John O. Whitaker, Jr.

Department of Life Sciences
Indiana State University
Terre Haute, Indiana 47809

Chris Maser[1]

USDI Bureau of Land Management
Range and Wildlife Habitat Laboratory
Route 2, Box 2315
La Grande, Oregon 97850

and

Stephen P. Cross

Department of Biology
Southern Oregon State College
Ashland, Oregon 97520

Foods of Oregon Silver-Haired Bats, Lasionycteris noctivagans

Abstract

The silver-haired bat in Oregon feeds on a variety of insects. Major items are Lepidoptera, Homoptera (primarily Cercopidae), Hemiptera, Hymenoptera (primarily Formicidae), Coleoptera, and Neuroptera (Hemerobiidae).

Introduction

Little information exists on the food habits of silver-haired bats, *Lasionycteris noctivagans*. Gould (1955) found a stable fly, *Stomoxys calcitrans*, in the mouth of an individual from Massachusetts; Novakowski (1956) found young silver-haired bats feeding on dipterous larvae in an abandoned woodpecker hole in which they lived. Whitaker (1972) found 100 percent Trichoptera in the stomach of one and 90 percent Trichoptera and 10 percent Scarabaeidae in the stomach of another silver-haired bat from Indiana. Whitaker *et al.* (1977) found that the major foods of silver-haired bats ($n = 15$) in western Oregon varied but included Lepidoptera (32.0 percent volume), Diptera (18.9 percent), Isoptera (14.0 percent), and Hymenoptera (7.0 percent).

The purpose of this paper is to present information on the food habits of silver-haired bats from eastern Oregon.

Methods and Materials

Most bats were taken in Wallowa County in conjunction with DDT studies and in Grant County in conjunction with grazing studies. Some bats, however, were from Baker, Malheur, Harney, and Union Counties. The bats were captured in mist nets placed over waterholes.

---

[1]Present address: Forestry Sciences Laboratory, 3200 Jefferson Way, Corvallis, Oregon 97331.

We have data from (41) stomachs and 124 scats (Table 1). Stomach contents were taken from sacrificed bats, and scats were collected by keeping bats overnight in suitable holding containers before releasing them.

TABLE 1. Food of silver-haired bats (**Lasionycteris noctivagans**) from eastern Oregon, based on stomach and scat analysis.

	Stomachs (n = 41)		Scats (n = 124)	
	% Volume	% Frequency	% Volume	% Frequency
Lepidoptera				
Unidentified	29.7	51.2	67.7	97.6
Diptera				
Unidentified	10.9	39.0	9.6	44.4
Tipulidae	—	—	5.4	23.4
Chironomidae	0.05	2.4	—	—
Muscoidea	—	—	0.1	1.6
Otitidae	—	—	0.01	0.8
Homoptera				
Cercopidae	22.7	43.9	—	—
Cicadellidae	1.7	14.6	0.7	0.8
Fulgoridae	0.1	2.4	—	—
Unidentified	—	—	0.8	4.0
Hemiptera				
Unidentified	7.9	39.0	1.3	9.7
Lygaeidae	—	—	0.8	7.3
Miridae	—	—	0.3	1.6
Coreidae	—	—	0.1	0.8
Hymenoptera				
Formicidae	12.2	31.7	0.5	5.6
Unidentified	—	—	0.2	0.8
Coleoptera				
Unidentified	8.4	34.1	1.0	8.9
Chrysomelidae	1.2	4.9	0.1	0.8
Scarabaeidae	1.0	4.9	0.1	0.8
Carabidae	0.1	2.4	0.7	0.8
Trichoptera				
Unidentified	1.1	2.4	—	—
Orthoptera				
Unidentified	—	—	1.2	2.4
Isoptera				
Termitidae	—	—	0.4	1.6
Neuroptera				
Hemerobiidae	0.5	7.3	6.4	25.8
Chrysopidae	—	—	0.04	0.8
Unidentified Insect	2.4	17.1	1.4	8.1
Vegetation	—	—	1.1	2.4
Spider	—	—	0.04	0.8
Unidentified Material	—	—	0.2	2.4
	100.0		100.2	

