

Notes on the nest architecture and nesting biology of Black-capped Tanager (*Tangara heinei*) in northeastern Ecuador

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Abstract

Several brief accounts of the nesting biology of the Black-capped Tanager (*Tangara heinei*) have been published, most of them from Ecuador. Despite this, little is known of the specifics of nesting biology and nest architecture. Here we describe building behavior, nesting seasonality, and the details of nest architecture of the Black-capped Tanager in eastern Ecuador.

Key words: Black-capped Tanager, eggs, nest architecture, nest components, nest placement, *Tangara heinei*, waterloss.

Resumen

Existen varias descripciones de la biología de anidación del Tangara Gorrinegra (*Tangara heinei*), la mayoría provenientes de Ecuador. Aún así, no conocemos mucho sobre los detalles del comportamiento de adultos o la arquitectura de los nidos. Aquí describimos el comportamiento de los adultos durante la construcción, patrones estacionales de anidación, y los detalles de la arquitectura del nido de la Tangara Gorrinegra en el este de Ecuador.

Palabras clave: arquitectura del nido, componentes del nido, huevos, Tangara Gorrinegra, *Tangara heinei*, ubicación de nidos, pérdida de agua de huevos.

The Black-capped Tanager (*Tangara heinei*) is a monotypic species distributed from Venezuela to northern Ecuador (Isler & Isler 1999). It inhabits elevations from 1000 to 2700 m, and is frequently associated with forest disturbance, including natural forest openings and human-disturbed second growth (Hilty & Brown 1986, Isler & Isler 1999, Ridgely & Greenfield 2001). Despite being fairly common and widespread, little is known of its breeding biology. Hilty and Brown (1986) described a “grassy cup decorated with moss” from Colombia, and eggs from Colombia were described as pale greenish-white or dull blue with brown, grey, and lilac markings (Sclater & Salvin 1879, Ogilvie-Grant 1912, Hilty & Brown 1986). Ewert (1975) observed a pair during nest building and noted that, while only the female brought material, “both sexes participated in forming the nest”. More recently, several authors have described nests and eggs from western Ecuador (Greeney & Nunnery 2006, Arcos-Torres & Solano-Ugalde 2007). Here we present observations from north-eastern Ecuador on nest architecture, behavior during nest construction, and egg morphology.

We made all observations at Yanayacu Biological Station and Center for Creative Studies (00°36 S, 77°53 W, 2100 m), located 5 km west of Cosanga, adjacent to Cabañas San Isidro, Napo Province, Ecuador.

Behavior during nest construction. Using a video camera placed 10 m from the nest, we recorded adult behavior for the three days prior to laying of the first egg. At the time we began filming, the basic nest-cup structure was fairly well formed, but still weak and thin-walled. We recorded behaviors at the nest from 05:45 h to 18:15 h daily, for three full days. In general, during the observation period, which began initial formation of the cup, there was one behavior which the female used repeatedly to shape the cup. She would press her belly and breast down into the cup, with her rump slightly elevated and her wings slightly raised upward and backward so that the tips met across her rump. Once in this position, she would vibrate her entire body, stand and rotate slightly, then repeat the vibration. Often she would grab bits of stray material from the rim and tuck them under her breast before repeating the vibration. We

have seen similar “press and vibrate” behavior during cup shaping in other passerine genera (e.g., *Catharus*, *Turdus*, *Grallaricula*; HFG unpubl.). Otherwise, upon arrival at the nest with material, she would simply drop it into the cup. The only exceptions to this were the few times she arrived carrying a spider egg sac (probably family Theridiidae). On these occasions she entered the nest and reached out to the edge of the cup, repeatedly wiping her bill across the rim while holding the egg sac. After a portion of the web had caught on the rim, she would drag it along the rim, turning slowly and repeating this maneuver until the silk of the egg sac had been spread out across the rim, nearby branches, and the outside of the nest. Spider webs were likely used to fortify attachment points and maintain loose material in the rim and on the outside of the nest. While I did not observe the nest early in construction, presumably webs were used more frequently while nest materials were first being secured to the substrate.

While the male only visited the nest on four occasions during the three days before laying of the first egg, we observed him foraging with the female while she gathered material, and returning to the area around the nest, singing while she went to the nest. On one occasion the male arrived at the nest after the female, fed her, and then copulated with her. We never observed the male

bring material or contribute to construction of the nest in any way.

