N = 20	$F_{1,39} = 0.026$ $R^2 = 0.001$ $P = 0.872$	**6.2 ± 0.3** (5.5 - 6.7) N = 14	**7.8 ± 0.9** (6.6 - 9.4) N = 21	**7.3 ± 0.3** (6.6 - 8.0) N = 20	$F_{1,39} = 5.468$ $R^2 = 0.123$ $P < 0.05$
	Praia do Porto, SE	**34.3 ± 4.0** (28.8 - 42.1)	**52.7 ± 4.1** (42.4 - 67.9) N = 44	**53.6 ± 5.7** (42.4 - 67.9) N = 18	**52.0 ± 2.4** (48.2 - 58.1) N = 26	$F_{1,42} = 1.720$ $R^2 = 0.039$ $P = 0.197$	**5.9 ± 0.5** (5.3 - 6.9) N = 8	**8.9 ± 1.0** (6.6 - 10.7) N = 18	**7.8 ± 0.3** (7.4 - 8.7) N = 26	$F_{1,42} = 26.451$ $R^2 = 0.622$ $P < 0.001$
	Barra dos Coqueiros, SE	**36.4 ± 3.1** (33.3 - 39.4) N = 3	**50.3 ± 4.2** (41.8 - 57.7) N = 15	**48.7 ± 3.9** (41.8 - 53.5) N = 8	**52.1 ± 4.1** (44.6 - 57.7) N = 7	$F_{1,13} = 2.754$ $R^2 = 0.175$ $P = 0.121$	**5.8 ± 0.5** (5.3 - 6.1) N = 3	**7.8 ± 0.8** (6.6 - 8.9) N = 8	**7.7 ± 0.5** (7.0 - 8.5) N = 7	$F_{1,13} = 0.142$ $R^2 = 0.011$ $P = 0.712$
	Piaçabuçu, AL	**41.0 ± 2.2** (39.2 - 44.1) N = 4	**50.9 ± 4.2** (41.9 - 60.9) N = 36	**51.0 ± 5.5** (41.9 - 60.9) N = 19	**50.7 ± 2.1** (46.2 - 53.4) N = 17	$F_{1,34} = 0.050$ $R^2 = 0.001$ $P = 0.824$	**7.0 ± 1.0** (6.4 - 8.6) N = 4	**8.1 ± 0.9** (6.5 - 9.9) N = 19	**7.7 ± 0.4** (6.8 - 8.2) N = 17	$F_{1,34} = 3.427$ $R^2 = 0.092$ $P = 0.073$
	Genipabu, RN	**34.7 ± 2.3** (31.9 - 39.7) N = 11	**57.6 ± 8.9** (42.3 - 65.5) N = 7	**57.2 ± 10.3** (42.3 - 65.5) N = 4	**58.1 ± 8.9** (47.9 - 64.3) N = 3	$F_{1,5} = 0.015$ $R^2 = 0.003$ $P = 0.906$	**6.2 ± 1.3** (5.4 - 10.0) N = 11	**8.0 ± 2.3** (5.4 - 10.5) N = 4	**8.5 ± 0.9** (7.5 - 9.1) N = 3	$F_{1,5} = 0.123$ $R^2 = 0.024$ $P = 0.740$
	Pooled data	**36.9 ± 3.9** (28.8 - 45.7) N = 40	**51.9 ± 10.8** (41.3 - 67.9) N = 136	**51.5 ± 6.0** (41.3 - 67.9) N = 70	**51.5 ± 3.3** (44.6 - 64.3) N = 73	$F_{1,141} = 0.000$ $R^2 = 0.000$ $P = 0.995$	**6.2 ± 0.8** (5.3 - 10.0) N = 40	**8.2 ± 1.1** (5.4 - 10.7) N = 70	**7.6 ± 0.5** (6.6 - 9.1) N = 73	$F_{1,141} = 14.255$ $R^2 = 0.266$ $P < 0.001$

Table 2. Main prey consumed (based on the highest importance index), percentage of empty stomachs and number of prey types found in the stomachs of each population/species of cnemidophorine studied. Number, volume (mm3) and length (mm) of the largest prey consumed in each population are represented by mean ± standard deviation with amplitude in parenthesis and sample size (N). *Vertebrate prey found in the stomach (one gekkonid lizard at Maricá and one unidentified frog at Jurubatiba, Rio de Janeiro state).

Species	Locality	Main prey	Empty stomachs (%)	Prey types	Nº of prey	Volume of prey	Prey length
Contomastix lacertoides	Joaquina, SC	Ants, spiders and cricket	7.3 (3/41)	11	4.4 + 3.7 (1 – 18) N = 37	189.5 + 185.1 (10.8 - 820.5) N = 37	12.4 + 4.4 3.7-20.5 N = 37
Glaucomastix littoralis	Grussaí, RJ	Insect larvae, cockroaches and spiders	12.5 (3/24)	8	7.0 + 5.1 (1 - 23) N = 21	136.5 + 125.3 (0.1 - 435.5) N = 21	13.4 + 6.7 (3.0 - 34.6) N = 21
	Jurubatiba, RJ	Insect larvae, termites and cockroaches*	6.9 (2/29)	13	19.2 + 25.1 (1 - 96) N = 28	113.9 + 124.1 (2.0 - 509.1) N = 27	23.3 + 52.6 (4.0 - 289.7) N = 28
	Maricá, RJ	Insect larvae, termites and cockroaches*	0 (0/30)	11	37.5 + 52.4 (1 - 181) N = 26	120.6 + 237.3 (0.4 - 1001.7) N = 26	10.6 + 6.4 (1.7 - 22.2) N = 26
Ameivula nativo	Setiba, ES	Insect larvae, termites and spiders	11.1 (4/36)	16	8.5 + 7.5 (1 - 33) N = 34	106.8 + 184.6 (10.0 - 851.4) N = 34	13.1 + 6.2 (1.5 - 24.9) N = 34
	Comboios, ES	Insect larvae, ants and spiders	7.7 (3/39)	16	13.2 + 15.1 (1 - 77) N = 37	15.5 + 16.1 (0.3 -73.9) N = 37	10.7 + 5.3 (2.9 - 21.9) N = 37
	Guriri, ES	Insect larvae, termites and spiders	0 (0/35)	14	30.0 + 35.4 (1 - 134) N = 31	74.5 + 133.7 (0.7 - 516.9) N = 31	9.5 + 5.0 (2.2 - 18.6) N = 31
	Prado, BA	Insect larvae, termites and spiders	0 (0/11)	11	22.6 + 34.7 (1 - 117) N = 10	18.0 + 25.5 (1.1 - 87.1) N = 10	9.5 + 6.6 (1.7 - 18.2) N = 10
	Guaratiba, BA	Insect larvae, termites and spiders	2.7 (3/101)	16	23.9 + 27.7 (1 - 202) N = 98	44.7 + 79.0 (0.8 - 676.9) N = 98	12.0 + 5.7 (1.9 - 32.8) N = 98
	Maraú, BA	Insect larvae, termites and spiders	9.11/11	8	20.7 + 15.3 (2 - 46) N = 11	54.3 + 81.4 (0.7 - 249.4) N = 11	15.9 + 6.2 (0.9 - 23.3) N = 11
Glaucomastix abaetensis	Guarajuba, BA	Termites, spiders and insect larvae	0 (0/23)	9	11.0 + 9.7 (1-32) N = 22	38.3 + 43.2 (1.6 - 131.1) N = 22	7.3 + 3.6 (1.8 - 14.2) N = 22

Ameivula ocellifera	Guarajuba, BA	Insect larvae, termites and crickets	2.2 (1/45)	11	24.3 + 19.6 (1 - 75) N = 44	49.3 + 91.5 (0.9 - 414.7) N = 44	7.5 + 5.7 (1.5 - 25.1) N = 44
	Piaçabuçu, AL	Insect larvae, beatles and termites	5.3 (2/38)	14	20.3 + 21.6 (1 - 125) N = 37	69.9 + 97.7 (0.1 - 423.3) N = 37	13.0 + 5.8 (1.4 - 24.9) N = 37
	Praia do Porto, SE	Insect larvae, spiders and ants	2.0 (1/51)	11	16.2 + 12.4 (1 - 50) N = 46	40.6 + 77.3 (1.0 - 514.0) N = 46	11.1 + 6.0 (2.1 - 26.4) N = 46
	Barra dos Coqueiros, SE	Insect larvae, homoptera and beetles	0 (0/18)	13	12.7 + 8.0 (2 - 31) N = 18	27.5 + 35.5 (1.4 - 143.2) N = 18	10.3 + 5.4 (2.6 - 19.4) N = 18
	Genipabu, RN	Termites, cockroaches and insect larvae	5.9 (1/17)	12	18.1 + 23.4 (1 - 76) N = 16	192.2 + 295.8 (1.4 - 899.4) N = 16	11.3 + 8.8 (2.6 - 35.5) N = 16

Table 3. Differences in number of prey, volume and length ingested by juveniles (J) and adults (A) and by males (M) and females (F) (one-way analysis of variance test - ANOVA) in 15 populations of five cnemidophorine species at restinga habitats throughout Brazilian east coast. Effect of snout-vent length on log volume (V), number (N) and length (L) of prey consumed in each population studied (regression analysis test). Significant results are in bold. *Small sample size.

