

Scientific Note

New records of association between social wasp colonies and the Yellow Flycatcher *Tolmomyias* spp. (Passeriformes: Rhynchocyclidae) in Northeast Brazil

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Abstract. Social wasps are known to be aggressive, and this trait causes some other animal species to associate with these insects. These associations appear to be common in nature, however, they are not easily located nor understood. Thus, the objective of this work is to add new data to studies of associations between birds and wasps, recorded from the cerrado and caatinga of the states of Bahia, Ceará and Rio Grande do Norte, northeastern Brazil, from 2018 to 2021. Nine colonies of social wasps were found, associated with *Tolmomyias flaviventris* (Wied, 1831) and *Tolmomyias sulphurescens* (Spix, 1825) (Passeriformes: Rhynchocyclidae). The behavior of associating with wasp colonies is a form of defense of these birds against predators, and seems to be related to the breeding season of the birds, since predation on their nests is the main factor for reducing their reproductive success.

Keywords: animal behavior, paper wasp, interspecific association, nests, Polistinae.

Social wasps are known to be aggressive when disturbed in their colonies (Summer et al. 2018; Detoni et al. 2021), and due to this characteristic, occasionally other animals associate with these insects, thus getting some protection against predators (Barbosa et al. 2021). Although these associations seem common in nature, they are not easily located nor understood, being considered a relationship of commensalism, since only one species gets benefit (Beier & Tungbani 2006; Quinn & Ueta 2008; Somavilla et al. 2013; Mesezes et al. 2014; Almeida & Anjos-Silva 2015). This work adds new data to studies of associations between the Yellow Flycatcher, *Tolmomyias flaviventris* (Wied, 1831) and *Tolmomyias sulphurescens* (Spix, 1825) (Passeriformes: Rhynchocyclidae) and at least four species of wasps in the caatinga and cerrado biomes of northeastern Brazil.

Associations between wasps and birds were recorded in the cerrado of Angical (11°59'55" S, 44°41'10" W), Bahia, and in the caatinga of Graça (4°02'46" S, 40°45'10" W) and Quixada (4°58' 41" S, 39°1'8" W), Ceará and Cerro Corá (6°2'44" S, 36°20'52" W), Rio Grande do Norte (Fig. 1), through the active search method, over the years 2018 to 2022, opportunistically during other projects, for behavioral records, the *ad libitum* method was used, lasting 30 minutes. To identify the wasps, key proposed by Richards (1978) were used, to the bird an identification by picture and voice by Dr. Marcos Antônio Manhães from Universidade Federal de Juiz de Fora.

Nine colonies of social wasps were found, eight associated with *T. flaviventris* (Fig. 2): Two of these records in Bahia, of *Polybia* sp. and *Protoneectarina sylveirae* (de Saussure, 1854) (Hymenoptera: Vespidae), two in Ceará of *Polybia occidentalis* (Olivier, 1791) (Hymenoptera: Vespidae) and three of *P. sylveirae* and one *Polybia rejecta* (Fabricius, 1798) (Hymenoptera: Vespidae) in Rio Grande do Norte, in particular, *P. rejecta* has been registered associated with *Azteca chartifex* Forel, 1896 (Hymenoptera: Formicidae) along with the bird. Just one association registered in Ceará for *T. sulphurescens* (Fig. 1F): *Polybia jurinei* (de Saussure, 1854) (Hymenoptera: Vespidae). It is worth noting that *P. occidentalis*, *P. jurinei* and *P. sylveirae* were recorded for the first time

associating with other organisms, this record increases the number of species of social wasps that birds make their associations with.

The behavior of associating with wasp colonies is a way of defending these birds against predators, such as some mammals and birds of prey (Alexandrino et al. 2012; Sazima & D'Angelo, 2015) and ensuring the protection of their offspring (Cazal et al. 2010). The association between nests seems to be related to the breeding season of birds, since predation on birds nests is the main factor for reducing their reproductive success (Marini et al. 2009).

The bird nests ranged from approximately 15 to 50 centimeters away from the wasp colonies, and despite the proximity and intense foraging activity of the birds during the nest building process or feeding the chicks, the wasps were not aggressive with individuals of *T. flaviventris*. It is noteworthy that the nests of *T. flaviventris*, recorded in Bahia, had as substrate *Piptadenia* sp., a thorny plant belonging to the Fabaceae family. It is known that the nesting of birds and wasps in plants of the *Piptadenia* genus is considered a defense strategy, being great natural shelters against predators, due to the presence of thorns (Dejean et al. 1998).

