FOUR KESTRELS DEFEND NEST BOX CONTAINING EYASSES

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Although the pre-nesting association of the American Kestrel (*Falco sparverius*) may initially be characterized by promiscuous matings (Cade 1955, Balgooyen 1976), monogamous pairs form several weeks prior to egg-laying (Cade 1982). Wegner (1976) observed 2 male kestrels alernately bringing prey to the same female at a nest containing 5 young in New York; a possible deviation to monogamy by this species. However, he did not comment on nest defense, and to my knowledge, no one has previously documented defense of the same nest by more than 2 kestrels. Defense of the nest and young was described in detail by Balgooyen (1976), who noted that humans at kestrel nests were attacked more vigorously by male than female kestrels during incubation, but the reverse was true after eggs hatched. This report describes the behavior of 4 free-flying kestrels that defended a nest box containing 3 downy young.

As part of a study of kestrel use of reclaimed surface mines in West Virginia and Pennsylvania (Wilmers 1982), 3 nest boxes (1 in 1980, 2 in 1981) were available on the Lazzelle Cemetery Mine (2.5 mi. southwest of Maidsville, West Virginia). This 30 ha site, reclaimed to grassland in 1976, was surrounded primarily by woodland, although some old-field habitat and pasture land were proximal (see Wilmers 1982:26-27 for a detailed site description). Natural cavities suitable for kestrels were lacking on both the mine and adjacent areas. Nesting by kestrels did not occur on this mine in 1980.

On 17 May 1981, I visited this mine and found 1 nest box (no. 16) empty, but the other box (no. 30) contained a clutch of kestrel eggs that had broken due to a faulty nest box floor. Defense of this nest was not observed, although 2 kestrels were seen nearby. I repaired the box's floor and removed the broken eggs.

I revisited the mine on 28 May (copulation observed) and twice during June, but did not climb to either nest box because if the pair had renested, incubation would be in progress, and they may have been sensitive to human-caused disturbance during this period (Fyfe and Olendorff 1976). On 17 July 1981, I climbed to both boxes. Box no. 16 contained a single kestrel pellet but was otherwise empty. At box no. 30 (1731 hr) a silent female kestrel made 3 wide circles above the nest, using the flutter-glide motion (see Willoughby and Cade 1964). No kestrels were heard or seen as I ascended the nest box tree. Three kestrel nestlings (considerable down was present on their bodies) and 1 unhatched egg were inside. A silent male kestrel dove within about 1 m of my head, and then began klee-calling (Willoughby and Cade 1964). At least 1 male kestrel then made about 10 close passes within a 2 min. period. I thought that 2 males were involved in defense of the nest, and climbed to the upper tree canopy to determine the location of the birds. I observed 4 kestrels perched within 10 m of each other on dead limbs of a large ash (*Fraxinus americana*), less than 200 m from the nest box. One left its perch, dove past me twice, and returned to the ash. At least 2 birds were now klee-calling. About 1 minute later, the 4 kestrels departed from the ash, and 3 of them made close dives (within 5 m of me); 2 were males, the other a female. The fourth made a less vigorous dive about 20 m from the nest; its sex was not determined. Three of the birds flew back to the ash after a single dive; but 1 of the males made 5-6 successive dives, and then flew back to join the other birds. After approximately 15 sec. 1 of the kestrels made a direct flight of at least 1 km over an adjacent woodland, and disappeared. A second one flew to the edge of the mine, and was last seen perched there. The other 2 kestrels remained perched in the ash tree. The time was now 1752 hr.

Prior to 17 July 1981, I did not observe more than 2 kestrels on the Lazzelle mine, and for this reason, I believe that only 2 birds reared the young. The 2 "extra" kestrels that defended the nest might have been juveniles that dispersed onto the Lazzelle site from nests on mines nearby. Four of 7 kestrel nests on 4 mines situated within 5 km of the Lazzelle site were successful in 1981, producing 12 young (all fledged prior to 21 June). Certainly the date (17 July) was late enough for these young to have dispersed from the mines where they were born. After fledging, family groups of kestrels composed of adults and their young remained together for 3 weeks in Utah, and then dispersed (Smith et al. 1973). In California, dispersal of juveniles from nesting territories occurred as early as 2 weeks after formation of family groups (Cade 1955). Adult kestrels of both sexes tolerate the intrusion of dispersing juveniles into their territory (Balgooyen 1976).

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Literature Cited

Balgooyen, T.G. 1976. Behavior and ecology of the American Kestrel (*Falco sparverius* L.) in the Sierra Nevada of California. Univ. of Calif. Publ. Zool. 103:1-83.

Cade, T.J. 1955. Experiments on the winter territoriality of the American Kestrel, *Falco sparverius*. *Wilson Bull.* 67:5-17.

