

SUMMER FOODS OF THE DIAMOND-BACKED WATER SNAKE (NATRIX RHOMBIFERA), FROM REELFOOT LAKE, TENNESSEE

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**ABSTRACT:** Food items of 72 Natrix rhombifera from Reelfoot Lake, Tennessee, consisted almost entirely of fish (98.5 percent by volume), with sunfish (Centrarchidae) and silversides (Atherinidae) accounting for about 50 percent of the volume.

INTRODUCTION

Previously reported studies of the food habits of Natrix rhombifera (Hallowell) involved specimens from near the western edge of the species' range (Smith 1961). Our investigation included an area in the northeastern part of the range with a fauna substantially different from that reported by Sisk and McCoy (1964) and Bowers (1966). Hopefully, this study would reveal the summer diet of this species as well as indicate if differences in available fauna influenced food utilization.

MATERIALS AND METHODS

Seventy-two N. rhombifera were captured along the shore of Reelfoot Lake during July, August, and September, 1965. Collections were made shortly after dark when feeding activity of Natrix is at its peak (Cagle 1937, Diener 1957). Snakes were chilled in an ice chest immediately after capture and maintained at low temperature for 3 to 4 hours until sacrificed by freezing. Each snake was stored in a plastic bag in a freezer until analysis of digestive tracts 6 months later. Volumes of items were determined by water displacement. Items less than 0.1 ml were recorded as trace (T). Frequencies of occurrence were calculated for both stomach and intestinal contents. Because hard objects (e.g., chitinous exoskeletons, teeth, etc.) may remain in intestines for extended periods (Neill and Allen 1956), we recorded these because they might indicate foods seldom taken.

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Table 1. Items from the stomachs of 64 *N. rhombifera*, Reelfoot Lake, Tennessee. T = trace.

Item	% Vol.	% Freq. Occurrence
<u>Fish</u>	98.5	93.7
Centrarchidae	24.7	53.1
<u>Lepomis</u> (sunfishes)	15.5	39.0
<u>Micropterus</u> (basses)	6.4	14.0
<u>Pomoxis</u> (crappies)	T	1.6
Atherinidae		
<u>Menidia audens</u> (Mississippi silversides)	23.2	76.6
Serranidae		
<u>Roccus chrysops</u> (white bass)	12.5	6.2
Cyprinidae (minnows)	11.4	6.2
Clupeidae		
<u>Dorosoma cepedianum</u> (gizzard shad)	11.8	3.1
Ictaluridae		
<u>Ictalurus</u> (bullheads)	7.7	10.9
Cyprinodontidae		
<u>Fundulus notatus</u> (blackstripe topminnow)	0.6	1.6
Poeciliidae		
<u>Gambusia affinis</u> (mosquito fish)	T	1.6
<u>Miscellaneous</u>		
Insects	T	18.7
Chironomidae (midges)	T	3.1
Culicidae (mosquitoes)	T	1.6
Corixidae (water boatmen)	T	6.2
Snails	T	1.6
Vegetation (grasses, algae, leaves, duckweed)	0.3	21.9
Inorganic	T	6.2

## RESULTS AND DISCUSSION

We found a high percentage (98.5 percent by volume) of fishes (Table 1) with Centrarchidae and Atherinidae of principal importance. These two families represented nearly 50 percent of the foods by volume and occurred in more than 80 percent of digestive tracts containing food. Other investigators (Sisk and McCoy 1964, Bowers 1966, Cagle 1937) have reported fishes as the primary foods of N. rhombifera.

The absence of some vertebrates commonly part of the diet of water snakes in general and N. rhombifera in particular was of interest. In our study amphibians were conspicuously absent. In contrast stomachs of N. rhombifera collected in commercial minnow ponds in Texas yielded 63 percent anurans by volume (Bowers 1966). Anurans also comprised about 8 percent of the diet by volume in an Oklahoma study (Sisk and McCoy 1964). The absence of anurans in our study may reflect their scarcity as only one toad (Bufo sp.) was noted when collecting and no larvae were seen.

Teeth of a bat (unknown) were found in the intestine of one snake. Its presence in a largely piscivorous snake is of interest. Herreid (1961) suggested that bats may collide with one another or with projecting objects; and, that immature bats may be on the ground before capable of strong flight. During one collecting trip, a live red bat (Lasiurus borealis) was found along the shore.

Sisk and McCoy (1964) reported that N. rhombifera will take mammals and even bird eggs and Cagle (1937) recorded turtle remains. Carrion may be commonly taken as during our collection trips individuals were observed gorging on fish remains discarded by fishermen.

Miscellaneous items in intestines included debris, pebbles, duckweed, aquatic insects, and snake teeth. Some of these were probably ingested while feeding on selected food items. The remains of aquatic invertebrates probably reflected secondary ingestion (e.g., released into the lumen from digested prey) as fragments were usually found with remains of fishes known to feed on those forms (Rice 1942). However, N. rhombifera may take invertebrates as both Bowers (1966) and Sisk and McCoy (1964) reported crayfish. The teeth were thought a result of the natural shedding process. Although Brown (1958) reported cannibalism in N. sipedon, this was not indicated in our study.

The diet of N. rhombifera is variable, probably being altered considerably with changes in food availability. Our study did not support Bowers' (1966) findings in Texas. Studying snakes from a commercial minnow pond when golden shiners (Notemigonus crysoleucas) were raised, Bowers noted extensive consumption of anurans (63 percent). The rest of their diet was largely of yellow bullheads (Ictalurus natalis). The absence of golden shiners in the diet, though abundant, may reflect their agility and tendency to remain in deeper water.

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