SPECIES/POPULATIONS	NUMBER OF PREY			VOLUME (largest prey)			LENGTH (largest prey)		
Contomastix lacertoides	ANOVA **J x A**	ANOVA **M x F**	Regression **SVL x N**	ANOVA **J x A**	ANOVA **M x F**	Regression **SVL x V**	ANOVA **J x A**	ANOVA **M x F**	Regression **SVL x L**
Joaquina, SC	*	$F_{1,34} = 2.434$ P = 0.128	$F_{1,35} = 3.879$ P = 0.057	*	$F_{1,34} = 0.079$ P = 0.781	$F_{1,35} = 0.063$ P = 0.803	*	$F_{1,34} = 0.197$ P = 0.660	$F_{1,35} = 2.100$ P = 0.156
Glaucomastix littoralis									
Maricá, RJ	$F_{1,24} = 2.744$ P= 0.111	$F_{1,15} = 0.003$ P = 0.959	$F_{1,24} = 1.698$ P = 0.205	$F_{1,24} = 9.306$ $R^2 = 0.279$ **P < 0.05**	$F_{1,15} = 0.648$ P = 0.433	$F_{1,34} = 12.329$ $R^2 = 0.339$ **P < 0.05**	$F_{1,24} = 6.513$ $R^2 = 0.213$ P < 0.05	$F_{1,15} = 4.109$ R2 = 0.215 P = 0.061	$F_{1,24} = 5.441$ $R^2 = 0.185$ **P < 0.05**
Jurubatiba, RJ	*	$F_{1,25} = 0.735$ P= 0.400	$F_{1,2} = 106.638$ $R^2 = 0.810$ **P < 0.001**	*	$F_{1,25} = 3.662$ $R^2 = 0.128$ P = 0.067	$F_{1,26} = 1.049$ P = 0.315	*	$F_{1,25} = 0.009$ P = 0.926	$F_{1,26} = 0.045$ P = 0.834
Grussaí, RJ	$F_{1,19} = 0.007$ P = 0.933	$F_{1,13} = 0.012$ P = 0.916	$F_{1,19} = 0.017$ P = 0.897	$F_{1,19} = 8.803$ $R^2 = 0.317$ **P < 0.05**	$F_{1,13} = 2.012$ P = 0.180	$F_{1,34} = 2.434$ R2 = 0.433 **P < 0.05**	F1,19 = 3.129 P = 0.093	$F_{1,13} = 1.447$ P = 0.251	$F_{1,19} = 3.234$ P = 0.088
Ameivula nativo									
Setiba, ES	F1,32 = 0.528 P = 0.473	-	F1,32 = 0.217 P = 0.644	F1,32 = 1.720 P = 0.199	-	F1,20 = 1.215 P = 0.283	F1,32 = 7.323 R2 = 0.186 **P < 0.05**	-	F1,20 = 3.677 P = 0.070
Comboios	$F_{1,34} = 1.015$ P = 0.321	-	$F_{1,34} = 0.660$ P = 0.422	$F_{1,34} = 0.125$ P = 0.725	-	F1,34 = 1.132 R2 = 0.032 P = 0.295	$F_{1,34} = 1.777$ P= 0.191	-	$F_{1,34} = 1.132$ P = 0.336
Guriri	$F_{1,29} = 2.828$ P = 0.103	-	$F_{1,29} = 0.271$ P = 0.607	$F_{1,29} = 1.098$ P = 0.303	-	$F_{1,29} = 9.245$ R2 = 0.242 **P < 0.05**	$F_{1,29} = 0.332$ P= 0.569	-	$F_{1,29} = 2.859$ P = 0.102
Prado	*	-	*	*	-	*	*	-	*
Guaratiba	$F_{1,96} = 2.735$ P = 0.101	-	$F_{1,96} = 8.137$ $R^2 = 0.078$ **P < 0.05**	$F_{1,96} = 8.680$ $R^2 = 0.083$ **P < 0.05**	-	$F^{1,96} = 17.611$ $R^2 = 0.155$ **P < 0.001**	$F_{1,96} = 2.505$ P= 0.117	-	$F_{1,96} = 5.123$ $R^2 = 0.051$ **P < 0.05**
Maraú	F1,9 = 14.732 R2 = 0.621 **P < 0.05**	-	F1,9 = 18.246 R2 = 0.670 **P < 0.05**	F1,9 = 12.934 R2 = 0.590 **P < 0.05**	-	F1,9 = 13.837 R2 = 0.606 **P < 0.05**	F1,9 = 7.587 R2 = 0.457 **P < 0.05**	-	F1,9 = 7.634 R2 = 0.459 **P < 0.05**
Ameivula abaetensis	$F_{1,20} = 0.001$ P = 0.975	$F_{1,11} = 0.471$ P = 0.507		$F_{1,20} = 0.223$ P = 0.642	$F_{1,11} = 0.633$ P = 0.443	$F_{1,20} = 0.732$ P = 0.402	$F_{1,20} = 1.415$ P = 0.248	$F_{1,11} = 0.864$ P = 0.372	$F_{1,20} = 1.816$ P = 0.193

Ameivula ocellifera									
Guarajuba, BA	$F_{1,42}$ =0.224 P = 0.638	$F_{1,36}$ = 1.728 P= 0.197	$F_{1,42}$ = 1.825 P = 0.184	$F_{1,42}$ = 0.366 P= 0.548	$F_{1,36}$ = 2.423 P= 0.128	$F_{1,42}$ = 9.187 R^2 = 0.179 **P < 0.05**	$F_{1,42}$ = 0.280 P = 0.599	$F_{1,36}$ = 0.368 P = 0.368	$F_{1,42}$ = 5.323 R^2 = 0.112 **P < 0.05**
Barra dos Coqueiros, SE	*	$F_{1,12}$ = 5.065 R^2 = 0.297 **P < 0.05**	$F_{1,16}$ = 0.765 P = 0.395	*	$F_{1,12}$ = 0.344 P = 0.568 $F_{1,13}$ = 0.318 P = 0.582	$F_{1,16}$ = 1.197 P = 0.290	*	$F_{1,12}$ = 2.101 P = 0.173	$F_{1,42}$ = 0.333 P = 0.572
Praia do Porto, SE	*	$F_{1,38}$ = 0.271 P = 0.606	$F_{1,44}$ = 3.284 P = 0.08	*	$F_{1,38}$ = 1.915 P= 0.175	$F_{1,44}$ = 11.752 R^2 = 0.211 **P < 0.05**	*	F1,38 = 1.395 P = 0.245	$F_{1,44}$ = 5.883 R^2 = 0.118 **P < 0.05**
Piaçabuçu, AL	$F_{1,35}$ = 0.898 P = 0.350	$F_{1,27}$ = 0.952 P = 0.338	$F_{1,35}$ = 0.517 P = 0.477	$F_{1,35}$ = 0.038 P = 0.847	$F_{1,27}$ = 0.117 P = 0.070	$F_{1,35}$ = 1.342 P = 0.255	$F_{1,35}$ = 0.814 P = 0.373	$F_{1,27}$ = 3.271 P= 0.082	$F_{1,35}$ = 0.138 P = 0.712
Genipabu, RN	*	*	$F_{1,14}$ = 0.594 P = 0.454	*	*	$F_{1,14}$ = 11.248 R^2 = 0.445 **P < 0.05**	*	*	$F_{1,14}$= 11.321 R^2 = 0.447 P < 0.05

did not differ in prey length ingested (Table 3). Some *Ameivula nativo* (Setiba, Maraú and Guaratiba) and *Glaucomastix littoralis* populations (Maricá and Grussaí) presented ontogenetic differences in the size of prey consumed (Table 3).

The number, volume and length of the largest prey consumed also varied in terms of the mean SVL for some species/populations (Table 3). The similarity in diet composition varied among different populations/species and formed two distinct groups based on isoptera consumption (Fig. 2). The NMDS-ordination of prey frequency (based on number of prey ingested) showed low values of stress (0.0099) for 2D NMDS plot. The diet of *G. littoralis* from Grussaí differed from the two other populations studied, mainly due to the consumption of few termites and of many gastropoda. *Ameivula ocellifera* diet from Genipabu differed from others population of the same species by the higher consumption of Blattodea (Fig. 2, see attached material). *Ameivula nativo* populations had a geographic difference in the diet by state. *Ameivula nativo* populations from Bahia state were more similar in diet than those populations from Espirito Santo state, being Guriri the exception (the northern population from Espirito Santo state) that was more similar to Bahia state populations (Fig. 1 and 2). The configuration in one dimension represented a great part of original distance between objects for all populations.

Latitude had no influence on the consumption of termites ($F_{1,13}$ = 0.361, P = 0.558) or on prey diversity consumed by lizards (Regression Analysis: $F_{1,13}$ = 0.614, P = 0.477). There was no association between availability of termites in the environment (number of termite nests/ha) and the numerical percentage (r = 0.134, P > 0.05, N = 10) or the frequency of occurrence of termites (r = 0.091, P > 0.05, N = 10) in the diet of the lizards.

The number of termites and insect larvae consumed in each population were not related to each other (Spearman rank correlation, r_s = 0.135, P > 0.05) as well as the volume of termites and larvae ingested (Spearman rank correlation, r_s = 0.109, P > 0.05).

