ORNITOLOGIA NEOTROPICAL 26, 51–58, 2015

NESTING OF THE SCRUB TANAGER (*TANGARA VITRIOLINA*) IN ANDEAN ECUADOR

Juan F. Freile

Comité Ecuatoriano de Registros Ornitológicos, Casilla Postal 17-12-122, Quito, Ecuador.
E-mail: jfreileo@yahoo.com

Resumen. – Anidación de la Tangara Matorralera (*Tangara vitriolina*) en los Andes de Ecuador. – La Tangara Matorralera (*Tangara vitriolina*) habita en valles interandinos secos de Colombia y el norte de Ecuador. Pese a ocupar hábitats antropogénicos, el conocimiento sobre su biología reproductiva es limitado, sin una descripción completa del nido. En este trabajo presento una descripción detallada del nido, huevos, pichones y notas sobre el comportamiento reproductivo. El nido es una taza abierta construido con fibras de pasto, palitos secos, raicillas, fibras plásticas, pedazos de hojas secas y otros materiales vegetales, telaraña y pelos de mamífero. Está colocado cerca de la punta de una enredadera colgante, apoyado sobre tres ramas entrecruzadas, a 2 m del suelo. Los huevos celeste pálidos con manchas pardas fueron incubados por la hembra durante 14–15 días. El macho acompañó a la hembra y la alimentó en varias ocasiones. Los pichones fueron alimentados mayormente por la hembra. La pareja no intentó una segunda nidada en el sitio luego de la pérdida de sus pichones; al contrario, sustrajo material de este nido hasta tres días después del abandono.

Abstract. – The Scrub Tanager (*Tangara vitriolina*) occurs in dry inter-Andean valleys of Colombia and northern Ecuador. Even though it thrives in human-made habitats, knowledge about its breeding biology is scarce, with no complete description of its nest. In this paper, I present a detailed description of its nest, eggs, and nestlings, including notes on its breeding behavior. The nest is an open cup constructed with grass fibers, dry sticks, rootlets, plastic fibers, dry leaf litter and other vegetal material, spider web, and mammal hair. It was built near the tip of a hanging vine, supported below by three intertwined twigs, 2 m above ground. The female incubated whitish blue eggs speckled brown for 14–15 days. The male attended closely and brought food to the female several times. Nestlings were fed mostly by the female. The nesting pair did not attempt a second brood at this nest after failure; instead, they collected nesting material from this nest up to three days after nest failure.

Key words: Andes, Ecuador, eggs, incubation, nest, Scrub Tanager, *Tangara vitriolina*.

Handling Editor: Sandra Valderrama; **Receipt:** 30 October 2014; **First decision:** 7 January 2015; **Final acceptance:** 13 March 2015.

INTRODUCTION

The genus *Tangara* comprises 56 species that mostly inhabit humid lowland to montane forests (Burns *et al.* 2014). The degree of sympatry in the genus is exceptional (Burns & Naoki 2004), with as many as 10 different species occurring at certain humid Andean forests (Willis 1966). Yet, at least six species, not including those formerly grouped in the genus *Thraupis* (see Burns *et al.* 2014), occur primarily in drier woodland and scrubby areas (Isler & Isler 1999). Species of xeric habitats are grouped in a clade that comprises Burnished-buff (*T. cayana*), Lesser Antillean (*T. cucullata*), Scrub (*T. vitriolina*), Chestnut-backed (*T. preciosa*), and the recently described Green-capped Tanager (*T. meyerdeschauenseei*) (Burns

& Naoki 2004, Sedano & Burns 2010, Burns *et al.* 2014).

The Scrub Tanager is confined to dry inter-Andean valleys and slopes from northeast Colombia through northern Ecuador, where it inhabits semi-open woodland, gardens, hedgerows and shaded plantations (Isler & Isler 1999, Ridgely & Greenfield 2001). It is spreading into more humid areas of Colombia likely after deforestation (Hilty 1977, Ridgely & Tudor 2009). Little is known of its natural history despite its widespread adaptation to human-altered habitats. Breeding data available to date include a pair chasing two wrens, in apparent defense of a nesting area, in the upper Magdalena Valley of Colombia (Miller 1947); brief descriptions of open cup nests (Hilty 2011, Isler & Isler 1999); and an adult carrying lichens to a nest placed 9 m above ground (Greeney *et al.* 2011). Further, brief descriptions of eggs and of birds in breeding conditions are also reported (Miller 1963, Hilty & Brown 1986, Fjeldså & Krabbe 1990, Isler & Isler 1999).

