

PREVIOUSLY UNREPORTED NESTING ASSOCIATIONS OF THE YELLOW-OLIVE FLYCATCHER (*TOLMOMYIAS SULPHURESCENS*) (AVES: TYRANNIDAE) WITH SOCIAL WASPS AND BEES

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Novos registros de associação entre ninhos de bico-chato-de-orelha-preta (*Tolmomyias sulphurescens*) (Aves: Tyrannidae) e colônias de vespas sociais e de abelhas.

Key words: Yellow-olive Flycatcher, *Tolmomyias sulphurescens*, Atlantic Rainforest, Cerrado, interspecific association, nesting biology, Hymenoptera.

Nesting associations between birds and social hymenopterans have been published since late 19th century. Lists compiled by Joyce (1990) and Earley (2013), together with reports not provided by these authors (e.g., Bologna *et al.* 2007, Somavilla *et al.* 2013), show that 119 species of birds belonging to 26 families and six orders (as per Gill & Don-sker 2014) have been observed nesting close to colonies of 30 species of wasps and four of bees. However, among 123 references that mention bird-wasp or bird-bee associations, only 32 (26%) identified at least one insect to the species level. Even though most bird-hymenopteran nesting associations are concentrated in tropical areas (Quinn & Ueta

2008) and despite the high habitat and avian diversity in South America, little has been published about the subject in the continent when compared, for example, to bird-bird nesting associations described in North America and Europe (Quinn & Ueta 2008). Birds may have lower rates of nest predation (Robinson 1985, Wunderle & Pollock 1985, Joyce 1993, Beier & Tungbani 2006) or brood parasitism (Smith 1968) when nesting close to wasps. On the other hand, Beier & Tungbani (2006) were unable to find any advantages or disadvantages concerning hymenopterans, suggesting that the relation is commensal.

The Yellow-olive Flycatcher (*Tolmomyias sulphurescens* Spix, 1825) is a tyrant flycatcher

TABLE 1. Hymenopteran species with colonies close to Yellow-olive Flycatcher nests. State of Minas Gerais (= MG) and state of São Paulo (= SP). *Sá Júnior (2009); **Rolim *et al.* (2007). Figure numbers refer to graphics in this study.

Municipality (state)	Coordinates	Biome	Köopen climate	Species	Family	Month and year	Figure
São Luiz do Paraitinga (SP)	23°13'32"S, 45°18'58"W	Atlantic Rainforest	Cfa**	<i>Polybia jurinei</i>	Vespidae	Nov. 2009	1C
Bom Despacho (MG)	19°43'46"S, 45°15'22"W	Cerrado	Aw*	<i>Protopolybia exigua</i>	Vespidae	Oct. 2010	1B
Sete Barras (SP)	24°14'14"S, 48°04'48"W	Atlantic Rainforest	Af**	<i>Parachartegys fraternus</i>	Vespidae	Nov. 2011	1A
Itapevi (SP)	23°35'14"S, 46°57'46"W	Atlantic Rainforest	Cfa**	<i>Polybia fastidiosuscula</i>	Vespidae	Jan. 2012	1D
Anhembi (SP)	22°39'43"S, 48°10'44"W	Atlantic Rainforest	Aw**	<i>Apis mellifera</i>	Apidae	Oct. 2012	2B
Juiz de Fora (MG)	21°45'07"S, 43°19'02"W	Atlantic Rainforest	Cwa*	<i>Polybia fastidiosuscula</i>	Vespidae	Oct. 2013	1E
Juiz de Fora (MG)	21°45'07"S, 43°19'02"W	Atlantic Rainforest	Cwa*	<i>Polybia fastidiosuscula</i>	Vespidae	Nov. 2013	1F
Monte Alegre do Sul (SP)	22°41'01"S, 46°40'38"W	Atlantic Rainforest	Cfa**	<i>Apoica</i> sp.	Vespidae	Nov. 2013	2A

(Tyrannidae) that occurs in Neotropical forests of South and Central Americas (Ridgely & Tudor 2009). Its pensile nest is built hanging from thin branches in the understory using especially dark fibers of *Marasmius* fungus, with a lateral tunnel as entrance (Sick 1997, Anciães *et al.* 2012).

Although nesting associations between this flycatcher and social hymenopterans have been already described in the literature (e.g., Peck 1910, Gilardi & von Kugelgen 1991, Sick 1997), only Joyce (1990) managed to identify the species of wasps (a total of seven) involved.

Given the current scenario of lack of species-level identification in bird-hymenopteran nesting associations, this study aims to contribute to the knowledge about these associations in the Neotropical region, as well as provide subsidies for future studies.

