

BREEDING PROJECT INFORMATION EXCHANGE

B.P.I.E. No. 16. Donald V. Hunter, Jr., Centerville, S. D., reports on American Goshawk (*Accipiter gentilis*). In 1966 two large downy Goshawks were brought to me for a breeding project. They were a male and a female and presumably from the same nest. The male was typically further advanced in feather growth. Their exact origin is not known but they were said to be casualties of a logging operation somewhere in the high country of the central Rockies.

Upon arrival the young birds were placed in an unused room of a house and were fed by hand until hand-penned. They were trained to come to the fist, to the lure, and were also flown free, often both birds together. Both were flown at game successfully. The male was an exceptionally capable hunter. Occasionally they were taken down at the same time to the same lure. It was hoped that flying, hunting, and eating together might aid in establishing a pair bond. It proved to be a mistake, as on one fateful occasion the male reached the lure just ahead of the female and in the ensuing scuffle for the lure the male received a puncture wound in the back that damaged the nerves controlling his legs, thus leaving him paralyzed. In spite of intensive care he died a month later without recovering from the paralysis.

The dispositions of these birds were what I consider typical of non-imprinted, eyass Goshawks. They were neither friendly, tame, nor were they unmanageably wild. The male learned quickly and was an aggressive hunter, while the female was slower to learn and not as aggressive.

The female, since the death of the male, has been kept in a room the dimensions of which are 20' x 13' x 11' at the peak of the roof with side walls of 8'. The two windows are 2' x 3½', barred vertically with lathes. These windows are on the south wall. There are shelf perches on the inside window sills allowing the bird to sit in the sun when she wishes. The building was built originally as a chicken house for egg production. The framing is of 2x4 studs and rafters, sided with clapboards over sheathing and tar paper. The floor is dirt with 5" to 6" of ravis sand. A ledge in the NE corner is 7½' from the floor. There is at least one perch on each wall. The interior is whitewashed. A light bulb outlet is in the approximate center of the ceiling. The windows are relatively small and were it not for the reflective power of the white interior the room would be quite gloomy.

The only food has been chicken—1 to 5 week old cockerels fed whole. The Goshawk is fed all she will readily eat. No left over food is removed. No supplements are added.

Beginning on February 6th of 1967, the female (who was given the name Elizabeth or "Liz" for short) was subjected to 24-hour

light from a 100-watt electric bulb. There was not a gradual shortening of periods of darkness, but rather the light was just turned on and left on 24 hours a day. Elizabeth began molting on March 2. Between March 2 and March 20 she dropped four primaries, two secondaries, and one tail feather. The light was turned off on March 15. (No artificial light has been used since 1967.) No feathers were dropped from March 20 to May 12 when she again dropped secondaries and proceeded to molt normally, finishing in September.

During April and May of 1968 she was observed carrying objects up to various perches. A dropped glove, a piece of cardboard, etc., were found piled on the shelf perch. She was not given any nesting materials during that year. Nesting material consisting of various sized sticks was provided in April 1969. A part of a tree with several forks was placed in the east end of the room. She ignored the tree, choosing the corner ledge as the spot on which to build her nest. Quite a pile of sticks was carried to the ledge, but apparently not enough small sticks and/or lining material, as whatever eggs were laid apparently fell through and were destroyed.

In mid-April 1970, in addition to bare sticks, some twigs and foliated branches from a saved Balsam Christmas tree were placed in the room. A Christmas wreath of the same material was taken apart and left on the floor of the room. Although Liz was observed carrying materials, she did not add to the old nest or build a new one. On May 1 an additional nesting option was offered. This was made of four 2" x 6" x 24" pieces of wood to which 1" x 8" x 24" boards were nailed to form a box 24" x 24" x 6", open at both ends. This was nailed to the top of a 4" x 6½" post which was in turn guyed in a vertical position.

Almost immediately, the Goshawk began to carry sticks to the new platform. When she knew she was being watched she stopped nest building. At first she chose the larger sticks, some of which were ½" or more in diameter and 20" long. I did not observe whether these sticks were carried by foot or by beak. Smaller sticks and twigs were carried in the beak.

By May 9 a rather large nest had been constructed. Around noon Liz was on the nest, her ventral abdominal feathers elevated. She was apparently either ill or about to lay an egg. This time she did not object to my entering the room or my climbing the ladder to the nest. The nest was not as well constructed as it appeared from the window. None of the bark I had intended for use as lining material had been used. There was nothing to keep the eggs from falling down between the larger sticks. Liz was arranging the sticks with what appeared to be a sense of urgency. I offered her pieces of bark which she rejected by dropping them over the side of the nest to the ground. She did accept Balsam twigs with needles on and was putting these into the center of the nest as quickly as I gave them to her.

From time to time she lay on the material for a few seconds in a brooding position as if "trying it on for size." During one such maneuver she stayed a bit longer than usual in the brooding position. When she got up there was a brilliant, emerald-green egg under her. Since the lining was far from completed, the egg began to drop down between the sticks. There was not enough lining material to hold it. To solve this problem, I removed the egg and helped her finish her nest by placing enough small Balsam twigs in it to support the egg. She accepted this help and worked with me, re-arranging the material to fit her body. When I was satisfied that the egg would not fall through, I returned it to the nest and retired from the room.