Eggs and egg laying. Complete clutches consisted of two eggs at five nests. At two nests the eggs were laid roughly 24 h apart. At the depredated nest described below (see Seasonality and nesting success), eggs were laid 48 h apart, but this may have been due to the disturbance caused by loss of the first egg. Incubation at one nest lasted 14 or 15 days, and at a second nest, eggs hatched after 14 days.

We measured six eggs at Yanayacu which ranged from 19.8 to 22.9 mm long by 14.0 to 15.4 mm wide (mean \pm SD = 21.4 \pm 1.4 by 14.7 \pm 0.6 mm). All were similar to those described from the west slope of Ecuador (Greeney & Nunnery 2006, Arcos-Torres & Solano-Ugalde 2007); pale blue or greenish with cinnamon speckling heaviest at the larger end. Fresh weight (before visible development) of four eggs ranged from 2.16 to 2.42 g (mean \pm SD = 2.30 \pm 0.13 g). Two eggs of the same clutch, weighed the day the second was laid and again two days later, lost mass (mass loss = waterloss; Ar & Rahn 1980) at a rate of 0.88 and 0.63% per day, respectively. Two eggs of the same clutch, weighed three days apart during the middle of incubation, both lost mass at a rate of 1.16% per day.



Fig. 1. Nest and eggs of Black-capped Tanager in February 2007, Yanayacu Biological Station, Napo, Ecuador. Note that the red spot visible on the most distant egg was put there by the observers (Photo: H. F. Greeney).

Nests. Nests (n = 9) ranged in height from 1.2 to 8 m above the ground (mean \pm SD = 2.5 \pm 2.1 m). All except one, however, were below 2.6 m. Three nests were built in *Chusquea scandens* (Poaceae), two in *Baccaris* sp. (Asteraceae), two in *Alnus acuminata* (Betulaceae), one in *Tibouchina lepidota* (Melastomataceae), and one in *Solanum* sp. (Solanaceae). All nests were in areas of human disturbance, particularly overgrown pastures and along road cuts. Most nests were supported by at least three crossing or forking stems, usually where several bamboo (*Chusquea*) shoots crossed, or a small sapling forked into several branches. One was built on a single bamboo shoot at the point where over 40 leaves budded from the stem, and was supported by the many petioles of these leaves.

Nests were fairly neat cups built generally of lichens, dark and pale fibers, and dicot leaves, held together and attached to the substrate with spider webs (Fig. 1). Mean measurements (cm \pm SD) for three nests were: outside nest width, 9.2 \pm 0.3; outside nest height, 7.0 \pm 1.0; inner cup diameter, 5.8 \pm 0.3; inner cup depth, 3.8 \pm 0.3. We dried four nests (collected in 2001, 2002, 2006, and 2007), took them apart, and weighed the various components. We separated out the bulk of the nest cup (Fig. 2) from the lining (Fig. 3) and considered their composition separately. The mean (\pm SD) total weight of

nests was 8.7 \pm 1.3 g (range = 7.2-10.3 g). On average, the lining portion of the nest represented 14.8 \pm 5.5% of each nest. The mean composition (% \pm SD) of outer nest cups was: lichen 56 \pm 14; pale rootlets 19 \pm 5; moss 15 \pm 11; bamboo leaves 4 \pm 4; sticks and bark 3 \pm 3; dark rootlets 1 \pm 1; dicot leaves 1 \pm 1; spider silk & seed down 1 \pm 0.5. Mean lining composition (% \pm SD) was: lichen 31 \pm 11; pale rootlets 25 \pm 6; dark rootlets 20 \pm 13; grass strips 19 \pm 10; animal fur 5 \pm 9. Only one of the nests, however, used animal fur (18%), this one being located near a human dwelling where copious amounts of dog hair were available.

Seasonality and nesting success. Three nests had fledged in early February, mid-March, and late April, respectively. Another nest, where hatching date was known by estimating a 14 day incubation period (see above), had its clutch completed in early March. Other records include a nest under construction in mid-January and one with incubation underway at the end of April. Nests already containing nestlings (always 2 nestlings) were found in mid-March (2), early April (1), and mid-May (1). We observed fledglings in both late February and early July. These records suggest that nesting in our area lasts from January to June, with peak activity in March and April.

