

First description of the nest and notes on parental care of Oustalet's Tyrannulet, *Phylloscartes oustaleti* (Passeriformes: Tyrannidae)

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ABSTRACT: A nest of *Phylloscartes oustaleti* (Sclater, 1887), collected in the state of Santa Catarina, southern Brazil, is described as an ovoid structure with a dome-shaped lateral entrance supported laterally by thin twigs of a shrub. Building material was slender plant fiber interwoven with strands of live moss, which was growing also on twigs around the nest, thus serving to camouflage it. Egg cup was lined by silky material, probably seed down. This nest was found on 13 December 2007 when an adult was spotted carrying food to the nest, located 2.3 m above ground on the edge of secondary forest. Only arthropods were identified in the provisioned food, including mainly insects, but also spiders. General features of this nest conform to those of the few other species of the genus whose nests are known. Available records of Oustalet's Tyrannulet nests are consistent with the previously postulated September to December breeding season for the species, although one record of a bird carrying nest material in early August suggests the breeding season may extend earlier. Detailed nest descriptions are needed from a larger number of species before intra- and interspecific variation in nesting can be adequately appreciated in evolutionary or purely taxonomic contexts in this genus.

KEY-WORDS: Atlantic Forest, breeding, *Pogonotriccus*, systematics, taxonomy.

Phylloscartes oustaleti (Sclater, 1887) is a small bird (12 cm, 8 g) endemic to the Atlantic Forest in eastern Brazil, ranging from southern Bahia to eastern Santa Catarina, where it occurs in humid tropical and upper tropical forests, usually foraging with mixed-species flocks in canopy and subcanopy (Fitzpatrick 2004). In the absence of a comprehensive phylogenetic analysis to allow a proper delimitation of the genus *Phylloscartes*, it has been treated as consisting of 15–23 species, with different authors including or not species of other related genera (Fitzpatrick 2004, Ridgely & Tudor 2009, Clements *et al.* 2015). The nests of thirteen of these species are known, but only some of them have been described, in varying levels of detail (taxonomy following Clements *et al.* 2015): Marble-faced Bristle-tyrant *P. ophthalmicus* (Taczanowski, 1874), Spectacled Bristle-tyrant *P. orbitalis* (Cabanis, 1873), Southern Bristle-tyrant *P. eximius* (Temminck, 1822), Mottle-cheeked Tyrannulet *P. ventralis* (Temminck, 1824), Restinga Tyrannulet *P. kroniei* Willis & Oniki, 1992, Bahia Tyrannulet *P. beckeri* Gonzaga & Pacheco, 1995, Olive-green Tyrannulet *P.*

virescens Todd, 1925, Alagoas (Long-tailed) Tyrannulet *P. ceciliae* Teixeira, 1987, Cinnamon-faced Tyrannulet *P. parkeri* Fitzpatrick & Stotz, 1997, Minas Gerais Tyrannulet *P. roquettei* Sneath, 1928, Oustalet's Tyrannulet *P. oustaleti*, and Serra do Mar Tyrannulet *P. difficilis* (Ihering & Ihering, 1907), and Bay-ringed Tyrannulet *P. sylviolus* (Cabanis & Heine, 1859) (see Kirwan *et al.* 2010, Lombardi *et al.* 2010, Londoño 2014, Crozariol 2016).

Here we provide the description and report observations of an Oustalet's Tyrannulet nest discovered in a privately owned resort near Salto do Pirai, 18 km from Joinville, in the state of Santa Catarina, southern Brazil. Geographic coordinates taken at nest location, with a GPS receiver, were 26°17'20.8"S; 49°00'37.6"W (Datum WGS 84); elevation was 200 m a.s.l.

Nest location and dates: The nest was discovered at 16:10 h (BRST) on 13 December 2007, when L.P.G. spotted an adult carrying food to the nest. It was situated at the edge of tall secondary forest, about 2.5 m from a trail that is intensively used during sunny weekends by

people heading to waterfalls nearby (Figure 1A). At the nest location, this hiking path was cut into the ravine slope *c.* 50 m above the river. The nest was supported by thin twigs of a shrub growing on the bank by the trail side. The nest was 2.3 m above ground (at the trail level), and the vertical and horizontal distances from the bottom and left side of nest to the sloped ground (at the adjacent

bank) were 1.1 m and 0.5 m, respectively. The nest was collected by V.Q.P. two weeks later, when it was empty, and deposited at the Museu de Zoologia da Universidade de São Paulo (MZUSP 2282). Measurements were taken (with calipers) by L.P.G. on 12 February 2008, when he noticed the nest was “slightly compressed antero-posteriorly, possibly due to storage position”.



