

Description of the nest and notes on the breeding behaviour of Brassy-breasted Tanager *Tangara desmaresti*

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O ninho de *Tangara desmaresti* é descrito pela primeira vez em detalhe, a partir de dois ninhos em forma de tijela coletados no Maciço do Itatiaia, estado do Rio de Janeiro, em fevereiro de 2001 e janeiro de 2003. A observação na natureza de um desses ninhos, contendo dois ninhegos, e de um terceiro ninho, encontrado em janeiro de 2002 na Serra do Caraça, Minas Gerais, permitiu reunir informações sobre o comportamento parental e de construção do ninho, bem como sobre o alimento oferecido à prole por dois adultos: artrópodes, principalmente formas não aladas, e sementes. A construção foi feita por uma suposta fêmea com a ajuda de um suposto macho, que também levou material para o ninho. Musgo verde foi usado apenas externamente, sendo folhas secas de bambu e raques de folhas compostas o principal material encontrado na estrutura dos ninhos. Estes continham também teias de aranha e eram forrados com pedaços de líquen e rizomorfos de *Marasmius* spp. (crina vegetal). Sugere-se que o uso de musgo e folhas de bambu em ninhos de outras espécies do gênero seja estudado mais detalhadamente.

The genus *Tangara* is the largest among Neotropical birds^{1,6}, comprising c.50 species that occur in a wide variety of habitats from sea level to high mountains over tropical America⁶. One of the many species whose breeding biology is unknown is Brassy-breasted Tanager *T. desmaresti*, an Atlantic Forest endemic restricted to south-east Brazil, from montane Espírito Santo, Minas Gerais and Rio de Janeiro south to Santa Catarina; in several areas it occurs with Gilt-edged Tanager *T. cyanoventris*, which is largely sympatric^{6,13}. *T. desmaresti* inhabits the canopy of forest, forest edge, second growth and plantations, with records up to 2,200 m, but mostly from 800–1,800 m⁶. It is usually the most frequently seen *Tangara* in some extensively forested protected areas within this altitudinal range, e.g. Serra dos Órgãos National Park and Itatiaia National Park (pers. obs.).

A published reference to the nest of *T. desmaresti* as a deep, well-lined cup at the tip of a branch, for example in an *Araucaria* tree (Sick¹¹ quoted by Isler & Isler⁶ and repeated in Sick^{12,13}), is a generalisation concerning the nest of 'sairas', *Tangara* spp.¹¹, *T. desmaresti* being mentioned just as an example. In addition, there is an account of its breeding in captivity¹⁵, but we are unaware of any detailed description of the nest, nest site or breeding behaviour of *T. desmaresti* in the wild. Here we report observations of three nests of *T. desmaresti*, describing two of these and supplying notes on nest building, nestlings and parental behaviour.

Nest locations and dates

The two nests described below were found in the Itatiaia massif, Rio de Janeiro state; these have been deposited in the collection of the Museu de Zoologia da Universidade de São Paulo (MZUSP). A

third nest was observed in the Serra do Caraça, Minas Gerais state.

The first nest (number 1) was discovered on 27 February 2001 containing two nestlings that were being fed by adults (Fig. 1), and was observed from 07h50 to 13h50 with binoculars and a spotting scope. On the following day the nestlings were found dead and were collected, together with the nest (MZUSP 2271). The nest was at the Vale Verde joint property (22°23'S 44°34'W; 1,000 m), Serrinha do Alambari, municipality of Resende. It was placed 2.24 m above ground in a 3.5-m cultivated guava tree (*Psidium guajava*, Myrtaceae), in a large cleared area with a summer house and many isolated trees, c.30 m from the edge of forest on the slope down to the rio Santo Antonio.

A second nest (number 2) was located on 5 January 2003 in an advanced stage of construction, when a bird was seen (through binoculars) bringing small pieces of moss and sitting on the nest; on 26 January 2003 we returned and collected the nest (MZUSP 2270), which was empty and had the lining slightly removed. This nest was at the Pousada na Colina, Vale do Pavão (22°20'S 44°34'W; 1,130 m), municipality of Itatiaia. It was 9 m above ground at a branched node of an 11-m cultivated bamboo, part of a living fence at the property limit (Fig. 2). The culm of this bamboo had a diameter of 8 cm at 40 cm above ground, and 3.5 cm beside the nest.

