

OBSERVATIONS ON THE ROLE OF NEST BOX SANITATION IN AFFECTING EGG HATCHABILITY OF WILD SPARROW HAWKS IN EASTERN PENNSYLVANIA

by

Donald S. Heintzelman
New Jersey State Museum
Trenton, New Jersey 08625

Introduction.—In two recent papers discussing factors which could affect the breeding success of captive Sparrow Hawks (*Falco sparverius*) and/or other falcons, Porter and Wiemeyer (1970) and Nelson (1971:65) suggested that bacteria-contaminated nest boxes or material remaining in nest boxes from one year (breeding season) to the next may cause the death of some embryos in Sparrow Hawk eggs the following year. Nelson (1971:65) suggested that “It is possible that digestive tract contaminants (bacteria) from the nestlings in the nest one year may be able to survive overwinter and kill embryos in eggs laid at the same ledge the following year (or on the same nestbox litter, or in contact with the nestbox walls, in the case of captive Kestrels).”

This interesting hypothesis is worth considering in terms of the role which nest box sanitation may play in affecting egg hatchability rates, and hence breeding success, of wild Sparrow Hawks. During the period 1959 through 1966, 21 nests of wild Sparrow Hawks were located on Charlex Farm, Albany Township, Berks County, Pennsylvania (Heintzelman and Nagy, 1968). All nests were in boxes placed in suitable locations on the study area. To avoid unnecessary human disturbance of nesting birds, only 14 of the 21 nests were studied in varying degrees of thoroughness. However, during the period 1959 through 1966, once a nest box was placed on the study area no attempt was made to clean or disinfect it after a nesting season was completed. Any contaminants which accumulated in a box remained there. Thus, field data pertaining to Sparrow Hawk nest boxes which were used successively for two or more years might shed light on the role which bacteria may play in causing Sparrow Hawk embryo mortality in eggs deposited in a potentially contaminated nest box resulting from Sparrow Hawk use during a preceding breeding season.

Results.—Table one summarizes the clutch sizes and hatchability rates of those Sparrow Hawk eggs which were deposited in three different uncleaned nest boxes for two or more successive years (Heintzelman and Nagy, 1968:308).

Table 1. Hatchability Rates of Sparrow Hawk Eggs in Uncleaned Nest Boxes

Nest Number	Clutch Size	No. Eggs Hatched	% Eggs Hatched	No. of Males	No. of Females
1959B	2	2	100	1	1
1960B	5	5	100	2	3
1961B	6*	5	83	4	1
1962B	4	3	75	3	0
1963B	5	5	100	2	3
1965B	5	4	80	1	3
1966B	1	0	0	0	0
1961F	3	3	100	2	1
1962F	6	6	100	2	4

*One egg accidentally destroyed while being numbered.

The location of box B was particularly attractive to Sparrow Hawks during the eight years that the author, and/or Alexander C. Nagy, studied these birds. In fact, box B was utilized during seven of the eight years of this study, 1964 being the only year that it was unoccupied. However, during the eight years two different boxes actually were used by Sparrow Hawks at nest site B. From 1959 through 1961, one box was left intact at site B, and the hatchability rate of the clutches deposited in the box during 1959 and 1960 was 100 percent. Unfortunately, one of the six eggs in the 1961 clutch at site (=box) B accidentally was broken while being numbered. The remaining five eggs hatched successfully, however. By the end of the 1961 breeding season box B was so dilapidated that it was replaced with a new box which was fastened in exactly the same position as the old one. Thus, the replacement box still was referred to as box B because it was simply a replacement at site B. Sparrow Hawks readily

accepted replacement box B during the 1962 nesting season and had a 75 percent hatchability rate that year, followed by a 100 percent hatchability rate during 1963. The acceptance of the replacement box, incidentally, suggests that the site, rather than the actual nest box, was of primary importance to the falcons in their selection of an appropriate nesting place. In any event, the replacement box at site B was not utilized during 1964. However it was again used during 1965 with an 80 percent hatchability rate, and during 1966 with a zero percent hatchability rate.

The third example of a Sparrow Hawk nest box, used successfully for successive years, was box F. This structure was utilized during 1961 and 1962, with a 100 percent hatchability rate recorded for both years.

The over-all hatchability rate of the 55 Sparrow Hawk eggs deposited in 14 nests studied in Berks County, Pennsylvania, during the eight year period 1959 through 1966 was 78 percent (Heintzelman and Nagy, 1968:309). However, the over-all hatchability rate of Sparrow Hawk eggs deposited in three nest boxes during two or more successive years was 82 percent. Considered individually, "old" box B produced a 94.3 percent average hatchability rate during the period 1959 through 1961, "new" (=replacement) box B produced an 87.5 percent average hatchability rate during 1962 and 1963, "new" (=replacement) box B produced a 40 percent average hatchability rate during 1965 and 1966, and box F produced a 100 percent average hatchability rate during 1961 and 1962.

Discussion and Conclusion.—As in many studies, more questions are raised than are answered. For example, is it possible that the difference between the diets of the wild Sparrow Hawks nesting in eastern Pennsylvania (Heintzelman, 1964) and the diets of captive birds nesting at Patuxent Wildlife Research Center (Porter and Wiemeyer, 1970) could affect the type and extent of bacterial contamination in Sparrow Hawk nest boxes? Porter and Wiemeyer (1970:600) suggest that gram-negative motile rods, such as *Proteus* sp., may be responsible for entering Sparrow Hawk eggs and killing embryos. Would the excrement of captive birds nourished on a diet formulated by man be more likely to support bacteria such as *Proteus* sp. than would the excrement of wild Sparrow Hawks feeding upon wild animals such as those reported by Heintzelman (1964) for the population of falcons considered in this paper? Microbiologists might find it inter-

esting to investigate such a possibility.

In any event, the data from the wild population of nesting Sparrow Hawks considered in this paper are not sufficiently numerous to permit more than a tentative conclusion to be reached regarding the role which nest box sanitation may exert as a factor limiting the egg hatchability rate, and hence breeding success, of wild Sparrow Hawks. However, the available data suggest that nest box sanitation is not an important factor in causing embryo mortality in eggs of one population of wild Sparrow Hawks.

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