ANALYSIS OF NESTING MATERIALS FROM A GREAT BASIN FERRUGINOUS HAWK NEST

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Abstract

A newly constructed Ferruginous Hawk (*Buteo regalis*) nest was dismantled to determine the species origin, length, diameter and weight of each of the sticks of which it was constructed. Sagebrush (*Artemesia tridentata*) and juniper (*Juniperus osteosperma*) sticks composed 75.58% and 23.26% of the total. No significant deviation existed between sagebrush percent composition of the nest and that of vegetation surrounding the nest. The mean size of juniper sticks in the nest differed significantly from those on the ground in the vicinity of the nest. A possible explanation for the inclusion of rubbish in Ferruginous Hawk nests is offered.

Introduction

The Ferruginous Hawk (*Buteo regalis*) builds large bulky stick nests, and if available includes items such as paper, plastic sheeting, bones and manure (Weston 1969). In fact, nests have been described composed almost entirely of bleached buffalo bones (Williams and Matteson 1947). The nest cup is usually lined with strips of bark and grass.

A new nest may be constructed each year or an old one refurbished and used for several nesting seasons. The latter practice may result in nests of considerable dimensions. Behle, Woodbury and Cottan (1944) described nests measuring 2 m in height and 3 m in diameter, while Tavener (1919) estimated the height of a nest that had been used for a number of seasons to be 4–5 m. Weston (1969) found that the mean diameter of 24 newly constructed nests was approximately 1 m. He also noted that both members of the pair engaged in nest building and once started, worked continuously until the nest was completed.

We initiated this study in conjunction with one on nest site selection, in order to determine the types and sizes of sticks used in Ferruginous Hawk nest construction. We particularly wanted to know if the birds were selecting a specific type or size of stick or simply using what was conveniently available.

Study Site and Methods

A newly constructed Ferruginous Hawk nest was located in central Utah (N. latitude 40°00' and W. longitude 111°55') during June 1980. The area is typical cold desert habitat (Murphy et al. 1969). The nest did not

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show any signs of use although a single male Ferruginous Hawk was present in the area during each of several nest visits.

As the nest was dismantled, the length, diameter, weight and species of each stick were recorded. In addition, the juniper bark lining the nest cup was weighed. The vegetational composition of the area around the nest was determined by counting the number of woody plants in 2 randomly chosen transects, 2 m by 50 m. They originated at the nest tree and extended outward to the north and east along ordinal lines. Two transects were considered sufficient because of the scarcity and uniformity of the existing vegetation. We also randomly selected dead juniper sticks, scattered within a radius of 25 m of the nest, and recorded the length and diameter of each.

Mean length, diameter and weight were calculated for the juniper and sagebrush sticks of the nest. The mean length and diameter of juniper nest sticks were compared to the means of those found around the nest, using F-tests ($P=0.05$). We compared sagebrush percent composition of the nest to that of the surrounding area with a chi-square test ($P=0.05$).

Results

The nest we dismantled was in the top of a juniper 3.2 m in height and as is typical, located at the edge of an open stand (Woffinden 1975). The nest measured 70 × 90 cm, while the nest cup was 30 cm in diameter and lined with 130 g of juniper bark.

Mean lengths, diameters and weights of the 258 sticks included in the nest are given in Table 1. Total weight of the nest was 11.13 kg. Sagebrush and juniper sticks were the major constituents; 75.58% and 23.26% respectively. Snakeweed (*Xanthocephalum sarothrae*), mustard (*Erysimum osperum*) and horsebrush (*Tetradymia canescens*) made up the remaining 1.16%.

Table 1. Type, Length, Diameter and Weight of Sticks Comprising a Ferruginous Hawk Nest.

Type of Stick	N	Mean Length mm	Range	SD	Mean Diameter mm	Range	SD	Mean Weight g	Range	SD
Juniper	60	481.57	180–1430	246.21	19.65	5–40	8.00	68.00	1–320	64.15
Sagebrush	195	302.41	110–930	111.59	24.45	8–54	7.92	35.35	6–140	28.89
Snakeweed	1	230.00	–	–	2.00	–	–	1.00	–	–
Horsebrush	1	300.00	–	–	18.00	–	–	6.00	–	–
Mustard	1	610.00	–	–	10.00	–	–	26.00	–	–

Sagebrush was the most commonly occurring woody plant in the area surrounding the nest tree, comprising 62.58% of the total. Snakeweed, horsebrush and juniper were less common with a frequency of 34.4%, 2.79% and 0.23% respectively. No mustard was found in the immediate vicinity, although it grew commonly along the roads in the valley. The nest tree was an isolated individual, but 33 other junipers of similar size were counted within a 125 m radius.

