INFLUENCE OF WINTER WEATHER ON DAILY MOVEMENTS BY TELEMETERED BOBWHITE QUAIL COVEYS IN TENNESSEE

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INTRODUCTION

Knowledge of the response of bobwhite quail (*Colinus virginianus*) coveys to changing environmental conditions is important in evaluating the extent to which winter weather may affect quail populations. Observations by Buss and Mattison (1954), Gooden (1952), and Hawkins (1958) indicated that wind, precipitation, decreased temperature, and snow cover resulted in reduced covey movements. We employed a radio-telemetry system to obtain quantitative information of daily movement patterns of coveys and to assess effects of various environmental conditions on these movements.

STUDY AREA AND METHODS

The study area was a 214 acre plot within a quail management area on the Ames Plantation in Fayette County, Tennessee. Vegetation consisted of idle land and woody cover surrounding small cultivated fields. The quail population during the study averaged one quail per 2.2 acres.

The climate of west Tennessee is humid and temperate. A long growing season, averaging 209 days, and a high annual rainfall, averaging 51.6 inches, favors lush vegetational growth. Mean temperatures range from 42 F in winter to 78 F in summer.

Winter of 1969-70 was severe in west Tennessee. Temperatures at nearby Bolivar averaged 4.6 F below normal during the January - March study period (U. S. Dept. Commerce 1970). Daily maximum temperatures averaged 49.8 F, and the average minimum temperature was 28.8 F. Maximum daily temperature was less than 32 F eight times during the study.

Precipitation during the study was also below normal. The study area receives an average of 17 inches of precipitation during winter. Slightly more than 11 inches were recorded during the winter of 1969-70.

Readings of light intensity and wind velocity were taken at two hour intervals diurnally. The onset and termination of diurnal precipitation was also recorded in the field. Barometric pressure was read at sunrise, noon, and sunset. Miles of ground wind per day, daily precipitation, and temperature at two hour intervals were obtained from a U. S. Weather Bureau station three miles from the study area. A thorough discussion of the study area, the telemetry system, and other methods is offered in a related paper (Yoho and Dimmick, in Press).

RESULTS AND DISCUSSION

Transmitters were harnessed to quail live-trapped on the study area. The 14g. transmitter had little apparent effect on quail behavior. Telemetered quail were located, as nearly as possible, at two hour intervals during daylight hours. The straight line distance between each location was assumed to represent movement during that period. When two or more of these two-hour records were missing,

that day's data on the covey's movements were not used. During the 166 days that 11 quail carried transmitters, 88 days of data on movements of five coveys were extracted.

Daily Movements

Except during windy weather, coveys left roost after dawn but prior to sunrise, and roosted within 10 minutes after sunset, probably in relation to light intensity as suggested by Klimstra and Ziccardi (1963). Coveys moved an average of 427 yards (standard deviation = 198 yards) during the day. Frequently, similar movement patterns to the same portion of the range occurred on successive days.

Coveys moved in linear fashion to some portion of the range upon leaving roost, probably to feed. Movement during the first period, averaging 123 yards, was significantly longer than movement during any other period (Table 1).

After early linear movements, coveys usually wandered randomly much of the day. Seldom did lengthy movements occur during the six hours from mid-morning until early afternoon (Fig. 1). Similar movements, averaging 54, 48, and 51 yards, occurred during these three periods.

Table 1. Results of Duncan's new unequal multiple range test for differences in periods of two hour movement of coveys telemetered during the winter 1969-70, Ames Plantation, Tennessee.*

Mean periods of two hour movement in yards, starting with the first two hours after sunrise					
Period 3	Period 4	Period 2	Period 5	Period 6	Period 1
48.0	5.1	54.0	77.4	94.5	122.7

*Underlined values are not significantly different from each other at the 95 percent level of probability.

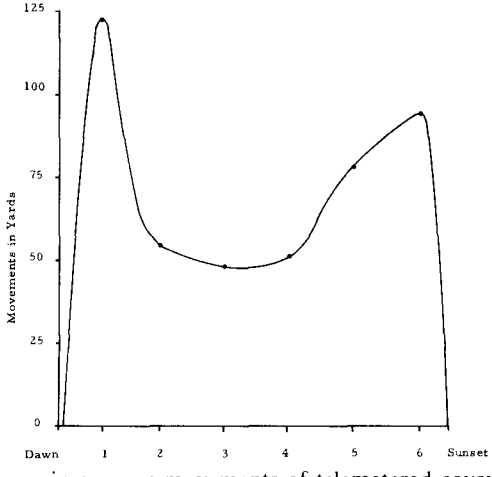

Figure 1. Changes in average movements of telemetered coveys during two hour periods throughout the day during winter 1969-70, Ames Plantation, Tennessee.

Increased movement toward the end of the day lasted twice as long as early morning activity. Coveys often shifted range or moved toward roost during the fifth period in mid-afternoon, and movements averaged 77 yards. Movements averaged 95 yards during the sixth period. Directional, often lengthy walks to roosts often occurred as sunset approached, reflecting use of several specified roost sites by each covey.

Influence of Weather on Daily Movement

Temperature during daylight hours was the only weather variable significantly related to daily movement (Table 11). Coveys moved greater distances on warm days than on cold days.

The response of coveys to the amount of wind during the day and the amount of rain during the day was nearly significant (Table 11). Coveys were not inclined to move long distances during rainy or windy weather.

Weather during the night probably influenced covey movements the next day. Measurements of wind and rain taken during the 24 hour period from sunset to sunset correlated more closely to daily movement than did sunrise to sunset measurements of wind and rain (Table 11).

During mornings and evenings characterized by gusty winds of more than ten miles per hour, coveys often remained on roost two or more hours after sunrise or established roost two or more hours before sunset. Coveys did not roost during early morning or late afternoon rainfall. Otherwise, wind and rain affected quail movements similarly.

Coveys were sheltered and inactive most of the time during windy or rainy days. Usually movements occurred during each two hour period, but these were shorter than movements during less severe weather. Coveys burrowed into dense cover after each movement. Possibly movements during inclement weather signified short periods of feeding.

Flushing of coveys had more effect on total daily movement than any weather variable examined in this study (Table 11). After being flushed, coveys restricted movements for the remainder of the day. The more times a covey was flushed, during a diurnal period the less inclined it was to move around.

Table 11. Relative effect of environmental factors on daily movement of coveys during the winter 1969-70 on the Ames Plantation, Tennessee. Factors are listed in decreasing order of importance based on correlation coefficients (n = 88).

Number of observed flushes during the day	-0.2717*
Average diurnal temperature	0.2364*
Miles of wind passed during the day	-0.1768
Total rain during the day	-0.1546
Average diurnal light intensity	0.1437
Hours of diurnal rain	-0.1416
Average diurnal wind velocity	-0.1376
Day length	0.0651
Ground temperature	0.0242
Average diurnal barometric pressure	-0.0124

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A STUDY OF AGE STRUCTURE AND SEX RATIOS IN BEAVER COLONIES IN GREEN COUNTY, GEORGIA

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ABSTRACT

A study of the age and sex structure in a selected beaver (*Castor canadensis* carolinensis) population was conducted from January 1971 to January 1972 in Green County, Georgia. Twenty-four beavers were trapped from four colonies in the study area. The animals were aged by cranial measurements and dental cementum and sexed by necropsy. There was no significant sex ratio difference in the kit and yearling classes. The sex ratio for the 2-year-old and adult classes was 13 males to 7 females. The sex ratio for the total population was 14 males to 10 females. The four study colonies averaged six beavers per colony.

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