After dark that same day I returned to the chamber to find Liz standing on the side of the nest. She fluffed her feathers and protested my presence verbally but did not attack, nor did she seem bothered by my flashlight. The egg had dried to pale green and was lying in the center of a well-finished nest. Liz had torn apart pieces of a cardboard box left in the room and used these pieces of cardboard as an excellent substitute for the strips of bark seen in nests in the wild. Liz had somehow managed to get the cardboard under the egg without breaking it. I removed her egg and replaced it with a chicken egg of about the same size.

On May 12 another egg was laid at approximately the same time of day as the first one, *e.g.* noon, and a third was laid on the 15th. Each egg was replaced with a chicken egg. (Same egg laying interval as Berry reports.) The eggs will be analyzed for pesticide content this fall at South Dakota State University.

After the laying of the second egg, Liz began to incubate and after the 13th was never found off the nest. She would leave the nest only to accept food or to attack me if I entered the chamber during daylight. After dark she would stand up when I entered but would not leave the nest.

Since there is little in the literature concerning incubation temperatures of raptors, and since there have been some difficulties in artificial incubation which suggest incorrect temperatures, I attempted to take temperature readings with a remote-indicating, electric hygrometer which measures both humidity and temperature. The sensing elements were placed with the eggs. Liz would not tolerate this, and even at night would have the sensing element out of the nest before I could get readings. Placing the sensor under the eggs and in the nesting material gave readings only slightly above the ambient temperature. Next a fever thermometer was placed with the eggs. This, too, the bird quickly removed. By pushing the thermometer up through the nest from the bottom (bulb up) seemingly valid readings were taken. However, the average of 10 (ten) readings was only 95.4 degrees—the highest was 97.2 degrees. This is so much lower than expected that its validity is questioned.

Further investigation in this vein is intended.

As soon as the eggs were laid I tried to locate a viable set of wild Goshawk eggs. I was still trying when, on June 4th, one of the chicken eggs hatched. Though Liz was brooding it satisfactorily I removed it and replaced it with another egg. Two days later another egg had hatched and the chick was found partially eaten on the floor. The cause of death is unknown. It may have walked over the edge of the nest, falling to its death, later to be partially eaten by rats. Or perhaps Liz killed it, though she seemed to accept the first chick as her own. I gave up hope of Goshawk eggs and took a Swainson's Hawk egg from a local nest and replaced one of the chicken eggs with it on June 14th.

On June 20th the Swainson's Hawk egg hatched. The remaining chicken eggs were then removed. The chicken egg that had been incubated since May 14 appeared, upon opening, to have been infertile. The other two contained partially developed live embryos. I never tried to observe Liz feeding the Swainson's chick, as she was so upset and aggressive that I feared she might injure it trying to protect it. The chick grew rapidly until on June 24 I made a serious error in judgment. I decided to enter, examine, and photograph the chick in the daylight. I donned a jacket and hard-hat, but neglected protective glasses. As soon as I opened the door Liz was on me. She struck my hard-hat, using her talons with such ferocity that I was not able to face her—I have found that hawks in the wild will not strike if you face them. They usually hit only from behind. Braving the attacks I proceeded up the ladder and seeing that the chick was stretched out supine on the nest, I thought it dead. Picking it up, however, I found it alive and very fat. During my climb and as I examined the chick, Liz was beating a tattoo on the helmet and on my shoulders, quite harmlessly thanks to the thickness of the jacket and helmet. Then she changed her tactics and began to reach under the hard-hat toward my unprotected face. The chick was in my right hand. With my left I was holding on to the ladder. I had to release my hold on the ladder to protect my eyes. As I did so one leg of the ladder sunk into the dirt floor causing it to shift to one side and causing me to lose my balance. The chick and I fell to the floor. I was uninjured, but the chick apparently sustained serious injuries, for it died during the night. A replacement chick was not readily available, so my 1970 Goshawk breeding attempt ended.

Conclusions

1. The experiment with photoperiod manipulation reinforces the theory that light changes, molt, and gametogenesis are closely interrelated in raptors, and that more study should be done on this relationship.

2. In view of the success of this project, Berry's project, and others, many female eyass Goshawks would probably lay and

incubate eggs in captivity under the right circumstances.

3. Interference of all kinds should be kept to a minimum. Provisions should be made for observations without disturbing the birds, ideally without their knowing they are being watched.

4. Brooding and incubation temperatures should be studied.

5. Adequate nesting materials should be provided well in advance of a nesting season.

6. Brooding and rearing behavior in captivity should be studied. For this purpose it would be very helpful to have available a source of wild eggs, should the eggs laid by captive birds prove infertile or fail to hatch.

7. In the event the eggs of the captive birds are fertile and do hatch, the sufficiency of the pre-laying diet of the captive bird may be compared with that of wild birds, by including at least one wild egg of approximately the same laying date in the clutch.

Future Plans

1. Introduction of Liz to one or more haggard, male, western Goshawk this fall or winter.

2. If success with a haggard male fails, provide eggs or young from a wild source for her to raise in order that:

a. Her mothering ability in captivity can be further evaluated.

b. She be provided with an eyass male as a potential mate for future experiments.