

## LETTERS

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### PRESUMPTIVE FORAGING ASSOCIATION BETWEEN SHARP-SHINNED HAWKS (*Accipiter striatus*) AND WHITE-FACED CAPUCHIN MONKEYS (*Cebus capucinus*)

Associations between monkeys and birds have been reported for several different species pairings in tropical regions of both the Old and New World. The avian associates reported are largely insectivorous and include species from Cuculiformes, Passeriformes, and Falconiformes (see references in Ferrari,<sup>3</sup> Fontaine<sup>4</sup>). Within the latter order, this behavior has been observed in White Hawks (*Leucopternis albicollis*),<sup>9</sup> Plumbeous (*Ictinia plumbea*) and Grey-headed (*Leptodon cayanensis*) kites,<sup>3</sup> and frequently in Double-toothed Kites (*Harpagus bidentatus*).<sup>1,4,5,8</sup>

There may be indirect competition for food resources between the species involved in these associations, but generally it is assumed that the relationship is a commensal one: the monkeys are affected little by the presence of the birds, while the birds benefit through the capture of flushed prey. Little detailed study has been made of bird/monkey associations (although see Boinski and Scott,<sup>1</sup> Fontaine<sup>4</sup>). It is likely that this behavior exists in a number of other avian species but remains unreported. Of particular note is that published accounts of foraging associations involve resident, rather than migratory, avian species. To my knowledge, this observation represents the first time that a migratory species (and a bird-eating raptor) has been reported to associate with monkeys in such a relationship.

On 20 December 1991, while studying the foraging behavior of migratory songbirds in Tivivies Forest Reserve, Puntarenas, Costa Rica (9°52'N 84°42'W), I observed a troop of 15-20 White-faced Capuchin Monkeys (*Cebus capucinus*) moving through a stand of Black Mangrove (*Avicennia bicolor*). During the half-hour period that I watched the monkeys, they moved approximately 100 m and were accompanied for the entire period by two immature female Sharp-shinned Hawks (*Accipiter striatus*). The hawks were distinguishable from Double-toothed Kites, the other species of similar size and appearance seen on the study area, by the absence of a black median stripe on the throat and the extent of streaking on the breast. Both Double-toothed Kites and Sharp-shinned Hawks were seen regularly in the study area from November through February. Over the 4 mo period of observations during this field season, however, I encountered capuchin troops on seven occasions and noted a commensal relationship with birds only in this single instance.

The monkeys moved through the canopy at between 7 and 15 m (canopy height 20 m). The hawks perched from 1 to 5 m apart on branches at about the height of the highest foraging monkeys (12 to 15 m). Both birds appeared to maintain positions roughly in the center of the monkey troop by making several flights each during the observation period. I observed no attempts on prey by the hawks during this time, and no potential avian prey were seen.

Monkey troops are followed routinely by a small number of avian species,<sup>1,8</sup> but these accounts of foraging associations have indicated the involvement of resident birds only. For example, the most consistently reported and best studied associations are between the largely insectivorous Double-toothed Kite, a resident species, and White-faced Capuchins<sup>4,5</sup> or Squirrel Monkeys (*Saimiri sciureus*).<sup>1,2</sup> Given that many migrant bird species spend more than one-half of any given year on their wintering areas,<sup>7</sup> it is somewhat surprising that migrant bird/monkey associations have not been recorded previously. Migrant insectivores, such as flycatchers which make use of aerial sallies to capture prey, would presumably benefit from this type of association.

Several explanations for the lack of such reports are possible: 1) Interactions between migrant birds and monkey troops may simply be rare. The Sharp-shinned Hawk is likely subject to selection for behavioral plasticity and associational learning, given that it is a species which forages on prey that vary in concentration and behavior over the course of the year and over its migration route. Thus, following monkeys is only one of several possible tactics that sharp-shins might use during the winter period; 2) Boinski and Scott<sup>1</sup> noted that the incidence of avian foragers at monkey troops varied with rainfall levels and arthropod abundance. They found that insectivorous birds associated more commonly with monkey troops during the wet season, when total arthropod abundance was low, than during drier periods which have greater arthropod availability. Because Sharp-shinned Hawks and other migrant birds are present during the dry season, their absence from lists of species associated with monkey troops may be solely a function of prey availability, and the relative profitability of other foraging strategies when compared with that of following monkey troops.

Previous reports of bird/monkey associations refer to species of birds which are largely, if not solely, insectivorous.<sup>1,3,5,9</sup> Sharp-shinned Hawks are predominantly bird-eating raptors, although they are reported to eat insects occasionally during the breeding season and on migration<sup>6</sup>; their diet is not described for the wintering grounds. Bird-eating raptors may be attracted to forage in association with monkeys due to the general flushing of potential prey (both insects and birds) by the troop, or because the monkey troops themselves attract insectivorous birds which are potential prey for raptors.

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#### ROOSTING AMERICAN KESTRELS (*Falco sparverius*) DURING MIGRATION IN SASKATCHEWAN

American Kestrels (*Falco sparverius*) are summer residents over much of Saskatchewan. The density of breeding birds can be very high in the northern boreal forest,<sup>1,2</sup> while they are distributed more sparsely over the countryside and in urban areas in the southern prairie and parkland regions (pers. observation).<sup>3</sup> Fall migration generally spans mid-August to mid-September (pers. observation).

While much is known of the breeding behavior and winter ecology of the American Kestrel,<sup>3</sup> there are only a few observations of its roosting behavior.<sup>4,5,6</sup> The availability of roost sites may be an important factor in determining the distribution of kestrels, at least in winter.<sup>3,5</sup> Except for Merlins (*F. columbarius*) in winter (see<sup>7</sup> and references therein), our knowledge of roosting behavior in falcons is limited. Here we report on migrant American Kestrels congregating in an urban area to roost, as well as observations of intra- and inter-specific interactions near the roost site.

#### OBSERVATIONS

All observations were made in the city of Saskatoon (52°07'N 106°38'W) (see<sup>7</sup> for a description of the area), with efforts concentrated near our residences on the east side of the South Saskatchewan river within the older neighborhoods. The observations span 20 August to 13 September 1992, corresponding to the period of occupancy by the birds. During this period the overnight low temperature ranged from 1° to 10°C ( $\bar{x}$  = 4.9 SD = 3.6; Saskatoon Weather Office data).

We were initially alerted to the presence of kestrels in the residential area by their characteristic “klee” vocalization. This call is typically given in agonistic encounters.<sup>3</sup> Virtually every evening during the observation period one to three kestrels were heard from within the house where one of us (GRB) lives.