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BEHAVIOURAL NOTES

Social paper wasp (*Agelaia pallipes*) predates songbird nestling

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Abstract

The social paper wasp *Agelaia pallipes* is known to eat carrion and scavenge on vertebrates. There are few records of wasps predating vertebrates, including an attack on an adult hummingbird and the predation of bird nestlings. During a project monitoring reproductive behaviour of a neotropical songbird, the Lined Seedeater *Sporophila lineola* in south-eastern Brazil, we recorded the predation of a four-day-old nestling by a social paper wasp. In the video, the adult female bird attempted to visit the nest prior to the predation. The male could be seen with its crest feathers erect after a wasp left the nest, when the nestling was presumably already dead. When we arrived at the nest to remove the camera, we found the nestling dead, and did not observe the parents in the vicinity. We also registered two other dead nestlings in a different nest with similar wounds. However, the conclusive cause of death of those nestlings is unknown. Nest predation is a major selective pressure in birds, and insects are rarely assumed to play a notable role in this process. Further research is needed to better understand the nature of the relationship between wasps and birds.

KEYWORDS

Agelaia pallipes, insect predator, nest predation, *Sporophila lineola*

1 | INTRODUCTION

Social wasps (Vespidae) are generalist feeders that primarily feed on nectar and fruits for carbohydrates, and hunt arthropods as well as scavenge vertebrate and invertebrate carrion for proteins (Richter, 2000). However, there are few records of social wasps as predators of vertebrates. A Black-faced Hornet *Dolichovespula maculata* has been reported attacking a Rufous Hummingbird *Selasphorus rufus*, although the author did not observe whether the wasp stung the hummingbird (Grant, 1959). In the same report, a Yellow Jacket *Dolichovespula arenaria* was described as a predator of nestlings of the Rufous Hummingbird (Grant, 1959). In another observation, an unidentified wasp, probably a German Wasp *Vespula germanica*, was reported predating newly hatched nestlings of the Dunnock *Prunella modularis* (Moller, 1990). Worker wasps of the Tree Wasp *Dolichovespula sylvestris* were seen predating three newly hatched nestlings of a Blackcap *Sylvia atricapilla* (Wild, 1927). The parents, although observed in the vicinity, did not attempt to defend the nestlings. Finally, an unidentified wasp (Vespidae) was reported predating nestlings of the Red-billed Leiothrix *Leiothrix lutea* (Fu, Xiang, Kong, & Wu, 2016).

Here, we report a record of a social paper wasp predating a nestling of the Lined Seedeater *Sporophila lineola*, a small Neotropical songbird that lives in open habitats and builds cup-shaped nests in which they lay two or three eggs (Ferreira & Lopes, 2017).

2 | MATERIALS AND METHODS

We studied the reproductive behaviour of Lined Seedeaters on the Federal University of Viçosa campus in Florestal, Brazil (19°52′31″S, 44°24′52″W). The study area is about 1,500 ha, and the habitat

consists of open areas of pastures, plantations, gardens, lakes and fragments of semideciduous forest. Nests were visited once every two days, during which eggs or nestlings were measured and weighed.

We placed action camera's (Rollei Actioncam 372) on a tripod approximately 30 cm from nests and recorded up to two hours (between 6:00 a.m. and 12:00 p.m.), when nestlings were 1 to 6 days of age. Before starting the recording, we always checked the nest status, and after starting the recording, we waited for the parents to visit the nest to confirm that the camera did not interfere with parental behaviour.

3 | RESULTS AND DISCUSSION

During the breeding season (December 2019–March 2020), we monitored a total of 131 nests, of which we filmed parental care behaviour of 15 nests, comprising a total of 53 hr of recording and an average of 106 ± 53 min per nest.

On the morning of 20 January 2020, we recorded the predation of a four-day-old nestling of the Lined Seedeater by an *Agelaia pallipes* social paper wasp. This wasp is a swarm-founding species that lives in colonies of up to 16,500 individuals (Rodríguez-Jimenez & Sarmiento, 2008), and are known to include carrion in the diet (Moretti, Thyssen, Godoy, & Solis, 2008).