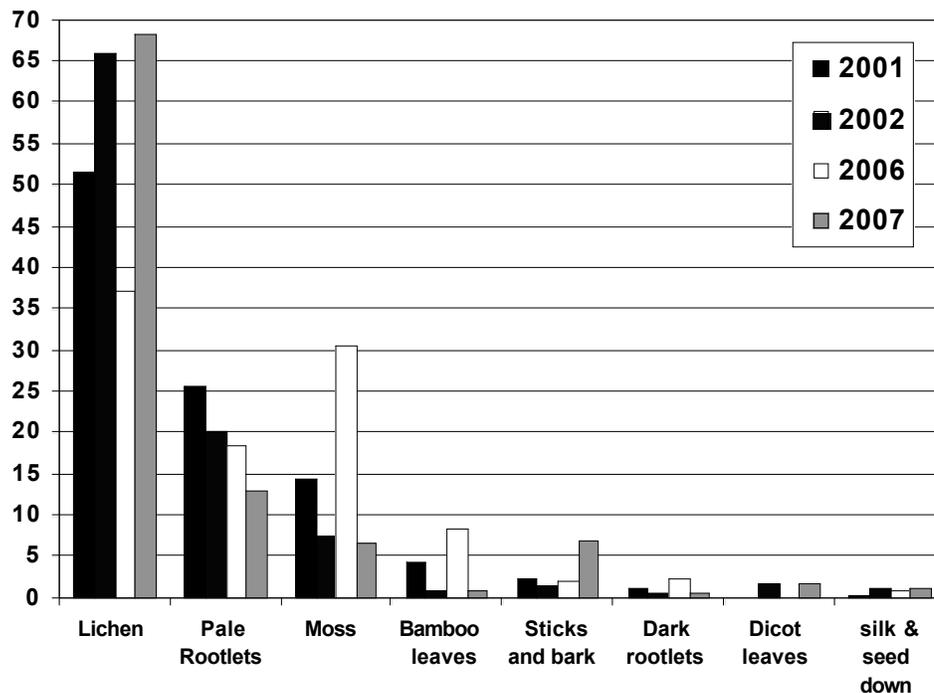


Fig. 2. Components of the outer nest structure of four Black-capped Tanager nests at the Yanayacu Biological Station, Napo, Ecuador. Percent of the total weight of outer structure is shown on the left.

Of seven nests where we were able to ascertain the outcome, only two (29%) fledged. One was abandoned during building, and another one was found covered in the blood and feathers of the two nestlings. The outcomes of the remaining nests are all worthy of further explanation. At two nests, the nestlings were abandoned by the adults. The first time this was observed, it was on the day of hatching. Later that day we observed both

adults around the nest area. At the second nest, nestlings were allowed to get thoroughly soaked during a rainstorm eight days after hatching. Later that day, only the female returned to the nest where she spent the night brooding the nestlings. Both nestlings were dead by the following morning, though both male and female visited the nest several times that day, attempting to feed.

