

NESTING ATTENTIVENESS AND INCUBATION PERIOD OF A WOOD DUCK

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In connection with a study of the Wood Duck (*Aix sponsa*) in central Ohio, I placed automatic recording devices at three nests of this species during the 1956 nesting season. The devices recorded the time spent by the incubating female on and off the nest. The incubating birds were disturbed by fishermen at two of the nests, but I think incubation behavior recorded at the third nest was entirely natural. W. J. Breckenridge (1956: 16-21) made similar recordings at three wood duck nests near Minneapolis, Minnesota, during 1948-1950, and some differences in our results suggest that my one recording should also be published.

EQUIPMENT AND TECHNIQUES

A Leeds-Northrup hygrothermograph was used as the recording instrument. This instrument consisted of a bracket-mounted cylinder rotated by a 7-day clock (Figure 1). A soft-lead pencil was held in a wire arm which could be moved short distances both horizontally and vertically; a weak spring pulled the arm both to the bottom of its range of movement and to the limit of its range of movement toward the rotating cylinder. With the pencil arm bracket rotated toward the cylinder, the spring tension

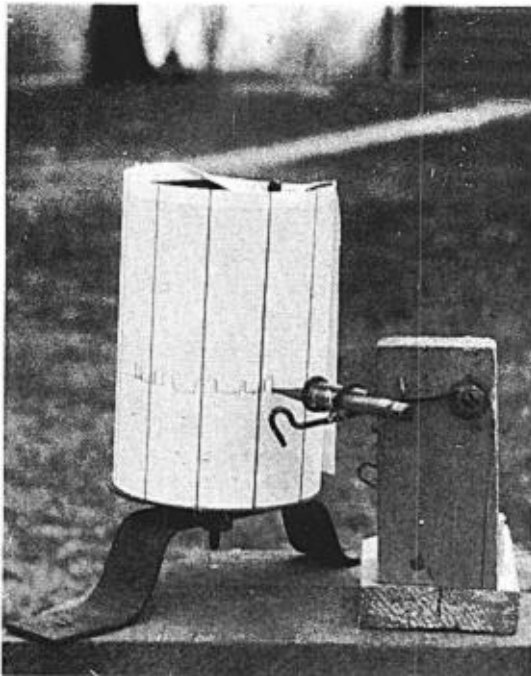


Figure 1. Recording Instrument Used at the Wood Duck's Nest.

held the pencil point lightly against the paper and in a downward position. Attached to the free end of the pencil arm was a strong button-carpet thread which extended upward through a pipe to the wood duck nesting box (Figure 2). At the nesting box this thread was attached to a hinged lever, one inch from its fulcrum. Another thread, attached to the longer end of the lever five inches from the fulcrum, extended through a hole into the nesting box four inches above the eggs and was attached to the opposite side of the box at the level of the eggs. The two threads were loose enough that the small spring on the pencil arm kept the pencil in a downward position when the bird was not on the nest; they were tight enough that slight pressure on the thread in the box pulled the pencil into its uppermost position.

Whether the incubating duck sat on the thread or crawled under it, she pulled the thread enough to elevate the pencil arm when she was on the nest. A horizontal line in the lower position was made on the record sheet when the bird was off the nest; a horizontal line in the upper position was made when the duck was sitting quietly on the nest; a vertical line followed by a horizontal line in the downward position was made when the duck left the nest; a vertical line followed by a horizontal line in the upward position was made when the duck returned to the nest; a series of vertical lines was made when the duck moved about on the nest.



Figure 2. Recording Instrument in Position in a Shelter Box beneath the Nesting Box.

Five days passed after I found the nest before I was able to install the recording instrument and to have it in operation, and the bird added an egg on each of these days. Finally, on May 15, 1956, the recording instrument was in operation at the nest.