The third nest (number 3) was also in an advanced stage of construction when it was located on 3 January 2002, and was observed for one hour with binoculars. This nest was in the forested part of the trail to Tanque Grande (c.1,250 m) within the Reserva Particular do Patrimônio Natural do Caraça (20°05'S 43°28'W), municipality of Catas Altas (see Vasconcelos & Melo Júnior¹⁶). It was cup-

shaped and placed c.5 m above ground, partially hidden at a branched node of a small-leaved native bamboo (probably *Chusquea* sp.), within dense growth at the forest edge. The nest was in a culm that was almost horizontal (inclination c.30°), above which there was no foliage, the canopy being in general quite discontinuous along this trail. Two individuals were seen carrying material to the nest, sometimes simultaneously. Whether they arrived at the same time or not, one bird deposited the material in the nest and departed quickly, whilst the other remained, sitting inside nest, as if shaping it. Building activity was not evenly distributed, with alternating periods of intensive work and periods when the nest was left unattended. Material brought to the nest included dry bamboo leaves, small toothpick-like (bamboo?) sticks, a rusty-coloured rootlet, and small pieces of a foliaceous lichen which appeared whitish on one side and black on the other.

Description of the nests

Nest 1 was a deep, thick-walled cup placed in a complex vertical embranchment of the tree, involving five twigs to which the nest was directly attached. These twigs originated from two adjacent crotches 5 cm apart, situated c.4 cm below the bottom of the nest. One of these crotches contributed only one twig, c.2 mm thick, as a lateral support to the nest. This twig was almost entirely visible, with only a few fibres from the border of the cup embracing it. Three of the other four twigs, 2–4 mm thick, were deeply merged into the nest walls, whilst the fourth, c.4 mm thick, was more exposed. Most twigs were leaved and one of them bore three small unripe fruits. One leaf, c.10 cm long and 6 cm wide, still attached to the tree, was trapped in a horizontal position between the nest and one of the supporting twigs, thus hiding part of the nest wall from side view.

The nest walls were composed primarily of large strips of dry bamboo leaves and reddish-brown rachises of compound leaves. These rachises were concentrated around the border of the cup, together with thin strips of bamboo leaves, less than 1 mm thick. The egg chamber was lined with black fungal rhizomorphs ('vegetable horsehair', *Marasmius* spp., see Sick¹⁰) and a few pieces of a pale greyish-green foliaceous lichen. Externally the nest was decorated with green moss, from just below the border to the bottom. In addition, at least six small (c.6 mm) hemispherical white silk spider cocoons were placed at several points of the nest. The outer diameter of the nest was 9 × 8 cm (measured at orthogonal angles). The inner diameter (i.e. the rim of the egg chamber) was 5.5 cm. The egg chamber depth was 3.5 cm and the external nest height was 7 cm.

Nest 2 (Fig. 3) had the same shape and nearly the same size as nest 1. Its side was placed against the bamboo culm and its base was supported by and partially interwoven to the branches growing on the node below it. The bamboo was inclined at an angle of 65° above the plane of the nest border, but not over it. The walls of the nest were constructed of large strips of dry bamboo leaves and thin brown rachises of small compound leaves, these being the only material forming the rim. Some floral peduncles, apparently of the same tree, were also used. The egg chamber, as in nest 1, was lined with hyphas of horsehair fungus and pieces of a pale greyish-green foliaceous lichen. Externally, the nest was decorated with green moss, even on the side that was facing the bamboo. Cobweb was extensively used, apparently as a fixing material. Small cocoons, like those found in nest 1, were also present. The outer diameter of the nest was 8 cm. The inner diameter was 5 cm. The egg chamber depth was at least 2.5 cm and the external nest height was 7 cm.

Nestlings

Both nestlings found in nest 1 had opened their eyes and the vanes of their flight- and body-feathers were starting to emerge from the sheaths when the nest was discovered on 27 February (Fig. 4). A noticeable feature was that the nestlings differed markedly from each other in body size and degree of development of their feathers (Table 1). Weights of these young were 38% and 43% of the mean weight ($n=3$) of adults of this species⁹. Because they were found dead the following day, it was impossible to monitor their subsequent growth and verify if both would fledge, despite the initial asynchronism. As far as we could observe, both nestlings were begging for and acquiring food normally.

