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Nests and eggs of some Costa Rican birds.—Although Costa Rica has a relatively well-studied avifauna, much remains to be learned about the breeding biology of many species. New breeding information for several species was collected in Costa Rica during 1984–1986 in a field survey conducted by the Western Foundation of Vertebrate Zoology (WFVZ). In this paper, we include information on seven species for which the nest and/or eggs previously were undescribed, although a summary of this information appeared in Stiles and Skutch (1989). Nomenclature follows that of Stiles and Skutch (1989), and egg shapes are those given by Preston (in Palmer 1962).

Vermiculated Screech-Owl (*Otus guatemalae*). Two vague references have been made to the breeding of this species. On 11 April (1942 ?), Sutton and Pettingill (1942) collected a female with enlarged ovaries in southwestern Tamaulipas, Mexico, at the entrance to a nest. The cavity was 15 ft (4.5 m) from the ground, but the nest contents were not determined. Wetmore (1968) reported a female collected on 19 March 1949 near Utive, Panama, with a nearly shelled egg in the oviduct. On 3 April 1986, while working at Cerro Montezuma (700 m), Alajuela Prov., about 45 km NE of Las Cañas, we flushed and collected a female (WFVZ #36,871) from a nest. The nest site was located in disturbed forest and was situated in a cavity in a decaying stump about 5 m from the ground. The cavity was 5 cm deep, and the entrance measured 23 × 18 cm. The shallow depth of the cavity suggested that it was made by a trogon rather than by a woodpecker. The nest contained two eggs deposited directly on wood chips. The slightly incubated eggs (WFVZ #154,790) are unmarked white, slightly glossy, and spherical, and they measure 35.10 × 30.51 and 34.30 × 29.60 mm.

Andean Pygmy-Owl (*Glaucidium jardinii*). We discovered a nest of this species on 26 March 1986 at an elev. of about 2000 m on the western slopes of Volcán Barva at La Concordia, Heredia Prov., about 24 km NW of San José. The nest site was located on a ridge at the edge of disturbed forest and pasture land with scattered stumps and mature trees. Our attention was drawn to the vicinity of the nest site by two loudly vocalizing Emerald Toucanets (*Aulacorhynchus prasinus*), which were being attacked by one of the

pygmy-owls that flew toward the toucanets from a small hole in a stump. The pygmy-owl was immediately collected (WFVZ #36,877), and it proved to be a female. The nest cavity was an abandoned woodpecker nest probably made by a woodpecker (*Melanerpes* sp.). The entrance was located 2.1 m from the ground. The 45-cm deep cavity contained three slightly incubated eggs (WFVZ #154,767) deposited on a bed of wood chips. The eggs were white, not glossy, and short subelliptical (2) and spherical (1) in shape, and they measured 29.57 × 24.62, 29.33 × 24.54, and 28.15 × 24.67 mm.

Dusky Nightjar (*Caprimulgus saturatus*). On 13 March 1986, at Hacienda San Miguel (ca 2050 m), 1 km E of Rancho Redondo, San José Prov., we were shown a nest of this species by an employee of the hacienda who had found it a few days earlier when he flushed the incubating bird. By the time of our arrival the nest was abandoned, apparently the result of predation, as most of the female's tail feathers were found on and adjacent to the nest. The single egg was intact (WFVZ #154,755) and contained a large dead embryo. The nest was located on a natural terrace, which was partially covered by tall grass and ferns, with some clearings and a few large trees. The nest was a small grass-lined depression about 10 cm in diam. The single egg was white, slightly glossy, and measured 28.65 × 21.62 mm.

Snowcap (*Microchera albocoronata*). MM discovered a nest of this species on 17 April 1986 at Finca Plastico ("Rara Avis"), Horquetas, about 29 km NW of Guapiles (650 m), Heredia Prov. The nest was located in the understory of primary forest on a slope leading toward a small creek. It was placed about 1.6 m from the ground at the base of a leaf on the outer branch of a small plant. The cup-shaped nest was made with brown moss mixed with green moss and lichens, and the lining contained brown moss and lichens. The female was secured (WFVZ #38,841). The two eggs (WFVZ #154,786) contained large embryos. They were dull white, long elliptical and subelliptical in shape, and measured 12.45 × 7.95 and 12.02 × 7.98 mm, respectively. Earlier, Carriker (1910) mentioned a nest collected in March 1908 above Guapiles. He described the nest as "a tiny little thing, built on a small knot on the side of a slender vine, hanging from a large tree." The eggs were broken when he attempted to collect them. F. G. Stiles (pers. comm.) encountered a nest of this species with two newly hatched young at "Rancho Levi," a small grassy clearing surrounded by forest (ca 720 m), about 3 km SE of Finca Plastico, on 3 April 1985. The nest was 1.75 m up in the lowest branches of a tree overhanging the edge of the clearing. It was rusty-brown in color, composed of tree fern scales, fine fibers and spiderwebs, and decorated with green moss and a few bits of lichen on the exterior.

