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Diet of *Pseudopaludicola falcipes* (Anura: Leptodactylidae) in southern Brazil

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Information on the use and acquisition of food resources is an essential part of the basic data on species biology (Sih and Christensen, 2001). Anurans are in general associated with opportunistic feeding habits (Duellman and Trueb, 1986; Wells, 2007). Only a small fraction of the large number of Neotropical species has been evaluated in detail regarding diet.

Among these understudied species, we can mention *Pseudopaludicola falcipes* (Hensel, 1867), a small-sized leptodactylid with average body size of 14 mm and semi-aquatic habits. It is a relatively abundant species in natural swamps and human-disturbed areas with available water bodies, such as irrigated rice crops (Borges-Martins et al., 2007; Maneyro et al., 2017). It has a wide distribution including Brazil, Argentina, Paraguay and Uruguay (Lavilla et al., 2004). Its diet has already been described for populations of the Amazon Forest and Northeast Argentina, revealing different patterns (Van Sluys and Rocha, 1998; Duré, 2002). Data obtained from Amazon Forest populations indicate that the species feeds mainly on prey from the orders Hemiptera and Diptera (Van Sluys and Rocha, 1998), while in Argentina the main preys belong to the subclass Acarina (Duré, 2002) and the order Collembola (Lopez et al., 2005). These studies suggest regional variation in the species' diet. Based on the latter, we aimed to generate data on the diet of *P. falcipes* in southern Brazil.

We collected specimens in the state of Rio Grande do Sul, in two localities: (a) a region of Semideciduous Seasonal Forest in the municipality of Campo Bom (between the coordinates 29°41'and 47.98''S, 51°0' and 48.15''W), and (b) a coastal region with areas of swamp and restinga inside a conservation unit (Taim Ecological Station; ESEC Taim, between the coordinates 30°00' and 31°14'S, 52°09' and 52°12'W). Localities are about 400 km apart from each other and both have practically the same climate regime: subtemperate climate, average temperature ranging between 18.1 and 19.5° C, and annual precipitation between 11162–309 mm (Maluf, 2000). According to Rubel and Kottek (2010), both areas are and will remain, at least until the year 2100, in the same climatic classification — Cfa — humid temperate climate marked by warm summers. We carried out sampling campaigns between November 2013 and October 2015, which were authorized by the competent Federal Organ, SISBIO (authorization # - 45861-2). We collected and euthanized individuals with xylocaine, fixed them with 10% formaldehyde and stored them in 70% ethanol. Afterwards, specimens were dissected to remove gastrointestinal contents, which were kept in 70% ethanol and sorted using a stereomicroscope. We calculated the number, volume and frequency of occurrence in absolute terms and percentages for each prey category (see Oliveira et al., 2015). We identified prey items to the taxonomic level of order (with exception of the family Formicidae and the subclass Acarina). We assessed the importance of each prey item using the Index of Relative Importance (IRI), according to Pinkas et al. (1971), in percentage values. We calculated trophic niche amplitude through the Levin's Standardized Trophic Niche Amplitude Index (Bsta) (Krebs, 1999), which allows comparisons between species.

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In total, we collected and analyzed gastrointestinal contents of 67 individuals (45 from Campo Bom and 22 from ESEC Taim). Among these specimens, 18 showed food content in an advanced stage of digestion (9 from Campo Bom and 9 from ESEC Taim), which prevented identification. We identified 174 food items classified into 10 prey categories. The most important prey category was Formicidae (IIR = 36.3%), followed by Diptera (IIR = 21.7%), Acarina (IIR = 18.2%) and Collembola (IIR = 15.5%). Other categories showed importance below 7%. Niche amplitude was 0.47.

As for other regions, flies (Diptera), mites (Acarina) and springtails (Collembola) were some of the most consumed prey items in the diet of *P. falcipes* (Van Sluys and Rocha, 1998; Duré, 2002). However, ants (Formicidae), the most important prey category in our study, make up the main difference in relation to other studied localities (Van Sluys and Rocha, 1998; Duré, 2002). While in the present study Formicidae represented about 24% of the total number of preys, in other studies Formicidae did not reach 5% (Van Sluys and Rocha, 1998; Duré, 2002). The consumption of ants has already been widely recorded for other Leiuperinae species, such as *Physalaemus ephippifer* (Rodrigues & Santos-Costa, 2014), *Physalaemus biligonigerus* (Oliveira et al., 2015), *Physalaemus lisei* and *Physalaemus gracilis* (Moser et al., 2017). It is possible that this consumption is related to opportunistic diets and to possible high availability of ants in the environment.

The large niche breadth recorded reinforces the hypothesis, which has not yet been tested. The recorded niche breadth (Bsta = 0.47) was higher than that of other *P. falcipes* populations (0.14 and 0.17; Van Sluys and Rocha, 1998; Duré, 2002). Although we have found a relatively high value for niche breadth, it can reach even greater values, such as 0.61 for *Pseudopaludicola boliviana* (Duré et al., 2004). In general, small leptodactylids are characterized by a more specialized diet with a narrower trophic niche breadth (Van Sluys and Rocha, 1998; Duré, 2002; Maneyro and Carreira, 2012; Oliveira et al., 2015; Moser et al., 2017). On the other hand, our values (as observed by Duré et al., 2004), suggest a more generalist feeding behavior when compared to the results of Van Sluys and Rocha, (1998) and Duré (2002). The data indicate that the species is marked by high food plasticity, which may be directly or indirectly related to prey availability, a parameter that was not evaluated in the present study.

Table 1. Prey categories consumed by *Pseudopaludicola falcipes* in southern Brazil. FO = frequency of occurrence of each prey category; IRI = Index of relative importance; N = number of individuals; V = total volume of prey (mm^3); (%) = percentage related to total.

Prey categories	N%	V%	FO%	IRI%
Formicidae	24.14	8.8	34.3	36.3
Diptera	16.67	8.5	26.9	21.7
Acarina	19.54	1.6	26.9	18.2
Collembola	24.14	2.9	17.9	15.5
Coleoptera	6.90	6.8	14.9	6.6
Araneae	4.02	1.3	7.5	1.3
Hymenoptera	1.72	0.8	3.0	0.2
Hemiptera	1.72	0.7	3.0	0.2
Annelida	0.57	0.1	1.5	0.0
Siphonaptera	0.57	0.1	1.5	0.0
Plant material		3.5	10.4	
Others		65.0	82.1	

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