State of Illinois
Henry Horner, Governor

Department of Registration and Education
John J. Hallihan, Director

# QUAIL AND PHEASANT STUDIES IN AN ORCHARD COUNTY

Frank C. Bellrose, Jr.

Published by Authority of the State of Illinois

NATURAL HISTORY SURVEY
Theodore H. Frison, Chief

Biological Notes No. 13 Urbana, Illinois May, 1940

# QUAIL AND PHEASANT STUDIES IN AN ORCHARD COUNTY

Frank C. Bellrose, Jr.*
Illinois Natural History Survey

In the summer of 1938, nesting studies and population estimates were made of quail and pheasants in the lower third of Calhoun County, Illinois. While some cruising of orchards and hay fields was undertaken to locate nests, most of the information on which these studies are based was obtained by interviewing farmers, during haying operations, in the field. Data were obtained on the number of acres of various farm crops, dates of mowing of forage crops, and number of quail and pheasant nests found.

These studies were extensive rather than intensive and were designed to shed some light on choice of nesting cover, nesting losses due to mowing, and relative density of quail and pheasants in one of the better Illinois quail counties. It is well known that farmers engaged in cutting operations often overlook the nests of upland game birds, but the number of such nests overlooked in Calhoun County is thought to be less than in most other parts of the Middle West because of the small fields and the scarcity of tractor-drawn mowers and rakes in this county.

Calhoun County consists principally of a long, narrow strip of rolling land between the Illinois and Mississippi rivers, extending about 40 miles from north to south, with an average width of 8 miles. Underlying the surface soil is a narrow limestone ridge, elevated 200 to 300 feet above the rivers and flanked on either side by their alluvial bottoms. Over this limestone ridge have been deposited materials of the Quaternary Period, consisting of clays, gravel and loess, which cover the ridge to a depth of 50 to 100 feet.

Formerly heavily forested with oaks, hickories and maples, the upland area has been cleared of most of its native stand and planted to apples, hay crops and grains. However, small woodlots abound, and brushy fencerows and roadsides are the rule rather than the exception. These form an ideal interspersion of cover types. Little corn is grown, but an excellent supply of the lesser ragweed and other natural foods exists along fencerows, woodlots, roadsides, creek banks and elsewhere.

---

*The writer is indebted to Arthur S. Hawkins, who supervised this study, giving many helpful suggestions and criticisms.

Table 1.--Reported number and destruction of quail nests in various cover types, Calhoun County, Illinois, 1938.

| Type of Cover | Number of Acres Mowed | Reported Number of Quail Nests | Number of Acres Per Nest | Number of Nests Destroyed | Number of Nests Hatched |
|---|---|---|---|---|---|
| Roadside | 16 | 4 | 4.0 | 3 | 1 |
| Apple orchard | 1,000 | 25 | 40.0 | 15* | 9 |
| Alfalfa, first cutting | 243 | 17 | 14.3 | 16 | 1 |
| Alfalfa, second cutting | 111 | 8 | 13.9 | 8 | 0 |
| Red Clover | 750 | 18 | 41.7 | 16 | 2 |
| Sweet clover | 84 | 2 | 42.0 | 2 | 0 |
| Wheat | 1,072 | 2 | 531.0 | * | 1 |
| Raspberry, dewberry | --- | 6 | --- | 3* | 2 |
| Pasture | --- | 2 | --- | 1 | 1 |
| Corn stubble | --- | 1 | --- | 1 | 0 |

*Outcome of one nest undetermined.

Nesting cover in Calhoun County, table 1, can be classified according to four major types: (1) roadsides and fencerows, (2) apple orchards, (3) hay fields and (4) grain fields. Roadside and fencerow nesting cover is furnished largely by such plants as blue grass (Poa praetensis), wild lettuce (Lactuca sp.), daisy fleabane (Erygeron sp.), blackberry (Rubus sp.) and smooth sumac (Rhus glabra).

Apple orchards, ranging in size from 1 acre to about 300 acres, abound on the rolling hills and provide more acreage of quail nesting cover than any of the other three types. Since most of the orchards are on rolling terrain, it is common practice to retard erosion by seeding between the trees with a mixture of red clover, blue grass and brome grass. This practice has, of course, greatly increased the quality of nesting cover in many orchards. In other orchards, where invasion of vegetation into bare areas is allowed to take place, forbs and other coarse herbs predominate in the ground cover. To facilitate spraying and picking of apples, fruit growers generally cut the herbaceous undergrowth in midsummer. During the 1938 season, however, because of the poor crop of apples, less than 50 per cent of the orchards were mowed; so poor in fact was the apple crop that many orchards were sprayed only once.

