

FACTORS AFFECTING NESTING SUCCESS OF RING-NECKED PHEASANTS

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THROUGH the spring and early summer of 1964, 11 Ring-necked Pheasant (*Phasianus colchicus*) nests were discovered in Toledo, Lucas County, Ohio. The determinate factors affecting nesting success, including interesting behavioral patterns in response to different stimuli, are reported. The earliest nest was located on 3 May and the latest on 15 June. The habitat varied considerably; nests were found in old weed fields, alfalfa, hawthorn thickets, blackberry patches, and forest. Once a nest was discovered, a tag was left near it to aid in finding it again. The location was checked each day to determine the date of hatching and the success in nesting. The nest site was approached carefully so as to not disturb the hen, and she was not flushed after the full clutch was laid. Of 11 nests discovered, three (27%) had some chicks leaving the nest. Seven chicks left one nest of 12 eggs; 15 chicks successfully left a nest of 24 eggs. A third nest had 12 eggs, all of which hatched, the young leaving successfully. Of a total number of 164 eggs laid only 34 chicks (21%) left the nest.

Reasons for nest failure could be separated into three categories: (1) behavioral conflicts, (2) rainstorms, and (3) predation. Behavioral conflicts resulted in three nest desertions, and part of the eggs from two other nests failed to hatch because the hen left the nest too soon. Rainstorms resulted in the flooding of one nest causing desertion, and in another case caused the death of 12 chicks before they left their nest. Predators destroyed three nests of eggs and removed three eggs from another.

Possible predators in the nesting area may have been opossums, raccoons, dogs, cats, Common Crows, and Norway rats. When only a few eggs were taken from a nest the predation was probably due to rats. However, on one occasion seven eggs were taken from a nest of 17. The hen continued to incubate and on the following day, the entire nest had been destroyed.

Behavioral conflicts causing nest desertions were due to: (1) more than one hen laying eggs in a nest, (2) a quail laying eggs in the nest, and (3) the presence of a cat in the nesting area.

In the late afternoon of 3 May a hen was flushed from a nest in a wooded area. The nest then contained 16 eggs. On 4 May the nest had 18 eggs, 5 May 22 eggs, and 6 May 23 eggs. When four additional eggs were found on 5 May the nest was visited the following morning and these notes taken:

0720: As the nest was approached a cock pheasant drove another cock away from the nest site and then retreated himself.

0740: A hen approached from the east and walked straight to the nest. She settled on the eggs and moved them about with her bill (the eggs were piled on top of one another). She left the nest heading west without laying an egg.

0755: A hen was observed 40 feet east of the nest. Several cocks continued crowing nearby.

0855: A cock continued crowing near the nest, returning a call in response to other cocks crowing.

0900: A female approached to within 50-60 feet northeast of the nest. She was startled by a train whistle and ran away. The observer then departed.

1500: One egg had been laid in the nest making a total of 23 eggs.

The nest containing 23 eggs was visited on every day from 7 May to 14 May. The nest site was not disturbed and no hen was ever flushed from the nesting vicinity. Possible reasons for desertion of the nest may be that (1) there was conflict between the different hens laying in the nest, (2) none of the hens would accept this large number of eggs, or (3) there may have been some influence upon the hens by the cock or cocks in the nesting area. Two eggs were laid in each of two different nests, on single days. It is possible that these hens laid two eggs in one day; however, it seems just as reasonable to assume that two different hens may have utilized the same nest on one day.

The nest deserted due to Bobwhite (*Colinus virginianus*) eggs had 13 pheasant eggs on 12 May, 14 on 13 May, and 15 pheasant eggs plus one quail egg on 14 May. The pheasant apparently deserted this nest, for she discontinued laying and did not incubate. On 20 May, a second quail egg had been deposited in the nest. The eggs remained in the nest on 19 June.

One hen pheasant deserted due to the presence of a house cat stalking near the nest site. The cat was observed watching the pheasant; however, the pheasant had seen the cat and was not sitting on the nest. The hen moved slowly away from her nest, keeping a safe distance from the cat, and she did not return. Possibly the cat captured the pheasant, but there was no evidence that it did so. The eggs remained undisturbed in this deserted nest from 16 May to 19 June.

When hen pheasants left the nest with a brood, two of them had eggs remaining unhatched, containing live chicks that probably would have hatched within a few hours. The hen may thus exhibit a stronger attachment to her chicks and the desire to find food for them may be stronger than the desire to remain on the unhatched eggs.

DISCUSSION

Bent (1932) reported that pheasants lay 6 to 14 or 15 eggs, usually 10 to 12, and that they have been known to lay eggs in other birds' nests.

Ball (1952) reported three pheasant hens sitting on nests of 41, 32, and

36 eggs, respectively. He also reported that the average clutch size was 11.5 in 1947 and 11.2 in 1948.

Ten of the 11 nests observed in the present study had a full clutch of eggs. However, there is evidence that on at least three occasions, more than one hen may have contributed to the nest eggs. Excluding one incomplete nest of flooded eggs, there was an average of 16 eggs per nest. Even though the sample number of nests is quite small, the average number of eggs appears relatively high.

There may have been more than three nests in which two or more hens were depositing eggs. The nest containing 24 eggs was not discovered until all the eggs had been laid. More than one hen may have been contributing to the number of eggs in this nest.

Kabat et al. (1948) reported that gallinaceous birds often will drop single eggs away from a nest site before selecting the site for the bulk of their clutch. Perhaps some nests are relatively easy to discover by females that have not selected a nest site of their own. These may be used to deposit the few eggs that would have been dropped away from any nest site. Several single eggs were discovered in the nesting area, far from any nest. Also, the dropping of these single eggs may be primarily in the early part of the nesting season before birds are strongly stimulated to select nest sites. In this study, known extra eggs were laid in nests on 4 May and 5 May, 14 May and 19 May. Two other nests having 19 and 24 eggs had the full numbers on 25 May and 8 May, respectively.

Blain (1954) reported a pheasant nest containing quail eggs which was deserted by the pheasant. There were six pheasant eggs when first found. Then one pheasant egg and one quail egg were added each day until there were eight quail and 13 pheasant eggs. The pheasant then deserted the nest.

Bellrose et al. (1964) reported that female Wood Ducks desert a nest much quicker if more than one hen is laying in it. It appears that hen pheasants may act similarly.

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NEST CARD PROGRAM

The North American Nest Card Program is winding up the 1965 nesting season, and many cards have already been returned. There are still many cards in the hands of the individual recorders, however, and these should be returned to us as quickly as they are completed. We are preparing the data for transferral onto IBM cards, and a large bulk of material is needed for the first run, to be started soon.

Regional Centers may determine for their members whether their cooperators should return the cards to the center first, in order to complete local records, or whether they may be sent directly to us as they are completed.—*Laboratory of Ornithology, 33 Sapsucker Woods Road, Ithaca, N.Y.*