Discussion

Cnemidophorine lizards from restinga areas along the eastern coast of Brazil have food habits consisting predominantly of larvae and/or termites, usually followed by spiders, cricket, ants and beetles. A diet composition characteristic of cnemidophorine species in different seasons and locations (e.g. Vitt, 1991; Vitt *et al.,* 1997; Eifler and Eifler, 1998; Mesquita and Colli, 2003; Menezes *et al.,* 2006; Dias and Rocha, 2007). As phylogenetically close species tend to be similar in foraging mode, the niche conservatism in diet is common in different strains of Squamata that occur in distinct geographic areas (e.g. VanSluys, 1993; Vitt *et al.,* 2003).

Differences in diet composition among the studied cnemidophorine populations/species, partially resulted from the differential consumption of termites among them. The populations with higher consumption of termites in the diet formed a separated group on NMDS graph. *Glaucomastix littoralis,* in the restinga of Grussaí (RJ), consumed few food items, being larvae the only prey category with a high importance index (79.3), which may explain this species, be further from other populations. The population of *C. lacertoides* from restinga da Joaquina (SC), also differed consistently from some populations/species. *Contomastix lacertoides* was the only species that did not consume termites, even though there were termites in the area, having preferences (at least during the study period) for preys such as ants and spiders. However, there are records of frequent consumption of termites and ants by other *C. lacertoides* populations (e.g. Milstead, 1961; Aún and Martori, 1996). In the literature available, only few populations/species of cnemidophorines did not consume termites (e.g. *Cnemidophorus lemniscatus* in Curuá-Una, Amazon – Vitt *et al.,* 1997; *C. nigricolor* in Venezuela – Paulissen and Walker, 1994).

In the present study, the populations/species in which the importance index of termites was not the highest one, larvae formed the most important prey, excepting *C. lacertoides* (Joaquina, SC) which had ants as the most important prey in diet. The high frequency of termites and larvae found in the stomach of most populations, indicate that these prey are the basis of the diet of populations/species of cnemidophorines in the eastern coast of Brazil. Despite the small size of termites, they, together with larvae, seemed to be an important source of energy, being the food items preferred by many populations of cnemidophorine species (including the genus *Aspidoscelis* from North America) (e.g. Pianka, 1970; Paulissen *et al.,* 1988; Vitt, 1991; Mesquita and Colli, 2003; Teixeira-Filho *et al.,* 2003; Dias and Rocha, 2007). The low mobility of larvae and the clustering occurrence of termites tend to compensate the cost

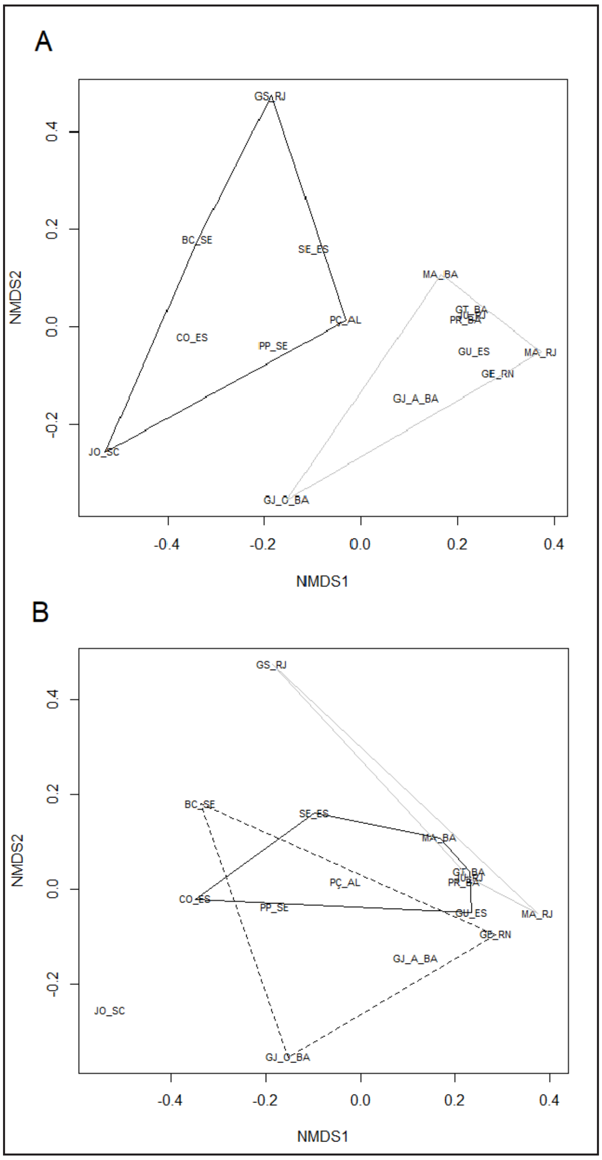

Figure 2. Two-dimensional non-metric multidimensional scaling ordination diagram to show the consumption of prey by cnemidophorines populations/species: A) grouped by isoptera consumption, B) grouped by species. BC_SE (Barra dos Coqueiros, SE), CO_ES (Comboios, ES), GE_RN (Genipabu, RN), GJ_O_BA (Guarajuba - *Ameivula ocellifera*, BA), GJ_A_BA (Guarajuba - *Glaucomastix abaetensis*, BA), GS_RJ (Grussaí, RJ), GT_BA (Guaratiba, BA), GU_ES (Guriri, ES), JO_SC (Joaquina, SC), JU_RJ (Jurubatiba, RJ), MA_BA (Maraú, BA), MA_RJ (Maricá, RJ), PÇ_AL (Piaçabuçu, AL), PP_SE (Praia do Porto, SE), PR_BA (Prado, BA), SE_ES (Setiba, ES).cnemidophorine studied. Number, volume (mm3) and length (mm) of the largest prey consumed in each population are represented by mean ± standard deviation with amplitude in parenthesis and sample size (N). *Vertebrate prey found in the stomach (one gekkonid lizard at Maricá and one unidentified frog at Jurubatiba, Rio de Janeiro state).

of active foraging and prey capture by increasing the efficiency of resource exploitation by these lizards (Pianka, 1986; Schoner, 1971; Nagy *et al.*, 1984; Etheridge and Wit, 1993). As active foragers, cnemidophorine species have ecophysiological and behavioral characteristics (as to extend and retire their tongs fastly during foraging search) that provide them the ability to detect and recognise chemically prey before attacking, favoring the finding of prey with low mobility that are hidden in leaf litter or under the topsoil (Cooper, 1990).

The availability of termites in the restinga area was not a determinant factor in the increase of termite consumption by these lizards, indicating that other factors results in differences of food preferences (especially termites) in the diet. For example, in the restinga of Joaquina (SC) termite nests occurred in a frequency comparable to other areas, but the local population of *C. lacertoides* did not consumed termites. Other studies also showed a lack of relationship between the availability of prey in the environment and the prey consumed by cnemidophorine lizards, indicating a degree of food preference by some populations (e.g. Dearing and Schall, 1992).

According to Pianka (1970), there is a latitudinal variation in the consumption of termites by lizards of the species *Aspidoscelis tigris*, which occurs from the United States to northern Mexico. In this species, populations with a further south distribution consumed higher amounts of Isoptera than northern populations. Parker and Pianka (1975) found the same trend for the species *Uta stansburiana*, which occurs in the same geographic area. In this study, we did not find a latitudinal trend in the diversity of prey consumed or in the consumption of termites by populations.

The intraspecific variations in the SVL of adults among areas were also found in other studies (e.g. Vitt, 1983, 1991; Feltrim, 2002; Mesquita and Colli, 2003; Dias and Rocha, 2007) and probably are due to the interactions of local factors that determine the size of individuals of each species (e.g. Meiri, 2007). There was a biological tendency to increase the mean number of items consumed with the increase of lizard SVL in each population studied. For *G. littoralis* pooled data, there was an increase in the number of items consumed with increasing SVL of lizards, mainly due to the number of termites in the diet. In other species, *A. ocellifera* and *A. nativo*, the relation was reversed, the number of items tended to decrease with the increase in SVL (pooled data), suggesting that larger lizards tend to consume fewer number of prey than smaller lizards, indicating an energy advantage of larger lizards to consume fewer but larger prey (e.g. Díaz and Carrascal, 1993; Brooks *et al.,* 1996) which is supposed made by the lizard to keep a positive energy balance.

The head width size of lizards affected significantly the volume and the length of the larger prey ingested in 60% (3/5) of the species studied. Adults tend to consume larger food items than juveniles, as demonstrated for other species of lizards (e.g. Van Sluys, 1993; Rocha *et al.,* 2004). However, in spite of the significant relationship (for population pooled data), the morphological variables of lizards (SVL and HW) explained less than 20% of the length and of the volume of prey ingested, probably due to the high consumption of termites (that have low size variation). This low or lack of relationship is commonly found for cnemidophorine species (e.g. Mesquita and Colli, 2003; Teixeira-Filho *et al.,* 2003; Menezes *et al.,* 2006).

