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THE RESPONSE OF BOBWHITE COVEYS TO DISTURBANCE DURING FIELD TRIALS

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The characteristically sedentary nature of bobwhites is well documented by intensive research and is generally well known to hunters and

others acquainted with the life habits of this species of game bird. Early studies (1,7) indicated that quail often spend their lives traveling less than 0.5 mile between the widest points of their range. Other workers have shown that while the majority of individual bobwhites in a population have similarly restricted ranges, the mean size of home range expressed as cruising radius may be up to 0.5 mile or more (3,5,6). In some cases, where environmental stress is great or where seasonal changes markedly alter the condition of habitat, bobwhites may move distances of several miles (2). In Missouri, the greatest amount of movement occurs in spring, when the population undergoes changes relative to its breeding status, and a lesser amount in the autumn (4). The situation is the opposite in Florida, where greatest mobility is observed in summer and fall, and least mobility in spring (5).

The studies cited above, while illustrating regional differences in specific movement patterns, emphasize the commonly accepted contention that covey ranges of quail are small and that over short periods of time quail may be expected to move within a cruising radius of 0.25 to 0.5 mile. In addition, these studies illustrate that a potentiality for marked shifts in range occurs in some populations of quail.

This study reports on the impact of a major field trial on some aspects of density, distribution, and behavior of a bobwhite population on a field trial area. Relationships between quail density, daily disturbance, and bird dog performance are discussed. We are grateful to William Brown, Editor, The American Field Magazine, for providing detailed accounts of the field trial competition and to John Rennie, The University of Tennessee, for aid in statistical analysis of the data. This study was supported by funds from McIntire-Stennis Project MS-3.

Study Area

The study was conducted on Ames Plantation, an 18,600-acre tract in Hardeman and Fayette counties, Tennessee. The plantation is located in the Eastern Gulf Coastal Plain physiographic region, and is generally representative of the western 0.3 of Tennessee. Major crops grown on the plantation include soybeans (Glycine max), corn (Zea mays), and cotton (Gossypium hirsutum). Beef cattle and forestry are other major enterprises.

A 2,100-acre area was used for intensive study of the quail population (Fig. 1). Land use on the area is divided between forest land (31%), idle land (28%), cultivated land (23%), and pasture (15%). A subunit of about 214 acres within this area was selected for studying the behavior of quail during winter with the aid of radiotelemetry. This unit contained proportionately more cultivated land and less of other types of land use than the remainder of the area.

Of particular significance to this study is the annual running of the National Championship Field Trial for pointing bird dogs. This event is conducted over 2 separate courses, each approximately 12 miles long, during the last 2 weeks in February. During the running of the trial, a brace of dogs is started on the Morning Field Trial Course at

about 0830 and another brace is run on the Afternoon Course at 1330 each day of the event except Sunday, weather permitting. The courses are marked prior to the first day's running, and each dog is required to follow the same course. Thus, the courses are run the same time each day over the same route. In addition to the dogs, handlers, and judges, a gallery ranging from about 60 to 600 mounted spectators follows a route coinciding with or closely paralleling the field trial courses.

A significant feature of the Morning Field Trial Course is its frequent looping and doubling, permitting a thorough searching of large blocks of habitat by the dogs. This feature facilitated management of this area, as management efforts could be concentrated in areas that would be traversed 2 or more times during each heat.

Methods

Density and distribution of quail on the study area were determined by direct censuses conducted twice annually during the periods of December 1966 and March 1972. These censuses employed 5 to 7 men walking 20 to 30 yards apart to flush coveys. The counts were believed to be a consistent but low estimate of the density and spatial distribution of the population. Statistical limits of confidence could not be established, however, because of the impracticality of obtaining replicate counts for any season. Each census required 4 to 6 days, and neither time nor manpower was available for replication.

