



SHORT NOTE

Foraging behavior of fire ant *Solenopsis saevissima* (Smith) (Hymenoptera: Formicidae) in *Felis catus* Linnaeus (Carnivora: Felidae) carcass

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Insects are the first organisms to detect and colonize dead animals, being present in every stage of decomposition (Carvalho et al., 2000). Carcass colonizers are classified as necrophagous, which feed on the corpse and are the first to arrive; natural enemies (predators and parasitoids), which feed on necrophagous in the corpse; omnivores, which feed both on the corpse and the associated fauna; opportunists, which use the corpse as refuge, warming and other purposes; adventives, which are found in the corpse with no apparent purpose (Almeida et al., 2010).

Ecological and fauna studies aiming to assess the decomposition-related entomofauna in vertebrate corpses are essential to understand the cycling dynamics of nutrients in ecosystems, as to build knowledge on the diversity related to these processes (Gomes, 2010). Furthermore, insects associated to murder cases and corpse decaying processes may participate in crime scenes and serve as evidence to the solving of such cases (Oliveira-Costa & Zuben, 2011).

Regarding activity, abundance and number of species, Formicidae family is an important group of insects related to animals in decomposition (Zara & Caetano, 2010). The

Abstract

Solenopsis saevissima fire ants were found foraging in a *Felis catus* carcass over tissues and secretions present in holes and mucosa. The ants built a dirt-made physical structure around the carcass, which prevented necrophagous flies from laying eggs or larvae in the body. These observations are relevant to increasing knowledge on the role of this ant genus in the decaying process of other animal corpses, including humans.

ecological role of ants in this process varies from predator to necrophagous (Moretti & Ribeiro, 2006).

A relevant ant group for forensic entomology is the genus *Solenopsis* Westwood, 1840, which includes individuals popularly known as fire-ants. These ants play the role of necrophagous and predators, and are present in various phases of the decomposition process (Oliveira-Costa et al., 2008).

The objective of this study was to register the presence and behavior of *Solenopsis saevissima* in a domestic cat carcass (*Felis catus* Linnaeus, 1758).

Observation took place during daytime in August 30 and 31 of 2014, in a public road of a residential condominium (21°46'02,72''S; 43°22'34,9''W) located in the urban area of the municipality of Juiz de Fora, Minas Gerais state, Brazil. The regional climate is characterized as warm subtropical – Cwa, according to Köppen (1970), and the weather conditions during the experiment were typical from winter (mean temperature of 14.1 °C), with short precipitation periods (0,2mm).

A domestic cat carcass (adult female) was found with unknown *causa mortis*. The corpse was in the first stages of the



decomposition process, transitioning through the fresh stage to the bloated stage, according to the classification suggested by Scaglia (2014). It is believed that death happened about 24 hours before the observations started.

An association between direct observation registers and spontaneous observation through *ad libitum* method (Altmann, 1974) was used for data sampling on the behavior of *S. saevissima* ants in the carcass.

Ant individuals were collected and fixed in alcohol at 70% in *ependorf* tubes for genus confirmation in laboratory. The Fernández (2003) dichotomous key was used for identification, as well as comparisons with reference individuals properly identified by specialists and deposited in the entomological collection of the Laboratório de Ecologia Comportamental e Bioacústica (LABEC) of Universidade Federal de Juiz de Fora.

Observations ended in August 31 of 2014 due to removal of the carcass by the condominium maintenance crew.

The *S. saevissima* ants (Fig 1A) were found exploring the whole carcass; the tissues and secretions present in holes and mucosa were being used as food source. Intense foraging activity by the ants was observed upon the carcass, as well as the construction of a physical structure made of dirt around the body (Figs 1B and 1C). Dirt accumulation around the corpse, associated with aggressive behavior of fire ants, may have prevented necrophagous flies from ovipositing (Fig 1D), once these individuals could not find the appropriate place (body cavities) for oviposition. The ants' action on the carcass also inhibited the presence of other decomposition-related insect species. Celino et al. (2009) observed the same soil-disturbing

phenomenon and suggested that this behavior is related to ant workers searching for larvae buried in the soil. However, in a very particular way, it stands out that the dirt accumulated by the ants for construction of the structure around the carcass was brought by the workers from another place (probably from the sidewalk), as the carcass was located in the interface of the asphalt and the sidewalk borders, thus offering no nearby resources to the construction of the structure.

