

Scientific Note

Predation of *Chlorostilbon lucidus* (Shaw, 1812) (Apodiformes: Trochilidae) hummingbird chicks by *Polistes canadensis* (Linnaeus, 1758) (Polistinae: Polistini): A new predatory interaction documented in the Brazilian Caatinga

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Abstract. Non-aggressive interactions between Neotropical social wasps (Vespidae) and birds frequently occur but remain poorly understood. Typically categorized as commensalism, where birds benefit while no advantages for the wasps have been documented, the intricate dynamics of these associations have gone unexplored. These wasps, which are generalist feeders primarily relying on nectar, fruits, arthropods, and carrion, are seldom reported as vertebrate predators. In this study, we present a novel observation of the red social paper wasp, *Polistes canadensis* (Linnaeus, 1758) (Polistinae: Polistini), preying on young glittering-bellied emerald hummingbirds - *Chlorostilbon lucidus* (Shaw, 1812) (Apodiformes: Trochilidae), opportunistically recorded in the urban area of Brazilian Caatinga biome. Predation occurred when a *Polistes canadensis* individual targeted a hummingbird's nest. This occurrence challenges the prevailing view of these associations and suggests that social wasps may play a more significant role as nestling predators than previously acknowledged, highlighting the need for further research.

Keywords: young birds, nest predation, red paper wasp, social wasp.

Non-aggressive associations between social wasps (Vespidae) and birds in the Neotropics are frequently observed but remain poorly understood. Typically, these associations are categorized as commensalism, as birds' benefit, while no advantages for the wasps have been documented (Robinson 1985; Beier & Tungbani 2006; Somavilla et al. 2013; Milani & de Souza 2018). However, a study examining the interactions between wasps and birds could illuminate their seemingly intricate relationship. These wasps are generalist feeders, primarily relying on nectar and fruits for carbohydrates while also hunting arthropods and scavenging vertebrate and invertebrate carrion for proteins (Richter 2000). Nevertheless, documented cases of social wasps acting as vertebrate predators are rare (Frankhuizen et al. 2020).

Recently, our attention was drawn to a report that the swarm-founding social wasp, *Agelaius pallipes* (Olivier, 1792) (Polistinae: Epiponini) was observed preying on a nestling of the Lined Seedeater [*Sporophila lineola* (Linnaeus, 1758)], a small Neotropical songbird that inhabits open habitats and constructs cup-shaped nests where they lay two or three eggs in the municipality of Viçosa, state of Minas Gerais, Brazil (Frankhuizen et al. 2020). Such occurrences are more commonly associated with more aggressive wasps of the subfamily Vespinae, such as yellowjackets and hornets [*Dolichovespula maculata* (Linnaeus, 1763), *Dolichovespula arenaria* (Fabricius, 1775), *Dolichovespula sylvestris* Scopoli, 1763, and *Vespula germanica* (Fabricius, 1793)] in the case of European birds (Wild 1927; Grant 1959; Moller 1990).

In this study, we present a new record of a red social paper wasp or "marimbondo-caboclo", *Polistes canadensis* (Linnaeus, 1758) (Polistinae: Polistini), preying on a young bird, *Chlorostilbon lucidus* (Shaw, 1812) (Glittering-bellied Emerald) (Apodiformes: Trochilidae). We opportunistically recorded the behavioral observations between wasps and birds in an urban area located in the municipality of Olho d'Água das Flores, the northeast region of Brazil, specifically within the

Caatinga biome of Alagoas (9°31'55.8"S 37°17'41.5"W), in September 2018. The *ad libitum* method (Altman 1974) was employed to document their behaviors.

Polistes canadensis is a social wasp found in the New World, with a wide distribution, occurring from the southern United States to southern Brazil and Argentina (Somavilla et al. 2021). There is a large species, approximately 25-30 mm in length, body color mostly reddish brown, with wings brownish (Fig. 1A). This species is common in human settlements and easily adapts to human environments. Researchers consider it a relatively aggressive species (Richards 1978; Montefusco et al. 2017; Somavilla et al. 2021).