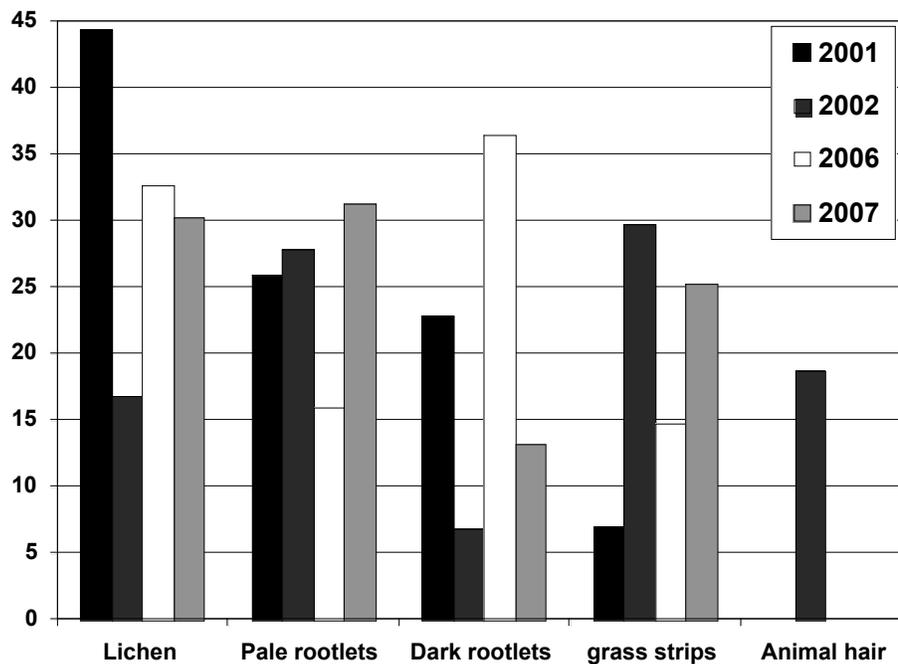


Fig. 3. Components of the inner nest lining of four Black-capped Tanager nests at the Yanayacu Biological Station, Napo, Ecuador. Percent of the total weight of the lining is shown on the left.

At a third nest, on the day after the first egg was laid (eggs 48 h apart), an Azara’s Spinetail (*Synallaxis azarae*) approached the nest while there was no adult tanager present. After peering into the cup for several seconds, it began pecking at the egg. After having pecked a large hole in the egg, it picked it up and dropped it over the edge of the nest. Upon her return, the female tanager consumed remains of the shell and yolk on the nest rim, sat in the nest for a short period, then left. The following morning, she laid her second egg, which was found several hours later, pecked open in the nest. Interestingly, the same day that the first egg was destroyed, we filmed an Azara’s Spinetail nest (with two eggs) only 10 m from the tanager nest. Tapes from the spinetail nest showed an adult Azara’s Spinetail entering the spinetail nest and rolling both eggs out of the entrance onto the ground.

Conclusions

Too few data are available to accurately assess nesting seasonality for Black-capped Tanager throughout Ecuador. Freile (2004) mentions an active nest in the Imbabura province in June, Greeney & Nunnery (2006) report breeding activity in December from western Pichincha province, while Arcos-Torres & Solano-Ugalde (2007) observed two nests active in June and July, also in Pichincha. Because Hilty & Brown (1989) report breeding activity for this species nearly year-round in Colombia, we suspect this is also true of Black-capped Tanagers in Ecuador, at least at a country-wide scale. Birds at Yanayacu, however, show a distinct preference for nesting during the rainier months (see Greeney et al. 2006 for a site description), and we believe further records will reveal this species’

preference for breeding during wetter periods across their distribution. Indeed, the records of breeding from western Ecuador (Greeney & Nunnery 2006) are also from rainier months. Ewert (1975) mentioned that a male Black-capped Tanager accompanied the female to the nest, helping to arrange material, but not bringing any material himself. More recently, Freile (2004) reported an active nest where both adults were bringing material. During our observations at Yanayacu we never observed males participating in nest building. We suggest that more observations on this aspect of nesting biology would be particularly useful in the future to elucidate the respective roles of the sexes in nest construction.

Unlike the described nests of most *Tangara* spp. (Isler & Isler 1999), there was little moss in most nests of the Black-capped Tanager. The minimal amount of moss in most of the nests was probably accidental, carried in while attached to other materials. In fact, nests with more moss in them tended to include sticks and lichens taken from mossier areas. Those nests described from western Ecuador, however, (Arcos-Torres &

Solano-Ugalde 2007) appear to have moss than those examined in our study. Detailed comparisons of nest components, across a wide geographic area, may reveal interesting patterns. Based on these, and observations on other *Tangara* spp., we suspect that differences in nest architecture and nest site selection may be a phylogenetically informative character within this genus. We urge others to describe further nests in detail to make these data available for comparison.

Acknowledgments

John V. and the late Ruth Ann Moore, as well as Matt Kaplan, have generously supported our ornithological field work through donations to the Population Biology Foundation. For tireless assistance in the field we thank E. Hannelly, E. Miller, & J. Simbaña. We gratefully acknowledge the ongoing support of the PBNHS, they remain our constant inspiration in a world gone mad. This is publication number 119 of the Yanayacu Natural History Research Group.

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