Here, I present for the first time detailed data on a nest, incubation, and nestlings in northern Ecuador, and briefly compare the nest and nesting behavior to other *Tangara* species.

METHODS

A pair of Scrub Tanager was found building a nest at Tumbaco, Pichincha province, northern Andes of Ecuador. Tumbaco is located 18 km east of Quito (00°13'S, 78°24'W, 2450 m a.s.l.). The area is characterized by gardens and small-scale croplands, with native vegetation confined to creeks and steep slopes. The climate in Tumbaco is dry, with a wetter season in October–May and a drier period in June–September.

The nest was found on 1 February 2014 when a pair was observed flying out from vegetation cover. Observations at the nest were made between 7 February–7 March 2014 from a hide 10 m away from the nesting site. Daily observations were undertaken from 06:00–09:30 h and from 16:30–18:45 h, totaling 20 observation hours. Observation periods were not standardized throughout the study period, with daily visits lasting 15–60 min.

On 7 February, the following nest measurements were taken: outer diameter, cup-rim diameter, nest height, cup depth, and height above ground. Following the nest failure, the nest was collected on 22 March. It was sun-dried for two weeks, disaggregated, and its components were weighed using a digital scale (Oxo, 0.5 g precision). Eggs were measured on a single occasion using a SPI dial plastic caliper (0.1 mm precision). Nestlings were not measured to avoid disturbing them.

RESULTS

Nest description and placement. The nest was constructed near the tip of a tangle of hanging ornamental vines (*Vinca* sp.; Apocynaceae), 2 m above ground (Fig. 1). It was an open cup supported below by three interwoven vines 2 cm in diameter. Nest measurements were: external diameter = 10 cm; external height = 8 cm; internal cup diameter = 7.5 cm; internal cup depth = 4.5 cm.

The nest was constructed with grass (Poaceae) fibers, 8.3–22.2 cm long (mean 14.2 cm; SD = 3.6 cm; n = 37), 0.3–1 cm wide; < 1 cm wide dry sticks, 4.3–16.8 cm long (mean 8.3 cm; ; SD = 2.9 cm; n = 63), some with small spines, others bare (apparently belonging to three plant species); 9.5–13.8 cm long rootlets (mean 11.7 cm; SD = 2.1 cm; n = 5); 9–66 cm long (mean 26.6 cm; SD = 18.2 cm; n = 12) green, white, and blue flexible string-like plastic fibers; pieces of dry leaf litter; lichens; moss; small, 'squarish' yellow pieces of harder plastic; seed down; spider web; and

FIG. 1. Nest and nest location of Scrub Tanager (*Tangara vitriolina*) at Tumbaco, Andean Ecuador; February 2014. Photo by the author.

mammal hair. The sun-dried nest weighed 14 g. Mass of its respective components were: 8 g of dry grass fibers; 3 g of lichens and moss; 3 g of dry sticks; < 1 g of wool, spider web, and hair; < 1 g of leaf litter; < 1 g of plastic fibers and pieces. Nest building lasted c. 8 days.

The inner structure was made mostly of interwoven grass fibers, with dry sticks and rootlets supporting the nest base and the base of the inner cup. Plastic string-like fibers were used to intertwine grass fibers and sticks, mostly in the inner structure, whereas vegetal wool, spider webs, and to a lesser extent mammal hair were used to secure nest material mostly in the inner and outer lining. Lichens were used mostly in the outer lining of the nest base and in the inner lining. Yellow plastic pieces, lichens and moss were interspersed in the inner and outer lining.

The nest was placed 15 cm from a 3.5 m tall wall that blocked sunlight from reaching the nest until c. 11:00 h, and next to a street with light to moderate traffic. Cars, buses, and

trucks passed within c. 2–4 m of the nest at speeds up to 35 km/h.

Eggs and incubation. The first egg was laid on 9 February 2014 at *c.* 11:00 h, eight days after the nest was first found. Two adult tanagers were still adding nest material when this egg was laid. A male was observed collecting seed down from a bromeliad (*Tillandsia* sp.), and a female brought a dry leaf to the nest and then settled over the single egg. The nest was inspected four times on 10 February, but the second egg was not found until 11 February.

The completed clutch consisted of two pale bluish white eggs blotched brownish to lavender, more prominent at the large end (Fig. 2). The first egg measured 22 x 12.2 mm and the second 21.9 x 12 mm.

The female began sitting on the first egg a few hours after it was laid on, even though a second egg was not laid until two days later. The female alone incubated. The male, however, remained nearby occasionally visiting the nest itself but not sitting on the eggs. During incubation bouts, the male often patrolled the nesting area uttering soft *tseep* calls or singing from perches above the nest. The male regularly joined the female when she left the nest for foraging. On several occasions, the male fed the incubating female either at the nest, next to the nest, or at an often-used perch less than 1 m from the nest.