FIGURE 1. (A) Location (white circle) of the nest of Oustalet's Tyrannulet (*Phylloscartes oustaleti*) in the shade of Atlantic Forest trailside understory near Salto do Pirai, Joinville, Santa Catarina state, Brazil. (B) Entrance view of the enclosed nest camouflaged by green moss and dry leaves. (C) Adult Oustalet's Tyrannulet sitting on a favored perch (a dry leaf petiole of a tree fern) before delivering a male katydid to nestlings. Photo: C. Ozanick.

Nest description: the nest was a closed structure, with a dome-shaped lateral entrance situated slightly above the vertical midpoint of the nest opening directly into the nest chamber (Figure 2). The nest wall was thin, constructed mainly of very slender (*c.* 0.1 mm thick) light straw-colored plant fibers interwoven with strands of live moss. These moss strands were spread loosely around the nest between supporting twigs and also hung below the nest together with some dry leaves, forming an appendage-like structure *c.* 30 cm long and giving the whole a general appearance of a natural, unkempt mass of epiphytes (Figure 1B). Some light straw-colored dry plant material stands below the entrance and is the most exposed part of the nest. The incubatory chamber (below entrance level) was lined with soft, beige, silky cotton-

like material, probably seed down. When the nest was collected, this lining was swollen and filled the entire nest cavity below its entrance, perhaps due to expansion after being soaked by recent rainfall.

The nest was supported laterally by three twigs stemming from two branches (Figure 2). Two of these twigs, forming a fork, were attached to the nest entrance. The slenderer one (2 mm thick; Figure 2 t3) was parallel to ground and firmly tied with many fibers to the bottom edge of the entrance, forming its doorsill; the other (5 mm thick; Figure 2 t1) was attached to the left and upper margins of the entrance with only a few fibers, thus being almost entirely exposed. Another twig (2 mm thick; Figure 2 t4), stemming from the same branch, was situated several cm below the nest without touching it. The third

supporting twig (2 mm thick; Figure 2 t2) originated from an independent branch and intersected the nest wall at two points 5 cm apart, passing horizontally through the nest near the top of the chamber.

Parental behavior: we observed the nest with binoculars and a spotting scope for about 6 h from 16:35 h to 19:10 h on the day of discovery and from 05:30 h to 08:43 h on the following day. During this period, we recorded (1) the frequency of adult visits to the nest, (2) the types and relative size of food items delivered to nestlings, and (3) adult behavior. We did not use a blind to observe activity at the nest, and despite our presence only *c.* 6 m (occasionally less) from the nest, the adult continued to regularly attend it. To avoid disturbing the nestlings or damaging the nest, we did not attempt to see or count nestlings or inspect the nest more closely.

Only one adult at a time was ever observed at the nest. Because sexes are alike in this species, we were unable to know the sex of the bird attending the nest or to verify the presence of a second adult. An adult usually arrived silently with a food item and spent some time at one of a few favored perches within *c.* 2 m of the nest (always facing its entrance side) before flying straight into the nest. Most often (69%), time spent waiting at the perch was < 30 s (range 5–270, mean = 37.4, *n* = 29), and only on four occasions 60 s or more. Adult remained inside the nest very briefly, apparently only long enough to feed young and collect fecal sacs. We never observed the adult perching on the outside of the nest, either for delivering food or to collect fecal sacs. No brooding

was evident during our observations. The adult usually vocalized only after leaving the nest (17 times, *vs.* 5 times upon arrival), while flying away across or along the trail toward the stream valley, but sometimes it stayed foraging and eventually vocalized on the canopy of treelets situated on the nest vicinity. The only occasion when the adult vocalized more continuously, for *c.* 2 min., was during the early morning of the second day after mobbing a female White-shouldered Fire-eye *Pyriglena leucoptera* (Vieillot, 1818; *Thamnophilidae*) *c.* 1 m from the nest, having apparently remained alarmed with the continued presence of this antbird nearby.