The predated nest originally contained three nestlings, but two of them died by unknown causes on 18 January 2020. One was found hanging on a leaf close to the nest, with wounds caused by ants and possibly other insects that were scavenging the carcass.

We filmed the nest for a total of 1 hr, 36 min, and 39 s, starting at 06h27. At 10′40′′ of the recording, the female attempted to visit the nest. After landing on the border of the nest, she immediately flew away. At 21′43′′, a wasp could be seen in the video for the first time. The wasp flew into the nest and landed on the head of the nestling. At 22′30′′, the nestling moved its head making the wasp fly away. The wasp then flew around the nest and landed on the nestling's head again at 22′48′′. The wasp then started biting the nestling's head, and flew off at 24′47′′, and blood could be seen on the nestling's head suggesting that the wasp had inflicted an injury on the nestling. At 41′48′′, a wasp could clearly be seen tearing off a piece of skin from the nestling's head (Figure 1a). The wasp then left at 42′04′′. At 48′34′′, a wasp could be seen flying around and in the nest. At 49′21′′, the nestling was last seen moving and presumably died. The wasp left at 53′34′′. A wasp was observed again at the nest at 69′51′′ and it left at 73′02′′. At 78′01′′, two wasps could be seen. One was flying in front of the camera for 10 s but never approached the nest. That wasp was flying so close to the camera that the image is vague, and we could not confirm that it belongs to the same species. At 81′04′′, a wasp was observed at the nest for the last time. A wasp was observed visiting the nest a total of 17 times during the recording. The male Lined Seedeater arrived at 92′12′′, with his crown feathers erected. The male found the dead nestling, got a piece of grass stem from the nest and left at 94′34′′. We returned to the nest to collect the filming equipment at 96′39′′. We could not see or hear the parents in the vicinity of the nest, and the nestling was found dead (Figure 1b).

FIGURE 1 (a) Frame from the video recording the social paper wasp *Agelaia pallipes* predating a four days old nestling of the Lined Seedeater, (b) The same nestling in (a) after the predation event; (c and d) nestlings of the Lined Seedeater found dead with similar wounds as the wasp predation in (a-b)

On 25 January 2020, we found two dead nestlings in a different nest of Lined Seedeater (976 m away from the nest in which we filmed the predation event) with similar wounds on the back of their heads (Figure 1c,d). We did not see any wasps when we found the dead nestlings, and we also did not see the parents.

Arthropods have been reported to predate unguarded nests, weakened nestlings or nestlings that prematurely fell from the nest (McCormick & Polis, 1982). However, this does not seem to be the case in our observation, because the parents were observed close to the nest and the nestling appeared in good health. Nevertheless, it is possible that the two dead nestlings observed two days before the predation event might have attracted a wasp, which then predated the remaining nestling.

There are few records of wasps predating birds. This, and the fact that we found additional nestlings with similar wounds five days after the recorded predation, indicates that wasps might be overlooked as nestling predators.

Interestingly, more than 200 species of birds have been reported to nest close to wasp nests including *Agelaia* sp. (Earley, 2013). In the Yellow-olive Flycatcher *Tolmomyias sulphurescens*, this strategy resulted in reduced nest predation and brood parasitism (Menezes, Barbosa, & Prezoto, 2014). Additionally, nest success of Rufous-naped Wrens *Campylorhynchus rufinucha* was shown to increase when occupied wasp nests were experimentally placed near wren nests (Joyce, 1993). More research on interactions between wasps and birds could teach us more about their apparently complicated relationship.

Nest predation is a major selective pressure in birds, and insects are rarely assumed to play an important role in this process. Carnivorous invertebrates are usually considered to be of lower trophic levels, and carnivorous vertebrates of higher trophic levels. Higher trophic levels are normally associated with a decrease in numbers and an increase in fierceness, agility, and size (Smith, 1972). Yet, more than 200 cases of arthropods preying on vertebrates have been reported (McCormick & Polis, 1982). This suggests that future studies should consider insects and other arthropods as potential nest predators.

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CONFLICTS OF INTEREST

All authors agree that there are no existing conflicts of interest among the authors.

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SUPPORTING INFORMATION

Additional supporting information may be found online in the Supporting Information section.

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