

FIRST DESCRIPTION OF THE NEST AND EGGS OF THE GRAY-AND-GOLD WARBLER (*BASILEUTERUS FRASERI*)

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Primera descripción del nido y de los huevos de la Reinita Grisidorada (*Basileuterus fraseri*).

Key words: *Basileuterus fraseri*, nest, egg, tropical deciduous forest, Tumbesian Region, Gray-and-gold Warbler, Ecuador.

The genus *Basileuterus* contains 24 species of wood-warblers that occupy a variety of habitats from northern Mexico to northern Argentina (Curson *et al.* 1994). Recent mtDNA work supports its inclusion within the monophyletic Parulidae (Lovette & Bermingham 2002). *Basileuterus* species are conspicuous elements of many Neotropical forests as they forage actively in the undergrowth and often join mixed flocks (Ridgely & Greenfield 2001). Within such flocks, many *Basileuterus* species can be found in noisy family groups (Curson *et al.* 1994). Reported clutch sizes range from 2 to 4 eggs, and all members of the genus build domed nests on or near the ground (Curson *et al.* 1994).

Basileuterus species can generally be clustered into superspecies or groups of similar looking birds, though some are not easily grouped (Curson *et al.* 1994). The Gray-and-gold Warbler (*B. fraseri*) may be one such outlier species within the genus (Curson *et al.*

1994), although Ridgely & Tudor (1989) note the resemblance of its song to that of the Russet-crowned Warbler (*B. coronatus*) and place it in a “gray-headed” group. Curson *et al.* (1994) characterize it as “basically endemic” to the Tumbesian region of western Ecuador and northwest Peru, though it also occurs in small numbers into the humid foothill forests of northwestern Ecuador, and may possibly engage in seasonal movements (Ridgely & Greenfield 2001). Two subspecies are recognized, *B. f. ochraceicrista*, found in Ecuador from Guayas Province north to northern Manabí Province, and the nominate *B. f. fraseri*, distributed from El Oro Province in Ecuador south to northern Lambayeque Province, Peru (Curson *et al.* 1994).

Though the Gray-and-gold Warbler is presumed to breed in the wet season (Curson *et al.* 1994, Ridgely & Greenfield 2001), no other breeding information is available for the species. Here we present descriptions of the nest and eggs and provide an analysis of nest



FIG 1. A Gray-and-gold Warbler nest in situ, Tumbes, Peru.

materials for comparison with past work on *Basileuterus* nests in Ecuador (Greeney *et al.* 2005).

In the morning of 2 December 1997, KZ found a nest with four eggs of the Gray-and-gold Warbler in the Quebrada Faical of the Tumbes Reserved Zone, dpto. Tumbes, Peru (03°49.43'S, 80°15.66'W; c. 400 m a.s.l.). This 75,000 ha ecological reserve protects hilly, tropical dry forest within the endemic-rich Tumbesian ecoregion (see Parker *et al.* 1995 for a detailed habitat description). The nest was located on the ground of a steep forested slope beside a trail and was embedded in a natural depression at the base of a small caimito tree (*Chrysophyllum* sp., Sapotaceae). It was globular with a side entrance that measured 6 cm wide by 4 cm high. The internal

chamber was 6.5 cm in diameter. External walls of the nest were constructed of fine sticks, herbaceous stems, petioles of compound leaves, dry bamboo leaves, and some moss and black fungal rhizomorphs (Fig. 1). The lining was composed of interwoven fine dry grasses and pale rootlets. The eggs were creamy white with pinkish-orange and red-brown speckles concentrated at the larger end, and measured 14.8 x 20.3, 15.1 x 20.4, 14.9 x 19.9, and 15.0 x 21.0 mm (Fig. 2). Upon discovery of the nest, the incubating bird hopped out and performed a brief distraction display.

We found the second nest in the new Jorupe Reserve, a private reserve owned by the Jocotoco Foundation. The nest was found at 650 m a.s.l., in the lower reaches of the



FIG 2. Eggs of the Gray-and-gold Warbler, removed for photographs from the same nest illustrated in Figure 1.

reserve, a dramatic landscape dominated by emergent trees of the Bombacaceae family. A thorny understory grows in the open woodland. Rain in the Tumbesian Region is highly seasonal, with the majority of the 300–1500 mm (depending on El Niño conditions) falling between December and May (Best & Kessler 1995).