Feeding visits to the nest occurred at an average rate of 9.3/h, and were about 2.3 times more frequent during the morning (12.4/h) than during the previous afternoon (5.4/h; *n* = 54). At no time did we hear begging calls. All of the large and conspicuous prey items we were able to identify in the provisioned food (*n* = 18) were arthropods (Figure 1C). These included three adult lepidopterans, two lepidopteran larvae (caterpillars) (*Lepidoptera*), three adult flies (*Diptera*) (including one horsefly: *Tabanidae*), two cockroaches (*Blattaria*), two katydids (*Ensifera: Tettigoniidae*), one praying mantis (*Mantodea*), one cicada (*Hemiptera: Cicadidae*), one stink bug (*Hemiptera: Pentatomidae*), one longhorn beetle (*Coleoptera: Cerambycidae*), and two spiders (*Araneae*). Fecal sacs were removed at an average rate of 2.1/h, almost four times more often in the morning (3.1/h) than in the previous afternoon (0.8/h; *n* = 12).

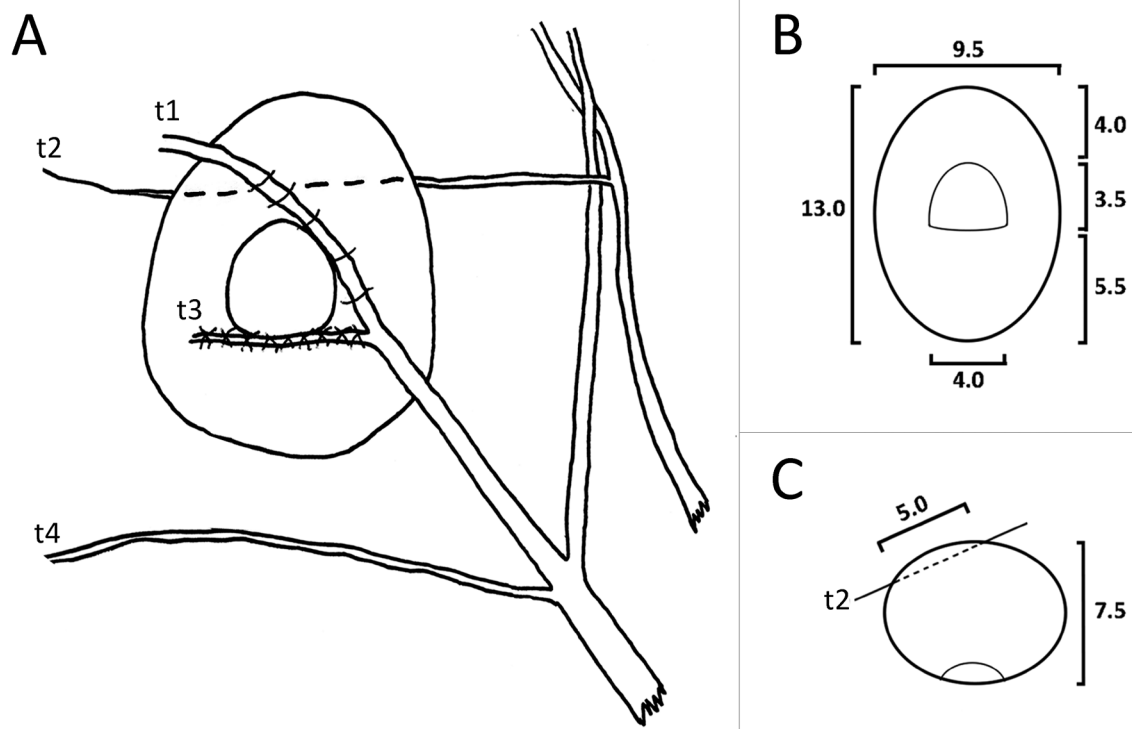


FIGURE 2. (A) Attachment to substrate and (B–C) External measurements (cm) of the nest of Oustalet's Tyrannulet. A, B – entrance view; C – top view; t1–t4 – twigs. Drawing: Juliana Machado.