On the 70 or more farms studied in the lower third of Calhoun County in 1938, hay was grown on 1,837 acres; red clover, the most important hay crop, on 1,163 acres; alfalfa, the second in importance, on 249 acres; sweet clover, on 175 acres. Wheat grown on 39 farms, comprised 95 per cent of the acreage of small grains. It aggregated 1,368 acres.

## BOBWHITE QUAIL

Clean farming, as practiced in the Big Prairie district of Illinois, has greatly restricted the range of the bobwhite quail. At present, good quail territory is found largely along the bluffs of the Illinois and Mississippi rivers and in the hill and tight subsoil regions of southern Illinois. Calhoun County combines many of the habitat characteristics of the river bluff and the hill countries, making it especially favorable to quail

### Roadside Nesting

Roadsides aggregating approximately 20 miles in length, about 25 acres in area, were cut by a local township commissioner between May 27 and July 15. Cursory observation indicated that approximately two-thirds of this area, 16 acres, was suitable for nesting cover. Table 1 shows the relative density of quail nests in these 16 acres of cut roadside cover as compared to the density in other cover types. No data on uncut roadside cover were obtained.

Of the four nests found along the mowed roadside, three were in clumps of blue grass; the other was in a patch of sweet clover. Two nests were deserted because of mowing; one nest hatched. In one instance the female returned to the nest only to have it destroyed by a predator, probably a dog.

## Orchard Nesting

In 1938, of the 2,635 acres of ground cover in apple orchards on the 70 Calhoun County farms visited, 1,000 acres were mowed. The number of acres of orchard ground cover mowed is reported to vary considerably from year to year; it depends on the crop of apples and the luxuriance of the herbaceous vegetation. Fewer acres than usual were cut in 1938. Moreover, orchards that were mowed contained many scattered patches of uncut vegetation. The number of quail nests reported in the 1,000 acres of mowed nesting cover in orchards is shown in table 1.

Despite some disturbance by the mower, 11 birds returned to their nests. Nests of two of these birds were subsequently destroyed by predators, but nine nests hatched. Each of the 11 incubating birds flushed ahead of the sickle bar, prompting the operator to raise the bar sufficiently to leave an island of vegetation around the nest. Thirteen nests were destroyed by the mower. The outcome of one nest was not determined.

In every instance, quail nests in apple orchards were located in the open areas between the rows of trees. Despite careful search, not one nest was found near the base of a tree; distances from nest to nearest tree trunk varied from 8 to 25 feet, with an average of 12 feet. The growth in the open areas evidently offers better nesting cover than the sparse vegetation underneath the tree canopy, where there is a deficiency of sunlight.

Of the 25 nests found in orchards, 6 were in red clover, 18 were in a mixture of blue grass and daisy fleabane, and 1 was on the bare ground, being roofed over with dead blue-grass stems.

## Hayfield Nesting

Red Clover.--Of the 70 Calhoun County farms visited, 50 produced red clover on a total of 1,163 acres. Seven hundred fifty acres were cut for hay; 413 were not mowed. The 413 unmowed acres were combined for seed in late August. Data on the first cutting of red clover are given in table 2.

The first bobwhite quail nest was not found until May 27, but hatching dates given in table 2 indicate that part of the quail population, despite a cool, rainy spring, started nesting early in May. From data presented in table 2, it is evident that a number of quail nests escaped destruction by hatching previous to completion of the first cutting of alfalfa and of red clover.

Relative numbers of nests in red clover as compared with those in other kinds of hay crops are given in table 1. Nest destruction in all but two cases was due directly to mowing. There are two records of incubating birds returning to their nests--doubtlessly because an island of cover was left about the nests--to hatch the eggs. In another instance, a nest was deserted despite the island of clover left about it.

Table 2.--Data on mowing of red clover and alfalfa and hatching of quail nests, Calhoun County, Illinois, 1938.

| Date | Per Cent of Red Clover Mowed | Per Cent of Alfalfa Mowed | | Number of Nests Hatched |
|---|---|---|---|---|
| | | First Cutting | Second Cutting | |
| May 16-23 | --- | 4.4 | --- | 0 |
| 24-31 | 0.6 | 60.0 | --- | 3 |
| June 1-8 | 13.0 | 35.6 | --- | 4 |
| 9-16 | 75.0 | --- | --- | 2 |
| 17-24 | 11.4 | --- | --- | 0 |
| June 25-July 2 | --- | --- | 8.3 | 6 |
| July 3-10 | --- | --- | 76.7 | 3 |
| 11-18 | --- | --- | 15.0 | 1 |
| 19-23 | --- | --- | --- | 1 |

Alfalfa.--Forty-three farms produced 249 acres of alfalfa. Forty-two acres escaped early cutting, but by mid July all but 6 acres had been mowed at least once. Table 2 shows the first cutting extending from May 16 to June 8; the second cutting extended from June 23 to July 16. It should be noted that the peak of the first cutting was reached 2 weeks earlier in alfalfa than in red clover.

