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Behavior and Ecology of the Alder Flycatcher (*Empidonax alnorum*) in Early Winter

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Introduction

The species accounts published in the *Birds of North American* series (Poole et al. 1992-2002) provide comprehensive summaries of what is known about the species they cover. They also call attention to the scarcity of information about the biology of migratory birds during migration and on their wintering grounds. Yet to assess the status and vulnerability of a species accurately, its year-round biology must be considered. The Alder Flycatcher (*Empidonax alnorum*) is one of the species for which migratory and winter behavior and ecology are poorly known (Lowther 1999). I studied the early winter ecology and behavior of Alder flycatchers at two sites along the Manu, a white-water meander river in Manu National Park, Madre de Dios, Peru between 1993 and 1997 (Fig. 1). I present the results here and comment on the vulnerability of the species to human-generated threats.

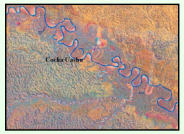

Fig. 1. The Manu, a white-water meander river

Methods

We mist-netted birds in vegetated sites along the length of each beach; captured, marked and measured individuals; and examined fecal material. We observed *E. alnorum* for 385 hrs over 70 days, concentrating observations at 9 territories and taking detailed notes on aggressive interactions feeding behavior, and vocalizations.

Results and Discussion

Habitat Use

Alder flycatchers arrived in mid-October, occupying primary successional habitats on point bars into meander loops. The initial and most common colonizing species of the primary succession is *Tessaria integrifolia* (Asteraceae), which begins as scattered clumps of low vegetation on the open sand. Over several seasons, the plants form a dense shrubby layer and then a forest of successively larger trees up to heights of 16m. Because new areas of beach are colonized seasonally, each zone consists of a dense, even-aged stand of *Tessaria* trees of more or less uniform height. By walking perpendicular to the point bar and away from the water, one crosses clearly evident zones of successively older and larger plants (Fig. 2A). After 8-15 years they begin to senesce and die. When the *Tessaria* trees are 2-3m tall, the stands are invaded by caña brava (*Gynerium sagittatum,* Gramineaceae), which grows up among the *Tessaria*.

Although the successively older zones of *Tessaria* may be clearly distinguishable (Fig. 2A), the vegetation is not always regular. Differences in water volume, flood levels, beach topography, and other factors influence the establishment and persistence of colonizing plants. Thus some vegetation formations are irregular: tree density and heights and sizes of tree clumps vary; they are often interspersed with patches of bare sand from a few to 10m across, and with monospecific stands of young caña or older *Tessaria* (Fig. 2B).

We found *E. alnorum* throughout the *Tessaria* zone, from the shrub (≥1m tall) stage (Fig. 2A, middle zone), through mixed *Tessaria*/caña stands, and into areas where trees were beginning to senesce. However, the birds were by far the most common in mixed stands of *Tessaria* shrubs and trees and caña brava, with plants of variable heights, especially those interspersed with patches of bare sand or bordering open backwaters (Fig. 2B).

The habitat closely resembles that on the breeding grounds with structural aspects of the vegetation appearing similar in both places. *Tessaria integrefolia* has been described as willow-like, and one Spanish common name for the species is river alder.

FIG. 2. Primary succession on point bars along the Manu River. A. Primary succession of *Tessaria integrefolia*. Arrows indicate low-growing *Tessaria* nearest the open beach, a middle zone of shrubby growth, and a zone of trees, as one moves away from the water. Invading caña brava is visible in the tree zone. B. Irregular primary succession. Scattered individuals and clumps of *Tessaria* and caña brava are interspersed with open areas of bare sand.

ACKNOWLEDGMENTS. I am grateful to the Peruvian National Institute of Natural Resources (INRENA) and Manu National Park for authorizing this research, and to my field assistants for helping to gather the data.

Territoriality

Because the zone of appropriate habitat along a beach is narrow, territories usually formed a single row along the length of the beach, although in a few places, they were two deep. We observed 9 territories, ranging in size from 0.04-0.25ha (Table 1). Three territories in 1995 were located in approximately the same areas as three of the territories in 1994, but were much smaller (Fig 3; Table 1), because of reduced habitat availability. Six of the territories were occupied by two birds each, 2 by one bird each, and 1 by three birds. The area per bird ranged from 0.04-0.12ha (Table 1). The larger territories included a greater range of *Tessaria* growth forms (i.e., shrubs, saplings, trees) and sizes, more irregular distributions of trees and caña, and larger open spaces.

Every territory was occupied by a bird designated as the dominant individual, or territory owner. This bird patrolled the perimeter of its territory; it called early in the morning, and sang the full *fee-bee-o* song vigorously. The other birds on the territory were "territory associates." The dominant did not challenge the associate(s), which, in general, was much less active and tended to stay close to the dominant. Several lines of evidence suggest that dominant birds were adult (second year [SY] or older) males and that associates were either females or young birds of either sex, although this conclusion awaits confirmation. If true, it could mean that family groups migrate together, that pair bonds persist following reproduction, or that new pair bonds are formed on the wintering grounds, with the pair migrating north together in the spring.

