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An Interspecific Foraging Association Between Nearctic-Neotropical Migrant Passerines in Bolivia

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ABSTRACT.—I present the first published record of a foraging association between Nearctic-neotropical migrant bird species during the austral summer in South America. I observed Barn Swallows (*Hirundo rustica*) and Cliff Swallows (*Petrochelidon pyrrhonota*) in February 2005 repeatedly foraging on aerial insects flushed by flocks of Bobolinks (*Dolichonyx oryzivorous*) settling onto soybean plants (*Glycine max*). Additional observations would be needed to distinguish this behavior between an opportunistic association and a commensal relationship. *Received 25 November 2005. Accepted 28 July 2006.*

Foraging associations assumed to be commensal between passerine species have been described within mixed species flocks (e.g., Hino 1998) and between non-flocking species (e.g., Willis 1972, Maxson and Maxson 1981, Robbins 1981). Here, I report the first documentation of a foraging association between two flocking Nearctic-neotropical migrant species during the austral summer.

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On 11 February 2005 from 0900 to 1000 hrs EST in San Juan, depto. Santa Cruz, Bolivia, ~100 km northwest of the city of Santa Cruz, I observed a flock of ~1,000 Bobolinks (*Dolichonyx oryzivorous*) foraging in soybean (*Glycine max*) fields. This large aggregation consisted of a series of smaller (30–400 individuals) flocks that moved across the field by landing in the soybeans for 15–60 sec, lifting to 1–3 m above the soybeans, flying 25–50 m, landing again, and repeating this pattern. After each landing, ~10–30 Barn Swallows (*Hirundo rustica*) and 0–5 Cliff Swallows (*Petrochelidon pyrrhonota*) captured aerial insects above the Bobolink flock, foraging 1–5 m above the soybean canopy for 5–10 sec. During two subsequent walking transects (400 m), perpendicular to and intersecting the flight path of the Bobolink flocks, I flushed Pyralid moths (*Omiodes indicata* Fabricius) with every step. The other insect species that flushed above the canopy, the adult stage of the velvetbean caterpillar (*Anticarsia gemmatalis* Hübner), was not abundant. No other insect species were observed flying

above the soybean canopy. The insect fauna on soybean leaves appeared to be species-poor and dominated by Pyralid moths, with species of Coleoptera and Homoptera occasionally noted.

The ''following'' behavior I observed is frequently used by swallows, which are known to follow mammals, birds, humans, and farm equipment that flush prey. In some cases, concentrations of animals serve as cues to swallows that indicate local concentrations of food resources (Brown and Brown 1995, 1999). Once a few individual swallows locate a food source, they may serve to attract more swallows, known as ''local enhancement'' (Brown 1988). My observation of swallows feeding on lepidopterans is unusual, as lepidopterans have been previously reported as comprising only a small fraction of the diet of Cliff and Barn swallows (Beal 1918). However, diet for these opportunistic feeders varies depending on availability of prey items (Brown and Brown 1995, 1999).

The association between the three species, if observed on a regular basis, could be an example of commensal insectivory, whereby the swallows increase their foraging efficiency, while Bobolink foraging efficiency is unaltered. Bobolinks are not known to forage on aerial insects and were not observed feeding above the soybean canopy. They were eating caterpillars on the soybean leaves (RBR, pers. obs.), indicating they were not competing with swallows for food resources. I did not observe interspecific aggression or other direct interactions between the Bobolinks and swallows, suggesting the swallows were not interfering with or otherwise altering Bobolink activity.

There are two ways that swallows might be increasing their foraging efficiency by following Bobolinks. However, I did not measure swallow foraging efficiency with, versus without, Bobolinks as ''beaters'' (Rand 1954). Bobolink flock activity appeared to invariably increase the number of prey flying per unit area (prey density), and swallows may have had a greater chance of locating prey, resulting in more capture attempts per foraging bout or per unit time (increased feeding rate, Brown 1988). Alternatively, when insects are forced to fly upon being flushed, the proportion of successful capture attempts per time spent foraging may be higher (increased success rate, Kushlan 1978).

This association was not sustained over time. On seven subsequent dates over 2 weeks, I observed monospecific flocks of Bobolinks using the same soybean field in the absence of swallows. On one of these dates, Bobolink flocks were also observed in two soybean fields ~3 km away, but swallows were not seen over or adjacent to the fields. I also observed swallows foraging over soybean fields in the absence of Bobolinks.

The association reported may occur sporadically in South American soybean fields when Bobolink and swallow distributions overlap spatially and temporally. Conditions under which this phenomenon may occur in soybean fields must include (1) caterpillars consumed by Bobolinks are available (e.g., after emergence and prior to application of insecticides), (2) flying insects preferred by swallows are available, and (3) Bobolink flocks are sufficiently large to flush prey in quantities that enable swallows to increase their foraging efficiency. Swallows may opportunistically use a ''following'' strategy to increase their foraging efficiency in different habitats with different beater species in South America.

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Interspecific Egg-dumping by a Violet-green Swallow in an Active Western Bluebird Nest

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ABSTRACT.—We observed a Violet-green Swallow (*Tachycineta thalassina*) laying an egg in an active Western Bluebird (*Sialia mexicana*) nest. The Western Bluebird male and not the female, was aggressive to the Violet-green Swallow but the swallow remained to lay the egg. This is the first documented incidence of which we are aware involving altricial interspecific egg-laying during the nestling phase. We suggest the timing of this event was more consistent with incidental egg deposition, or egg-dumping, than brood parasitism or nest usurpation. *Received 13 December 2005. Accepted 24 July 2006.*

Observations of birds laying eggs in nests of other species are of interest because this behavior, when timed appropriately and directed at nests where parents fail to recognize foreign eggs and offspring, may be the starting point for evolution of interspecific brood parasitism. Other explanations for this behavior are nest usurpation and egg-dumping, which is the deposition of an egg into another species' nest without any specific adaptive function. We collected video footage of a Violet-green Swallow (*Tachycineta thalassina*) laying an egg in an active Western Bluebird (*Sialia mexicana*) nest containing nine-day-old nestlings at Hastings Natural History Reservation, Carmel Valley, California (36° 22′ N, 121° 34′ W). Nest boxes have been monitored at Hastings and nearby ranches as part of a long-term study of Western Bluebirds since 1983 (Dickinson et al. 1996). Western Bluebirds are the primary box-nesting species at this study site, but other secondary cavity nesters use nest boxes at lower frequencies, including Ash-throated Flycatchers (*Myiarchus cinerascens*), Oak Titmice (*Baeolophus inornatus*), House Wrens (*Troglodytes aedon*), Bewick's Wren (*Thryomanes bewickii*) and Violet-green Swallows (Table 1).

We conducted a study of parental feeding behaviors during spring 2005 using video to identify patterns of resource allocation within

TABLE 1. Frequency of nest box use by secondary cavity-nesting species at Hastings Natural History Reservation, Carmel Valley, California, from 1983 to 2004.

Species	Nests (*n*)	Total use (%)
Western Bluebird	1,860	69
Ash-throated Flycatcher	298	11
Oak Titmouse	204	8
House Wren	175	7
Violet-green Swallow	122	5
Bewick's Wren	2	<1
Total nesting attempts (at least one egg)	2,661	100

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