In addition to the detailed nest description and associated observations presented above (among them what seem to be the first specific data on the diet of this species, which has been recorded only as “arthropods”: Fitzpatrick 2004), a limited amount of information on the nesting of Oustalet's Tyrannulet is available from other sources. Another nest of Oustalet's Tyrannulet was discovered by C.E.C. on 7 December 1986 in forest edge habitat at Augusto Ruschi (then Nova Lombardia) Biological Reserve (c. 19°50'S; 40°33'W; 900 m a.s.l.) in Espírito Santo state, southeastern Brazil. It was also a closed structure, placed c. 4 m above ground amidst a clump of dead leaves wrapped around twigs of a small tree. The nest appeared to be made mostly of green material (possibly live moss), which contrasted with the surrounding brown dry leaves. Two adults were foraging in the foliage around nest site when one of them, without carrying any food or building material, entered the nest, thus leading to its discovery. The nest location precluded a closer inspection at the occasion, and a big treefall at nest site precluded its collection when C.E.C. returned one month later, so that no further details on its shape and attachment became available. A third nest of the species, discovered in Espírito Santo by F. Costa in October 2010 (image available at <http://www.wikiaves.com/223181>), was also a closed structure with a lateral entrance, made of straw-colored fibers interwoven with live moss.

All these three nest records of Oustalet's Tyrannulet are consistent with the previously postulated September to December breeding season for the species (Fitzpatrick 2004). However, a bird photographed by F. Costa (image available at <http://www.wikiaves.com/178584>) carrying nest material in early August in Espírito Santo state suggests the breeding season may extend earlier. Two additional records of birds of this species carrying nest material are from November, in Espírito Santo and Paraná states (images available at <http://www.wikiaves.com.br/1519229> and <http://www.wikiaves.com.br/1154692>). This timing follows the general pattern of breeding bird activity occurring mostly during spring and early summer in southeastern Brazil (Euler 1900, Davis 1945, Marini & Durães 2001).

The general form and attachment of the nest of *P. oustaleti* agree with those found in the few other species of *Phylloscartes* whose nests are known. All these species construct closed structures with lateral entrances, and most of them include live moss as building material and have nests firmly attached to substrate instead of pensive (see Kirwan *et al.* 2010, Londoño 2014). Given its architecture, measurements and way of attachment, the Oustalet's Tyrannulet nest described here conforms to the closed/ovoid/lateral type of Simon & Pacheco (2005). Although the form of nests in this genus has usually been identified as “globular” (*e.g.*, Kirwan *et al.* 2010), strict

adherence to the classification scheme proposed by Simon & Pacheco (2005) in this case leaves no doubt that it is better to include the nest described here in their variant “ovoid”, in which “the length is up to twice the width”, and not with external diameters approximately identical as in their “globular” type. Since the vast majority of available descriptions lack any measurements, we predict that other species in this genus may also be found to build ovoid nests as more information becomes available or when existing information is reviewed. We concur with Kirwan *et al.* (2010) in their encouragement of nest finders and describers to use the system proposed by Simon & Pacheco (2005), as a way to render comparisons more objective across taxonomic levels. However, some features of nests that are required for such standardized descriptions cannot be assessed by photographs only, so we recommend that in addition to clear photographs and detailed field notes, nests be collected and deposited into museum collections whenever possible, in which we also concur with Russel *et al.* (2013).

The potential importance of nest architecture and other features related to breeding behavior in the understanding of phylogenetic relations among tyrant flycatchers (and other bird families) has been claimed by many authors along time (*e.g.*, Lanyon 1984, 1988, Kirwan *et al.* 2010, Crozariol 2016). Unfortunately, current knowledge is still unsatisfactory to be of any help in solving the puzzle of relationships among the members of *Phylloscartes* and related genera. Clearly, nest descriptions are needed in greater detail from a larger number of species before any intra- or interspecific variation can be adequately appreciated in evolutionary or even purely taxonomic contexts, because homoplastic and symplesiomorphic features may be a considerable source of noise. But not only data on nesting are scarce: existing DNA-based phylogenies of tyrant flycatchers have included barely a few species of this group (*e.g.*, Tello *et al.* 2009). Consequently, not even a preliminary understanding of the possible phylogenetic signal in the few known nesting features is possible at this systematic level. However, as molecular techniques have recently advanced many times faster than even the rapidly growing number of field ornithologists in the Neotropics, we expect this gap can be filled as soon as the attention of molecular phylogeneticists is focused on this particular group of birds, so that we can speed up learning on the evolution of their nesting habits.

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