In the late afternoon of 19 April 2006, we located a nest of the Gray-and-gold Warbler that contained two well-feathered nestlings. The nest was situated on the east side of a steep north to south-oriented ravine, around 1.5 m below the rim and 3.5 m above the bottom. The canopy closed over the ravine, and as the sun did not crest the rim until 10:00 h, the nest rarely received direct sunlight. The vegetation immediately surrounding the nest

was 30–50 cm tall, and a thin (1 cm diam.) liana stretched from near the base of the nest to the canopy, which began around 6 m above the nest. The adults clung to this liana ant-bird-like, using it to arrive at the nest from above. It was next to this thin liana, and tucked under a thicker, horizontal liana, that the nest was placed, facing down into and slightly with the orientation of the ravine.

Like all other described *Basileuterus* nests (Curson *et al.* 1994), this nest was a domed cup with a side entrance. It was built against the hill and under the vegetation such that the slope of the hill and the top of the nest were even. Outside, the nest was 13 cm wide, 12 cm front to back, and 9.5 cm tall. The entrance was 4 cm high, 5 cm wide, and did not have a lip. The cup was 5 cm wide, 3.5 cm

TABLE 1. Dry weight (g) component data by nest section for the Gray-and-gold Warbler.

Primary lining	Dry grass	0.422
	Dark flexible fibers	0.072
	Pale fibers	0.072
Secondary lining	Dry grass	0.741
	Dark flexible fibers	0.850
	Pale fibers	0.052
Dome and body of nest	Dry grass	2.846
	Dark flexible fibers	4.783
	Skeletonized leaves	0.843
	Pale fibers	0.020
Total	—	10.701

deep, and the total chamber height was 9.0 cm.

To directly compare the nest of the Gray-and-gold Warbler with the work of Greeney *et al.* (2005), we dried the entire second nest on low heat in an oven and then dissected it into its component parts. Like the nests of both the Three-banded (*B. trifasciatus*) and the Russet-crowned warblers (Greeney *et al.* 2005), that of the Gray-and-gold Warbler consisted of two distinct and easily separable linings placed within the body of the nest. The lower section of the body was tightly woven and readily differentiated from the loosely interwoven dome. The nest of the Gray-and-gold Warbler, however, differed from those of other species studied by Greeney *et al.* (2005) in its small size and relatively material-poor construction; the Three-banded Warbler and Russet-crowned Warbler nests, for instance, weighed 17.35 g and 39.35 g, respectively, as compared with 10.70 g for the Gray-and-gold Warbler. The masses of the various materials as distributed across the three identified sections of the nest are presented in Table 1. The primary lining is considered to be that which sat on top of the secondary lining. The skeletonized leaves were concentrated on the

upper surface of the dome while the dry grasses were distributed primarily on the inside surface. In both linings the dry grasses were concentrated on the bottom surfaces.

Our discussion of adult behavior is based both on analysis of a short video filmed on 21 April from 06:45 to 10:45 h, and from direct observations made around the nest. Generally, the adults foraged together in the understory above the ravine, remaining within c. 30 m of the nest, then dropped into the ravine and fed the nestlings one after the other, as reported for the Three-banded Warbler in Greeney *et al.* (2005). Occasionally, only one bird fed the nestlings, while the second, presumably the male, could be heard singing nearby. We could not determine how many nestlings the adults fed per visit. The mean time spent at the nest by an adult was 17 ± 4.4 s (± 1 SD, $n = 9$). Time away from the nest varied greatly. Adults were seen to leave with fecal sacs on three of the nine visits observed during the film.

At 07:30 h on 21 April, the first nestling fledged 15 s after one of the adults fed. Seventeen minutes later, 9 s after one of the adults fed, the second nestling fledged. The adults did not return to the nest for the

remainder of the film (3 additional hours) and, based on the background audio, they appeared to have left the immediate vicinity of the nest within a few minutes of the second fledging. The fledglings were able to fly, albeit laboriously, and both successfully flew up from the rim of the nest and out of the field of view of the camera, presumably to the surrounding vegetation.

Curson *et al.* (1994) state that the Gray-and-gold Warbler does not appear to be closely related to any other species in the genus. Its lighter nest may therefore simply be a peculiarity of its evolutionary history. Alternatively, it may represent an adaptation to the hotter and drier habitat it is found in as compared with the species studied by Greeney *et al.* (2005). The considerably heavier nest of the Russet-crowned Warbler, for instance, was collected at 2150 m a.s.l., and was constructed of presumably more insulating material like moss and an abundance of leaves. As we lack data to examine such elevational shifts in nest material use and thickness, we encourage others to undertake similar component analyses. With 24 species distributed throughout the Neotropics, we feel that *Basileuterus* would make an excellent study group for such intra-genus comparisons.

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