When the dates of alfalfa mowing are compared with those for the hatching of 20 quail nests, table 2, it is apparent that only a small percentage of nests hatched previous to completion of the first mowing and that few renesting birds would escape nest destruction by the second cutting.

The number of bobwhite nests found in alfalfa, as compared to those in other types of cover, is given in table 1. Twenty-four nests in alfalfa were destroyed or deserted as a result of mowing. However, there is one case of a quail returning to a cut-over nest to hatch the eggs.

Sweet Clover.--In 1938, sweet clover was grown on 15 farms, where it totaled 175 acres. Eighty-four acres of this were cut; the remaining 91 acres were left for use as a soil conserver and soil builder. Dates of mowing of this crop ranged from May 27 to July 2, with a mean of June 15. Of the two nests discovered in this cover, both were destroyed by mowing. A small percentage of quail nests reached the hatching stage before the peak of cutting of sweet clover in mid June.

## Grain Field Nesting

Wheat was grown on 1,368 acres of the farms studied in Calhoun County in 1938. Information was obtained on 1,072 of these acres cut by binders and combines. Despite cruising by the author in one wheat field and the vigilance of many farmers, only two quail nests were located in this cover type, for a density of one nest in 531 acres. In both instances the incubating birds returned to their nests in the stubble. One nest hatched about June 30; the other was still being incubated on July 18. The first nest was situated in a wheat field in which red clover had been sowed; the clover furnished added nesting cover. The second nest was partly under a shock of wheat bundles.

From the low nesting density in wheat fields, it appears that small grains are little utilized for nesting purposes by bob-whites. This fact is most unfortunate, inasmuch as small grains offer safer nesting sites than do hay fields. In Calhoun County, in 1938, the first wheat fields were not cut until June 18, the peak not being reached until June 27. The hatching data presented in table 2 indicate that about half of the quail nests hatched previous to the first activity of the reaper.

## Miscellaneous Nesting Cover

In this category are placed those nesting cover types that are small and restricted in habitat and that occur in waste corners of fields, pastures and woodlots.

One nest was found on June 2 among the stubble of a field that had been in corn the previous year. Situated in a small clump of grass (Hordeum sp.) and smartweeds (Polygonum sp.), it was destroyed by plowing.

Raspberry and dewberry patches harbored six nests. In each instance, however, these nests were among the blue grass growing with the briers. Three of the nests were destroyed by predators, two hatched, and the outcome of one was not determined.

Two nests were found in pastures. Both were located in a mixture of blue grass and daisy fleabane. Although the roof of one nest was removed in mowing, the female returned to incubate, and the eggs hatched. The other nest was destroyed by crows.

## Nest Loss

Nest loss of quail was greatest in alfalfa, where only a small percentage of nests escaped by hatching before the mower destroyed them. Since, of all crops, alfalfa showed the highest nest density and highest nest mortality, this crop formed an important hazard to the quail of Calhoun County.

Red clover was not nearly so hazardous a nesting cover as alfalfa. Fewer birds were attracted to red clover. Because of the later mowing of this crop, early nests escaped destruction, and, furthermore, approximately 30 per cent of this crop was not mowed.

Orchards offered, in 1938, safer nesting sites than did any other type of area under cultivation in the southern part of Calhoun County. Less than 50 per cent of the orchard acreage was mowed. Of the quail nests in orchards, 36 per cent hatched, despite the mowing, in some instances, of the immediate surroundings. While inconclusive, because meager, data at hand indicate that raspberry and wild dewberry patches and other waste places were safer nesting habitats than orchards; roadsides were less safe.

## Winter Population

In an effort to secure some idea of the abundance of upland game during the winter of 1937-38, the author interviewed farmers as to the number of quail coveys and pheasants on their farms. Because the county contains small farms, averaging 80 acres, and because most farmers there are active hunters, the author believes that a rough but fairly accurate measurement was obtained. On 10,619 acres, 187 quail coveys were reported, about one covey per 57 acres. Undoubtedly some coveys were reported more than once and some coveys unreported. Inasmuch as 10 birds per covey is a conservative average in that locality, the probable population in the winter of 1937-38 was about one quail per 6 acres.