In general, males and females from different species/populations of cnemidophorines studied consumed basically similar types of prey. However, females had a tendency to consume a greater number of prey in relation to males. In compensation, males had a tendency to consume a greater volume of prey in relation to females, probably due to the tendency of an increased size of the mandible shown by males. There were no differences in SVL between males and females, excepting for *G. littoralis* whose males were comparatively larger than females. Males of all species tended to have a greater head width (HW). This sexual dimorphism on HW between males and females of cnemidophorines, was also found for other species in Brazil (e.g. Vitt, 1983; Vitt *et al.,* 1997; Rocha *et al.,* 2000; Feltrim, 2002; Mesquita and Colli, 2003; Teixeira-Filho *et al.,* 2003; Dias and Rocha, 2007) and probably stems from the fact that males with a greater mandible width can get more advantages during the agonistic interactions with other males of the same species (i.e. result of the intrasexual component of sexual selection) (e.g. Vitt, 1983; Rocha, 1996).

The frequency of lizards with empty stomachs (0% to 7.3%) is consistent which is generally found for cnemidophorine species from different locations (e.g. Teixeira-Filho *et al.,* 2003; Mesquita *et al.,* 2006; Dias dados não publicados). This result suggests a positive energy balance, a constant energy gain (Huey *et al.,* 2001).

We concluded that the eastern populations of cnemidophorine lizards in restinga habitats of Brazil are omnivorous, but consum mainly arthropods, with few consumption of plant material. The high level of importance of termites and larvae in almost all populations/species probably contributed to the low intra-and interspecific differences in food habit. The diet of cnemidophorine species studied in restinga habitats, in general, tend to be similar to that found to other cnemidophorines, regardless its geographic distribution. Males and females of different populations/species tend to have similar diet composition.

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Literature cited

Anderson, R.A. & Karasov, W.H. 1988. Energetics of the lizard *Cnemidophorus tigris* and life history consequences of food-acquisition mode. *Ecological Monographs* 58: 79-110.

Aún, L. & Martori, R. 1996. Características de la biología de *Cnemidophorus serranus* y *Cnemidophorus lacertoides*.

Cuadernos de herpetología 9: 95-99.

Bergallo, H.G. & Rocha, C.F.D. 1994. Spatial and trophic niche differentiation in two sympatric lizards (*Tropidurus torquatus* and *Cnemidophorus ocellifer*) with different foraging tactics. *Australian Journal of Ecology* 19: 72-75.

Brooks, S.J.; Calver, M.C.; Dickman, C.R.; Meathrel, C.E. & Bradley, J.S. 1996. Does intraspecific variation in the energy value of a prey species to its predators matter in studies of ecological energetics? A case study using insectivorous vertebrates. *Écoscience* 3: 247-251.

Cooper, W.E. 1990. Prey odor detection by teiid and lacertid lizards and the relationship of prey odor detection to foraging mode in lizard families. *Copeia* 1990: 237-242.

Cooper, W.E. Jr. & Vitt, L.J. 2002. Distribution, extent, and evolution of plant consumption by lizards. *Journal of Zoology* 257: 487-517.

Dearing, M.D. & Schall, J.J. 1992. Testing models of optimal diet assembly by the generalist herbivorous lizard *Cnemidophorus murinus. Ecology* 73: 845-858.

Dias, E.J.R. & Rocha, C.F.D. 2007. Niche differences between two sympatric whiptail lizards (*Cnemidophorus abaetensis* and *C. ocellifer*, Teiidae) in the restinga habitat of northeastern Brazil. *Brazilian Journal of Biology* 67: 41-46.

Díaz, J.A. & Carrascal, L.M. 1993. Variation in the effect of profitability on prey size selection by the lacertid lizard *Psammodromus algirus*. *Oecologia* 94: 23-29.

Doughty, P. & Shine, R. 1997. Detecting life history trade-offs: measuring energy stores in "capital" breeders reveals costs of reproduction. *Oecologia* 110: 508-513.

Dunham, A.E. 1983. Realized niche overlap, resourceabundance and intensity of interspecific competition: 261–280. *In*: Huey, R.D., Pianka E.R. & Schoener T.W. (ed.), Lizard Ecology, Harvard University. London, UK.

Eifler, D.A. & Eifler, M.A. 1998. Foraging behavior and spacing patterns of the lizard *Cnemidophorus uniparens. Journal of Herpetology* 32: 24-33.

Etheridge, K. & Wit, L.C. 1993. Factors affecting activity in *Cnemidophorus*: 151-162. *In*: Wright, J.W. & Vitt, L.J., Biology of whiptail lizards (Genus *Cnemidophorus*). The Oklahoma Museum of Natural History. Oklahoma, USA.

Feltrim, A.C. 2002. Dimorfismo sexual em *Cnemidophorus lacertoides* (Squamata, Teiidae) do sul da América do Sul. *Phyllomedusa* 1: 75-80.

Flynn, C.N., Menezes V.A. and C. F.D. Rocha. 2020. Do restinga cnemidophorine lizards run on empty along the Brazilian coast? *Brazilian Journal of Biology* 81: 1-4
https://doi.org/10.1590/1519-6984.234318

Goicoechea, N.; Frost, D.R.; Riva, I.; Pellegrino, K.C.M., Sites, J., Rodrigues, M.T. & Padial, J.M. 2016. Molecular systematics of teioid lizards (Teioidea/Gymnophthalmoidea: Squamata) based on the analysis of 48 loci under tree-alignment and similarity-alignment. *Cladistics* 32: n/a-n/a.

Harvey, M.B., Ugueto, G.N. & Gutberlet, R.L. 2012. Review of teiid morphology with a revised taxonomy and phylogeny of the Teiidae (Lepidosauria: Squamata). *Zootaxa* 3459: 1-156.

Howard, A.K., Forester, J.D., Ruder, J.M., Parmerlee, J.S. & Powell, R. 1999. Natural history of a terrestrial Hispaniolan anole: *Anolis barbouri*. *Journal of Herpetology* 33: 702-706.

Huey, R.B. & Pianka, E.R. 1981. Ecological consequences of foraging mode. *Ecology* 62: 991-999.

Huey, R.B., Pianka, E.R. & Vitt, L.J. 2001. How often do lizards "run on empty"? *Ecology* 82: 1-7.

Magnusson, W.E. & Silva, E.V. 1993. Relative effects of size, season and species on the diets of some Amazonian savanna lizards. *Journal of Herpetology* 27: 380-385.

Magnusson, W.E., Paiva, L.J., Rocha, R.M., Franke, C.R., Kasper, L.A. & Lima, A.P. 1985. The correlates of foraging mode in a community of Brazilian lizards. *Herpetologica* 41: 324-332.

Maya, J.E. & Malone, P. 1989. Feeding habits and behavior of the whiptail lizard, *Cnemidophorus tigris tigris*. *Journal of Herpetology* 23: 309-311.

McCune, B. & Grace, J. 2002. Analysis of Ecological Communities. MjM Software Design. USA.

Menezes, V.A., Amaral, V.C., Van Sluys, M. & Rocha, C.F.D. 2006. Diet and foraging of the endemic lizard *Cnemidophorus littoralis* (Squamata, Teiidae) in restinga of Jurubatiba, Macaé - RJ. *Brazilian Journal of Biology* 66: 803-807.

Menezes, V.A., Dutra, G.F. & Rocha, C.F.D. 2008. Feeding habits of the endemic tropical parthenogenetic lizard *Cnemidophorus nativo* (Teiidae) in a restinga area of northeastern Brazil. *Journal of Natural History* 42: 2575-2583.

Menezes, V.A. & Rocha, C.F.D. 2011. Thermal ecology of five Cnemidophorus species (Squamata: Teiidae) in east coast of Brazil. *Journal of Thermal Biology* 36: 232-238.

Menezes, V.A. & Rocha, C.F.D. 2013. Geographic distribution, population densities, and issues on conservation of whiptail lizards in restinga habitats along the eastern coast of Brazil. *North-Western Journal of Zoology* 9: 337-344.

Menezes, V.A., Sluys, M.V., Fontes, A.F. & Rocha, C.F.D. 2011. Living in a caatinga-rocky field transitional habitat: ecological aspects of the whiptail lizard *Cnemidophorus ocellifer* (Teiidae) in northeastern Brazil. *Zoologia* 28: 8-16.

Mesquita, D.O. & Colli, G.R. 2003. The ecology of *Cnemidophorus ocellifer* (Squamata, Teiidae) in a Neotropical Savanna. *Journal of Herpetology* 37: 498-509.

Mesquita, D.O., Colli, G.R., França, F.G.R. & Vitt, L.J. 2006. Ecology of a Cerrado Lizard Assemblage in the Jalapão Region of Brazil. *Copeia* 2006: 460-471.

Milstead, W.W. 1961. Notes on teiid lizard in southern Brazil. *Copeia* 1961: 493-495.

Mitchell, J.C. 1979. Ecology of southeastern Arizona whiptail lizard (*Cnemidophorus*: Teiidae): population densities, resource partitioning, and niche overlap. *Canadian Journal of Zoology* 57: 1487-1499.

Nagy, K.A., Huye, R.B. & Bennett, A.F. 1984. Field energetics and forraging mode of Kalahari lacertid lizards. *Ecology* 65: 588-596.

Parker, W.S. & Pianka, E.R. 1975. Comparative ecology of populations of the lizard *Uta stansburiana. Copeia* 1975: 615-632.

Paulissen, M.A., Walker, J.M. & Cordes, J.E. 1988. Ecology of syntopic clones of the parthenogenetic whiptail lizard, *Cnemidophorus 'laredoensis'*. *Journal of Herpetology* 22: 331-342.

