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## Winter Movements and Covey Composition of the Eastern Bob-White<sup>1</sup>

By ROGER H. BOEHNKE<sup>2</sup>

Before a game species can be managed properly, it is necessary to have a knowledge of its mobility patterns. The radius of mobility from a center will determine minimum range requirements for the game bird or mammal.

Some of the earliest banding studies (Stoddard, 1931) indicated that nearly half of the quail spent their life-spans within a quarter mile of their birth places. Few ever wandered more than a mile. Later studies in other parts of the country (Duck, 1943; Lehmann, 1946; Murphy and Baskett, 1952) have shown that quail make longer movements. Because of these varying movement records in different parts of the country, trapping and banding studies were carried on in Iowa on a 3,320-acre study plot of the Decatur County Quail Research Area during the winters of 1951-1952 (Gooden, 1952), 1952-1953, and 1953-1954, to determine the seasonal movement patterns of Iowa quail.

The 3,320-acre study plot comprises sections 1, 11, 12, parts of sections 2 and 10 of Woodland Township, and part of section 36 of Highpoint Township, Decatur County, with parts of sections 6 and 7 of Jefferson Township, Wayne County. The area is composed largely of hilly and sloping land, with some level bottom land. The principal land usages are pasture, woodland, hayfields, and corn.

A census was taken on the study plot on or about October 31, January 1, and March 1, each year. The population on January 1, 1952, was 243 quail (Gooden, 1952); January 1, 1953, 211 quail; and January 1, 1954, 120 quail.

During those years there was an average yearly loss of 23 per cent of the quail from October to March. During a 13-year study on the 7,713-acre research area, Kozicky and Hendrickson (1952) found fall and winter losses ranging from 20.3 to 87.8 per cent. Mangold (1951) discovered from his study on a 4,739-

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acre tract of the research area that very little of the fall and winter loss came from hunting or predation, but that the largest loss came from shifting of coveys off the area. Similar conclusions were reached from observations made during the three years of this study.

Twenty funnel traps, constructed by Gooden (1952), were used for the trapping. The sides of the traps, which were covered with one-half inch mesh hardware cloth, were 30 inches long and 10 inches high. The top was covered with cotton cord seine to prevent injury to the quail. Two funnels with adjustable guide wires extended into the trap on two sides and were adjusted to different sizes for different coveys.

The quail would ignore corn in traps when it was available in the fields. When the fields were covered with snow, quail would concentrate around the traps and were easily caught. As soon as the snow melted, the coveys would quickly return to their natural feeding area and could not be trapped.

An attempt to use a drive trap during the periods of mild weather proved to be ineffective because of the rough terrain and movement of the coveys.

Certain quail within a covey became repeaters in the bait traps. Two quail were retrapped four times and showed up in the trap every time the trap was set in their area whether the rest of their covey came to the trap or not. One covey was often seen around the trap, but only one of its members could be caught. This one quail was retrapped three times.

Most coveys were dependent upon a cornfield. Regardless of other food and cover, cornfields were usually found on known winter covey ranges.

Ninety-three quail were trapped and banded during the winter of 1951-1952 (Gooden, 1952), 90 were banded during the winter of 1952-1953, and 6 were banded during the winter of 1953-1954.

Out of the 93 banded the first year, 4 were returned the following two years. Out of the 90 banded the second year, 3 were returned the following year. This gives an average percentage of 3.8 of the bands returned. One other band returned by hunters to a local farmer was lost by the farmer. Five out of the seven returned bands come from hunters.

Two quail were banded and retrapped on the same spot, one 10 months later and the other 23 months later.

Two other quail were banded at the same place and then were

retrapped 11 and 14 months later  $\frac{3}{4}$  mile away in the same covey (Table 1).

Other band returns showed movements of  $1\frac{1}{8}$  miles in 9 months,  $2\frac{1}{8}$  miles in 6 months, and  $3\frac{1}{2}$  miles in 8 months. The longest movement of  $3\frac{1}{2}$  miles was made by a female. This indicates that if an area, capable of supporting quail, had all of its quail removed and is within  $3\frac{1}{2}$  miles of a covey of quail, the quail in that covey are capable of repopulating that area.

Table 1

Movement records for bob-white banded during the winters of 1951-1952 and 1952-1953 on the Decatur County Quail Research Area

Minimum number of miles traveled	Number of months between banding and returns	Sex
0	10	Female
0	23	Male
$\frac{3}{4}$	11	Female
$\frac{3}{4}$	14	Female
$1\frac{1}{8}$	9	Female
$2\frac{1}{8}$	6	Male
$3\frac{1}{2}$	8	Female

A record was kept of the age and sex of each banded quail (Table 2). During the winter of 1951-1952, the 99 quail trapped had a sex ratio of 51 cocks to 47 hens, and an age ratio of 84 juveniles to 16 adults (Gooden, 1952). During the winter of 1952-1953, the 92 quail trapped had a sex ratio of 46 cocks to 54 hens, and an age ratio of 80 juveniles to 20 adults. The six quail, four males and two females, banded during the winter of 1953-1954, were all juveniles.

An interesting point is that during the winter of 1952-1953, the sex ratio for 18 adults was 78 cocks to 22 hens. The sex ratio

Table 2

Sex and age ratios of the 92 quail trapped during the winter of 1952-1953 on the Decatur County Quail Research Area

No. of quail	Sex ratio	male:female	Age ratio	Juvenile:adult
74	Juveniles	38:62	Males	67:33
18	Adults	78:22	Females	92:08
92	Combined	46:54	Combined	80:20

for 74 juveniles was 38 cocks to 62 hens. The change from majority of females to males taking place between the juvenile and adult years, seems to indicate that the high loss of birds occurred in the female segment of the population and that the loss of females occurred after the winter trapping and before hatching time.

During the winter of 1952-1953, all the quail in three coveys were banded, and some quail were banded from all the remaining coveys except one. Eleven coveys were in the same area on which quail had been banded the previous year. If the quail kept within or returned to their original covey range over a year's time, it would be expected that more of the banded quail would have been retrapped the following year. Quail may occupy a so-called covey range year after year, but these are usually different quail.

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