On 28 February, at 08h00, the nestlings were dead; the smaller one was inside the nest and the other one, covered by small ants, was on the ground, c.1 m from the projection of a vertical line below the nest. We could find no clue for a possible cause of their deaths. Five minutes later, two adults arrived at a nearby tree and vocalised as they had the day before (see Parental behaviour below), but this time they brought no food and departed without visiting the nest.

Parental behaviour

During the six consecutive hours we dedicated to observing nest 1, only two adults were seen together, either undertaking fledging care at the nest or perching nearby. They behaved quite conspicuously, drawing our attention to the nest, as they arrived from far away flying over the clearing and perched high on a nearby tree, c.8 m tall,

usually vocalising, whenever they approached the nest site. We did not use any cover to observe their visits to the nest, and they did not stop feeding their young regularly despite our presence only c.15 m away.

Although the sexes are virtually alike in this species, we were able to recognise that two birds brought food to the nest, because one was slightly duller and its tail-feathers were visibly worn. Nestlings were fed 26 times, at a rate of 2.2 meals per nestling per hour. Only once did one bird brood the nestlings, sitting on the nest for eight minutes (08h05–08h13) after both members of the pair had delivered food, one after the other, to the young. Visiting adults also collected faecal sacs, which were removed from the nest ($n=2$) or swallowed ($n=1$).

Both arthropods and seeds were identified in the nestlings' diet. Several of these items were relatively large and were conspicuous in the adults' bill as they approached the nest. The 11 food items reliably identified involved four spiders, four seed agglomerates, one unidentified winged insect, one Orthopteran nymph and one caterpillar. Items found in the stomach contents of the larger nestling were five spiders, two nymphs of planthoppers (Homoptera), one nymph of Tettigoniidae (Ensifera), one caterpillar, and 11 seeds, both arillate and non-arillate. Some items were amazingly intact, as if the young had died suddenly, soon after its last meal. On the other hand, the stomach of the other nestling contained only remains of one caterpillar, fragments of insect legs and elytra, and five seeds, as if parents had stopped feeding it well before its death. Faecal sacs collected during handling of young and fallen to the ground below the nest contained seeds of four types and arthropod remains.

Discussion

The dates when nests were found in three consecutive years, either in advanced stages of construction or containing nestlings, suggest that the species might start breeding relatively late, in late spring or early summer; this corresponds to the middle of the rainy season in the Atlantic Forest of south-east Brazil, where most bird breeding activity occurs earlier, in spring^{3,4}, tanagers generally following this pattern⁶. However, our visits to the sites where the nests were found have been rather occasional, and their finding resulted from no special or evenly distributed effort. Similarly, nest-building activity of *T. cyanoventris* was recorded in November⁶ and early January (pers. obs.), both in Rio de Janeiro state, and breeding records for Green-headed Tanager *T. seledon*, the only other species of the genus in the same range for which breeding dates are available,

Table 1. Measurements of the nestlings of *Tangara desmaresti* found in nest 1, taken after they were found dead on 28 February 2001.

Measurement	Nestling 1	Nestling 2
Primary 5 length (exposed vane)	24 (11) mm	34 (17) mm
Primary 6 length (exposed vane)	24 (7) mm	33 (16) mm
Wing-length	34 mm	42 mm
Tail-feather length (exposed vane)	6 (1) mm	13 (7) mm
Tarsus-length	17 mm	18 mm
Bill-length (nares to tip)	9 (4) mm	9 (4) mm
Total length	57 mm	71 mm
Weight	7.9 g	8.9 g

are from November, December and February in Rio de Janeiro and November–December in Paraguay⁶. Although all these records point to a slightly delayed breeding season, additional data are obviously needed before any seasonal breeding pattern can be determined, either for *T. desmaresti* or for congeners in south-east Brazil.

Although all three nests were associated with man-made clearings and two were placed on cultivated plants, which suggests that the species may favour some level of anthropogenic disturbance, all nest sites were surrounded by extensive tracts of native vegetation and situated within or in close proximity to protected areas. Several other species of forest-based *Tangara* are known to have nested in cultivated trees (e.g. mango: Turquoise Tanager *T. mexicana*; banana: *T. seledon*) or in isolated trees within clearings or forest edges (e.g. Bay-headed Tanager *T. gyrola*, Silver-throated Tanager *T. icterocephala*)⁶. However, records may be biased toward nests in such situations simply because they are more likely to be found in areas more visited by observers. As seems to be the rule for most species of this genus⁶, the nests we found were relatively well concealed by surrounding foliage regardless of their different heights above ground, this being apparently the most variable of the nest characteristics in several other species⁶.