An individual *P. canadensis* (Fig. 1A) opportunistically preyed on a hummingbird's nest, identified as *C. lucidus* (Fig. 1B). This particular bird's nest was well-known in the area due to producing consistent offspring over the past three years, and researchers had closely monitored it nearly every day to document chick growth during the breeding season.

On the day of the predation incident, observers noticed the chicks in the nest around 8:00 AM, following their usual routine. However, during a subsequent observation around 11:30 AM, when the adult bird was away from the nest, a *P. canadensis* wasp was found on top of a still-living chick. The wasp was positioned near the head of the chick, which was visibly moving. The social wasp displayed typical foraging behaviors, including cutting and macerating tissue to facilitate the transportation of the resources, behaviors commonly observed in social wasps. The wasp's cuts were concentrated in the most sensitive areas of the chick's body, such as the neck, around the eyes, and near the beak, which could cause significant injury and distress. No defensive behavior was observed from the adult *C. lucidus* birds. Regrettably, the injured chick did not survive (Fig. 1C), and the social wasp was collected for identification by entomological net, and the voucher material was deposited in the Instituto Nacional de Pesquisas da Amazônia - INPA

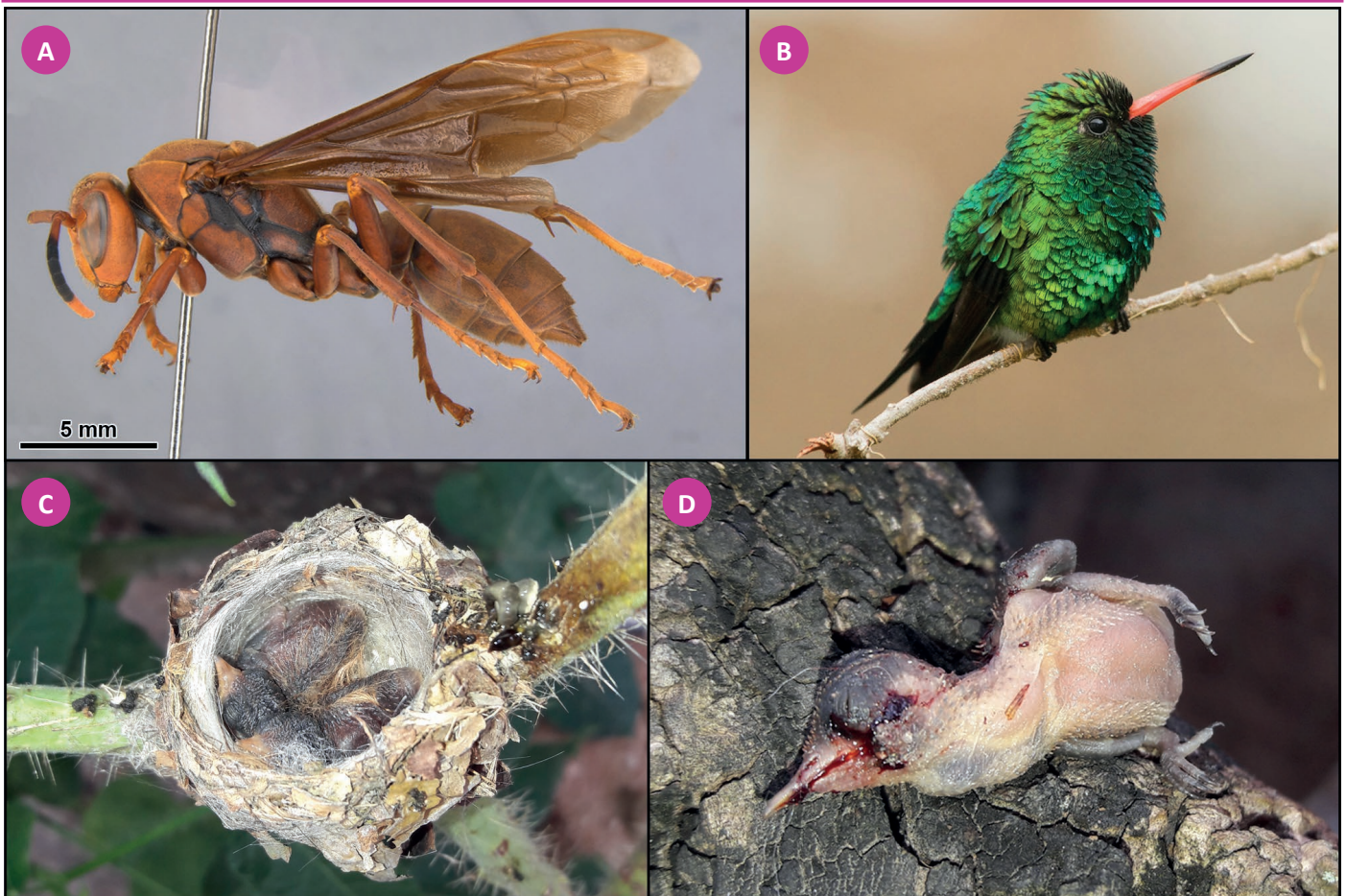


Figure 1. (A) Red paper social wasp *Polistes canadensis*. (B) Glittering-bellied emerald hummingbirds adult (*Chlorostilbon lucidus*). (C) Young *Chlorostilbon lucidus* in nest. (D) Young *Chlorostilbon lucidus* with marks of wasp predation in the most sensitive areas of the chick's body, such as the neck, around the eyes, and near the beak.

Collection and identified by a specialist.

Social wasps and birds are known to have a well-documented symbiotic relationship, with birds actively seeking social wasp colonies to take advantage of the aggressive behavior of the wasps (Somavilla et al. 2013; Menezes et al. 2014; Somavilla & Fernandes 2020; Silva et al. 2023). However, when it comes to antagonistic interactions, it is more commonly documented that birds prey upon social wasp colonies in search of food resources, such as larvae, pupae, and, in some species, sweet substances (Windsor 1976; McCann et al. 2013; McCann et al. 2015; Sazima et al. 2014). In contrast, there are few documented cases of social wasps preying on birds in the Neotropics (Frankhuizen et al. 2020).