There was no significant deviation between sagebrush percent composition of the nest and that of the surrounding vegetation ($X^2=2.31$, $P=0.05$). Significant differences were noted when mean lengths and diameters of juniper nest sticks were compared to that of those in the surrounding area ($F=18.50$, length; $F=69.91$, width; $P=0.05$).

Discussion

The typical Great Basin Ferruginous Hawk nest is a large bulky structure constructed primarily of sagebrush and juniper sticks. Paper, animal dung, plastic, bones, grass and strips of bark are often included. Many raptor species add green leaves and twigs to their nest throughout the nesting season. The purpose of this behavior is not currently understood (Brown and Amadon 1968), although Newton (1979) suggests that it may serve to indicate an occupied nest or territory. Bent (1937) and Lokemoen and Duebbert (1974) described Ferruginous Hawk nests that contained greenery. We have not observed this behavior by them in our study area and find literature accounts of such to be quite rare. However, there are numerous descriptions of various types of rubbish being included in Ferruginous Hawk nests (Weston 1969, Bent 1937, Olendorff 1973, Smith and Murphy 1973, Thurow et al. 1980, Williams and Matteson 1947). Perhaps the incorporation of these atypical materials into the nest of this prairie species satisfies the innate urge of decorating the nest with greenery. The absence of green vegetation in Ferruginous Hawk nests in areas where it is readily available and routinely added to the nests of other sympatric raptors, supports this hypothesis.

Nest building is a time and energy demanding activity which undoubtedly would be compounded by active selection of a unique set of materials. The major constituents of Ferruginous Hawk nests differ throughout the range of the species, but it appears that in each area the bulk of the nest is composed of materials that are most readily available. The sagebrush percent composition of the nest we studied did not deviate statistically from that of the vegetation around the nest. Thus, we assumed that there was no species-specific selection of nesting materials, but choice was a function of availability. However, the juniper sticks in the nest were significantly smaller than those in the surrounding area, suggesting that size selection was occurring.

Imler (1937) lists the weight of adult male Ferruginous Hawks as 1,237 g (2 individuals) and of adult females as 1,983 g (3 individuals). The heaviest juniper stick from the nest weighted 320 g, which is approximately 26% of the male or 16% of the female weights listed above. We have found entire jackrabbit (*Lepus californicus*) carcasses in Ferruginous Hawk nests; the calculated weight of these was at least 825 g (Haskell and Reynolds 1947). It seems unlikely, then, that a stick of 320 g represents the maximum manageable size for this large raptor. Rather, it appears that the pair of hawks we studied were selecting nesting materials that were most readily available but within a given size class, even though this behavior could increase the energy cost of nest construction. In addition we suggest that Great Basin Ferruginous Hawks are substituting rubbish of various types for greenery in the decoration of their nests.

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A SURVEY OF RAPTORS IN NORTHERN UTAH, 1976-79

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Abstract

A roadside survey of raptors was conducted in Cache Valley, Utah during 3 (1976–77, 1977–78, and 1978–79) non-nesting seasons (November to mid-April). The Rough-legged Hawk (*Buteo lagopus*) was most numerous, followed in abundance by the Red-tailed Hawk (*Buteo jamaicensis*), Marsh Hawk (*Circus cyaneus*) and American Kestrel (*Falco sparverius*). Thirteen other species of raptors were observed. Male Kestrels were 2 to 3 times more abundant than females in December through March. Light phase individuals were 3 to 5 times more numerous than dark phase birds among Red-tailed Hawks and Rough-legged Hawks.

Introduction

The present study was undertaken to provide information on the relative numbers of raptors during the non-breeding season in Cache Valley, Utah. Surveys of raptors taken over several months from roads can provide information on distribution and seasonal changes in abundance of birds of prey.