Paulissen, M.A. & Walker, J.M. 1994. Diet of the insular whiptail lizard *Cnemidophorus nigricolor* (Teiidae) from Grand Rocques Island, Venezuela. *Journal of Herpetology* 28: 524-526.

Pianka, E.R. 1970. Comparative autoecology of the lizard *Cnemidophorus tigris* in different parts of its geographic range. *Ecology* 51: 703-720.

Pianka, E.R. 1977. Reptilian species diversity: 1-34. *In*: Gans, C. & Tinkle ,D.W., Biology of the Reptilia. Academic Press.

New York, USA.
Pianka, E.R. 1986. Ecology and natural history of desert lizards. Princeton University. New Jersey.
Punzo, F. 1990. Feeding ecology of the six-lined racerunner (*Cnemidophorus sexlineatus*) in southern Florida. *Herpetological Review* 21: 33-35.
Pyron, R., Burbrink, F.T. & Wiens, J.J. 2013. A phylogeny and revised classification of Squamata, including 4161 species of lizards and snakes. *BMC Evolutionary Biology* 13: 93.
Reeder, T.W., Cole, C.J. & Dessauer, H.C. 2002. Phylogenetic relationships of whiptail lizards of the genus *Cnemidophorus* (Squamata: Teiidae): a test of monophyly, reevaluation of karyotypic evolution, and review of hybrid origins. *American Museum Novitates* 3365: 1-61.
Rocha, C.F.D. 1996. Sexual dimorphism in the sand lizard *Liolaemus lutzae* of southeastern Brazil: 131–140. *In*: Pefaur, J.E. (ed.), Herpetologia Neotropical. Consejo de Publicaciones. Universidad de Los Andes. Merida.
Rocha, C.F.D., Araújo, A.F.B., Vrcibradic, D. & Costa, E.M.M. (2000). New *Cnemidophorus* (Squamata; Teiidae) from coastal Rio de Janeiro state, southeastern Brazil. *Copeia* 2000: 501-509.
Rocha, C.F.D., Van-Sluys M., Vrcibradic, D., Hatano, F.H., Galdino, C.A., Cunha-Barros, M. & Kieffer, M.C. 2004. A comunidade de répteis da Restinga de Jurubatiba: 179-198. *In*: Rocha, C.F.D., Esteves F.A. & Scarano F.R. (ed.), Pesquisas ecológicas de longa duração na Restinga de Jurubatiba: ecologia, história natural e conservação. RiMa Editora. São Carlos, SP.
Schall, J.J. & Ressel, S. 1991. Toxic plant compounds and the diet of the predominantly herbivorous lizard, *Cnemidophorus arubensis*. *Copeia* 1991: 111–119.
Siqueira, C.C., Kiefer, M.C., Sluys, M.V. & Rocha, C.F.D. 2013. Variation in the diet of the lizard Tropidurus torquatus along its coastal range in Brazil. Biota Neotropica 13: 93-101.
Suguio, K. & Tessler, M.G. 1984. Planícies de cordões litorâneos quaternários do Brasil: origem e nomenclatura: 15-25. *In*: Lacerda, L.D., Araujo D.S.D., Cerqueira R. & Turcq B. (ed.), Restingas, origem, estrutura, processos. Universidade Federal Fluminense Press. Niterói, RJ.
Teixeira-Filho, P.F., Rocha, C.F.D. & Ribas, S.C. 2003. Relative feeding specialization may depress ontogenetic, seasonal and sexual variations in diet: the endemic lizard *Cnemidophorus littoralis* (Teiidae). *Brazilian Journal of Biology* 63: 321-28.
Van Sluys, M. 1993. The reproductive cycle of *Tropidurus itambere* (Sauria: Tropiduridae) in southeastern Brazil. *Journal of Herpetology* 27: 28-32.
Vitt, L.J. 1983. Reproduction and sexual dimorphism in the tropical teiid lizard *Cnemidophorus ocellifer*. *Copeia* 1983: 359-366.
Vitt, L.J. 1991. An introduction of the ecology of cerrado lizards. *Journal of Herpetology* 25: 79–90.
Vitt, L.J., Pianka, E.R., Cooper, W.E. Jr. & Schwenk, K. 2003. History and the global ecology of squamate reptiles. *American Naturalist* 162: 44–60.
Vitt, L.J. & Caldwell, J.P. 1993. Ecological observations on Cerrado lizards in Rondônia Brazil. *Journal of Herpetology* 27: 46-52.
Vitt, L.J., Zani, P.A., Caldwell, J.P., Araújo, M.C. & Magnusson, W.E. 1997. Ecology of whiptail lizards (*Cnemidophorus*) in the Amazon Region of Brazil. *Copeia* 4: 745-757.
Vitt, L.J., Zani, P.A., Ávila-Pires, T.C.S. & Espósito, M.C. 1998. Geographical ecology of the gymnophtalmid lizard Neusticurus ecpleopus in the Amazon rain forest. *Canadian Journal of Zoology* 76: 1671-1680.
Vitt, L.J., Zani, P.A., Caldwell, J.P. & Durtsche, R.D. 1993. Ecology of the whiptail lizard *Cnemidophorus deppii* on a tropical beach. *Canadian Journal of Zoology* 71: 2391–2400.
Wilkinson, L. 1990. SYSTAT: The system for statistics. Evanston. USA.
Wright, J. W. 1993. Evolution of the lizards of the genus *Cnemidophorus*: 28-81. *In*: Wright, J.W. & Vitt, L.J. (ed.), Biology of whiptail lizards (Genus *Cnemidophorus*). The Oklahoma Museum of Natural History Press. Oklahoma, USA.
Zar, J.H. 1999. Biostatistical Analysis. Upper Saddle River. New Jersey.

Appendix

Number (N), volume (V) (in mm3) and frequency (F) of each prey category consumed by each cnemidophorine species studied at restinga habitats along the Brazilian east coast. Ix = importance index of each prey category in diet (most important prey are in bold). (In portuguese).

Contomastix lacertoides	**Joaquina, SC (N = 38)**			
ITEM	**N (%)**	**V (%)**	**F (%)**	**IX**
Gastropoda	1 (0.6)	37.9 (0.2)	1 (2.6)	1.1
Arachnida				
Araneae	**56 (34.6)**	**3116.0 (16.1)**	**20 (52.6)**	**34.4**
Acari	9 (5.6)	12.0 (>0.1)	7 (18.4)	7.9
Hexapoda				
Orthoptera	7 (4.3)	1449.4 (7.5)	7 (18.4)	10.1
Blattodea	1 (0.6)	43.8 (0.2)	1 (2.6)	1.1

Hemiptera	2 (1.2)	12.5 (>0.1)	1 (2.6)	1.2
Coleoptera				
Adultos	6 (3.7)	182.4 (1.0)	5 (13.2)	5.9
Larvas	2 (1.2)	78.5 (0.4)	2 (5.3)	2.2
Hymenoptera				
Formicidae	**71 (43.8)**	**8417.4 (43.7)**	**22 (57.9)**	**48.5**
Outros	1 (0.6)	12.1 (>0.1)	1 (2.6)	1.0
Larvas de Lepidoptera	4 (2.5)	151.7 (0.8)	4 (10.5)	4.5
Diptera				
Adultos	1 (0.6)	66.8 (0.3)	1 (2.6)	1.1
Larvas	1 (0.6)	9.4 (>0.1)	1 (2.6)	1.0
Total de larvas	7 (4.3)	239.6 (1.2)	6 (15.8)	7.3
Artropodes não Identificados	-	5705.2 (29.6)	-	-
TOTAL	162	19295.8		

Glaucomastix littoralis	**Maricá, RJ (N = 30)**				**Jurubatiba, RJ (N = 29)**				**Grussaí, RJ (N = 24)**			
ITEM	**N (%)**	**V (%)**	**F (%)**	**I_x**	**N (%)**	**V (%)**	**F (%)**	**I_x**	**N (%)**	**V (%)**	**F (%)**	**I_x**
Gastropoda									10 (6.8)	87.0 (1.3)	7 (29.2)	12.4
Arachnida												
Araneae	6 (0.6)	123.1 (1.6)	5.0 (16.7)	6.3	17 (3.0)	41.7 (0.5)	5 (17.2)	6.9	8 (5.4)	122.2 (1.8)	7 (29.2)	12.1
Pseudoscorpiones					1 (0.2)	0.6 (0.0)	1.0 (3.4)	1.2				
Malacostraca												
Isopoda	2 (0.2)	11.5 (0.2)	2.0 (6.7)	2.3	8 (1.4)	67.8 (0.9)	4.0 (13.8)	5.4				
Chilopoda									1 (0.7)	30.6 (0.5)	1 (4.2)	1.8
Hexapoda												
Thysanura	1 (0.1)	3.1 (0.04)	1.0 (3.3)	1.2								
Orthoptera	2 (0.2)	3.9 (0.1)	2.0 (6.7)	2.3	6 (1.1)	88.7 (1.2)	5.0 (17.2)	6.5				
Isoptera	**879 (90.8)**	**2089.4 (27.5)**	**22.0 (73.3)**	**63.9**	**378 (67.3)**	**815.7 (10.8)**	**21.0 (72.4)**	**50.2**	6 (4.1)	7.5 (0.1)	1 (4.2)	2.8
Operário	870 (89.9)	2048.1 (27.0)	22.0 (73.3)	63.4	378 (67.3)	815.7 (10.8)	21.0 (72.4)	50.2	6 (4.1)	7.5 (0.1)	1 (4.2)	2.8
Soldado	9 (0.9)	41.3 (0.5)	4.0 (13.3)	4.9								
Blattodea	**11 (1.1)**	**3649.3 (48.1)**	**6.0 (20.0)**	**23.1**	**14 (2.5)**	**840.4 (11.2)**	**7.0 (24.1)**	**12.6**	**5 (3.4)**	**1649.2 (24.7)**	**3 (12.5)**	**13.5**
Hemiptera					7 (1.2)	225.5 (3.0)	3.0 (10.3)	4.8				
Homoptera	2 (0.2)	2.9 (0.04)	2.0 (6.7)	2.3	2 (0.4)	29.9 (0.4)	2.0 (6.9)	2.6				
Coleoptera												
Adultos	4 (0.4)	314.1 (4.1)	4.0 (13.3)	6.0	7 (1.2)	154.8 (2.1)	4.0 (13.8)	5.7	2 (1.4)	29.8 (0.4)	2 (8.3)	3.4