Results and Discussion

The most important food of silver-haired bats from eastern Oregon was adult Lepidoptera, forming only 29.7 percent of the volume in stomachs, but comprising 67.7 percent in scats (Table 1). Flies were also important in stomach and scat samples. Several foods important among the stomach samples, such as the froghoppers (Cercopidae, 22.7 percent volume), ants (Formicidae, 12.2 percent), and unidentified beetles (12.7 percent), were of relatively little importance in the scat samples. Besides moths, unidentified flies, Hemerobiidae, and Tipulidae were important in scats, but of little importance in stomachs. Thus, the foods varied between the two types of samples.

Three possible causes for these discrepancies are: (1) differential results related

to the examination of stomach vs. scat samples; (2) differential availability of prey items to the bats in the two samples; and (3) differential digestibility.

The use of stomach contents is generally superior to scats for food habits analysis because of the problem of differential digestion. Digestible items will be in constantly decreasing quantity as they move backward in the digestive tract. Flying insects, however, have chitinous hard parts which digest but little, and North American bats feed almost entirely on flying insects. Thus, scat analysis would seem to introduce less bias from differential digestion than would be the case with food habit studies of many other species. The use of the scat, rather than stomach, analysis is especially valuable because some species of bats are greatly decreasing in abundance.

All scat samples were from Grant County. Comparison of stomach and scat samples taken at the same time would allow comparison of the two techniques, but stomachs of only eight bats were available from the Grant County localities. Percent volumes of the main foods in these eight stomachs were Lepidoptera, 74.8 percent; unidentified Diptera, 14.4 percent; Cercopidae, 6.5 percent; Coleoptera, 2.5 percent; Cicadellidae, 1.3 percent; and Hemerobiidae, 0.6 percent. Lepidoptera and Diptera were similar in both scat and stomach samples. A more extensive comparison of stomachs versus scats is, however, in progress on other species of eastern Oregon bats.

The six main categories of foods in silver-haired bats from western and eastern Oregon, respectively, with percent volumes, were: moths (32.0, 29.7), flies (18.9, 11.0), termites (14.0, ——), bees and wasps (7.0, ——), hemipterans (6.6, 7.9), crickets (3.8, ——), Homoptera, mainly Cercopidae (——, 24.5), ants (——, 12.2), and beetles (——, 10.7).

Thus moths were the main food, forming just under a third of the volume in both cases, and flies and hemipterans were also important in stomachs and scats. The other three most important foods in the western Oregon sample, termites, bees and wasps, and crickets, did not occur, however, in stomachs from eastern Oregon bats. The remaining three most important foods of eastern Oregon silver-haired bats were cercopids, ants, and beetles. All three occurred at low rates in western Oregon stomachs. We know of no good reasons for these differences in food habits, other than differential availability of prey. This hypothesis may not, however, be the entire answer.

Acknowledgments

This report was partially funded under the cooperative Oregon Range Validation Project, Study No. 39-PNW-77, USDA Forest Service, Portland, Oregon. Ellen McMahon (Southern Oregon State College, Ashland) and Charles Reith (University of New Mexico, Albuquerque) helped collect the bats in Grant County. Jon M. Skovlin (Range and Wildlife Habitat, La Grande, Oregon) critically read the manuscript. We sincerely appreciate the help.

Literature Cited

Gould, E. 1955. The feeding efficiency of insectivorous bats. J. Mammal. 36:399-407.
Novakowski, N. S. 1956. Additional records of bats in Saskatchewan. Can. Field-Nat. 70:142.
Whitaker, J. O., Jr. 1972. Food habits of bats from Indiana. Can. J. Zool. 50:877-883.
————, C. Maser, and L. E. Keller. 1977. Food habits of bats of western Oregon. Northw. Sci. 51:46-55.

Received October 17, 1979
Accepted for publication December 20, 1979