Home ranges of coveys and other aspects of quail behavior were studied with the aid of radio telemetry (8). Transmitters weighing about 14 g were placed on the backs of quail, and signals were monitored with the aid of a portable receiver. Signal strength varied greatly, occasionally being detectable at distances of 0.5 mile or more, but usually at ranges of 50 to 100 yards.

The performance of bird dogs in locating coveys during the field trials was determined from examining the accounts of the running of these trials published in The American Field Magazine. These accounts recorded the number of coveys pointed per heat, and the total time on the course logged by each dog. Data from heats for which neither dog finished the course were excluded from the analyses.

Results

Quail Populations

The quail population was studied with respect to its density on the study area and its distribution along the field trial course.

Density

The mean number of coveys on the 2,100-acre study area was 94 in December and 80 in March during the period 1966-1972 (Table 1). The autumn-to-spring decline in covey count during this period ranged from about 10 to 20%, averaging 15.4% for the 6 years. This seasonal decline in numbers of coveys on the study area was accompanied by comparable changes in

numbers of individual quail (Table 1), and generally indicates that a relatively stable population of quail occurred on the study area. The decline in numbers corresponded roughly to the estimated hunting mortality on the area, most of which occurred after the December census. We observed extremely little egress of quail from the study area that could be attributed to the activities associated with the field trial.

Distribution

The distribution of coveys with respect to that portion of the study area traversed by the field trial (42.5%) appeared to be similarly unaltered. In 1971-72, for example, 49 of 111 coveys located during December were on that portion of the study area encompassing the field trial grounds (Fig. 2). During March, 1972, less than 2 weeks following the trial, about 48 of 95 coveys were on that same portion. This pattern of distribution occurred during all other years of the study period (Table 2). That part of the study area used by the field trial is intensively managed for quail, and is more attractive to quail during late winter. Consequently, it appears that the general distribution of coveys on the study area is determined by the availability of good habitat, and is relatively unaffected by the potentially disruptive activities of the field trial.

Covey Ranges

The home ranges of 5 coveys of quail during the winter period of 1970 were defined through the use of radio-telemetry equipment. These coveys were monitored for periods ranging from 26 to 79 days during January through March, 1970. Home range sizes varied from 10.0 acres to 28.9 acres, averaging 16.7 acres for the 5 coveys studied.

The effect that the field trial could exert on a covey's use of its established range was observed during the 1970 field trial. The range of 1 covey lay in the path of the field trial, and the effect of this disturbance on the covey's range utilization is illustrated in Fig. 3. At approximately 1700 on the first day of the trial, large numbers of horsemen entered the covey's range, many of them riding at full gallop. The covey, situated in a small cover strip, became extremely active, ran erratically through its range, and travelled about 450 yards in little more than 10 minutes. During all of this activity, the covey remained on the ground and it eventually took refuge in dense honeysuckle. During the next morning the covey was located directly in the path of the advancing gallery. The covey divided permanently, with 1 portion of the covey abandoning the covey range and joining another covey that ranged off the field trial course. The residual segment of the covey remained within its original home range for another day, then moved off its established range and joined another covey southwest of the field trial course. This covey's original range was located near the starting point and ending point of the morning and afternoon courses, respectively. Thus, in addition to the disturbance caused by the gallery passing through their range, the quail were subjected to additional disruptions such as the loading of horses and gear, and heavy automobile traffic. The covey's response to disturbance of this magnitude was dramatic.

Table 1. Numbers of coveys and numbers of quail on the Ames Plantation study area during December, 1966 to March, 1972.

Period	Number of coveys			Number of quail		
	December	March	Percent decline	December	March	Percent decline
1966-67	90	76	15.6	1184	925	21.1
1967-68	101	81	19.8	1478	1073	27.4
1968-69	100	82	18.0	1394	1033	25.9
1969-70	73	66	9.6	1007	832	17.4
1970-71	89	77	13.5	1179	964	18.2
1971-72	111	95	14.4	1334	1269	4.9
Mean	94	80	15.4	1263	1016	19.5
Acres/covey	22.3	26.4	-	-	-	-
Acres/bird	-	-	-	1.7	2.1	-

Table 2. Number and proportion of coveys on the study area which were located on the field trial course.