Larvas	40 (4.1)	424.6 (5.6)	11.0 (36.7)	15.5	35 (6.2)	186.1 (2.5)	6.0 (20.7)	9.8	41 (27.7)	257.8 (3.6)	16 (66.7)	32.7
Neuroptera												
Adultos					2 (0.4)	289.8 (3.8)	1.0 (3.4)	2.5				
Larvas	4 (0.4)	99.5 (1.3)	2.0 (6.7)	2.8	8 (1.4)	293.2 (3.9)	4.0 (13.8)	6.4	72 (48.6)	4442.4 (66.4)	18 (75.0)	63.4
Hymenoptera Formicidae	6 (0.6)	62.7 (0.8)	3.0 (10.0)	3.8	4 (0.7)	2.5 (0.0)	3.0 (10.3)	3.7	3 (2.0)	7.2 (0.1)	2 (8.3)	3.5
Hexapoda												
Larvas de Lepidoptera	6 (0.6)	47.2 (0.6)	5.0 (16.7)	6.0	29 (5.2)	1923.2 (25.6)	15.0 (51.7)	27.5				
Diptera					2 (0.4)	0.5 (0.0)	2.0 (6.9)	2.4				
Larvas não identificadas					3 (0.5)	13.6 (0.2)	3.0 (10.3)	3.7				
Total de larvas	**50 (5.2)**	**571.3 (7.5)**	**17 (56.7)**	**23.1**	**75 (13.4)**	**2416.1 (32.2)**	**19 (65.5)**	**37.0**	**113 (76.3)**	**4700.2 (70.0)**	**22 (91.7)**	**79.3**
Ooteca					1 (0.2)	4.7 (0.1)	1.0 (3.4)	1.2				
Pupa					7 (1.2)	495.7 (6.6)	4.0 (13.8)	7.2				
Casulo					1 (0.2)	7.1 (0.1)	1.0 (3.4)	1.2				
Artropodes não Identificados		401.4 (5.3)				2850.1 (24.6)				53.1 (0.8)		
Material Vegetal												
Frutos	1 (0.1)	80.5 (1.1)	1.0 (3.3)	1.5								
Folhas	3 (0.3)	11.0 (0.1)	3.0 (10.0)	3.5								
Outros		6.0				10.4 (0.1)	3.0 (10.3)					
Lacertilia					1 (0.2)	177.0 (2.3)	1.0 (3.4)	2.0				
Amphibia	1 (0.1)	255.0 (3.4)	1.0 (3.3)	2.3								
TOTAL	968	7585.1			559	7519.0			148	6686.9		

Ameivula nativo	**Setiba, ES (N =36)**				**Comboios, ES (N = 39)**				**Guriri, ES (N = 35)**			
ITEM	**N (%)**	**V (%)**	**F (%)**	I_x	**N (%)**	**V (%)**	**F (%)**	I_x	**N (%)**	**V (%)**	**F (%)**	I_x
Gastropoda	1 (0.4)	9.2 (0.1)	1 (2.8)	1.1	7 (1.4)	26.5 (0.7)	2 (5.1)	2.4	8 (0.9)	46.0 (0.7)	6 (17.1)	6.2
Arachnida												
Araneae	38 (13.4)	287.4 (4.1)	18 (50.0)	22.5	76 (15.5)	505.4 (13.0)	28 (71.8)	33.4	17 (1.8)	87.7 (1.4)	10 (28.6)	10.6
Opiliones					3 (0.6)	1.2 (0.03)	2 (5.1)	1.9				
Acari	1 (0.4)	0.008 (0.0)	1 (2.8)	1.0					1 (0.1)	0.1 (0.0)	1 (2.9)	1.0

Pseudoscorpiones					1 (0.2)	0.4 (0.01)	1 (2.6)	0.9	2 (0.2)	1.2 (0.02)	2 (5.7)	2.0
Malacostraca												
Isopoda	2 (0.7)	11.0 (0.1)	1 (2.8)	1.2	1 (0.2)	7.2 (0.2)	1 (2.6)	1.0				
Diplopoda	1 (0.4)	2.6 (0.04)	1 (2.8)	1.1								
Hexapoda												
Thysanura					3 (0.6)	17.0 (0.4)	3 (7.7)	2.9				
Orthoptera												
Adultos	5 (1.8)	152.4 (2.1)	4 (11.1)	5.0	8 (1.6)	65.6 (1.7)	7 (17.9)	7.0	2 0.2)	6.5 (0.1)	2 (5.7)	2.0
Ninfa	1 (0.4)	8.0 (0.1)	1 (2.8)	1.1								
Isoptera	74 (26.1)	140.4 (2.0)	11 (30.5)	19.6	34 (6.9)	63.6 (1.7)	5 (12.8)	7.1	672 (72.9)	1158.9 (18.3)	20 (57.1)	49.4
Operário	74 (26.1)	140.4 (2.0)	11 (30.5)	19.6	32 (6.5)	61.2 (1.6)	5 (12.8)	7.0	669 (72.6)	1152.2 (18.2)	20 (57.1)	49.3
Soldado					2 (0.4)	2.4 (0.1)	1 (2.6)	1.0	3 (0.3)	6.7 (0.1)	2 (5.7)	2.0
Mantodea									1 (0.1)	12.1 (0.2)	1 (2.9)	1.1
Blattodea	21 (7.4)	3096.5 (43.8)			2 (0.4)	155.7 (4.0)	2 (5.1)	3.2	15 (1.6)	3226.2 (51.0)	5 (14.3)	22.3
Hemiptera	1 (0.4)	13.7 (0.2)	1 (2.8)	1.1	4 (0.8)	41.1 (1.0)	4 (10.2)	4.0	3 (0.3)	29.4 (0.5)	3 (8.6)	3.1
Homoptera	2 (0.7)	11.2 (0.2)	2 (5.5)	2.1	6 (1.2)	8.5 (0.2)	5 (12.8)	4.7	13 (1.4)	139.5 (2.2)	8 (22.9)	8.8
Adultos					5 (1.0)	8.5 (0.2)	4 (10.2)	3.8				
Ninfa					1 (0.2)	1.2 (0.03)	1 (2.6)	0.9				
Coleoptera												
Adultos	8 (2.8)	284.8 (4.0)	7 (19.4)	8.8	50 (10.2)	510.7 (13.1)	15 (38.5)	20.6	7 (0.8)	76.6 (1.2)	7 (20.0)	7.3
Larvas	66 (23.3)	1235.2 (17.5)	17 (47.2)	29.3	73 (14.9)	678.5 (17.5)	21 (53.8)	28.7	39 (4.2)	345.1 (5.5)	15 (42.9)	17.5
Neuroptera												
Larvas	4 (1.4)	118.0 (1.7)	2 (5.5)	2.9	4 (0.6)	50.3 (1.0)	4 (10.2)	3.9	11 (1.2)	132.3 (2.1)	5 (14.3)	5.9
Hymenoptera												
Formicidae	17 (6.0)	19.3 (0.3)	9 (25.0)	10.4	180 (36.8)	217.2 (5.6)	23 (59.0)	33.8	115 (12.5)	88.7 (1.4)	11 (31.4)	15.1
Outros	1 (0.4)	2.9 (0.04)	1 (2.8)	1.1								
Lepidoptera												
Adultos					3 (0.6)	76.4 (2.0)	2 (5.1)	2.5	1 (0.1)	43.9 (0.7)	1 (2.9)	1.2
Larvas	20 (7.1)	820.6 (11.6)	14 (38.9)	19.2	13 (2.6)	322.4 (8.3)	10 (25.6)	12.2	12 (1.3)	175.2 (2.8)	10 (28.6)	10.9
Diptera												
Adultos	3 (1.1)	1.2 (0.02)	2 (5.5)	2.2	3 (0.6)	39.8 (1.0)	3 (7.7)	3.1				