No attack was not observed by the wasp species against the birds, this is due to the behavior of the birds, of avoiding the branches close to the same trees as the nests as perches, always using other trees as perches, so it avoided some discomfort and possible attacks. However, the social wasps occasionally showed alarm behavior, characterized by wing opening, abdomen contraction and active patrolling around the nest. Although some of these species have already been recorded in previous works (Menezes et al. 2014; Sazima & D'Angelo 2015), no data related to the behavior or associations of these social wasps species were described by the authors. However, observations indicate that the associations are related to the protection given by wasps to bird nests, with no apparent benefit being identified for wasps in this association. Studies with the aim of understanding the real increase in reproductive success by birds with association must be carried out in order to elucidate this incredible interaction.

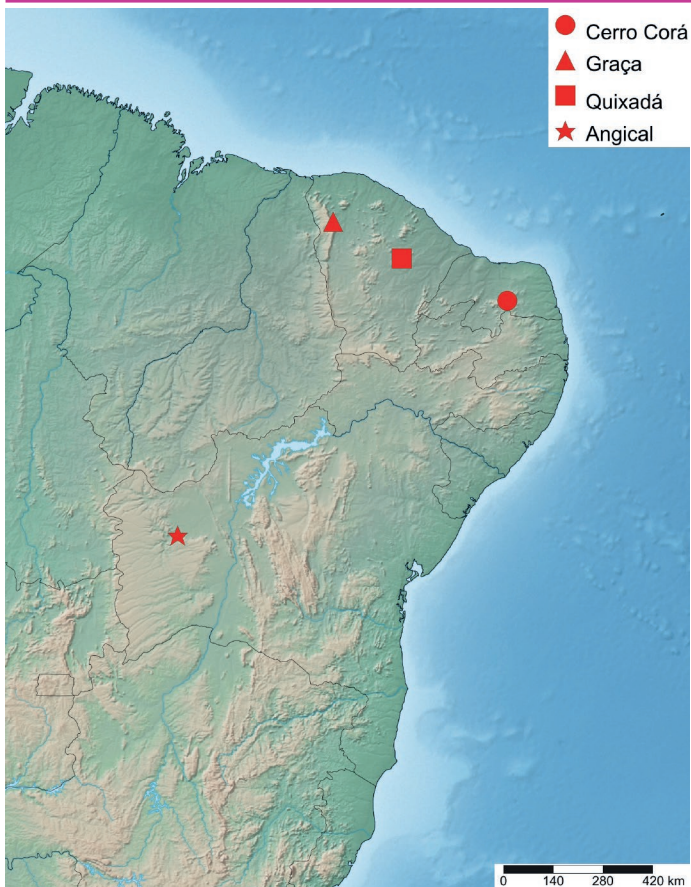


Figure 1. Location of records of associations between social wasp colonies and the Yellow Flycatcher *Tolmomyias* spp. (Passeriformes: Rynchocyclidae) in Northeast Brazil: Circle - Cerro Corá, Rio Grande do Norte; Square - Quixadá, Ceará; Triangle - Graça, Ceará; Star - Angical, Bahia.

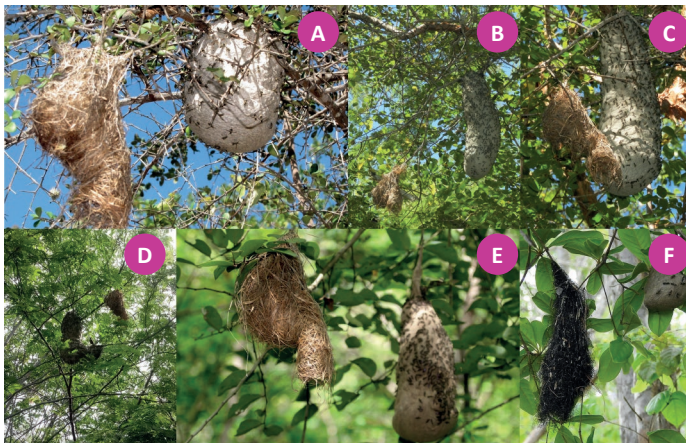


Figure 2. Nests of *Tolmomyias flaviventris* associated with social wasp colonies: A, B and C *Protonectarina sylveirae* in Cerro Corá/RN; D - *Protonectarina sylveirae* in Angical/BA; (E) - *Polybia occidentalis* in Quixadá/CE and (F) Nests of *Tolmomyias sulphurescens* associated with *Polybia jurinei* in Graça/CE.

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Authors' Contributions

Data collection and first version of the manuscript were performed by ESS and WSN data collect; BCB identified the material and produced the digital images. All authors wrote the manuscript, discussed the results, and contributed to its final version.

Conflict of Interest Statement

We have no conflict of interest to declare.

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