Period	December		March	
	No. of coveys on field trial course	% of total coveys	No. of coveys on field trial course	% of total coveys
1966-67	49	54.4	40	52.6
1967-68	51	50.5	37	45.7
1968-69	54	50.0	39	47.6
1969-70	37	50.7	32	48.5
1970-71	47	52.8	45	58.4
1971-72	49	44.1	48	50.5

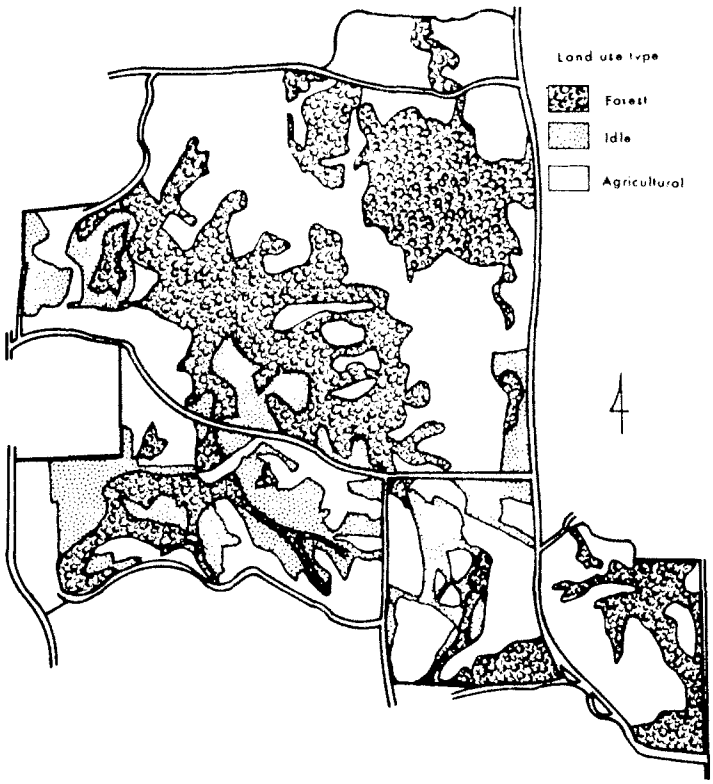

Fig. 1. The study area, a 2100 acre tract on Ames Plantation, Fayette and Hardeman counties, Tennessee.

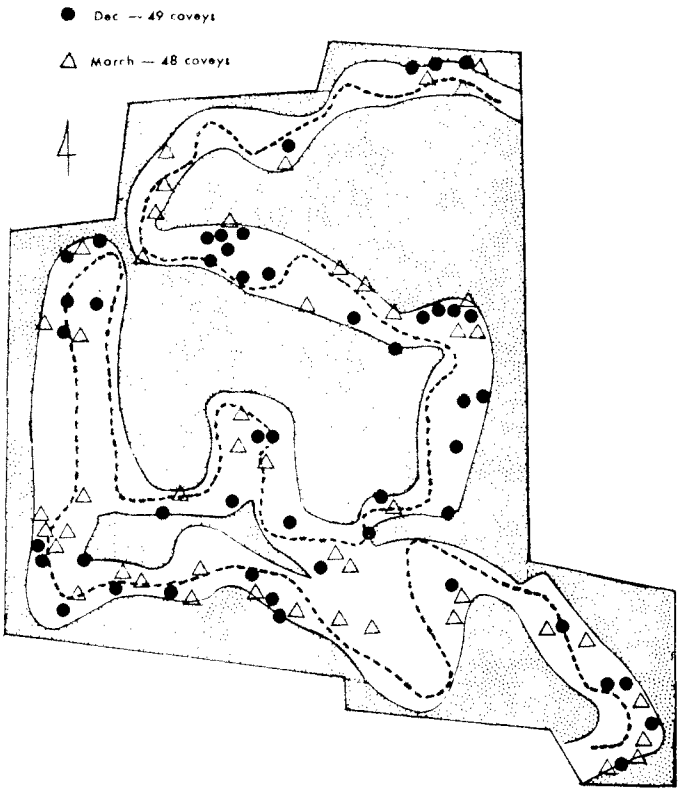

Fig. 2. Location of coveys on the morning field trial course during December, 1971 and March 1972.

