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Observations at a Paradise Tanager nest.—The Paradise Tanager (*Tangara chilensis*) inhabits the canopy and forest edge of tropical forests in the Amazon Basin and Guianan region of South America (Isler and Isler 1987, Ridgely and Taylor 1989). At the Tambopata Nature Reserve in southeast Peru (12°50′S, 69°17′W) it is common in canopy mixed species flocks (Donahue et al. 1987). We observed a nest there from an observation platform in the canopy of an emergent tree.

The nest, in an early stage of construction, was discovered by Donahue on 23 June 1989. It was supported in the fork of a small, leafy branch 31 m above the ground in the outer top edge of an emergent *Ceiba pentandra*. The nest was then observed from a canopy platform in the same tree for a total of 48 h from 23 June to 23 July 1989. The first material observed for nest construction was long, stringy bright green staghorn lichen-like moss. As construction progressed, white, irregular strings of the common Amazonian fungus *Rhizomorpha corynephora* were added to the nest, with the green moss still being predominant. Additionally, the birds used a fluff similar to dandelion seeds and possibly spider web in smaller quantities. Near the end of the construction period straw-like grass was used to line the nest. Construction was last observed on 1 July.

During construction, the birds' visits to the nest site usually lasted one to two min. The frequency of the visits varied (e.g., 24 June ten trips spaced three to fifteen minutes apart over a 2.5-h period, 27 June three trips over 4 h, and 1 July two trips over 2 h during a 5-h observation period). Both members of the tanager pair were present during nest construction. However, only one bird carried building materials on each visit to the tree. Copulation, with the female holding nesting material in her beak, was observed once after the pair had entered the tree. Afterwards, the female placed the moss in the nest. The male moved off into another part of the tree until she had finished. They then left together, silently.

Incubation was first observed 4 July. Incubation sessions varied from 15 to 55 min. As during construction, the frequency of nest visits varied (e.g., 9 July 2 trips over the 3-h observation period, 12 July 6 trips over 4 h, and 17 July 3 trips over 3 h of observation). The incubating bird often left the nest unnoticed, quietly dropping out of the tree. Calling started up only some distance from the nest tree.

The *Ceiba* tree was losing its leaves while the nest was under construction. By 20 July, the tree was leafless and the nest completely exposed. On this date, we first watched the adult pair feed the nestlings. Both members of the pair brought spiders, orthopterans, and caterpillars to the nest. Feeding was observed on 20–21 July only. We watched the pair make two trips over one hour on the first day in the late afternoon and five trips over 3.5 h of observation on the second day. Usually one bird sat on the nest for 40–60 min after both of the birds had delivered their food, one after the other, to the nestlings. Once both birds left immediately after making their deliveries but returned 15 min later with more food. One bird then sat on the nest. On 23 July, the nest was found hanging 5–6 m below the original nest position and out of reach of recovery. The cup-shaped side hung towards our platform. The tanagers were not present. One week later, after a rain storm, there was still no activity and the old nest was gone. It is probable that the nest's complete exposure was responsible for its failure. Indeed, known nest predators, such as toucans, aracaris, and toucanets, had been seen frequently in nearby fruiting trees throughout the observation period.

On 26 August a pair of Paradise Tanagers was seen building a nest in the same tree. Again, the nest was in the outer top edge of the tree crown in a small fork, mostly hidden by leaves. Copulation was observed in a neighboring tree, and again, the female had nesting material

in her beak. The same green moss and the white, stringy fungus were visible as part of the nest. On 3 September the nest was gone, as were the birds.

During nest construction the tanagers frequently were accompanied to the nest tree by Green-and-gold Tanagers (*Tangara schrankii*) and Black-faced Dacnises (*Dacnis lineata*), and less often, by a Turquoise Tanager (*T. mexicana*) and an Opal-crowned Tanager (*T. callophrys*). The visiting birds stayed near the member of the pair not actively nest building. None of the birds foraged during the visit and no aggression was shown by the pair of Paradise Tanagers towards the visitors. The birds made chip notes while in the tree. Later, during the incubation period, a male Green Honeycreeper (*Chlorophanes spiza*) followed the Paradise Tanager into the tree. As the tanager sat on its nest, the honeycreeper moved about in the tree eventually approaching the nest from underneath. The tanager left its nest, sat opposite the honeycreeper until it left, then returned to incubate. During the feeding stage, a female Blue Dacnis (*Dacnis cayana*) was chased out of the tree after it approached and nearly touched the nest from below. The individuals of these six species, along with the pair of Paradise Tanagers, seemed to be permanent members of a large mixed species flock that we frequently observed in the vicinity of the *Ceiba pentandra* tree between January and September 1989. When we watched these species interact with the Paradise Tanagers at their nest, the flock was not seen in the vicinity.