Black-cheeked Woodpecker (*Melanerpes pucherani*). Several nests of this species have been reported, but the eggs are apparently undescribed. Stone (1918) mentioned a nest hole in a dead tree in a clearing on 4 April 1911 in Gatún, Panama. Russell (1964) reported five nests found in Belize between the months of April and July which were placed between 12 to 55 ft (3.65 to 16.75 m) above the ground in palms or dead trees. Skutch (1969) made observations at a nest in Costa Rica during April and May 1941. When he observed the male ejecting an egg, he examined its remains, which appeared small for this species. He suggested that woodpeckers remove from their own nests any small or visibly abnormal eggs. On 14 May 1986, at Zapote, Bijagua (500 m), Alajuela Prov., about 45 km NE of Las Cañas, we collected a set of two fresh eggs (WFVZ #154,781). Interestingly, one of the eggs seems to be abnormally small, as Skutch (1969) reported for the eggshell remains he examined. The eggs were glossy white, and they measured 24.71 × 16.33 and 21.24 × 15.32 mm. They were subelliptical and short oval in shape, respectively. The nest was located in a hole in a stump in a pasture about 8 m from the ground. The cavity was 35 cm deep, and the diameter of the entrance measured 10 × 8 cm. The nest contained one egg when checked on 12 May. Based on the contents of two other nests examined, two eggs may comprise a complete clutch. A second nest found on 12 May 1986 in a nearby pasture was 3.5 m above

the ground and contained two well-grown chicks. A third nest examined on 3 May at Cerro Montezuma was located 6 m up in a stump at the edge of pasture and disturbed riparian forest. It contained four recently hatched chicks that were unfeathered and flesh colored. Thus, the clutch size for this species may range from 2–4 eggs.

Rufous-winged Tanager (*Tangara lavinia*). On 11 May 1986, at El Macho, Alajuela Prov., ca 45 km NE of Las Cañas at an elev. of 550 m, MM flushed one of these tanagers from a small citrus tree at the edge of a pasture near disturbed forest. Upon investigation, an almost finished nest was found. On 15 May, the bird was found on the completed nest, but no egg had yet been laid. On the 18th, the nest contained two fresh eggs (WFVZ #154,830) that were bluish-white in color and marked over their entire surface with spots of lilac, brown, purplish brown, and dark brown concentrated at the larger end. They measured 21.70 × 16.05 and 22.25 × 15.96 mm and were oval and subelliptical in shape, respectively. The nest was located in the outer part of a citrus tree about 1.6 m from the ground. It was cup-shaped and made with fine grasses mixed with some mosses, some dry leaves, and small roots and lined with fine blackish rootlets. Previously, Hilty and Brown (1986) mentioned a bird building a nest in July, W Valle, Colombia.

Black-and-yellow Tanager (*Chrysothlypis chrysomelas*). In a recent comprehensive review, Isler and Isler (1987) mentioned that there is no published information on the breeding of this species. On 22 June 1986, at Virgen del Socorro, Alajuela Prov., MM and F. Stiles observed a female entering a nest placed in the fork of an outer branch about 8 m up in an *Inga* tree within disturbed riparian forest. The nest (WFVZ #54,753) was cup-shaped and made with brown vegetable fibers, mosses, and dry leaves and lined with black vegetable fibers and fungal rhizomorphs. Unfortunately, the contents were lost during the collecting episode, which took place during a rainstorm. The female's insistence upon returning to the nest suggested that it contained either heavily incubated eggs or recently hatched chicks. The adult female was collected (WFVZ #35,513).

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A case of polygyny in the Wood Thrush.—Harem polygyny is rare among North American passerines as a regular breeding strategy, but it is not unusual as a facultative or opportunistic strategy (Ford, Current Ornithology 1:329–356, 1983). A single case observed during a long-term study of a color-banded population of Wood Thrushes (*Hylocichla mustelina*) indicates that this species may be listed among those rarely practicing harem polygyny.

From 1974–1990, Roth and co-workers observed 157 male Wood Thrushes (311 bird-years) and 719 nests in a Delaware woodlot (unpubl. data; see Johnson et al., Condor 92: 89–96, 1990 for site description and methods). At 30% of the nests, the male owner was identified positively, i.e., seen feeding the young or guarding the nest. We could clearly associate an identifiable male with most other nests, using capture data or observations of singing or scolding nearby. We cannot be certain that undetected harem polygyny has not occurred, but only this one case has been confirmed.

In 1990, we observed a male (Y) and a female (X1) nesting for their second year on our study site. Both had been mated monogamously in 1989. A predator destroyed the pair's first nest on 16 May 1990. X1 laid three eggs in a new nest 23–25 May; two young fledged 18 June. Y was identified as the male owner when Johnson saw him perched on this nest 3 June. A secondary female, X2, was initially seen by Bartlett on 31 May building a nest about 50 m from X1's. Y was netted 6 June within 25 m of X2's nest, but no male owner was confirmed there until Johnson saw Y feeding the nestlings on 20 June. The next day Bartlett observed Y again feeding X2's nestlings, and Bartlett and Johnson simultaneously saw him feeding one of X1's fledglings less than 1 m from X2's nest. Y was captured and given a new color-band combination on 22 June. On 25 June, Kleiner saw him feeding the nestlings at X2's nest, and Johnson saw him feeding a fledgling from X1's nest about 20 m from X2's nest.

One young fledged from X2's nest on 28 June. Johnson saw X2 foraging in the company of Y on 11 July. Another nest, built in early July near her first nest, probably was hers also. It failed 18 July, and X2 was not seen again. X1 built another nest in late June, and three young fledged from it 25 July, having been fed in the nest by Y.

Ford (op. cit.) suggested cases of harem polygyny in normally monogamous species may arise when a mated male acquires the territory and mate of a vanished neighbor. Such was not the case here; no other territorial male was in the area of X2's nests. Among regularly polygynous species, factors associated with polygyny include high male density with variation in territory quality (Verner, Evolution 18:252–261, 1964) and variation in male quality (Weatherhead and Robertson, Am. Nat. 113:201–208, 1979). We cannot judge which of these was important here; in 1990 male density at the site was at its highest level since 1977 (Roth and Johnson, in prep.), but we did not assess territory quality or male quality. Y's territory was in an area used annually by Wood Thrushes but was not clearly unusual. Y