Cade, T.J. 1982. The falcons of the world. Comstock/Cornell Univ. Press, New York. 192pp.

Fyfe, R.W., and R.R. Olendorff. 1976. Minimizing the dangers of nesting studies to raptors and other sensitive species. Can. Wildl. Serv. Occas. Pap. 23. Edmonton, Alberta. 17pp.

Smith, D.G., C.R. Wilson, and H.H. Frost. 1972. The biology of the American Kestrel in central Utah. *Southwestern Nat.* 17:73-83.

Wagner, W.A. 1976. Extra-parental assistance by male American Kestrel. *Wilson Bull.* 88:670.

Willoughby, E.M., and T.J. Cade. 1964. Breeding behavior of the American Kestrel (Sparrowhawk). *Living Bird* 3:75-96. 3:75-96.

Wilmers, T.J. 1982. Kestrel use of nest boxes on reclaimed surface mines in West Virginia and Pennsylvania. M.S. Thesis. W.Va. Univ., Morgantown. 182pp.

ABSTRACTS OF THESES AND DISSERTATIONS

NESTING BEHAVIOR OF THE FERRUGINOUS HAWKS (*Buteo regalis*)

Behavioral data were gathered from 1972 to 1974 at 12 Ferruginous Hawk (*Buteo regalis*) nests in Curlew Valley of southeastern Idaho and northern Utah. Although Ferruginous Hawks occupied territories from mid-March through mid-July, courtship activity may have begun on winter territories or enroute to summer nesting territories. Courtship flight in the traditional sense was not observed during the study. Other preincubation behaviors likely functioned in courtship or pair formation and maintenance. These included the gathering and delivery of nest materials, arranging the nest, and food transfer.

Seasonal utilization of perches revealed little difference in the type of perch preferred during the preincubation period, whereas incubation and brooding behavior favored tree and ground perches. Throughout the breeding season favorite ground perches were utilized for resting, prey transfer, feeding and nest sanitation.

Both prominent perching and flight display were conspicuous forms of territorial advertisement and defense during preincubation. Only male hawks were observed hovering, and then only when winds exceeded 20 km/h. Regular soaring occured primarily in context of territorial defense and hovering. Associated with aggression, follow-soar usually functioned in escorting intruders out of the territory. Buoyant flight may function in advertisement or pair contact but seems also to operate in more aggressive, territorial advertisement and defense in both conspecific and interspecific contexts.

Few conspecific encounters were observed. More interactions occurred with Swainson's Hawks than any other buteo, yet aggression was of relatively low intensity and Swainson's Hawks often successfully interspersed their territories around established Ferruginous Hawk nests. Defense against large avian predators (eagles) or large ground predators (coyotes) involved coopertative, alternating attacks by the resident pair of Ferruginous Hawks. Little interaction occurred with other avian species observed within Ferruginous Hawk territories.

Incubation behavior data were gathered during 60h of observation in 1974 at three nests. At each nest site both sexes incubated, the number of shifts nearly equal for males (23) and females (27), although the females incubated 69.4% of the total incubation time and males 30.6%. The mean time per parent shift for male (49.2 ± 50.4) was significantly less than for females (91.5 ± 72.4 min). Males incubated more (71.1%) during the early half of the day, and were not known to incubate at night. Nests with eggs were seldom left unattended by either adult.

Adult and young hawks both exhibited adaptations to a hot, dry environment. Nestlings evidenced physical discomfort during times of high ambient temperatures, particularly in the absence of shade, wind, or cloud cover. During such periods the nestlings employed a variety of thermoregulatory mechanisms to alleviate the problem. The overall mean body temperature for two nestlings on seven dates between 31 May and 23 June was 40.3 ± 0.9° C. Midday fluctuations of body temperature from 38.5 to 43.5° C indicated a tolerance of hyperthermia. Nesting behavior thermoregulatory mechanisms included shade-seeking, nest-edge-perching, wind-orienting, panting, wing-drooping, feet-out-front posturing and ptiloerection.

The adult male was seldom observed at the nest during the nesting period, and then only for food transfers which occurred primarily at the nest. Only the female participated in brooding, sentinel-perching and feeding of the young. Her involvement in these activities subsided by the time the nestlings were three weeks old. By that time nestlings were more ambulatory and more proficient at self-feeding. Other nestling maintenance behavior increased from the second week with continued feather growth and locomotory development and coordination. Ambulatory and social development began in the nest and continued for several days after fledging, as the young hawks spent considerable time on the ground in the vicinity of the nest.

Powers, Leon R., 1981. Nesting Behavior of the Ferruginous Hawk (*Buteo regalis*). Ph.D. Dissertation. Idaho State University, Pocatello, Idaho.