

Brief Communication / Comunicación Breve

Nesting of the bird *Tolmomyias sulphureus* (Spix, 1825) (Passeriformes: Tyrannidae) associated with the ant *Camponotus senex* (Smith, 1858) (Hymenoptera: Formicidae) in the Cerrado, Brazil

Anidación del ave *Tolmomyias sulphureus* (Spix, 1825) (Passeriformes: Tyrannidae) asociada a la hormiga *Camponotus senex* (Smith, 1858) (Hymenoptera: Formicidae) en el Cerrado, Brasil

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Abstract. The nesting of birds associated with social insects has already been documented in different Brazilian biomes, including in the Cerrado, but information about this association in this biome is still scarce. Thus, our objective is to report the nesting association between bird and ants in the Cerrado. In April 2023, in the Grande Sertão Veredas National Park, a colony of the weaver ant *Camponotus senex* (Smith, 1858) was reported as being 10 cm from an active nest, with eggs, of a *Tolmomyias sulphureus* (Spix, 1825), a yellow-olive flatbill, 5 meters from the ground, in a plant substrate. The report brings new information about the nesting behavior of *T. sulphureus* and the *C. senex* ant within the Cerrado, but it is not possible to define whether this association is recurrent or accidental, and further studies are needed to better elucidate this ecological relationship, as well as the advantages for both, especially for the ant.

Key words: Commensalism; nest; weaver-ant.

Resumen. La anidación de aves asociadas a insectos sociales ya ha sido estudiada en diferentes biomas brasileños, incluso en el Cerrado, pero la información sobre esta asociación es aún escasa, por lo tanto, nuestro objetivo es reportar la asociación de anidación entre hormigas y aves en el Cerrado. En abril de 2023, en el Parque Nacional Grande Sertão Veredas, una colonia de la hormiga tejedora *Camponotus (Myrmobrachys) senex* (Smith, 1858) fue reportada a 10 cm de un nido activo, con huevos de *Tolmomyias sulphureus* (Spix, 1825), a 5 metros del suelo, en un sustrato vegetal. Este reporte provee nueva información sobre el comportamiento de anidación de *T. sulphureus* y la hormiga *C. senex* dentro del Cerrado, pero no es posible definir si esta asociación es recurrente o accidental, y se necesitan más estudios para dilucidar mejor esta relación ecológica, así como las ventajas para ambos, especialmente para la hormiga.

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Palabras clave: Comensalismo; nido; hormiga tejedora.

The nesting of birds in association with colonies of social insects (bees, wasps, ants) constitutes a defense mechanism for their nests (Quinn and Ueta 2008; Sazima and Angelo 2015). The aggressive biting and stinging behavior of certain species of ants help protect the birds from the attacks of mammals and reptiles (Janzen 1966). Previous studies have been reported on the commensal relationship between ants and birds (Rojas-Soto *et al.* 2014), such as *Pitangus sulphuratus texanus* (Van Rossem, 1940) in the United States of America (Pettingill 1942), and *Tolmomyias sulphurecens* (Spix, 1825) in Guatemala (Gilardi and von Kugelgen 1991) and Costa Rica (Young *et al.* 1990), all of which were associated with acacia trees (Fabaceae), which have a symbiotic relationship with ants (Young *et al.* 1990).

In Brazil, the associations of birds with social insects, especially with social wasps, have already been documented in different biomes (Almeida and Anjos-Silva 2015; Milani and Souza 2018), including the Cerrado (Menezes *et al.* 2014; Souza *et al.* 2017), but there is little information on the association of birds with ants in the Cerrado biome, which has lost more than half of its original area (MapBiomias 2021) while still being considered a hotspot (Myers *et al.* 2000; Critical Ecosystem Partnership Fund 2018). Therefore, studies of ecological interactions in this biome are important to better understand the dynamics of this ecosystem, in order to establish management and conservation actions of the biota. Therefore, the objective here is to report on the nesting association between birds and ants in the Cerrado biome.

The occurrence was registered by chance, in April 2023, in an area of gallery forest of the Carinhanha river, of the Cerrado vegetation physiognomy, in the Grande Sertão Veredas National Park (15°11'16.4" S 45°41'00.9" W), north of Minas Gerais. A photographic record (Nikon 60x Optical Zoom Wide camera) was performed, with 10 minutes of ethological observation, *ad libitum* method, and with the recording of all behavior acts (Del-Claro 2010). Disturbances to the nest were provoked with 2-minute intervals, via contact in the ant colony, using the handle of an aerial insect net. At the end of the observation, some specimens of the ant were collected, which were identified by Dr. Kleber Del Claro (Federal University of Uberlândia). The bird was identified by its nest, according to Dr. Marco Antônio Manhães (Federal University of Juiz de Fora).