The nest was on the Wehrle Estate, an area maintained as a wildlife refuge, at Buckeye Lake, Ohio. There was little human disturbance near the nest, and the bird's incubation behavior probably was as nearly undisturbed as could be attained. The female duck was removed from the nest for banding, but she remained on the nest 20 hours after the banding experience, and I think that banding the bird did not appreciably change her incubation behavior.

RESULTS

The female duck came to the nest at 5:45 p.m., May 15, and remained on the nest until 10:30 p.m. This was the only time she went off the nest during darkness. She returned to the nest the following morning at 4:30 a.m., laid an egg, and left the nest at 7:15 a.m. She remained off the nest until 4:50 p.m., when she returned and started her incubation period. She laid another egg the following morning, May 17; the complete clutch contained ten eggs. I learned of this last egg-laying by examining the nest during the female's next period off the nest, between 9:20 a.m., and 10:30 a.m., on May 17.

The attentive and inattentive periods may be best seen in the accompanying graphical record (Figure 3). Movements of the bird when on the nest are not shown in this graph. When on the nest the bird did not sit motionless for long periods but instead was incessantly moving about on

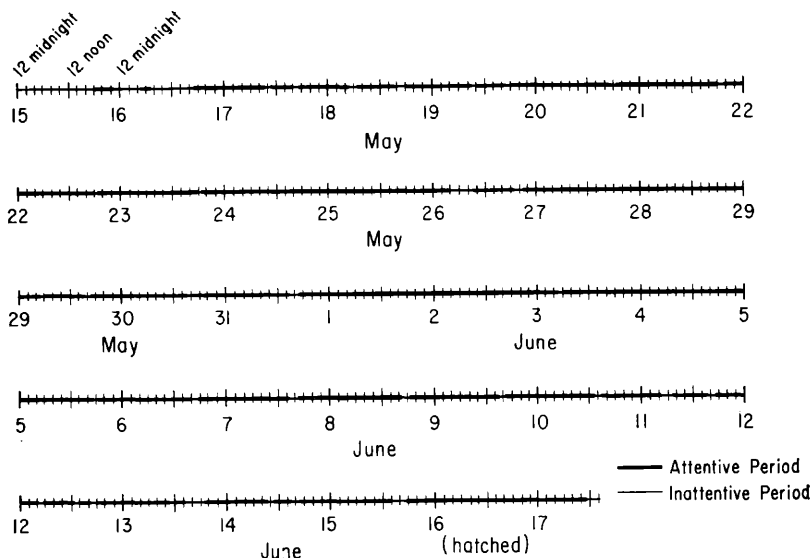


Figure 3. Complete Record of Attentive and Inattentive Periods of an Incubating Wood Duck.

the nest. Much of this movement was for turning the eggs, for, as was determined in another nest where the positions of the marked eggs were mapped on four different days, the eggs are turned frequently and their positions changed in the nest.

The ducklings hatched on June 16, during the thirty-first day of incubation. The exact hour of hatching was not shown by the recording instrument, but the ducklings left the nest in the forenoon of June 17, and ducklings normally leave the nest in the forenoon of the day following hatching. Including the incubation period and the time after the ducklings hatched before they left the nest, the female spent $66\frac{1}{2}$ hours on the nest. There were four extremely long attentive periods: 60, 59, $57\frac{1}{2}$, and $56\frac{1}{4}$ hours. The four extremely long periods were the only attentive periods of more than 24 hours. There were 11 attentive periods from 20-24 hours in length, 4 from 15-20 hours, 5 from 10-15 hours, 6 from 5-10 hours, and 4 less than 5 hours. The average duration of 34 attentive periods was $19\frac{1}{2}$ hours. The shortest attentive period was $2\frac{1}{4}$ hours.

