

NOTES AND COMMENTS



A new enemy of *Apis mellifera* (Hymenoptera: Apidae): First report of *Nomamyrmex esenbeckii* (Hymenoptera: Formicidae) attacking honey bee colonies

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ABSTRACT

Nomamyrmex esenbeckii, commonly known as the legionary ant, belongs to the group of army ants. This social insect employs a cooperative hunting method that is considered more evolved than solitary hunting ants. Their main preys are other ants and termites. However, in this article, we report for the first time in Mexico the predatory behavior of *N. esenbeckii* on *Apis mellifera* colonies.

ARTICLE HISTORY

Received 11 December 2020
Accepted 10 August 2021

KEYWORDS

Army ants; predator; pest; threat; *Apis mellifera*

Army ants (Hymenoptera: Formicidae) are the dominant group of insects in tropical and subtropical ecosystems. This is an ancient taxon of social predators with nomadic behavior that specialize in preying upon ants, termites, and some wasps, as well as other insects (Brady et al., 2014; Souza & Moura, 2008). *N. esenbeckii* Westwood (Formicidae: Dorylinae) belongs to the group known as the New World army ants. This ant species is one of only four in its genus and is a specialist social predator of other ants (Brady et al., 2014; Swartz, 1998). The previously recorded arthropod prey of *N. esenbeckii* comprises mainly leaf-cutting ants, such as *Atta laevigata*, *A. cephalotes*, *A. colombica*, *A. mexicana*, *Acromyrmex rugosus* (Powell & Clark, 2004; Sánchez-Peña & Mueller, 2002; Souza & Moura, 2008; Swartz, 1998), as well as other ant genera, such as *Camponotus* and *Odontomachus* (Powell & Clark, 2004). They have also been reported as predating termites of the genus *Nasutitermes* (Souza & Moura, 2008). However, to date, no attacks of *N. esenbeckii* on colonies of *Apis mellifera* L. (Hymenoptera: Apidae) have been recorded in North America or elsewhere.

In August 2019 an attack of *N. esenbeckii* was recorded in the apiary of Centro de Investigaciones Biológicas (Universidad Autónoma del Estado de Morelos), which is located in the city of Cuernavaca in Morelos, Mexico (18°59'02.3"N 99°13'56.4"W). It consists of 40 Jumbo type beehives with a deep

hive (brood chamber) and shallow honey super, with 10 frames measuring 45 × 28 cm and 45 × 14 cm each, respectively. The bees belonging to the race *Apis mellifera ligustica* Africanized. Two colonies of *A. mellifera* were depredated in less than 48 h by this ant, which was found in the deep hive (brood) and on the bottom hive (Figure 1a and b). Furthermore, dead ants and worker bees were found on the hive bottom (Figure 1c). Specimens of the soldier and worker ants of *N. esenbeckii* were collected and transported to the laboratory for taxonomic identification according to the taxonomic keys of Alatorre-Bracamontes et al. (2019) (Figure 1d–f). The species was identified by Jaime Hernández-Flores.

The European honey bee, *A. mellifera*, is a very important species for pollination services in ecosystems worldwide. However, in recent decades managed honey bees have been facing severe colony losses, of which global warming, anthropogenic activity, pests, and diseases are considered to be the main drivers (Hristov et al., 2020; Neov et al., 2019). Emerging pests and diseases threaten pollinators around the world; these problems are associated with honey bee colony collapse disorder (CCD), a phenomenon that has generated serious concern due to the decrease in honey bee colonies, which leads to a status of extinction risk in this vital ecological service provider (Stanimirović et al., 2019). This is the first report of *N. esenbeckii* predation of colonies of *A. mellifera* in the world. According to

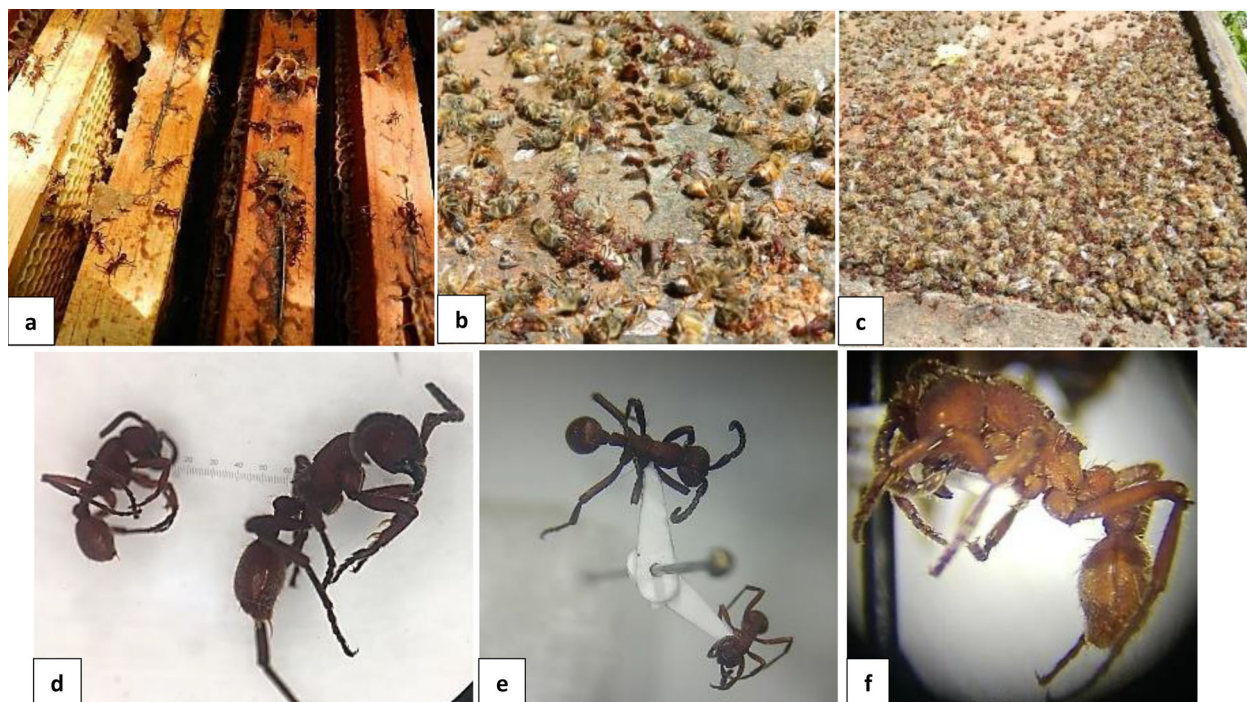


Figure 1. (a) Soldiers and workers of army ants in the deep hive (brood), (b) Army ant soldiers on the bottom hive, (c) Army ant and honey bee corpses on the bottom hive resulting from the battle, (d) Lateral view of collected army ant worker (left) and soldier (right) specimens, (e) Dorsal view of army ant soldier (top) and worker (bottom) specimens, (f) Lateral view of army ant soldier specimen.

Alatorre-Bracamontes et al. (2019), the current distribution of *N. esenbeckii* in Mexico extends to more than 20 states. This puts managed colonies of *A. mellifera* at risk of becoming prey of this social predator, representing a serious threat to the beekeepers of Mexico and other areas where army ants occur.

Disclosure statement

No potential conflict of interest was reported by the authors.

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