The observations of copulation during which the female held nesting material and the consistent occurrence of only one bird carrying nesting material suggest that the female is at least predominantly responsible for nest building. This contradicts Ruschi's (1979) report of pairs building the nest together. According to Isler and Isler (1987), females of the genus *Tangara* typically build their nests alone, although they are attended closely by the male. Tanager males not actually helping the female in construction often accompany her while she gathers material or may sing or call nearby while she works on the nest (Skutch 1989). This is consistent with our observations, as the bird not actively constructing hopped about in the tree, chipping frequently, after arriving with its mate.

The cup shape of the Paradise Tanager nest, typical of tanagers as a whole (Skutch 1989) and of the *Tangara* genus specifically (Isler and Isler 1987), is consistent with the only description of a *Tangara chilensis* nest (Ruschi 1979). However, the nest elevation of over 30 m is higher by more than 10 m.

It was not possible to determine whether both sexes participated in incubation, as the sexes are alike, and the bird that came to incubate arrived at the tree alone. Most likely, the female was solely responsible for incubation, as is typical for tanagers (Isler and Isler 1987). The observed incubation range of 13–17 days agrees with Ruschi (1979), Isler and Isler (1987), and Skutch (1989).

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Observations of the breeding biology of the Elfin Woods Warbler.—The endemic Elfin Woods Warbler (*Dendroica angelae*) was first described in 1972 from the Caribbean National Forest, Luquillo Mountains, Puerto Rico (18°19'N, 66°45'W) (Kepler and Parkes 1972). Initially thought to be restricted to the Luquillo Mountains (Kepler and Parkes 1972), the species was later reported in other mountain ranges on the island, although it is still considered rare (Willis 1972, Gochfeld et al. 1973, Perez-Rivera and Maldonado 1977). The first Elfin Woods Warbler nest was found in the Luquillo Mountains by Wiley (1985). Between 1977 and 1985, Wiley (1985) located four additional nests in the Luquillo Mountains, but detailed observations on breeding biology are lacking. I found Elfin Woods Warbler nesting in aerial leaf litter in the Maricao State Forest in western Puerto Rico. I here present the first observations of its breeding biology. The species currently is being considered for threatened or endangered status (U.S. Fish and Wildlife Service 1989).

Study area.—The Maricao State Forest is located in the Cordillera Central mountain range in western Puerto Rico (18°09'N, 66°58'W) and covers 4150 ha. Mean annual rainfall is 2346 mm, mean annual temperature is 22°C, and relative humidity fluctuates between 60% and 90% (Colon et al. 1976 in Cruz and Delanoy 1984). Three life zones are recognized within Maricao State Forest boundaries: subtropical moist, subtropical wet, and subtropical lower montane (Ewel and Whitmore 1973). Five plant associations also exist there: Maricao mixed-hardwood, forests derived on volcanic soils, Maricao windy ridge, lower montane palm forest, and *Podocarpus* mixed-hardwood.

Methods and materials.—The following variables were measured at active nest sites: percent ground cover (ocular tube), percent canopy cover (ocular tube), shrub density (counting number of shrubs along two perpendicular transects within the sampling plot that were intercepted by my outstretched arms), diameter at breast height (dbh) of trees (diameter tape), canopy height (clinometer), nest height (clinometer), and altitude (altimeter and topographic map) (James and Shugart 1970, Cruz and Delanoy 1984). All measurements were made within a 0.01-ha circular plot centered on the nest. Nest components were identified, whenever possible, as to plant species. Nest measurements included inner diameter, outer diameter, height, and depth, all measured with a dial caliper (±0.1 mm). I used 7 × 35 binoculars to observe the warblers. No blind was used, but the warblers appeared to behave normally. Time spent by adult Elfin Woods Warblers at the nest was recorded to the nearest second using a stopwatch, and the number of visits to the nest was counted. The standard observation period was 08:00–11:00, with observations varying from one to five days between 4 April and 8 May 1990. Each observation period was subdivided into hourly intervals to assess behavior differences during the morning. Arthropods brought to the nest were identified as to order, whenever possible.

Results.—I discovered a nest under construction on 30 March 1990 at an elevation of 750 m within the *Podocarpus* mixed-hardwood association, of the subtropical lower montane Life Zone. A second nest was found in the same area on 27 April 1990.

Trees within the 0.01-ha circular plot of the first nest included *Cecropia peltata* (1),