The timing of this predation incident coincides with the optimal foraging period for social wasps (Detoni & Prezoto 2021). The injuries observed on the nestlings, caused by the social wasps, are similar to those previously documented in the literature, where wasps have been reported attacking live bird's nestlings or freshly dead carcasses. For example, Somavilla et al. (2018) describe instances where wasps have attacked recently deceased *Rattus norvegicus* (Berkenhout, 1769) (Muridae), focusing on soft tissues and areas with easy access to the flesh. Frankhuizen et al. (2020) also highlight cases where social wasps, especially from the genus *Agelais* Lepeletier, 1836, exploit injured nestlings as a resource, cutting into areas such as the eyes, neck, and soft abdominal regions. Moreover, the discovery of additional nestlings with similar wounds five days after the initial predation event suggests that the role of wasps as predators of nestlings may be more significant than previously thought. This underestimation may be due to the difficulty in observing these predation events directly, as wasps are typically quick and opportunistic predators.

This finding suggests that social wasps may have a more significant impact on bird populations, particularly young birds, than previously thought. It raises questions about the intricacies of the relationship between these two groups and the potential ecological implications of such predation events. Further research is needed to understand

the dynamics of these interactions and their possible consequences for both social wasps and bird populations in the Neotropics.

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Authors' Contributions

AS: Investigation, Validation, Writing - review & editing; MMS: Investigation, Validation, Writing - review & editing; BCB: Investigation, Validation, Writing - review & editing.

Conflict of Interest Statement

The authors declare no conflict of interest.

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