The inattentive periods totaled $51\frac{1}{4}$ hours. The longest inattentive period after incubation started was $5\frac{1}{4}$ hours, from 3:45 a.m. to 9:00 a.m., following the first extremely long attentive period of $57\frac{1}{2}$ hours. The shortest inattentive period was $\frac{1}{4}$ hour. The attentive period immediately preceding this short inattentive period was 23 hours; the attentive period immediately following was $23\frac{1}{2}$ hours. There was only one inattentive period exceeding 5 hours, 2 between 3 and 4 hours, 23 between 1 and 2 hours, and 3 under 1 hour. The average duration of the 33 inattentive periods after incubation started was about $1\frac{1}{2}$ hours.

There was no regularity in the duration of the attentive and inattentive periods, nor in the time of day of these periods. Of the 33 inattentive periods, 10 were in the forenoon and 23 in the afternoon; the bird was more inclined to leave the nest in the afternoon than in the forenoon. Seven periods started before 9:00 a.m.; 8 between 9:00 a.m. and 3:00 p.m.; 18 after 3:00 p.m. The seven inattentive periods before 9:00 a.m., also started before 5:00 a.m. Eleven of the 18 inattentive periods after 3:00 p.m. started after 4:00 p.m.; 5 after 5:00 p.m.; 2 after 6:00 p.m. When the female left the nest in the morning, she most often left early, before 5:00 a.m.; when she left after 3:00 p.m., she most often left during the two hours between 3:00 p.m. and 5:00 p.m.

DISCUSSION

The Wood Duck sometimes begins incubation as much as three days before its clutch is complete (Dixon, 1924:56). Leopold (1931:213) observed that females spent as much as three nights on the nest before incubation actually commenced. My bird commenced incubation about 12 hours before the last egg of the clutch was laid.

Breckenridge (1956:17) observed variation in the time of day of inattentive periods: at one nest he found a reasonably regular afternoon inattentive period, at a second nest both morning and evening periods, and at a third he found no regularity. My bird showed no regularity in the time of day in inattentive periods. She left the nest most often, however, in the late afternoon. It should be noted that my bird left the nest eight times (about 25 percent of the total) between 9:00 a.m. and 3:00 p.m. Breckenridge's birds seldom left the nest during the mid-day.

Breckenridge (*ibid.*) commented that some species of birds incubate

their eggs continuously for as long as 14 days, but his wood ducks only once failed to leave the nest at least one time daily. It is notable that my duck had four protracted attentive periods of more than 56 hours each.

Breckenridge (*op. cit.*, 19-20) reported incubation periods of from 25-31 days for his three clutches, and presented evidence to indicate that periods of more than 25 days result from disturbance of the incubating bird and consequent chilling of the eggs. The eggs in my nest hatched in their thirty-first day of incubation, and I have every reason to believe that this was an undisturbed incubation. The total time of inattentiveness was only about 10 hours more at my nest (51 $\frac{1}{4}$ hours) than at Breckenridge's (41). My nest contained a two-inch layer of loose down; this is the usual amount of down in a wood duck's nest. I presently do not have an alternative explanation for the recorded differences in wood duck incubation periods.

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SUMMARY

An automatic recording device was operated at the nest of a wood duck throughout the incubation period. Incubation was started about 12 hours before the last egg was laid. The average length of the 34 attentive periods was 19 $\frac{1}{2}$ hours, ranging from 2 $\frac{1}{4}$ to 60 hours, with four extremely long periods of more than 56 hours each. The average length of the 33 inattentive periods was 1 $\frac{1}{2}$ hours, ranging from $\frac{1}{4}$ to 5 $\frac{1}{4}$ hours. There was no regularity in the length or time of day of the inattentive periods. The eggs hatched during the thirty-first day of incubation; the clutch was believed to have had a natural and undisturbed incubation.

LITERATURE CITED

- BRECKENRIDGE, W. J.
1956. Nesting study of wood ducks. *Jour. Wildl. Mgmt.*, **20**: 16-21.
- DIXON, JOSEPH
1924. Nesting study of the wood duck in California. *Condor*, **26**: 41-66.
- LEOPOLD, FREDERIC
1951. A study of nesting wood ducks in Iowa. *Condor*, **53**: 209-220.

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