Larvas não identificadas	11 (3.9)	79.8 (1.1)	8 (22.2)	9.1	5 (1.0)	34.2 (0.9)	2 (5.1)	2.3				
Total de larvas	**101 (35.7)**	**2253.6 (31.9)**	**26 (72.2)**	**46.6**	**95 (19.1)**	**1085.4 (27.7)**	**28 (71.8)**	**39.5**	**62 (6.7)**	**652.6 (10.4)**	**20 (57.1)**	**24.7**
Ovo	3 (1.1)	2.7 (0.04)	1 (2.8)	1.3								
Pupa									1 (0.1)	146.9 (2.3)	1 (2.9)	1.8
Artropodes não Identificados		688.6 (9.7)				1050.7				561.7 (8.9)		
Material Vegetal												
Flores												
Frutos												
Sementes	3 (1.1)	28.6 (0.4)	2 (5.5)	2.3	13 (2.6)	11.3 (0.3)	4 (10.2)	4.4	2 (0.2)	19.6 (0.3)	2 (5.7)	2.1
Folhas												
Outros		56.1 (0.8)	3 (8.3)	3.4						25.5 (0.4)	7 (20.0)	
TOTAL	283	7070.2			489	3884.9			922	6322.9		

Ameivula nativo	**Prado, BA (N = 11)**				**Guaratiba, BA (N = 101)**				**Maraú, BA (N = 11)**			
ITEM	**N (%)**	**V (%)**	**F (%)**	**IX**	**N (%)**	**V (%)**	**F (%)**	**IX**	**N (%)**	**V (%)**	**F (%)**	**IX**
Gastropoda									1 (0.4)	0.6 (0.02)	1 (9.1)	3.2
Arachnida												
Araneae	**12 (5.3)**	**43.5 (4.2)**	**8 (72.7)**	**27.4**	**59 (2.6)**	**486.3 (3.1)**	**37 (36.6)**	**14.1**	**9 (4.0)**	**15.6 (0.4)**	**6 (54.5)**	**19.7**
Opiliones	1 (0.4)	12.0 (1.2)	1 (9.1)	3.6								
Pseudoscorpiones					3 (0.1)	0.9 (0.01)	3 (3.0)	1.0	1 (0.4)	0.2 (0.01)	1 (9.1)	3.2
Diplopoda					1 (0.04)	8.2 (0.05)	1 (1.0)	0.4				
Hexapoda												
Orthoptera												
Adultos					4 (0.2)	26 (0.2)	4 (4.0)	1.5				
Ninfa	2 (0.9)	21.0 (2.0)	2 (18.2)	7.0	1 (0.04)	5.0 (0.03)	1 (1.0)	0.3				
Isoptera	**161 (70.9)**	**512.5 (49.5)**	**5 (45.4)**	**55.3**	**1690 (75.0)**	**5925.0 (38.4)**	**72 (71.3)**	**61.6**	**142 (62.8)**	**870.8 (23.9)**	**10 (90.9)**	**59.2**
Operário	160 (70.8)	511.3 (49.4)	5 (45.4)	55.2	1463 (64.9)	3737.2 (24.2)	62 (61.4)	50.2	142 (62.8)	870.8 (23.9)	10 (90.9)	59.2
Soldado	1 (0.4)	1.2 (0.1)	1 (9.1)	3.2	16 (0.7)	28.0 (0.2)	8 (7.9)	2.9				
Alado					211 (9.4)	2159.8 (14.0)	16 (15.8)	13.1				
Blattodea	1 (0.4)	1.6 (0.1)	1 (9.1)	3.2	11 (0.5)	1098.4 (7.1)	5 (4.9)	4.2				

Hemiptera					9 (0.4)	315.2 (2.0)	7 (6.9)	3.1	1 (0.4)	18.4 (0.5)	1 (9.1)	3.3
Homoptera	3 (1.3)	3.8 (0.4)	2 (18.2)	6.6	11 (0.5)	26.2 (0.2)	10 (9.9)	3.5				
Psocoptera					1 (0.04)	2.5 (0.02)	1 (1.0)	1.1				
Mallophaga					1 (0.04)	31.9 (0.2)	1 (1.0)	0.4				
Coleoptera												
Adultos	3 (1.3)	29.4 (2.8)	2 (18.2)	7.5	22 (1.0)	272.3 (1.8)	19 (18.8)	7.2	5 (2.2)	196.6 (5.4)	4 (36.4)	14.7
Larvas	16 (7.1)	106.8 (10.3)	6 (54.5)	24.0	207 (9.2)	2381.5 (15.4)	64 (63.4)	29.3	52 (23.0)	951.3 (26.1)	8 (72.7)	40.6
Neuroptera												
Larvas	3 (1.3)	142.0 (13.7)	2 (18.2)	11.1	86 (3.8)	1946.3 (12.6)	38 (37.6)	18.0	3 (1.3)	280.9 (7.7)	3 (27.3)	12.1
Hymenoptera												
Formicidae	8 (3.5)	14.6 (1.4)	2 (18.2)	7.7	33 (1.5)	66.1 (0.4)	11 (10.9)	4.3				
Outros	4 (1.8)	0.4 (0.04)	1 (9.1)	3.6	2 (0.1)	173.1 (1.1)	2 (2.0)	1.1				
Lepidoptera												
Adultos									1 (0.4)	4.0 (0.1)	1 (9.1)	3.2
Larvas	7 (3.1)	82.1 (7.9)	4 (36.4)	15.8	80 (3.5)	1777.1 (11.5)	34 (33.7)	16.2	9 (4.0)	253.5 (7.0)	4 (36.4)	15.8
Díptera					2 (0.1)	91.3 (0.6)	1 (1.0)	0.6				
Larvas não identificadas	1 (0.4)	1.1 (0.1)	1 (9.1)	3.2	3 (0.1)	13.4 (0.1)	2 (2.0)	0.7	2 (0.9)	2.5 (0.1)	2 (18.2)	6.4
Total de larvas	**27 (11.9)**	**252.0 (24.4)**	**7 (63.6)**	**33.3**	**378 (16.8)**	**6209.6 (40.2)**	**84 (83.2)**	**46.7**	**66 (29.2)**	**1488.2 (40.9)**	**11 (100.0)**	**56.7**
Ovo	4 (1.8)	1.0 (0.1)	1 (9.1)	3.7	10 (0.4)	46.6 (0.3)	2 (2.0)	0.9				
Pupa					19 (0.8)	436.3 (2.8)	12 (11.9)	5.2				
Artrópodes não Identificados		59.9 (5.8)				305.6 (2.0)				1048.9 (28.8)		
Restos de material vegetal		2.3 (0.2)	1 (9.1)							0.01 (0.0)	1 (9.1)	
TOTAL	226	1034.2			2255	15435.15			226	3643.4		

Glaucomastix abaetensis	**Guarajuba, BA (N = 23)**			
ITEM	**N (%)**	**V (%)**	**F (%)**	**I_x**
Arachnida				
Araneae	**39 (16.3)**	**244.9 (9.2)**	**15 (65.2)**	**30.2**
Hexapoda				
Orthoptera				
Adulto	14 (5.8)	369.9 (13.8)	8 (34.8)	18.2
Ninfa	3 (1.3)	8.8 (0.3)	2 (8.7)	3.4
Isoptera	**144 (60.7)**	**796.9 (29.8)**	**18 (78.3)**	**56.3**
Operário	138 (57.5)	746.0 (27.9)	18 (78.3)	54.6
Soldado	6 (2.5)	50.9 (1.9)	4 (17.4)	7.3
Blattodea				
Adulto	2 (0.8)	196.2 (7.3)	2 (8.7)	5.6
Ninfa	1 (0.4)	5.1 (0.2)	1 (4.3)	1.7
Hemiptera	4 (1.7)	4.6 (0.2)	1 (4.3)	2.1
Coleoptera				
Adultos	20 (8.3)	203.5 (7.6)	5 (21.7)	12.6
Larvas	2 (0.8)	17.8 (0.7)	2 (8.7)	3.4
Hymenoptera Formicidae	1 (0.4)	0.1 (0.004)	1 (4.3)	1.6
Lepidoptera (larva)	7 (2.9)	100.9 (3.8)	6 (26.1)	10.9
Diptera (adulto)	2 (0.8)	2.1 (0.1)	2 (8.7)	3.2
Artropodes não Identificados		622.3 (23.3)		
Total de larvas	**10 (4.1)**	**212.5 (8.0)**	**7 (30.4)**	**14.2**
Larvas não identificadas	1 (0.4)	93.8 (3.5)	1 (4.3)	2.8
Material Vegetal		6.4 (0.2)	4 (17.4)	
TOTAL	240	2673.5		

Ameivula ocellifera	**Guarajuba, BA (N = 45)**				**Barra dos Coqueiros, SE (N = 18)**				**Praia do Porto, SE (N = 51)**			
ITEM	**N (%)**	**V (%)**	**F (%)**	**I_x**	**N (%)**	**V (%)**	**F (%)**	**I_x**	**N (%)**	**V (%)**	**F (%)**	**I_x**
Gastropoda					6 (2.6)	45.5 (2.5)	5 (27.8)	11.0				
Arachnida												
Araneae	57 (5.3)	683.0 (8.1)	24 (53.3)	22.3	20 (8.8)	38.8 (2.2)	11 (61.1)	24.0	**111 (14.9)**	**210.8 (3.8)**	**35 (68.6)**	**29.1**
Acari					3 (1.3)	5.6 (0.3)	2 (11.1)	4.2				
Pseudoscorpiones					1 (0.4)	0.4 (0.02)	1 (5.5)	2.0				
Hexapoda												
Thysanura					3 (1.3)	9.2 (0.5)	3 (16.7)	6.2				
Odonata									1 (0.1)	44.2 (0.8)	1 (2.0)	1.0