Observations showed that ants have accumulated most of the dirt around the head of the corpse, which was partially covered (Fig 1 B). Such behavior shown by ants has limited the action of necrophagous insects (mainly flies), which had restricted access to the natural cavities of this region (mouth, ears, eyes and nostrils). According to Oliveira-Costa and Zuben (2011), the head part is the necrophagous' main access way to oviposition, as it is the first body part to start decomposing. *Solenopsis* ants' behavior of covering this part with dirt shows the dominance that this genus is able to place in a carcass, limiting the actions of other insects and changing the process of decomposition. Wells and Greenberg (1994) also inferred that the presence of ant *Solenopsis* in carcasses cause failures in succession of other insects in the decomposition process. Thus, such presence must be considered when using sequence data (succession pattern) to estimate postmortem intervals (PMIs).

Zara and Caetano (2010) relate that *Solenopsis* ants may indeed use a carcass on purpose, becoming dominant over the resources and avoiding competitors by the mass recruitment shown by ants. This group can be found in urban and forest areas (Moura et al., 1997) and its colonization

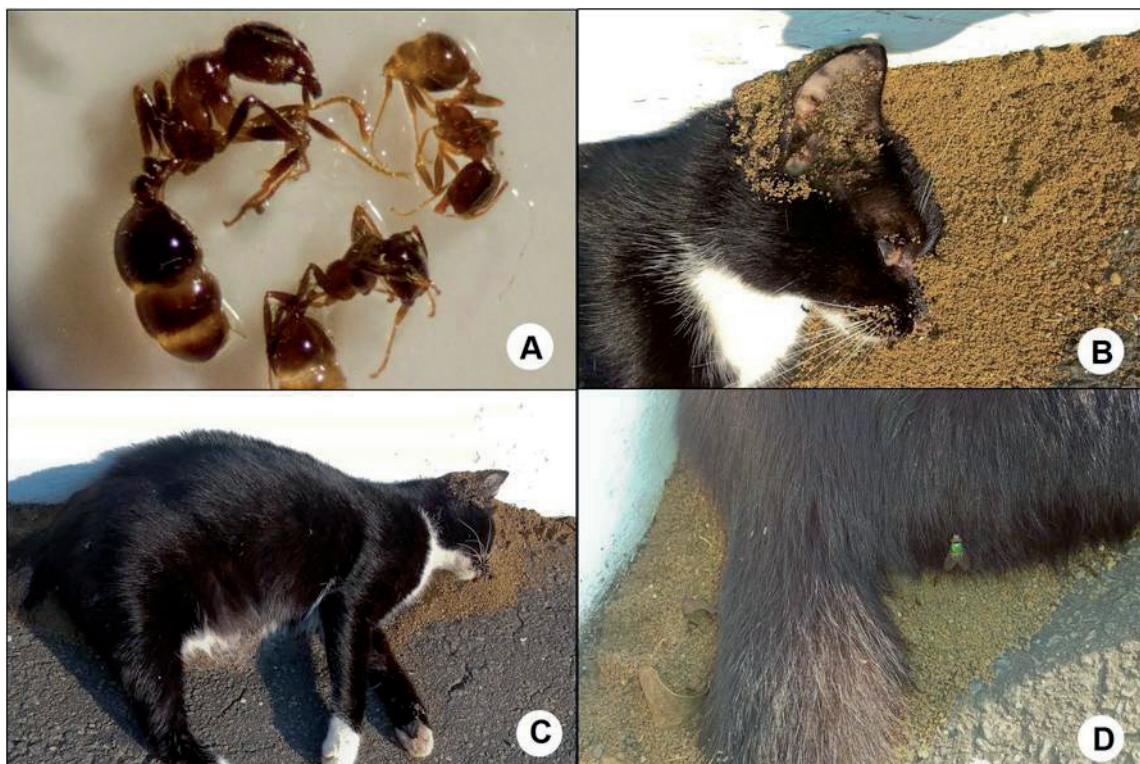


Fig 1. A - Ants of the *Solenopsis* genus photographed under stereomicroscope. B and C - Dirt-made physical structure around the cat carcass. D - Necrophagous flies prevented from ovipositing in a hole (anal cavity) due to the presence of ants in the body and the structure around the carcass.

changes the succession pattern and prevents other insect species from laying eggs in the carcasses (Moura et al., 2005).

The occurrence of *Solenopsis saevissima* and the behavior of burying in a medium sized vertebrate carcass are proof of the workers' capacity to modify the decomposition process. These observations are relevant to increase knowledge on this genus' role in the decaying process of other animal corpses, including humans.

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