Records were made by chance between the years of 2009 and 2014 in forest frag-

ments belonging to two biomes, Atlantic Forest (*sensu* IBGE 2009) and Cerrado (Tropical Savanna), and located in eight municipalities in the states of Minas Gerais (MG) and São Paulo (SP), in southeastern Brazil (Table 1). The sites are inserted in four climates in the Köppen classification (Rolim *et al.* 2007, Sá Júnior 2009): humid subtropical with dry winter (Cwa); humid subtropical (Cfa); tropical with dry winter (Aw); tropical wet (Af).

In order to detect behaviors displayed by bird and insects, nests were observed for a varied amount of time using the *ad libitum* method (Altmann 1974). Wasps were identified based on the architecture of their colonies, following the classification proposed by Wenzel (1998).

Eight Yellow-olive Flycatcher nests were observed in association with active colonies of social insects, of which seven belonged to wasps and one to bees (Table 1). Four



FIG. 1. Active Yellow-olive Flycatcher nests associated to colonies of social wasps *Parachartegus fraternus* (A), *Polybia fastidiosuscula* (D, E, F), *Polybia jurinei* (C), and *Protopolybia exigua* (B).

species of wasps (Hymenoptera: Vespidae) were identified: *Parachartegus fraternus* (Gribodo, 1892) (Fig. 1A), *Polybia fastidiosuscula* Saussure, 1854 (Figs 1D–F), *Polybia jurinei* Saussure, 1854 (Fig. 1C), and *Protopolybia exigua* (Saussure, 1854) (Fig. 1B). Besides, one wasp was identified to genus level, *Apoica* sp. (Fig. 2A). The only bee species recorded was *Apis mellifera* Linnaeus, 1758 (Hymenoptera: Apidae; Fig. 2B).

Despite the proximity between nest and colony, and the intense activity displayed by the flycatcher, especially when building its nest, no physical interaction of any kind, including aggressive behavior by the wasps towards the bird, was observed.

The associations published here are, to our knowledge, the first ones ever described in the Atlantic Forest and Cerrado biomes with identification of hymenopteran species.



FIG. 2. (A) Yellow-olive Flycatcher nest being built close to an active colony of nocturnal social wasps *Apoica* sp. (B) Yellow-olive Flycatcher nest (1) under construction close to a tree cavity (2) colonized by Africanized honey bees (*Apis mellifera*).

Four of them, *Polybia fastidiosuscula*, *P. jurinei*, *Protopolybia exigua*, and *Apis mellifera*, had never been observed in association with the Yellow-olive Flycatcher. Thus, the number of species of insects (Hymenoptera: Vespidae and Apidae), with which this bird is known to be associated, rises from seven [*Agelaius arata* (Say, 1837), *Apoica pallens* (Fabricius, 1804), *Brachygastra melifera* Say, 1837, *Parachartegus fraternus* (Gribodo, 1892), *Polybia occidentalis* (Olivier, 1791), *Polybia rejecta* (Fabricius, 1798), and *Synoecca septentrionalis* Richards, 1978] to 11. Only the Banded Wren (*Thryophilus pleurostictus*, Troglodytidae) is known to be associated with more species, a total of 14 (Joyce 1990).

In addition, the social wasps *Polybia fastidiosuscula*, *P. jurinei*, and *Protopolybia exigua* had

never been described in a nesting association with birds. Other species of the genus *Polybia* had been observed in association with birds of seven families (Haverschmidt 1957, Wunderle & Pollock 1985, Somavilla *et al.* 2013). Smith (1968) recorded associations between unidentified wasps belonging to the genus *Protopolybia* with large-sized icterids [Oropendolas, *Psarocolius* spp. (Icteridae), and Yellow-rumped Cacique, *Cacicus cela* (Icteridae)]. Moreover, the social wasp *Parachartegus fraternus* had already been observed in association with two species of wren (Troglodytidae: *Campylorhynchus rufinucha* and *Thryophilus pleurostictus*) in Costa Rica, besides the Yellow-olive Flycatcher itself (Joyce 1990). Wasps of the genus *Apoica* also were observed in associa-

tion with four species of birds, including the Yellow-olive Flycatcher (Fry 1972, Joyce 1990). Africanized honey bees (*Apis mellifera*), the only non-vespid hymenopteran recorded here, was observed to be associated with only one species of bird, the Banded Wren (*Thryophilus pleurostictus*) in Costa Rica (Joyce 1990).

In order to elucidate the nature and possible advantages of such bird–hymenopteran associations e.g., whether a bird like the Yellow-olive Flycatcher benefits from it and if there is some influence on the reproductive success of hymenopterans, further ecological and behavioral studies are required.

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