

NOTES ON THE DIET OF REPRODUCTIVELY ACTIVE
MALE RAFINESQUE'S BIG-EARED BATS
(*Corynorhinus rafinesquii*)

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Abstract: Using fecal samples, we examined the diet of five reproductively active male Rafinesque's big-eared bats (*Corynorhinus rafinesquii*) from the Upper Coastal Plain of South Carolina during August and September, 1999. Diets of these individuals in upland pine stands were similar to diets of Rafinesque's big-eared bats in bottomland and upland hardwood habitats. Although fecal samples contained three insect orders—Diptera (flies), Homoptera (aphids, cicadas, and hoppers), and Lepidoptera (moths)—the diet consisted primarily of lepidopterans (99.4% ± 0.4%).

Key Words: *Corynorhinus rafinesquii*; diet; Lepidoptera; Rafinesque's big-eared bat.

INTRODUCTION

Clark (1990, 1991) described the foraging and roosting ecology of Rafinesque's big-eared bats in bottomland hardwoods in South Carolina, whereas Hurst and Lacki (1997, 1999) provided detailed diet, roosting behavior, home range size, and habitat use data in the Cumberland Plateau of Kentucky. Hurst and Lacki (1997) noted that the diet of Rafinesque's big-eared bats consisted of members of the orders Coleoptera, Homoptera, Diptera, Hemiptera, Hymenoptera, and Trichoptera, but primarily was composed of lepidopterans. No studies have examined

the diet of Rafinesque's big-eared bats in upland pine stands in the Southeast. Based on previous surveys by the authors, we have found >80% of suitable structures (e.g., abandoned houses, barns) in upland pine stands in the Upper Coastal Plain of South Carolina used by Rafinesque's big-eared bats. Because upland pine stands are intensively managed using forest management practices (e.g., thinning, timber harvest, prescribed fires) and because a large portion of the Southeastern landscape contains managed pine communities, Rafinesque's big-eared bats roosting and foraging in pine communities may be heavily impacted by these forest management practices. Therefore, information about the diet of Rafinesque's big-eared bats in upland pine stands is needed to better understand the relationship of this species to one of the most predominant landuse patterns within its distribution.

METHODS

Our study was conducted between 27 August and 25 September 1999 on the 1,057 ha Silver Bluff Sanctuary located in the Upper Coastal Plain of South Carolina approximately 19 km southeast of Augusta, Georgia. Almost half (44%) of the plantation consists of pine-dominated communities. Pine plantations on Silver Bluff are managed for fiber production with a portion of the revenue used to offset sanctuary operational costs. Although loblolly pine (*Pinus taeda*) is the most common plantation species, longleaf pine (*P. palustris*) and slash pine (*P. elliotii*) are also present. Other forest types include pine/mixed hardwoods (21%) and bottomland hardwoods (16%). Loblolly pines, water oaks (*Quercus nigra*), red maples (*Acer rubrum*), and sweetgums (*Liquidambar styraciflua*) are common components in the pine/mixed hardwood stands, whereas laurel oak (*Quercus laurifolia*), swamp chestnut oak (*Q. michauxii*), cherrybark oak (*Q. falcata* var. *pagodaefolia*), American elm (*Ulmus americanus*), and sweetgum occur in the bottomlands. Fields and aquatic habitats such as streams and ponds are common on Silver Bluff (15% and 4% of land area, respectively).

Abandoned structures were searched on Silver Bluff for roosting Rafinesque's big-eared bats. As part of a larger habitat use study, we captured and radiotagged roosting big-eared bats in mist nets erected around roost exits (Menzel et al., 2001). Reproductive condition was determined by examining testicular swelling and distention of the caudae into the interfemoral membrane (Racey, 1988). Two 0.75 × 0.5-m black aluminum trays were placed on the floor directly beneath roost locations after bat exited the roosts to forage. Roosts were entered every other day to collect fecal pellets from the trays and to ensure that only radiotagged individuals were roosting above the trays. Although we observed big brown bats (*Eptesicus fuscus*) roosting in one structure used by a Rafinesque's big-eared bat, no bats other than radiotagged individuals were observed roosting in structures where fecal samples were collected.

All fecal samples were frozen immediately upon collection and analyzed following the method described by Whitaker (1988). Insect fragments were identified to the ordinal level. Percent volume of all orders was estimated visually. A modified version of Black's (1972) method to estimate percent volume for Lepidoptera (Carter, 1998), because they were often represented only by their scales.

RESULTS AND DISCUSSION

Seven of the eight abandoned structures surveyed contained reproductively active male Rafinesque's big-eared bats. Forty-three fecal pellets were collected from five reproductively active males. Diet analyses conducted on bat fecal pellets provides a reasonably reliable sample of the diet of bats, and these results publishable in some of the most reputable wildlife journals in the United States (see e.g., Ellis, 1993; Churchill, 1994; Kurta and Whitaker, 1998; Whitaker et al. 1999).

Fecal pellets contained insect fragments from three insect orders: Lepidoptera (moths = 100%), Diptera (flies = 20%), and Homoptera (aphids, cicadas, hoppers = 20%). Moths were the primary prey item consisting of $99.4\% \pm 0.4\%$ (SE) of fecal sample volume. Flies and homopterans comprised less than 1% of the volume of most pellets ($0.4\% \pm 0.40\%$ and $0.2\% \pm 0.20\%$, respectively).

Although coleopterans, homopterans, dipterans, hemipterans, hymenoptera and trichopterans regularly are consumed by Rafinesque's big-eared bats, lepidopterans dominate the diet of bats that forage in hardwood dominated communities (Ellis, 1993; Hurst and Lacki, 1997). Although the tracked bats forage in habitat types remarkably different from those previously described in the literature (i.e., upland pine stands versus bottomland or upland hardwood communities) their diets did not differ from those previously reported (Ellis, 1993).

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