A colony of the weaver ant *Camponotus (Myrmobrachys) senex* (Smith, 1858) was recorded nesting 10 cm from the nest of an active *T. sulphurescens* nest, a yellow-olive flatbill, with eggs, about 5 meters from the ground in an unidentified plant substrate (Fig. 1).

This bird species is known to build its nest near different species of social wasps in Brazil (Menezes *et al.* 2014; Milane and Souza 2017), including in the Grande Sertão Veredas National Park (Carvalho *et al.* 2023). There are also records of nesting of this species in acacias trees (Fabaceae), which have a symbiotic relationship with ants of the genus *Pseudomyrmex* Lund, 1831 (Young *et al.* 1990; Gilardi and von Kugelgen 1991). Some birds, such as *Melierax poliopterus* Cabanis, 1869 (Accipitridae), *Cryptospiza reichenovii* (Hartlaub, 1874) (Passaridae), and *Lonchura cucullata* (Swainson, 1837) (Passaridae), have been recorded nesting near weaver ants (Moreau 1942; Maclaren 1950). However, this is the first record of *T. sulphurescens* nesting in association with *C. senex* and is also the first record of this species of ant nesting in association with a bird nest (this study).

The period for nest construction, laying, and incubation of *T. sulphurescens* ranges from 20 to 23 days (Anciães *et al.* 2012), while the ant *C. senex*, which has an arboreal habit, builds its nests with silk produced by its larvae (Schremmer 1979a, b) reaching an average size of 34.24 cm in diameter (Santos and Del-Claro 2009). Due to the size of the ant's nest, more than 30 cm in diameter, it is assumed that it was already in the tree trunk when *T. sulphurescens* nested, which suggests that the bird selected the site, due to the probable benefit provided by the ant colony.



Figure 1. Nest of the bird *Tolmomyias sulphurescens* associated with the colony of the ant *Camponotus senex* in a Cerrado gallery forest area, Grande Sertão Veredas National Park, Minas Gerais, Brazil. / Nido del ave *Tolmomyias sulfurescens* asociado a la colonia de la hormiga *Camponotus senex* en un área de bosque de galería del Cerrado, Parque Nacional Grande Sertão Veredas, Minas Gerais, Brasil.

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Most bird nests built in the vicinity of social wasp colonies involve the most aggressive species of these insects (Fitzpatrick 2004). With ants, it seems that this relationship is also similar, since *C. senex* is an aggressive species, mainly in the defense of their nest (Santos *et al.* 2005a).

Among the defense strategies of *C. senex*, there is percussion, the production of sounds, which may be similar to those produced by some social wasps of the genus *Polybia* Lepelletier, 1836 (Santos *et al.* 2005a). The mechanism of percussion in *C. senex* consists of recruiting workers out of the nest to alert the colony against attacks by possible predators (Santos *et al.* 2005b). This was observed in this study, at the first moment of disturbance, via touch with the handle of the aerial insect net, the ants began to move intensely through the surface of the nest and to produce a drumming sound, which was repeated, two or three times, with an interval of 2 to 4 seconds. With the persistence of the disturbance, the ants began to occupy the branches and leaves of the surroundings of their colony, but no ants were observed entering the bird's nest, with only a few workers moving quickly across its surface. Most birds that nest near social insects build pendant, dome, or covered nests (Myers 1929, 1935; Wunderle and Pollock 1985), as is the case with *T. sulphurescens*, which probably offers some protection to hatchlings and young birds (Earley 2013).

Finally, when proceeding to the collection of ant specimens, the apex of sound production and movement occurred, in which the ants moved through the cable of the net, toward the researcher, moving their pincers and releasing formic acid, showing a defense role that can be beneficial to the bird. In the nesting of the bird *L. cucullata* with the weaver ant *Oecophylla smaragdina* Fabricius, 1775, Maclaren (1950) observed that ants ignore any vibration of foliage caused by birds, but swarm furiously in their nests at the slightest human interference.

The benefits for ants, as for social wasps, of the association with birds is nebulous; while some studies suggest a relationship of commensalism, without gains for insects (Gilardi and von Kugelgen 1991; Beier and Tungbani 2006), other authors report dietary benefits (Hansell 2000; Bologna *et al.* 2007). The ants could benefit by having access to bird feces and/or ectoparasites, as observed in other bird-insect relationships (Moreau 1942; Chisholm 1952), however, due to the brevity of the bird's nesting periods and its small size, this appears to be an unlikely source of significant nutrition for the ant colony (Gilardi and von Kugelgen 1991). These uncertainties apply to our report, since it is not possible to assess whether there are benefits for the ants, and if there are, what these would be.

Our report brings new information about the nesting behavior of *T. sulphurescens* and the *C. senex* ant within the Cerrado; however, it is not possible to define whether this association is recurrent or accidental, and further studies are needed to better elucidate this ecological relationship, as well as the advantages for both, especially for the ant.

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