Despite heavy nesting losses in mowed areas, Calhoun County had in the fall of 1938, as in the autumn of 1937, a good stand of quail. This is especially remarkable in view of the disastrous winter of 1935-36 which, according to apparently reliable reports reduced bobwhites to a relatively low population in the locality. Undoubtedly the rapid recovery was due in large part to successful nesting in apple orchards with uncut cover crops, red clover fields many of them unmolested until after hatching time, fencerows, and raspberry and dewberry patches.

## RING-NECKED PHEASANT

According to Mr. Robert Meyer, a lifelong resident and hunter in Calhoun County, the first ring-necked pheasants, a dozen birds, were released there about 1913. Liberations of pheasants by the State Department of Conservation between 1928 and 1937 amounted to 688 birds; the largest number released in any one year was 158 in 1936.

There was in 1938 a density of approximately one pheasant per 40 acres. This figure is based on a reported 251 birds on 10,025 acres covering 55 farms. The number is surprisingly high in view of the fact that in Calhoun County the pheasant is reaching the southern extremity of its range and that much of the land there is not devoted to grain crops.

## Nest Density

In 1938, 16 pheasant nests were recorded on 2,077 acres of orchard and hay crops in Calhoun County. On 750 acres of mowed red clover there were five nests, a density of one nest per 150 acres. Five pheasant nests were recorded on 243 acres of cut alfalfa for a density of one nest per 48 acres. Eighty-four acres of sweet clover contained two nests, one nest per 42 acres. On 1,000 acres of mowed ground cover in orchards there were four pheasant nests, a density of one nest per 250 acres.

Ring-necked pheasants reached a nest density in alfalfa relatively high for Calhoun County. Sweet clover contained a larger number of nests per acre, but the acreage involved is considered too small to be representative.

## Mortality

Two of the four pheasant nests in orchards hatched; one of the five nests in red clover hatched; not one of the five nests in alfalfa was successful; and both nests found in sweet clover fields were destroyed. All known pheasant nesting losses were the direct result of mowing. One nest was successful in red clover; it hatched before the field was mowed. Two nesting hens and one adult cock pheasant were killed in the mowing of 84 acres of sweet clover.

Like the bobwhite, pheasants attained a higher nesting success in orchards than in any other area under cultivation. Alfalfa proved to be an important hazard to the nesting success of the pheasant through its attractiveness to nesting birds and the ensuing heavy mortality of nests due to mowing.

# MANAGEMENT RECOMMENDATIONS

Although this study deals largely with conditions in Calhoun County, the writer believes that some of the principles set forth in this paper are applicable to regions elsewhere, particularly where apples predominate among the farm crops.

The quail population in Calhoun County and many southern counties is high, but a few simple management practices, that are related to nesting and that can be correlated with sound farming practices, might make it even higher. The same practices may reasonably be expected to benefit the pheasant population.

Apple orchards offer the greatest possibilities for increasing the nesting success of bobwhites and pheasants in Calhoun County. It is commonly recognized that mowing in many orchards takes place when there is a lull in other farm activities. If, without inconvenience, cutting of the ground cover were delayed until after July 4, the majority of the quail nests in orchards would escape destruction from mowing. Such a delay seems feasible, especially in those orchards containing varieties of apples not picked until late August or September.

Leaving uncut areas along margins and in corners of orchards would prevent destruction of many quail nests. It would be especially beneficial if the same areas in orchards were left uncut year after year, since early-nesting quail are attracted by the previous year's vegetation.

A number of Calhoun County farmers reported that they avoided damage to quail nests by raising the sickle bar as high as practicable before they started mowing. Many of the nests, placed as quail nests usually are in cup-shaped depressions, were not touched by the mower with the sickle thus raised. In almost every case in which the nest was not touched, the bird returned. Some farmers prevented destruction of nests by raising the sickle bar by means of the hand lever when quail flushed in front of the mower.

Although there is a considerable loss of quail nests along roadsides, these areas are attractive to nesting birds and should be considered in any plan to increase the quail population. Many miles of country roadside were mowed in 1938 to improve the appearance and to control weed plants. However, the vegetation of many roadsides consists of grasses and other herbaceous vegetation which are not weeds and which do not detract from the appearance. Farmers and township road commissioners may find it feasible to leave stretches of roadside unmolested, or at least to postpone mowing until after July 4, a date past the peak of the quail nesting season in Calhoun and neighboring counties.