

cific confrontations were observed during the course of this study although a Vesper Sparrow and a Western Meadowlark perched on a particular large juniper simultaneously on several occasions. The number of perches continuously available to a bird exceeded 200 in the most restricted case and was generally >1000.

Perch-sites, by nature of their high degree of selection by birds, are important components of avian habitat, but are they or could they be potentially limiting? In the present study, 74.0% of perches used by Western Meadowlarks were chosen from a group of the highest shrubs that included only 3.5% of all available shrubs. This pattern is similar but not as dramatic for the other bird species and emphasizes preferences for high perches. It also suggests that shrubs for perching may be a potential limiting resource. Absolute numbers of perches needed by individuals have not been determined for any passerine species to my knowledge, although Lack (1933) and Lack and Vanables (1939) stated that a single tree or shrub used solely as a song perch was necessary in territories of several heathland and woodland birds.

There are several reasons why shrub perches, in most cases, would not be limiting to shrubland and grassland birds. Not all species of birds require a fixed perch for singing (i.e., Horned Lark, Western Meadowlark) and the lack of elevated perches in areas inhabited by true grassland birds may have been a selecting force in the evolution of aerial song displays. Some species (e.g., Western Meadowlark) appear to select the highest available perches in different areas and do not exhibit fixed, narrow ranges in perch heights used. Birds inhabiting grasslands lacking shrubs and requiring fixed perches (e.g., Vesper Sparrow) use grass and forb stalks from which to sing (Wiens 1969) but the same species used shrubs almost exclusively in this study when shrubs were available. In other birds (e.g., Brewer's Sparrow), it is virtually impossible to determine if song perches are limiting because use is confounded with other functions such as nest support and feeding sites. Habitat suitability of an area for shrubland and grassland birds is certainly improved by elevated song perches but the presence of certain species may not be dependent upon them. Abundant song perches should allow males to effectively delineate, patrol, and defend boundaries of their territories.

Acknowledgments.—I thank W. K. Parker for field assistance during this study. M. W. Carter and R. Morrell provided expert advice on statistical and computer methodology. J. C. Barlow, C. L. Cink, J. T. Flinders, H. H. Frost, C. D. Jorgensen, T. Rich, H. D. Smith, and C. M. White provided helpful editorial suggestions and J. Eckensberger typed the manuscript. Funding was provided by the Department of Zoology, Graduate School, and ASBYU organization of Brigham Young University. The U.S. Forest Service provided lodging and access to records.—JOHN S. CASTRALE, *Dept. Zoology, Brigham Young Univ., Provo, Utah 84602.* (Present address: *Indiana Division of Fish & Wildlife, R.R. 2, Box 477, Mitchell, Indiana 47446.*) *Accepted 10 Apr. 1983.*

Wilson Bull., 95(4), 1983, pp. 655–656

Observations of male woodcock on singing grounds.—American Woodcock (*Scolopax minor*) males have been previously reported to use two or more singing sites within a display period (Sheldon, *The Book of American Woodcock*, Univ. Mass. Press, Amherst, Massachusetts, 1967; Davis, *Wilson Bull.* 82:327–328, 1970). These observations were speculative, however, since the woodcock involved were unmarked and only appeared to be the same birds. During our study, conducted at the McClintic Wildlife Station, 11 km north of Point Pleasant, Mason Co., West Virginia, birds were color banded and positive identifications made. Woodcock using multiple sites were observed at eight locations between 4 March and 2 April 1979. Individual birds frequently were seen displaying at two or more singing

sites located 100–210 m apart. Some birds alternated between sites during the same display period, or from one day to the next. Some males appeared at auxiliary positions only when other males attempted to use these sites. A description of a typical example, which occurred on 19 March, follows: We arrived at the singing site before the display period began. A bird began “peenting” (Sheldon 1967) on site A at 05:40. Shortly thereafter a bird “peented” on site B (188 m northwest and separated from singing ground A by a row of trees and shrubs). The bird on site A flew over to site B, “cackled,” began a display flight over site A but landed on site B. He was identified on both sites as “double-green”—the bird which had displayed on site A for 13 consecutive days. The bird made another display flight and landed on site A. During the next 28 min five more flights were made, site A being used three times and B used twice. This bird alternated between these sites for several days. He frequently “cackled” on his approach to site B. Several weeks later site B became occupied and remained so for 10 days, with the double-green bird remaining on site A for an additional 24 days.

Pugnacious behavior on singing sites during the display period is not uncommon in woodcocks (Sheldon 1967; Godfrey, Ph.D. diss., Univ. Minnesota, Minneapolis, Minnesota, 1974). During this study such behavior was usually preceded by audible “peents” or “cackles” by intruding birds. On three occasions, non-displaying birds were estimated to be 0.3 m to 1 m from a displaying male. These non-displaying birds appeared to be ignored by the displaying male. All birds involved were color-banded and of known sex. One non-displaying male previously displayed on another singing site. No vocalizations were heard from the non-displaying males. If pre-copulatory calls, as described by Sheldon (1967), are necessary for female receptiveness to mating, these silent males may represent a minimal competitive challenge to dominant males trying to attract hens.—BRYON P. SHISSLER AND DAVID E. SAMUEL, *Div. Forestry, West Virginia Univ., Morgantown, West Virginia 26506. Accepted 4 Mar. 1983.*

Wilson Bull., 95(4), 1983, pp. 656–661

Notes on the ecology of the Black-breasted Puffleg on Volcán Pichincha, Ecuador.—The 10 endemic Andean “puffleg” hummingbirds of the genus *Eriocnemis* include a number of little known species presently known from only one or a few adjacent mountains or from a single river valley. We here report the first detailed observations on the ecology of the endemic Ecuadorian species, the Black-breasted Puffleg (*Eriocnemis nigrivestis*), which is known only from Volcán Pichincha and Volcán Atacazo, two adjacent volcanic peaks less than 20 km west of Quito in north-central Ecuador.

During a 3-week search in September 1980, we located three *E. nigrivestis* on Cerro Pugsí, on the west slope of Pichincha. Here we conducted a brief study from 19–27 September on the habitat and feeding ecology of this little known hummingbird.

The study site was a saddle of flat ground on a ridge crest located at 3020 m elev. (for a picture of this site see Chapman, *Bull. Am. Mus. Nat. Hist.* 55:94, plate XIX, 1926). We observed one male daily in specific feeding areas and also sometimes heard another male individual calling: a monotonous repeated metallic *tzeet tzeet tzeet tzeet*. We also found one site regularly visited by a female.

The natural vegetation on the saddle was shorter in height than the vegetation on surrounding slopes or in the valleys of the Río Mindo and Río Verdecocha, which run south and north, respectively, of Cerro Pugsí. Most canopy trees did not exceed 8–10 m in height. Dense growths of ericads and abundant epiphytes characterized the non-arborescent vegetation, but several areas on the saddle were grazed by cattle, resulting in local grassy open-