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Habitats Used by Common Ground-Doves in southern Alabama.—In the United States, Common Ground-Doves (*Columbina passerina*) are distributed from California to North Carolina and sporadically farther north in the East. They are considered local, uncommon to common permanent residents in the lower third of Alabama, are rare farther north (Howell 1928, Imhof 1976), and have recently been designated a Species of Special Concern statewide (Keeler 1986).

Although some authors (Howell 1928, Bent 1932, Johnston 1964, Imhof 1976) have reported on habitats used by ground-doves, they have not quantified characteristics of those habitats. Herein, we describe quantitatively the habitats Common Ground-Doves use in southern Alabama.

Study area and methods.—We studied the lower one-third of Alabama including 24 counties in 1986 and 25 during 1987. All of these counties, with the exception of the northern three-fourths of Lee County, lie in the Coastal Plain. Community type, seral stage, percent overhead cover, percent ground cover, herbaceous vegetation height, and height and diameter breast height (dbh) of the largest tree were recorded for each site where ground-doves were observed or heard while driving 322 km of roads (as per Breeding Bird Survey routes) in each county (Jones 1988). This also was done for each differing adjacent habitat for comparative purposes. Community type and seral stage were determined by species composition and physical measurements of individual plants. Each site was classified by seral stage as forb, grass, low shrub (0.3–1 m in height); high shrub (1–3 m); low tree (3–6 m); young forest (>6 m, and 10–50 cm dbh); or mature forest (>6 m, and >50 cm dbh). For community types, habitats were classified as old field, coastal dune, agricultural field, forest, or young pine plantation. Habitat variables were assessed via the quarter-point method (Brower and Zar 1984) using a 30-m interval where possible. Otherwise, an interval was used that allowed each cardinal point to be sufficiently distant from an ecotone to

TABLE 1
HABITAT VARIABLES (MEAN \pm SE) FOR SITES SAMPLED IN THE COASTAL PLAIN OF ALABAMA, 1986-1987

Year	Birds present (+, -)	Overhead cover (%)	Ground cover (%)	Vegetation height (m)	Tree height (m)	Dbh (m)
1986	+	13.1 \pm 5.7 ^a	76.0 \pm 7.2 ^a	0.8 \pm 0.1 ^a	8.3 \pm 2.0 ^a	0.1 \pm 0.03 ^a
	-	55.2 \pm 8.5 ^b	68.4 \pm 11.1 ^a	0.9 \pm 0.2 ^a	23.9 \pm 2.7 ^b	0.3 \pm 0.03 ^b
1987	+	15.8 \pm 3.9 ^a	76.6 \pm 3.9 ^a	0.6 \pm 0.03 ^b	4.1 \pm 0.4 ^c	0.1 \pm 0.01 ^a
	-	59.3 \pm 4.4 ^b	70.4 \pm 4.9 ^a	0.6 \pm 0.05 ^b	18.6 \pm 1.1 ^d	0.4 \pm 0.02 ^b

^{a, b, c, d} Means within a column sharing a letter are not different ($P > 0.05$).

preclude influence by canopy cover. Standard procedures used in measuring each variable have been previously described (Jones 1988).

Means of all habitat variables were grouped by the presence or absence of ground-doves (site type). Analysis of variance (ANOVA) was used to determine if any site type differences ($P < 0.05$) occurred between variables (Steel and Torrie 1980, SAS Institute Inc. 1985). Years were pooled to make comparisons between site types where there were no ($P > 0.05$) year-type interactions.

Soil characteristics, including percentage of sand, clay, silt, natural fertility, and reaction (pH), were obtained for all sites with ground-doves in eight counties in which a U.S. Soil Conservation Service (SCS) County Soil Survey existed.

Results and discussion.—Seventy sites having ground-doves were used in the analysis of habitat data. Differing but associated sites ($N = 150$) were used for comparative purposes. Sixty-nine sites with ground-doves were classified by habitat type as old field (31), young pine plantation (23), forest (7), agricultural field (4), coastal dune (3), and homesite (1). Ground-doves were observed in all vegetative zones from the foredunes through the hind-dunes at sites in coastal dune habitats. They also were observed in freshly plowed or recently harvested agricultural fields, and in hardwood and pine forest types. Old fields were used most often (45%), but young pine plantations also were used heavily (33%).

Overhead cover, tree height, and dbh were the only three variables found to differ ($P < 0.0001$) between site types (Table 1). Differences existed between site types ($F = 24.6$, $df = 3$, $P = 0.0001$) and overall year effect ($F = 13.3$, $df = 3$, $P = 0.0001$), with the latter attributable to the differences in sample sizes between years. No ($F = 0.6$, $df = 3$, $P = 0.63$) interaction between year and type existed, so years were combined and re-analyzed. In general, the canopies of sites with ground-doves were much more open ($\bar{x} = 15.14 \pm 3.3\%$ closure) than those without doves ($\bar{x} = 58.45 \pm 3.9\%$ closure). Ground cover and herbaceous vegetation height were very similar between site types. Both tree height and dbh showed trends similar to overhead cover. Sites with doves had smaller trees and dbhs (height $\bar{x} = 5.20 \pm 0.6$ m, dbh $\bar{x} = 0.10 \pm 0.01$ m) than those without doves (height $\bar{x} = 19.59 \pm 1.1$ m, dbh $\bar{x} = 0.34 \pm 0.02$ m).

Ground-doves located during this study occurred most often in early successional stages such as old fields and young pine plantations. The physical structure of these habitat types, rather than the species composition, seemed most important. The Common Ground-Dove has been described as a "disturbance species" (J. L. Landers pers. comm.) and would be expected to occur more frequently in the early successional habitats observed in this study. These habitats satisfy their food and nesting requirements because forbs and grasses that

produce small seeds, a major food of ground-doves, are generally abundant there. Early seral stages also provide good nesting cover (Landers and Buckner 1979).

Forty-two soil types occurred in the sample of 63 sites with ground-doves (some sites contained more than one soil type). Of the 63 sites occupied by ground-doves that could be categorized by soil type, four were sands, 26 were loamy sands, 32 were sandy loams, and one was loam. Of the 1,722,593 ha of soil types that existed in all counties, 1.12% was sand, 21.4% loamy sand, 31.9% sandy loam, and 0.97% loam. Soil characteristics of habitats in which ground-doves were found during this study were sandy soil ($\geq 64\%$ of content in 98.4% of sites) low pH (4.75–6.7), and low natural fertility. Sandy soils have been reported as characteristic of ground-dove habitat (Hopkins 1958). All of these characteristics probably combine to retard the rate of succession and make suitable ground-dove habitat available for longer periods of time.

The characteristics of the habitats used by ground-doves in this study support the premise that they are closely associated with early seral stages and sandy soils. Additional research to determine the exact habitat requirements of Common Ground-Doves is required. Such work should include determination of habitat requirements in other portions of the Common Ground-Dove's range and specific use(s) of each habitat.

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