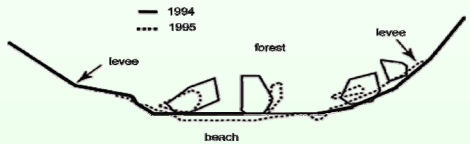

Fig. 3. Territories of Alder flycatchers

The dominant was primarily responsible for defense of the territory, for which it employed all of the vocalizations normally heard on the breeding grounds, including the *fee-bee-o* song and the *pit*, *whee*, and *churr* calls. Territorial interactions were signaled by a series *pits* given with increasingly frequency. At the lowest levels of aggression, the birds interacted vocally by countercalling, but remained on their own territories apparently not in visual contact. Sometimes, the birds moved toward a common territorial boundary and engaged in a vocal duel, countersinging with loud, forceful *fee-bee-os*, or giving harsh *pits* and other calls. In interactions of the greatest intensity, the dominant bird on the territory chased rapidly and silently after the trespasser, but stopped at the territory boundary, whereas the intruder kept on flying.

Because the appropriate habitat available on any given beach is limited, it is likely that wintering Alder Flycatchers are widespread along meander rivers throughout the Amazon Basin. It also may be that only a portion of the population establishes winter territories, with the other birds moving about in small flocks.

TABLE 1. Size and occupancy of winter territories of *E. alnorum*

Terr.	Area (ha)	No. birds	Area/ bird (ha)
93-N	0.23	2	0.12
93-S	0.10	2	0.05
94-M	0.25	2	0.13
94-W	0.23	2	0.12
94-R	0.20	3	0.07
94-F	0.08	2	0.04
95-M	0.14	2	0.07
95-W	0.06	1	0.06
95-F	0.04	1	0.04
Mean	0.15	1.9	0.07

Feeding Behavior

We recorded data on 185 bouts of feeding. In 78 bouts the birds fed on insects and in 7, on fruit. Insects were taken most commonly by aerial hawking (n = 162, 91% of observations) in which a bird flies from its perch directly at a flying insect and snatches it from the air. The birds then returned to the original perch 48% of the time or continued to a new, forward perch, 52% of the time. The average perch heights before (3.5m) and after (3.8m) aerial feeding, when the birds moved to a new perch, did not differ significantly from each other or from the mean perch height (3.3m) when the birds returned to the same perch. The birds also fed by perch-gleaning (n = 10, 6% of observations), in which a perched bird removed an insect from the undersurface of a nearby leaf, and hover-gleaning (n = 6, 3%). Bouts of fruit feeding were often long (≤ 10 min), especially on fruits of *Cissus* sp. (Vitaceae). Birds plucked and swallowed fruits whole, similar to the way that they perch-gleaned insects. Sixteen of 19 fecal samples contained fruit remains, 1 contained insect remains, and 2 contained remains of both, and feathers on the lower abdomen of 4 additional birds were stained with purple fruit juice. Fruit-eating by *E. alnorum* has not been reported previously, although it is not uncommon among other species of migrating and wintering flycatchers.

Conservation status

At present, Alder Flycatcher populations show no evidence of declines. However, anecdotal reports suggest that the behaviorally dominant Willow Flycatcher (*Empidonax traillii*) is displacing the Alder from parts of its breeding range. Loss or degradation of riparian habitats on the wintering (and breeding) grounds is also a potential threat. The floodplain habitats along Amazonian meander rivers are renewed each year by depositions of silt. They tend to be very fertile and thus, vulnerable to agricultural development. In addition, species (particularly *Tessaria*) characteristic of the primary succession are especially fast-growing and produce fiber that is suitable for paper pulp. So far, high transportation costs to markets have constrained the commercial development of these riverside habitats. However, with new roads and more sophisticated types of transportation, the situation is likely to change. Because these primary succession habitats are constantly being renewed, however, it may be possible to develop land-use plans in which only the post-*Tessaria* successional stages are cleared for agriculture or only zones of the tallest, most mature *Tessaria* are cut for paper pulp. Preservation of the *Tessaria*/caña brava habitat is important not only for the Alder Flycatcher, but also for the more than 100 other species of birds (residents and nearctic migrants) reported to use it, seven of them exclusively.

Literature Cited: Lowther, P. E 1999. *Empidonax alnorum* Alder Flycatcher. The birds of North America 446.
Poole, A., P. Stettenheim, & F. Gill (eds.). 1992-2002. The birds of North America. The Birds of North America, Inc., Philadelphia, PA.