

Notes on the Diet of Female Bird-Voiced Treefrogs (*Hyla avivoca*) in Southern Illinois

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ABSTRACT

We examined stomach contents of 14 female bird-voiced treefrogs (*Hyla avivoca*) collected in southern Illinois. Adult and larval coleopterans and lepidopterans were the most abundant prey items, whereas hymenopterans (ants), homopterans, and two unidentified insects also were consumed. These data suggest that, like male *H. avivoca*, females of this species forage primarily on arboreal insects.

INTRODUCTION

The bird-voiced treefrog (*Hyla avivoca*) occurs in Austroriparian swamps from South Carolina to Florida, across the Gulf Coast to Louisiana, and north along the Mississippi and Red River Valleys into Oklahoma, Arkansas, Kentucky, Tennessee and extreme southern Illinois (Conant and Collins, 1991; Dundee and Rossman, 1989; Krupa, 1986; Smith, 1961, 1966; Trauth and Robinette, 1990). On 1 January 1999, *H. avivoca* was listed as a state threatened species by the Illinois Endangered Species Protection Board (Redmer and Kruse, 1998; J. Herkert, pers. comm.).

Because *H. avivoca* is secretive and its habitat often is quite inaccessible, little is known about its biology. The non-vocal females rarely are collected (Hellman, 1953), and most natural history information for this species is based on data collected from males (Redmer, 1998). The only previous study of this species' diet was based on the stomach contents of males collected in Arkansas (Jamieson et al., 1993). The objective of this study was to identify food items from a sample of female *H. avivoca* collected in southern Illinois.

MATERIALS AND METHODS

Fourteen adult female *H. avivoca* were collected at seven localities in four southern Illinois counties (Union, Johnson, Pope, Pulaski). Two frogs were collected as they approached males in breeding choruses, 10 were collected when found crossing roads adjacent to breeding choruses, and two were collected on roads in early autumn. All but one was returned to the laboratory, euthanized within 12 hr of capture, fixed in 10% formalin, and preserved in 70% ethanol. One specimen was preserved ca. 48 hr after capture. All specimens were dissected later, the stomachs and intestinal sections (if distended indicating presence of food items) were opened, and food items were removed and stored in individual vials of 70% ethanol. Food items were examined with a dissecting microscope and identified to the lowest possible taxonomic level using keys of Borror et al. (1989).

RESULTS AND DISCUSSION

Food items were found in seven (50%) of the 14 examined specimens. Within this sample, there was an average of 1.75 food items per frog, and 3.5 items for frogs with food items (range=1-5).

Nineteen individual food items (all insects) were recovered (Table 1). Larval and adult coleopterans were the most frequent food items (N=8), comprising 42.1% of the total sample. Identified coleopteran families were Chrysomelidae and Elateridae. Remaining coleopterans were unidentified larvae or adults. Lepidopterans (three unidentified larvae and one adult) were the second most frequently (21.1%) recovered food items. Three (15.8%) hymenopterans, all ants (Formicidae), were found in the stomachs of two frogs. Two (10.5%) homopterans (one cicadellid and one membracid) and remains of two (10.5%) unidentified insects also were recovered.

Several of the insect taxa and life stages (especially adult elaterid and chrysomelid beetles, homopterans, and lepidopteran larvae) we identified usually forage on, or are encountered on above-ground foliage (Milne and Milne, 1996). This indicates that female *H. avivoca* forage while perched in arboreal habitat. Furthermore, the absence of ground-dwelling or grass-dwelling arthropods (e.g., Isopoda; Orthoptera: Acrididae, Gryllidae) also indicates that these treefrogs forage above ground. Male *H. avivoca* collected in Arkansas specialized on arboreal ants (*Cremastogaster* sp.), which comprised 72% of their diet (Jamieson et al., 1993). The ants in our sample could not be identified to genus. Although it is possible that these ants also were arboreal species, they could have been terrestrial species ingested while these frogs moved over land toward breeding areas. The closely related gray treefrogs (*H. chrysoscelis*, *H. versicolor*) reportedly feed

extensively on arboreal elaterids as well as terrestrial harvester ants (*Pogonomyrmex*), indicating that they forage on ground as well as in elevated habitats (Ralin, 1968). The diet of the green treefrog (*H. cinerea*) consists primarily of arboreal insects as well as terrestrial ones (Brown, 1974; Freed, 1982). *Hyla cinerea* also is an Austroriparian species that reaches its northern range limit in southern Illinois (Smith, 1961). However, unlike *H. avivoca*, the former species is more of a habitat generalist and it is expanding its range in the state (Redmer, et al., in press).

Although our sample size was moderately small (N=14 frogs, seven with stomach contents), this study indicated that female *H. avivoca* forage primarily above ground, and that this species is much more habitat-specific than are closely related or syntopic congeneric treefrogs. Recent studies of this species in Illinois also indicate that it is highly specialized (Redmer, et al., in press). Large choruses occur primarily in remnant Austroriparian swamps with stands of mature baldcypress (*Taxodium disticum*) and/or tupelo (*Nyssa aquatica*) trees and a dense canopy (Redmer, et al., in press). Because *H. avivoca* now is listed as a state threatened species in Illinois, further quantified studies of its habitat are desirable.

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Table 1. Frequency of food items (N=19) found in the digestive tracts of seven female *Hyla avivoca* collected in southern Illinois.

Food	Taxa	Percent of Sample	Number of Items
Insecta			
	Coleoptera	42.1	8
	Chrysomelidae	(5.3)	1
	Elateridae	(15.8)	3
	Unidentifiable larva	(5.3)	1
	Unidentifiable adults	(15.8)	3
	Hymenoptera	15.8	3
	Formicidae	(15.8)	3
	Lepidoptera	21.1	4
	Unidentifiable larvae	(15.8)	3
	Unidentifiable adults	(5.3)	1
	Homoptera	10.5	2
	Cicadellidae	(5.3)	1
	Membracidae	(5.3)	1
	Unidentifiable	10.5	2