Orthoptera												
Adultos	**69 (6.5)**	**1818.4 (21.6)**	**21 (46.7)**	**24.9**					13 (1.7)	108.1 (2.0)	9 (17.6)	7.1
Ninfa	14 (1.3)	122.0 (1.5)	3 (6.7)	3.1					1 (0.1)	1.4 (0.03)	1 (2.0)	0.7
Isoptera operário	**782 (73.2)**	**3732.5 (44.4)**	**35 (77.8)**	**65.1**	9 (3.9)	12.1 (0.7)	4 (22.2)	8.9	163 (21.8)	221.0 (4.0)	24 (47.1)	24.3
Mantodea									1 (0.1)	8.3 (0.2)	1 (2.0)	0.7
Blattodea	3 (0.3)	64.3 (0.8)	3 (6.7)	2.6								
Hemiptera												
Adultos	13 (1.2)	46.0 (0.5)	8 (17.8)	6.5	1 (0.4)	2.8 (0.1)	1 (5.5)	2.0	13 (1.7)	180.1 (3.3)	10 (19.6)	8.2
Ninfa	4 (0.4)	66.3 (0.8)	3 (6.7)	2.6					2 (0.3)	7.7 (0.1)	2 (3.9)	1.4
Homoptera												
Adultos	6 (0.6)	30.7 (0.4)	4 (8.9)	3.3	**65 (28.5)**	**110.6 (6.2)**	**13 (72.2)**	**35.6**	21 (2.8)	442.8 (8.0)	15 (29.4)	13.4
Ninfa	5 (0.5)	35.7 (0.4)	3 (6.7)	2.5					2 (0.3)	14.7 (0.3)	1 (2.0)	0.8
Coleoptera												
Adultos	40 (3.7)	164.6 (2.0)	13 (28.9)	11.5	**30 (13.1)**	**141.2 (7.9)**	**16 (88.9)**	**36.6**	78 (10.4)	1046.5 (19.0)	29 (56.9)	28.8
Larvas	20 (1.9)	516.2 (6.1)	15 (33.3)	13.8					6 (0.8)	20.2 (0.4)	6 (11.8)	4.3
Neuroptera												
Larvas	1 (0.1)	18.7 (0.2)	1 (2.2)	0.8								
Hymenoptera												
Formicidae	15 (1.4)	13.9 (0.2)	8 (17.8)	6.4	11 (4.8)	10.2 (0.6)	7 (38.9)	14.8	**148 (19.8)**	**129.5 (2.4)**	**29 (56.9)**	**26.3**
Outros					1 (0.4)	1.2 (0.1)	1 (5.5)	2.0				
Lepidoptera												
Adultos	1 (0.1)	0.05 (0.0)	1 (2.2)	0.8	2 (0.9)	7.8 (0.4)	2 (11.1)	4.1	11 (1.5)	373.1 (6.8)	8 (15.7)	8.0
Larvas	30 (2.8)	385.1 (4.6)	18 (40.0)	15.8	59 (25.9)	732.3 (40.8)	15 (83.3)	50.0	99 (13.3)	1352.1 (24.5)	32 (62.7)	33.5
Diptera												
Adultos	3 (0.3)	50.7 (0.6)	2 (4.4)	1.8	5 (2.2)	7.7 (0.4)	2 (11.1)	4.6	2 (0.3)	518.4 (9.4)	2 (3.9)	4.5
Larva					1 (0.4)	2.4 (0.1)	1 (5.5)	2.0				
Ninfa									1 (0.1)	8.5 (0.2)	1 (2.0)	0.8
Larvas não identificadas	5 (0.5)	100.3 (1.2)	5 (11.1)	4.3					5 (0.7)	29.9 (0.5)	4 (7.8)	3.0
Total de larvas	**56 (5.3)**	**1020.3 (12.1)**	**27 (60.0)**	**25.8**	**60 (26.3)**	**734.7 (40.9)**	**15 (83.3)**	**50.2**	**110 (14.8)**	**1402.2 (25.4)**	**35 (68.6)**	**36.3**
Ovo									5 (0.7)	0.8 (0.02)	3 (5.9)	2.2
Pupa					1 (0.4)	5.2 (0.3)	1 (5.5)	2.1	2 (0.3)	45.6 (0.8)	2 (3.9)	1.7

Artropodes não Identificados		543.6 (6.5)				654.0 (36.4)						
Material Vegetal										603.3 (10.9)		
Flores	1 (0.1)	7.9 (0.1)	1 (2.2)	0.8					3 (0.4)	16.3 (0.3)	3 (5.9)	2.2
Frutos									1 (0.1)	30.5 (0.6)	1 (2.0)	0.9
Sementes					10 (4.4)	8.1 (0.4)	2 (11.1)	5.3	54 (7.2)	53.3 (1.0)	15 (29.4)	12.5
Folhas									4 (0.5)	15.0 (0.3)	3 (5.9)	2.2
Outros		13.8 (0.2)	2 (4.4)							27.5 (0.5)	5 (9.8)	
TOTAL	1069	8413.8			228	1795.1			747	5509.9		

Ameivula ocellifera	**Piaçabuçu, AL (N = 38)**				**Genipabu, RN (N = 17)**			
ITEM	**N (%)**	**V (%)**	**F (%)**	**I_x**	**N (%)**	**V (%)**	**F (%)**	**I_x**
Gastropoda	6 (0.7)	12.4 (0.2)	6 (15.8)	5.6	2 (0.7)	8.7 (0.2)	2 (11.8)	4.2
Arachnida								
Araneae	31 (4.0)	116.0 (1.6)	20 (52.6)	19.4	3 (1.0)	51.7 (1.0)	2 (11.8)	4.6
Diplopoda	8 (1.0)	15.9 (0.2)	4 (10.5)	3.9				
Hexapoda								
Orthoptera								
Adultos	10 (1.3)	742.8 (10.1)	9 (23.7)	11.7	5 (1.7)	1778.7 (33.8)	5 (29.4)	21.7
Isoptera	**280 (36.5)**	**722.4 (9.8)**	**16 (42.1)**	**29.5**	**237 (81.7)**	**405.4 (7.7)**	**8 (47.1)**	**45.5**
Operário	277 (36.1)	719.5 (9.8)	15 (39.5)	28.5	237 (81.7)	405.4 (7.7)	8 (47.1)	45.5
Soldado	3 (0.4)	2.9 (0.04)	1 (2.6)	1.0				
Blattodea	3 (0.4)	490.5 (6.7)	3 (7.9)	5.0	**9 (3.1)**	**1854.1 (35.3)**	**3 (17.6)**	**18.7**
Hemiptera	21 (2.7)	178.3 (2.4)	14 (36.8)	14.0	4 (1.4)	249.5 (4.7)	4 (23.5)	9.9
Homoptera								
Adultos	38 (4.9)	345.2 (4.7)	17 (44.7)	18.1	7 (2.4)	76.5 (1.5)	4 (23.5)	9.1
Ninfa					1 (0.3)	3.4 (0.1)	1 (5.9)	2.1
Coleoptera								
Adultos	**95 (12.4)**	**373.7 (5.1)**	**29 (76.3)**	**31.3**	7 (2.4)	47.9 (0.9)	5 (29.4)	10.9
Larvas	13 (1.6)	19.1 (0.3)	5 (13.1)	5.0	5 (1.7)	153.4 (2.9)	5 (29.4)	11.4

Larva de Neuroptera	1 (0.1)	4.8 (0.1)	1 (2.6)	0.9	2 (0.7)	53.2 (1.0)	2 (11.8)	4.5
Hymenoptera								
Formicidae	41 (5.3)	124.9 (1.7)	24 (63.1)	23.4	2 (0.7)	1.0 (0.02)	2 (11.8)	4.2
Outros	7 (0.9)	62.0 (0.8)	6 (15.8)	5.8				
Lepidoptera								
Adultos	10 (1.3)	653.6 (8.9)	8 (21.0)	10.4	1 (0.3)	1.6 (0.03)	1 (5.9)	2.1
Larvas	139 (18.1)	2370.3 (32.3)	33 (86.8)	45.8	2 (0.7)	25.4 (0.5)	2 (11.8)	4.3
Diptera								
Adultos	3 (0.4)	33.5 (0.4)	2 (5.3)	2.0	3 (1.0)	11.3 (0.2)	1 (5.9)	2.4
Larva	2 (0.3)	14.5 (0.2)	2 (5.3)	1.9				
Total de larvas	**155 (20.1)**	**2408.7 (32.9)**	**34 (89.5)**	**47.5**	**9 (3.1)**	**232.0 (4.4)**	**7 (41.2)**	**16.2**
Pupa	1 (0.1)	4.8 (0.1)	1 (2.6)	0.9				
Artropodes não Identificados		929.1				537.5 (10.2)		
Material Vegetal								
Sementes	50 (6.5)	69.5 (0.9)	11 (28.9)	12.1				
Folhas	1 (0.1)	5.6 (0.1)	1 (2.6)	0.9				
Outros		9.5 (0.5)						
	767	7325.9			290	5259.5		