With the exception only of Green-naped Tanager *T. fucosa*, which constructs a ball-shaped nest², all *Tangara* species for which nests are known build cup nests^{6,7,18}. Moss has been recorded as a nest material used by 13 other species of *Tangara*^{2,5,6,14,18}. Among these, moss was recorded as the main material for ten species, whilst three species (including *T. desmaresti*) used it only on the external surface, probably for camouflage. However, at least half of the records implying the use of moss as a bulk are simply statements that the observed nests were 'mossy cups'^{5,6}. In addition, five species were recorded to use no moss in their

nests. Clearly, more detailed descriptions of nests, preferably based on collected material or monitoring of construction since early stages, are needed before we can accept as a sound generalisation that 'the majority of known *Tangara* nests consist largely of moss'⁸.

Lichens and cobweb, among other materials we found in *T. desmaresti* nests, have been recorded also for some other species of the genus^{6,7,17}. Likewise, the frequent use of *Marasmius* rhizomorphs as a lining material was reported for Burnished-buff Tanager *T. cayana*, Blue-necked Tanager *T. cyanicollis* and other tanagers by Sick¹⁰, and might be expected for many others. However, the only mention of the use of bamboo as a nest material by another species of *Tangara* deserves additional comment. A pair of *T. cyanoventris* observed by T. A. Parker building a nest 12 m above ground that 'appeared to be lining the nest with bamboo strips'⁶ might in fact have been using this material more extensively to shape the nest wall, and only subsequently would start lining with softer stuff. We also recorded a pair of this species carrying flexible dried bamboo leaves and thin fibres to a nest they were building c.10 m above ground in a young *Araucaria* tree. Although it was not possible to collect this nest or observe it at closer range, we could see through a spotting scope that it was a cup in an advanced stage of construction, leaning at the same time on the base of a primary branch and the trunk of the tree. We expect that further observations will demonstrate that bamboo is regularly used as a preferred nest material by these two species, which are considered to be closely related⁶. Choice of nest material, in this case, would reflect a fixed behavioural trait, rather than simply the availability of material.

On the single occasion we could observe building activity for some time, both members of a supposed pair carried material to the nest, but apparently only (or mainly) one of them shaped it. The same has been recorded for most of the few other species whose nest construction was observed in the wild: Azure-rumped Tanager *T. cabanisi*, *T. fucosa*, Speckled Tanager *T. guttata*, *T. gyrola*, *T. icterocephala*, Plain-coloured Tanager *T. inornata*, Golden-hooded Tanager *T. larvata*, *T. seledon*^{2,6,7} and *T. cyanoventris* (pers. obs., see above). In four species, however, only the female was seen carrying nest material, although males were constantly present: *T. cayana*¹⁷, Paradise Tanager *T. chilensis*¹⁸, Black-capped Tanager *T. heinei*⁶ and *T. mexicana*⁶.

The clutch size of two and the young being fed arthropods and fruit by both parents, as we observed in nest 1, are typical of *Tangara* tanagers⁶. Most arthropods we recorded in the nestlings' diet, including insects, were wingless or

immature forms, denoting they were obtained primarily from the substrate surfaces rather than in the air, which is consistent with records of foraging methods most frequently used by the species⁶.

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1



2



3



4

Figure 1. Two young were being fed arthropods and arillate seeds by two adults in this nest of *Tangara desmaresti* when it was found, in a guava tree, on 27 February 2001, at Serrinha do Alambari, Itatiaia massif (L. C. Marigo)

Figures 2–3. Location (arrow) and situation of a nest of *Tangara desmaresti* found 9 m above ground in an 11-m cultivated bamboo that was part of a living fence in the property limit at Pousada na Colina, Vale do Pavão, Itatiaia massif (L. P. Gonzaga)

Figure 4. Nestlings of *Tangara desmaresti* were noticeably different in size and degree of development. Because they were found dead on the day following their discovery, it was not possible to monitor if both would fledge, despite the initial asynchronism (L. C. Marigo)

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