at each location in the tree. While one may not expect to find as many morphological or behavioral feeding specializations in frugivores as are found in insectivores (Snow 1971), this is not to say that various adaptations of the bird species that are primarily related to other functions (e.g. feeding on an alternative insect food source, reproductive display) may not also have secondary effects in determining the kinds of fruit that the bird can most efficiently include in its diet. Future studies are required that would include more detailed data on the feeding method of the birds and on characteristics of the fruit other than size.

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Diet-Correlated Variations in Social Behavior of Wintering Tennessee Warblers

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From 14 December 1976 to 6 March 1977 we made extensive observations of the foraging and social interactions of Tennessee Warblers (*Vermivora peregrina*) wintering at Monteverde, located at 1,400 m on the Cordillera de Tilarán in northwestern Costa Rica (10°18′N, 84°49′W). Most Tennessee Warblers foraged for insects in the foliage of trees of all sizes. Like other winter residents they sometimes participated in mixed-species flocks, but more often they foraged for insects in pairs or small conspecific groups.

At any given time a small minority of the warblers fed on nectar, mostly at the flowers of the machete tree (*Erythrina lanceolata* Standl.:Leguminosae), scattered individuals of which stood at pasture edges and homesites. This small tree was conspicuous because its leafless branches bore pendant clumps of bright scarlet flowers. That wintering Tennessee Warblers feed on nectar is apparently common knowledge among ornithologists in Central America (e.g., F. G. Stiles and E. Morton, pers. comm., see also Peterson and Chalif 1973, A Field Guide to the Birds of Mexico, Boston, Houghton-Mifflin, p. 203).

Unlike their counterparts foraging for insects, nectar-feeding warblers were intolerant of conspecifics. Each individual defended its *Erythrina* and other trees within a radius of about 15 m by chasing conspecifics away. Agonistic encounters occurred during 55% of our 31 observations of nectar-feeding warblers. In approximately half of these encounters conspecifics were driven off, while in the other half a warbler was supplanted by hummingbirds (*Amazilia tzacatl* or *Campylopterus hemileucurus*) or, in one case, by a Black-throated Green Warbler (*Dendroica virens*), although the latter bird did not flower-feed.

On 13–14 January and 7–8 March in San José we observed Tennessee Warblers nectar-feeding in Poró trees (*E. poeppigiana*), which have far greater crown volumes than *E. lanceolata*. Entire Porós were apparently too large for one warbler to defend successfully. Typically, four or five birds spaced themselves

within the crown of a tree, and any individual that entered another's portion of the tree was chased out of it. The volume of Poró canopy defended by a single bird at San José appeared similar to the total crown volume of the largest machete tree at Monteverde.

Tennessee Warblers arrive in Costa Rica between August and October (Skutch *in* Bent 1963, Life Histories of North American Wood Warblers, part 1, New York, Dover, pp. 85–86; Slud 1964, Bull. Amer. Mus. Nat. Hist. 128: 320). Individual *Erythrina* trees bear abundant blossoms for only 4–6 weeks, mostly during December–February. As trees go in and out of flower a scramble for trees worth defending probably occurs, with individuals that can successfully defend nectar sources shifting from tolerance to intolerance of conspecifics at least once and perhaps several times during a single winter.

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Discovery of an Oilbird Colony in the Western Drainage of the Ecuadorian Andes

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The Oilbird, *Steatornis caripensis,* has been recorded from many lower montane localities in the periphery of the Amazonian basin of mainland South America, in the coastal mountains of northern Venezuela, eastern Panama, and Trinidad. Many records, however, involve single individuals collected in the open, and comparatively few are of birds secured within, and showing the locations of, roosting and nesting colonies. Thus the precise distribution of these colonies remains largely unknown, even though the most conspicuous and accessible ones have become famous among ornithologists; one has been studied in great detail (Snow 1961, 1962). The occurrence of stray individuals far from known colonies could indicate that smaller groups roost and nest elsewhere, a possibility substantiated by recent evidence from highland Ecuador.

Several Oilbirds have been collected in the vicinity of Quito despite its high elevation (about 2,800 m) and its separation from the Amazonian basin by mountains of over 4,000 m (Salvatori and Festa 1900, Lönnberg and Rendahl 1922, Chapman 1926); one was captured alive and later preserved as a skin at the campus of Universidad Católica, Quito, on 3 July 1975. The source colony of these birds was unknown but it seemed unlikely that they came from southeastern Ecuador, some 400 km from Quito, where the only colonies in the country have been reported (Albuja and de Vries 1977).

Rumors of a nearer site first reached me in February 1976, when the geographer Francisco Terán claimed that a colony of fruit-eating "owls" lived in a gully near Puéllaro, a town only 25 km north of Quito, and added that these might be Oilbirds rather than owls because peasants in the neighborhood reputedly raided the colony and obtained nestlings from which they extracted oil. I visited the Puéllaro area on 7 and 9 October 1977, and with additional information from local people was able to explore the actual site.

It consists of an undetermined but small number of shallow caves formed by subsidence of pieces of volcanic tuff in the nearly vertical walls of a 175 m-long section of the Quebrada Santa Marta, a mountain torrent that has carved a trench 25–30 m deep with sides only 6–8 m apart, and which flows rather precipitously into the Río Guayllabamba. The general course of the quebrada follows an east-west slope, which is gentle with low banks in the stretch immediately above the trench and gradually becomes steeper so that below the trench the water rushes in a long series of rapids toward the Guayllabamba. The site is about 500 m downstream from the Quebrada Santa Marta bridge of the main road between the towns of Guayllabamba and Puéllaro, 63 km by road from Quito, at an elevation of about 2,160 m.

Despite the sheer tuff walls of the gully, native trees grow attached to cracks and raise their crowns well over the rims. Their foliage shields the gully from direct sunlight; this and the gully's steepness and depth make its lower recesses perpetually dark. The vegetation along the trench contrasts sharply with that growing in the surroundings; while native trees have persisted in the gully itself, cultivated fields of corn, tomatoes, and beans, pastures, and *Agave* and *Eucalyptus* hedges surround it. A permanently inhabited dwelling is only 100 m from the north rim, and directly above the darkest portion of the trench are the remains of an old foot bridge.