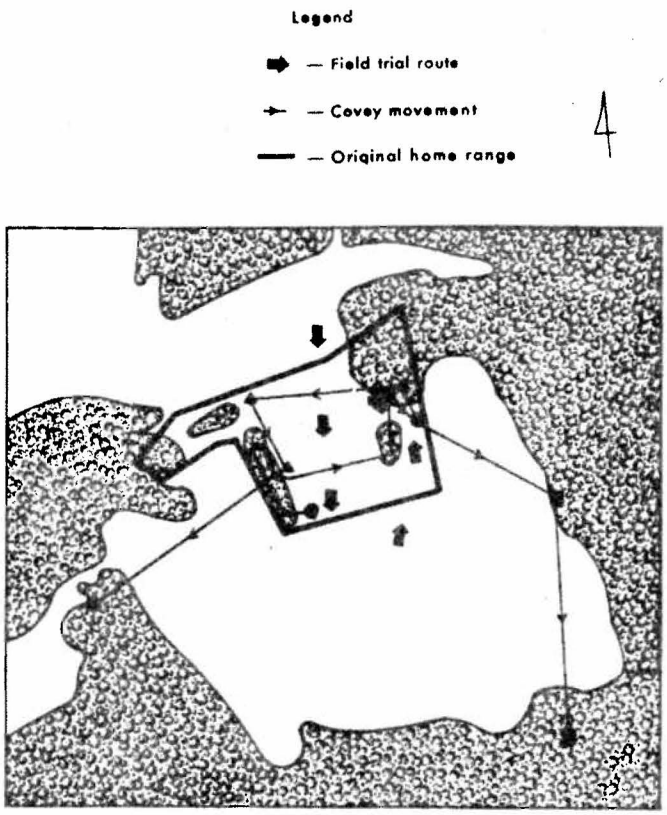

Fig. 3. Home range boundaries and movements of a covey disturbed by field trial activities Feb. 15–17, 1970.