Incubation bouts lasted 13–27 min (mean = 17.6 min; SD = 5.6 min; n = 8) from day 1–5 (since laying of second egg), and 14–45 min (mean = 22.1 min; SD = 9.0 min; n = 14) from day 6 until hatching. Off-nest bouts lasted 6–27 min (mean = 16.4 min; SD = 8.7 min; n = 7) from day 1–5 (since laying of second egg), and 8–14 min (mean = 10.8 min; SD = 2.5 min; n = 9) from day 6 until hatching. Nestlings were found on 24 and 25 February, resulting in an incubation period of 14–15 days. Presumably the first egg hatched in the early morning of 24 February, since the nest was last inspected on 23 February at 18:25 h (10 min before sunset) and first inspected on 24 February at 06:45 h (50 min after sunrise). The second egg presumably hatched in the afternoon of 24 February or before 07:30 h on 25 February. Nestlings hatched less than 24 hours apart.

Nestlings and nestling attendance. At hatching, nestlings had pink skin, with sparse sooty grey down on the upperparts and upperwings. Gapes were paler than the skin. The mouth lining color was not noted. The nestlings exhibited active begging behavior when the nest was inspected closely. At days 2–3, they had more extensive sooty grey down on their backs and upperwings (underparts were not visible), and gapes were more pinkish.

The female and male attended and fed the nestlings from day 1 through 5 after hatching, but the female made most of the feeding visits, entering the nest more frequently than the male. On three occasions during the five days of observation of nestling attendance, both birds approached the nest but only the female fed the nestlings and sat in the nest. The male remained perched next to the nest or in the nest rim, and fed the female. The female alone made seven visits during this brief observation period, whereas male alone made only three.

Brooding bouts lasted a mean of 13.5 min (range = 7–25 min; SD = 6.4 min; n = 7) and were primarily done by the female. Two visits to the nest by the male lasted 1–2 min and one brooding bout lasted 5 min. After one feeding bout, the male took away a white fecal sac. Most food items were too small for identification and many of them were regurgitated, but the female brought one small, white, pulpy fruit. Male and female were last seen brooding on 28 February.

Adult behavior. In 67% of the visits to the nest (female and male, n = 42), birds followed the

FIG. 2. One egg of a clutch of two of Scrub Tanager (*Tangara vitriolina*) found at Tumbaco, Andean Ecuador; February 2014. Photo by the author.

same route to enter the nest. They first perched on a metallic fence less than 2 m from the nest, and then they either flew directly into the nest (40% of the visits) or jumped onto other perches up to seven times before entering the nest.

Both birds were less vigilant when leaving the nest during incubation. Fifty-six percent of the times they flew directly off the nest, often perching on the nest rim before departing, and flew above the street. However, adults left the nest in another direction when attending nestlings (more cautiously getting out of the nest by 1–2 jumps and flying up and behind the wall). In 11% of the times, they departed towards a light post that was often used for foraging.

In most visits to the nest, adults remained silent but they occasionally uttered a low, soft, and rather buzzy *dzii* call. However, vocal interactions were more frequent outside the nest when both birds foraged together or perched to preen. Likewise, soft calling was also done when the male visited the nesting area and the female was brooding. The male sang from nearby perches on few occasions. One frantic vocal interaction was also observed, when both birds abruptly approached the nesting site and uttered a simultaneous jumble before leaving the area. The reason for their behavior was not determined.

Two episodes of apparent nest defense against a pair of Great Thrushes (*Turdus fuscater*) were also observed, with one member of the pair aggressively chasing the thrushes.

Nest fate. Six or seven days after hatching, the nestlings disappeared with no sign of damage to the nest, suggesting that they had been preyed upon. Heavy rains fell during the two days before the nest was found empty. Both adults continued to visit the nest three days after nest failure, but it was not reoccupied. Both adults were seen pulling nest material from the rim and inner cup of the nest three days after nest failure, and flying away with it.

