

**BEHAVIORAL ECOLOGY OF RED-TAILED HAWKS
(*BUTEO JAMAICENSIS*), ROUGH-LEGGED HAWKS
(*B. LAGOPUS*), NORTHERN HARRIERS (*CIRCUS CYANEUS*),
AMERICAN KESTRELS (*FALCO SPARVERIUS*), AND OTHER
RAPTORIAL BIRDS WINTERING IN SOUTH CENTRAL OHIO**

Abstract

A field study of the behavioral ecology of sympatric Red-tailed Hawks (RTH), Rough-legged Hawks (RLH), Northern Harriers (NH), American Kestrels (AK), and other raptorial birds wintering in a 73.5 km² tract in south central Ohio was conducted during the winters of 1973-74 through 1976-77.

Ten species of Falconiformes and three species of Strigiformes were seen in the area during the four winters of study. RTH, RLH, NH, and AK comprised over 99 percent of the individuals seen. The size and composition of this four-species raptor community remained remarkably constant during the four winters of study, ranging from 1.22 birds/km² in 1976-77 to 1.40 birds/km² in 1975-76.

Interspecific spatial overlap was greater in areas of high use than in areas of moderate and low use. Intraspecifically, NH showed the greatest amount of interseasonal overlap, and AK showed the least.

The four species all used cropland more than expected and grazed pastures less than expected on the basis of habitat type availability. Interspecific differences in all species pairs occurred with respect to vegetation type, field size, and field slope selected. Activity dependent shifts in vegetation type use occurred in all four species. Intraspecific differences in vegetation type use occurred in NH. The four species differed in use of fields bordered by woodlots, tree rows, or roads. RTH, RLH, and NH avoided areas within 75 m of active farmsites whereas AK preferred them. Depending on the field characteristic examined, niche breadths (J') differed considerably among the four species, and when these are viewed in conjunction with changes in the degree of niche overlap (α) between species pairs for each of the field characteristics, an extremely complex pattern of niche overlap and habitat use emerges.

RLH, NH, and AK all showed significant shifts in temporal activity. While RTH, RLH, and AK did not differ from one another with respect to temporal patterning, all three species did differ significantly from NH. Significant temporal shifts in the percentage of birds flying when sighted occurred in RTH and RLH, but not in NH or AK.

Interspecific differences in the ratio of flying to perched birds occurred in all paired species comparisons. Only NH were observed more frequently flying than perched, and only NH pounced more frequently from flight than from a perch. The four species differed with respect to both perching height and perching substrates. The three tree perching species (RTH, RLH, and AK) partitioned that resource according to the height of the tree, their perching height, the location of the tree, and their perching location in the tree. The four species differed in the amount of flap-sailing, hover-flying, and soaring they engaged in, as well as the height and speed at which they flap-sailed. Harriers differed intraspecifically in the flight types they employed and in the height and speed at which they flew.

There were intraspecific differences in pouncing success and hunting bout success. Juvenile harriers were less proficient hunters than adult harriers. In all species hunting success depended on vegetation type hunted. In NH and AK hunting success depended on pounce type.

Variations in temperature, relative humidity, solar radiation, precipitation, and wind velocity were accompanied by shifts in raptor activity.

Numerically small mammals made up the bulk of RLH and NH diets, and in all species but RTH small mammals comprised the majority of the diet by biomass. RTH pirated more prey from other raptors than did the other three species. Adult male harriers took more avian prey than did adult female or unsexed juvenile harriers. The percent of insects in the diet of AK increased with increasing temperatures.

One hundred three interspecific and 69 intraspecific encounters among RTH, RLH, NH, and AK were observed. In 20 percent of the encounters, prey robbery or carcass displacement was attempted. Both RLH and NH were victims of piracy.

While overall species overlaps (∞) indicated a similar degree of niche overlap for all four species, RTH, NH, and AK all exhibited at least one overwhelming difference in their niche from the other three species while RLH did not. On the basis of the relative degree of overlap, activity and diet, rather than habitat, were the most important niche dimensions, and time was least important. Weather-related changes in the behavior of the four species resulted in shifts in the diversity of niche parameters that were of the same order of magnitude as interspecific differences in the same parameters. Viewed in their entirety, these data indicate considerably complex resource partitioning among the four species comprising this open-habitat raptor guild.

Bildstein, K. L. 1978. Behavioral ecology of Red-tailed Hawks (*Buteo jamaicensis*), Rough-legged Hawks (*B. lagopus*), Northern Harriers (*Circus cyaneus*), American Kestrels (*Falco sparverius*), and other raptorial birds wintering in south central Ohio. Ph.D. dissertation. The Ohio State University, Columbus. 364 pp.

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ASPECTS OF THE BIOLOGY OF THE AUSTRALASIAN HARRIER (*CIRCUS AERUGINOSUS APPROXIMANS* PEALE 1848)

Abstract

The study is based on 18 months of intensive fieldwork on the southwestern coast of the North Island of New Zealand. During this time 212 Australasian Harriers were trapped, retrapped, measured, sexed, aged, individually marked, and observed. Fortnightly observations of the individually marked population were made over a further seven months. The Australasian Harrier and European Marsh Harrier are considered to be conspecific. Evidence is presented showing that there is no valid reason for considering *Circus aeruginosus* of the Pacific Islands to be a different subspecies from *C. aeruginosus* of Australia and New Zealand. During the breeding season ten terri-