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**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 occurred 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 cooperative, 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 ( $49.2 \pm 50.4$ ) was significantly less than for females ( $91.5 \pm 72.4$  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  $40.3 \pm 0.9^\circ\text{C}$ . Midday fluctuations of body temperature from  $38.5$  to  $43.5^\circ\text{C}$  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 piloerection.

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.