DISCUSSION

Nest dimensions, materials, clutch size, eggs, incubation period, and nestlings were

generally similar to other *Tangara* species (Isler & Isler 1999, Gonzaga & Castiglioni 2006, Arcos-Torres & Solano-Ugalde 2007, Sheldon & Greeney 2007, Freeman & Greeney 2009, Gelis *et al.* 2006, Greeney *et al.* 2008, 2011), and to the general patterns exhibited by other thraupids (Hilty 2011). The nest was 5 g heavier than the nest of Black-capped Tanager (*T. heinei*), the only species for which total nest weight and weights of component materials are available (Greeney *et al.* 2008). Seed down, thin dry sticks, and plastic fibers were not previously reported as nest building material within the genus *Tangara*, but likely reflect local availability of materials. Marra (1990) indicates that Green-and-gold (*T. schrankii*) and Lesser Antillean tanagers use primarily dried leaves for nest building and lining. Dried leaves were also the predominant nest material used by a building pair of Opal-crowned Tanager (*T. callophrys*) (pers. observ.). Nest material needs further investigation (Gonzaga & Castiglioni 2006) in order to elucidate if *Tangara* species select locally available material or if it is more taxa-specific. A single exception to the simple, open cup nest known for the genus *Tangara* exists in literature. Christian (2001) describes a ball-shaped mass of dead plant material (with lateral entrance?) for the Green-naped Tanager (*T. fucosa*) but fails to indicate if the ball-shaped structure was actually constructed by the tanagers or if they were building a cup-shaped nest inside the vegetation clump.

Unlike most *Tangara* species that have their nests supported from below by horizontal substrates or vertical forks (Hilty 2011, Isler & Isler 1999), the nest of the Scrub Tanager in this study was placed near the end of a hanging vine tangle, recalling descriptions of *Tangara* nests placed in hanging epiphyte clumps (e.g., Rufous-throated (*T. rufigula*) and Golden (*T. arthus*) tanagers; Hilty 2011, Isler & Isler 1999). Nonetheless, it differs from a Scrub Tanager nest reported near the end of a branch, which lacks further details (Hilty 2011). The nest was well concealed from nearly all directions, as described for other Andean *Tangara* members (Hilty 2011).

As is reported for other *Tangara*, the female alone incubated the eggs, fed nestlings more frequently than the male, and the male fed the female at the nest or nearby (Skutch 1954, Hilty 2011). Both eggs of the Scrub Tanager were apparently laid in the early morning, 48 hours apart, unlike consecutive day's laying reported by Skutch (1954) for Silver-throated (*T. icterocephala*), Speckled (*T. guttata*), Bay-headed (*T. gyrola*), and Golden-hooded (*T. larvata*) tanagers in Costa Rica, but similar to a single nest studied by Greeney *et al.* (2008) for the Black-capped Tanager. The nestlings, however, hatched on consecutive days, suggesting that the incubation began on the day prior to clutch completion.

Snakes and larger birds are presumed to be the major predators when there are no signs of damage to the nest (Skutch 1985). Potential predators of Scrub Tanager nestlings in the study area include Great Thrush, Tropical Mockingbird (*Mimus gilvus*), American Kestrel (*Falco sparverius*), and snakes (five species reported in the area; Yánez-Muñoz *et al.* 2009). Potential mammalian predators (which usually damage nests) include rats, cats, and opossums. Remarkably, the Great Thrush is a major nest predator in the Papallacta region of northeast Ecuador (H. F. Greeney, pers. comm.), and at high elevations in Peru (G. Londoño, pers. comm.). The nest was not reoccupied after failure, despite the frequent reuse of nests reported by other *Tangara* species (Isler & Isler 1999), regardless of nest fate (Skutch 1954, Hilty 2011).

There is little knowledge about the basic breeding biology of *Tangara* tanagers, and the scant information available has been generated at very few sites (Hilty 2011). There are nest descriptions or breeding information for 42 out of 56 *Tangara* species, but most are

anecdotal observations of one or a few nests during a single breeding season (Hilty 2011). Knowledge about most Andean (Greeney & Nunnery 2006, Arcos-Torres & Solano-Ugalde 2007) and Amazonian species (van Houtan & Álvarez-Loayza 2006) is very scarce hindering our understanding of breeding seasonality, reproductive biology, and evolutionary implications. Some behavioral traits seemingly vary across *Tangara* species, like the participation of nest helpers (Long & Heath 1994, Gelis *et al.* 2006), reoccupation of nests and consecutive clutches, male participation in breeding duties, and incubation constancy by females. Only with additional data will these traits be better understood.

ACKNOWLEDGEMENTS

Thanks are due to Emilia, Martín and Bernardo Ullauri for help inspecting the nest for first time. Alejandro Solano provided insightful suggestions for studying the nest. Thanks to Diego Cisneros, Jorge Valencia, Gustavo Londoño, and Harold Greeney for sharing unpublished data. This manuscript benefited from comments by Harold Greeney, Steve Hilty, and two anonymous reviewers.

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