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## Thesis Abstracts

### Behavior and Ecology of Post-Fledging American Kestrels

I studied the behavior, habitat and perch use, causes of mortality, and time to dispersal of post-fledging American Kestrels (*Falco sparverius*) during spring and summer 1988–90 in central Iowa. To monitor kestrel activity, I attached radio-transmitters to 64 birds in 50 nests. All young in the study fledged from nest boxes, most of which ($N$ = 47) were attached to the backs of highway signs along the Interstate-35 (I-35) right-of-way.

During the first week after fledging, kestrels spent <1% of their time foraging or flying; the remainder was spent in inactive behavior. Kestrels fledging from nests along the interstate were observed at this time primarily in cropland and along the interstate right-of-way, where they frequently perched on the ground.

Of the 16 kestrels found dead, all but 1 died during the first week after fledging, before flying skills had developed. Mammalian predation accounted for six deaths and was the main cause of mortality. Only 2 of 61 radio-marked kestrels that fledged from nest boxes along the interstate died because of a collision with a vehicle.

As kestrels grew older, perch resting decreased whereas perch hunting increased. Post-fledging kestrels fed almost exclusively on invertebrates, and mean hunting success did not exceed 55% during the 4–5 wk that birds were observed.

In 1988–89, I observed social hunting among siblings, families, and also among unrelated kestrels. Social hunting occurred during both perch hunting and ground hunting. Social foraging in these kestrels was imitative rather than cooperative.

In 1990 I observed experimentally adjusted broods of two and five post-fledging American Kestrels to test two hypotheses: 1) imitative social foraging increases the foraging efficiency of individuals in large broods, and 2) individuals in large broods will disperse sooner than individuals in small broods. No differences in foraging efficiency or in dispersal time were detected, but sample sizes were small because of high mortality or signal failure among radio-marked birds

Kestrels fledging from nest boxes along the interstate hunted extensively along secondary roads. Mean time until the initiation of dispersal of kestrels along the interstate was 22.7 d after fledging ($N$ = 29, SE = 1.07, range = 9–39 d).

Band recoveries provided little evidence of natal philopatry. Only 1 of 17 birds recaptured in nest boxes as adults was banded as a nestling.—**Daniel E. Varland. 1991. Ph.D. thesis. U.S. Fish and Wildlife Service, Iowa Cooperative Fish and Wildlife Research Unit, 11 Science II, Iowa State University, Ames, IA 50011.**

### Resource Partitioning Between Two Sympatric Goshawks in the Australian Wet Tropics

Resource use by sympatric populations of the Grey Goshawk *Accipiter novaehollandiae* and the Brown Goshawk *A fasciatus* was studied in the wet tropics of northern Australia.

A morphological comparison of the two similar-sized species showed *A. novaehollandiae* is adapted for life in dense forest. The species differs from *A. fasciatus* in the shape of the wing and the size and shape of feeding structures. With a powerful bill and talons, and short but thick tarsi, it is adapted for feeding on medium-sized mammals and reptiles, and larger birds such as pigeons and megapodes.

*A. fasciatus,* with longer, more narrow wings, is adapted for life in more open habitats, for capturing prey in the open, and with a more delicate bill and long tarsus, possesses characters typical of bird-eating accipiters.

The diets of the two species concurred with their morphological differences. During the breeding season *A. fasciatus* took more birds than *A. novaehollandiae,* which concentrated more on medium-sized mammals and reptiles. Dietary differences during the breeding season were related to morphological differences and habitat preference of males, who were the principal food providers. During the non-breeding season there was some overlap in prey type taken by the two species and some segregation between males and females in the size of prey taken.

The hunting behaviors of the two species also differ: *A. novaehollandiae* prefers still-hunting and short-stay perch hunting, while *A. fasciatus* prefers more active foraging in addition to perch hunting.

Radio-telemetry also confirmed the implications of the morphological comparison. *A. novaehollandiae* preferred closed forests, tall open forest and tall woodland. *A. fasciatus* was most often encountered in more open habitats, but also foraged within closed forest. Both species utilized habitat edges.

The species had similar laying and fledging times; however, *A. novaehollandiae* nested in more dense habitats than *A. fasciatus*. Overlap occurred with both species nesting in tall open forest and tall woodland. *A. novaehollandiae* nested significantly closer to closed forest than *A. fasciatus*.

Nests of *A. novaehollandiae* tended to be in large spreading trees with nests placed at the end of major branches, allowing easy access. *A. fasciatus* were more catholic in their choice of nest sites and placement of nests. Differences in the overall size of nest trees were due to habitat differences: the largest trees occurred in closed forest, tall open forest and tall woodland, where *A. novaehollandiae* nested.

Ninety-four percent of *A. novaehollandiae* nests of known outcome were successful, as opposed to 62% for *A. fasciatus*. Production of young was similar between the two species, but greater nest failure for *A. fasciatus* meant that this species fledged fewer young per initial nest than *A. novaehollandiae*. Violent thunderstorms were responsible for nest failure and nestling deaths. Repetitive use of nests by both species only occurred following successful nesting.

Interspecific distances to nearest-neighbor were less than intraspecific distances. Close interspecific nesting was related to habitat heterogeneity and prey availability within the study area.

The two species clearly partitioned their resources, but the role of competition (present-day or past) in resource partitioning was unresolved. However, it was apparent that *A. novaehollandiae* (males in particular) behaviorally exclude all *A. fasciatus* from their forest patches. This active exclusion of *A. fasciatus* by *A. novaehollandiae* may be responsible for maintaining the present-day distribution of the two species where they coexist.—**Andrew M. Burton. 1991. Ph.D. thesis, Department of Zoology, James Cook University of North Queensland, Townsville, Q4811, Australia.**