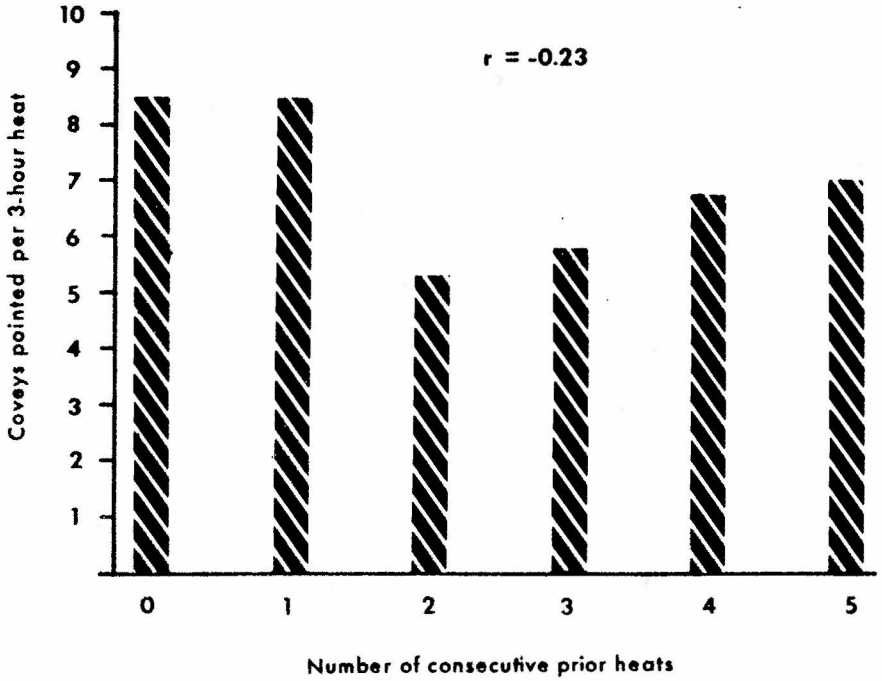

Fig. 4. Number of coveys pointed per 3-hour heat on the morning field trial course, 1967–72.

Performance of Bird Dogs

The performance of the competing dogs in locating coveys was considered a subjective index of the impact which the field trial exerted upon the availability of coveys. Over the 6 field trials studied, dogs averaged pointing 1.3 coveys per hour. The number of covey points per dog-hour varied only slightly between years; analysis of variance indicated that these minor differences were not statistically significant. It is likely that variations in quail density between years were not great enough to exert significant influence on the dogs' ability to locate coveys.

We used linear regression to measure the relationship between the number of coveys pointed during a 3-hour heat and the number of consecutive heats run prior to that heat. We assumed that if repeated disturbance of the area by the large gallery initiated egress of quail from the field trial course, we would detect a trend toward fewer covey points as the field trial progressed. We did not observe such a trend over the 6 trials. The greatest number of points occurred on days preceded by zero and 1 day of prior running, but no consistent trend was obvious (Fig. 4). The correlation was low (-0.23), and was not significant.

Conclusions

We draw 2 major conclusions from our study of field trial activities and quail behavior. First, we conclude that the rather traumatic experience of having their home range invaded by large numbers of mounted riders is sufficient disturbance to cause some coveys to demonstrate marked shifts in the location of their activity centers and home ranges. Telemetry data on 1 covey indicated clearly that coveys may disintegrate and abandon a well-established home range when these circumstances become prevalent.

Second, a point we believe to be more significant, the dramatic adjustment of home range was not universal among coveys on the study area. Covey distribution and density remained relatively unaltered, and the dogs' ability to locate and point coveys did not diminish as the trials progressed. Thus, it appears that minor, and occasionally major, shifts in covey ranges may be compensated for by 3 factors: (A) the moderately high density of quail maintained on the field trial course by good habitat management; (B) day-to-day variations in the specific areas searched by the dogs, and (C) the layout of the field trial course which enhanced the "interception" of displaced coveys.

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HABITAT UTILIZATION BY BOBWHITE QUAIL DURING WINTER

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Abstract:

This study was conducted on a 214-acre area of the Ames Plantation, Fayette County, Tennessee. Information on habitat utilization by bobwhite quail (Colinus virginianus) during winter was obtained by telemetering quail during January - March, 1970. The ranges of five coveys averaged 16.7 acres. Coveys spent little time in cultivated fields although this type of cover constituted much of the home ranges of 4 coveys. Cedar woods, hardwood forests, and old fields were used in proportion to their abundance for diurnal protective cover by the quail population, but presence of honeysuckle (Lonicera japonica) or other dense understory cover generally increased the attractiveness of a wooded area for quail. Honeysuckle was also the preferred ground cover for roosts.

The characteristic habitat or vegetative type most important to the bobwhite during winter varies widely among portions of its range in North America. The specific vegetative types quail utilize most frequently in a particular region reflect both their immediate needs for coping with environmental problems and the variety of vegetative types available to them. Typically, certain features of habitat exert significant influence on diurnal patterns of quail movement during winter. This is evidenced by the bobwhite's tendency to spend disproportionate amounts of its time in certain areas. Bobwhites in south-central Kansas, an area characterized by open herbaceous cover, show a strong inclination to establish "headquarters" in patches of brushy or woody cover when available (9). In Wisconsin, hedgerow of specified dimensions is the significant feature determining the quality of winter habitat for quail (5), and in