

ANTS IN HISTORIC BUILDINGS: DAMAGE, BIOLOGY AND CONTROL

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Ants are insects belonging to the order Hymenoptera, the same group of wasps and bees (Herrick, 1926). They are called social insects because they have three characteristics that define the behavior in social insects: occurrence of at least two generations in a given moment of development of the colony; division of individuals into castes and cooperative care of offspring (Wilson, 1971).

These insects can occur in almost any terrestrial environment, except at the poles. Like any natural environment, artificial environments can be colonized and exploited by several species of ants. Thus, some of them are associated with the man and live in their homes (Eicheler, 1990, Fowler et al. 1994; Passera, 1994; Humam and Gordon, 1996; Bueno and Campos-Farinha, 1999).

Some species are neutral regarding the influence on economic aspects of humanity, but a large number of them is certainly beneficial for the action of aeration and soil movement, as well as decomposition of organic substances, contributing to nutrient cycling (Hölldobler and Wilson, 1990, Campos-Farinha et al., 1997).

Attention in recent years has been aimed at a group of ants that have specific habits and behaviors, characterizing them as wandering or urban species - "tramp species" (Passera, 1994). According to Hölldobler and Wilson (1990) and Passera (1994), urban species have the following characteristics: (a) Polygyny (b) constitute unicolonial populations, (c) breeding colonies by fragmentation, (d) show low aggressiveness intraspecific and interspecific aggression high, are scattered throughout the world through trade and human lives in intimate relationship with man

The presence of pests is due to the ecological imbalance caused by man himself. The accumulation of inadequate food, lack of care with the trash, the extermination of large predators, lack of hygiene and even the low educational level of the population that prevents them from having access to basic information on hygiene and health lead to and the uncontrolled proliferation of insects, lacking in natural conditions (Luz, 1991).

In Brazil, the situation is a big concern, once the ant fauna in homes has been detected in hundreds of samples in various cities, revealing more than two dozen different species, which demonstrates the presence of alien species (Fowler et al. 1994; Bueno and Campos-Farinha, 1999).

The most important exotic in Brazilian cities are: *Tapinoma melanocephalum*, *Paratrechina longicornis*, *Monomorium floricola*, *Monomorium pharaonis*, *Pheidole megacephala* and native species are: *Wasmannia auropunctata*, *Linepithema humile* and *Pogonomyrmex* spp. that behave the same way that exotic species. Among the native species, we also highlight the genera *Crematogaster*, *Camponotus*, *Pheidole* and *Solenopsis* (Fowler et al. 1994; Bueno and Campos-Farinha, 1999; Oliveira and Campos-Farinha, 2005).

Recent research on the market of urban pest controllers pointed the ants as pests more difficult to be controlled, besides being the most frequently mentioned in complaints, mainly in hospitals (Corrêa, 2000).

Urban ants have been controlled through insecticide sprays or liquids with non-specific products. They are applied directly on the ants or nearby areas. Techniques are also used with products sprayed in cracks in walls and behind boxes of sockets and electrical switches. Other forms of control are to use insecticides with residual effect, or applications in areas outside (perimeter treatment) (Jacob, 2001).

The methods of control through the application of insecticides in the form of powders or aerosols are not recommended because the colonies are usually found in places inaccessible or difficult to reach and tend to migrate when subjected to unfavorable conditions (Green et al., 1954). Furthermore, only 5 to 10% of workers leave the nest to forage, with no complete eradication of the colony (Bueno and Campos-Farinha, 1999). However, these applications can sometimes result in the elimination of the colony. But generally, these methods require the use of large quantities of insecticide, increasing the treatment. In addition, the overuse of insecticides can contaminate household items, medical equipment in hospitals or food factories food (Jacob, 2001).

Before the effective control is necessary to know the real situation of the ant infestation through monitoring. Basically, to know the level of infestation, how many and which species are present, and where colonies are located. This monitoring can be conducted through interviews, visual inspections and non-toxic baits. After careful analysis of information obtained may be assessed the need to control or not (Bueno and Campos-Farinha, 1999).

To have an effective control of these ants you need the knowledge of the biology of the species, thus avoiding the indiscriminate, excessive and unnecessary use of insecticides (Bueno and Campos-Farinha, 1999).

Among the urban ant species of economic importance will be described those that can cause damage in areas of historical heritage. In these environments, these ants can build nests by taking advantage of minor damage and cracks in door frames, wooden benches or concrete tiles, walls, sculptures and electrical wiring.

Due to the specific habits, these ants migrate easily from one place to another carrying all or part of their colony, causing infestations increase in size. That would be a form of reproduction, the sociotomy, which occurs through the fragmentation of individuals from one location to another. During breeding seasons, the ants perform copulation within urban structures, as along the evolution abolished the nuptial flight.

Besides discomfort that ants cause in urban environments, they can also damage electrical wiring causing a short circuit, injuring people through their stings and / or bitten. Some species exude a strong acidic odor.

Importantly, unlike the wood-boring termites and other insects, the ants do not feed on wood and any cellulosic material. They can only take advantage of the wooden structures, sculptures, paper files, libraries to build their nests. They go out looking for food and water and can cause a nuisance by their mere presence.

Next will be described some of the main species of ants that may occur in urban areas, such as historic buildings. The descriptions are taken from the Technical Bulletin of the Biological Institute (Campos-Farinha et al., 1997).

***Solenopsis* spp. (Fire ant):** The coloration can vary from light yellow to brown to shiny black. They have a sting at the end of the abdomen, body and head with few hairs (bristles). Polymorphic. There is no soldier. Their bite is painful because it introduces the ant sting in the skin of the victim inoculating the venom that causes blisters as if they were burns, may cause allergic responses in some people and, in severe cases, anaphylactic shock. Their nests are usually located in open areas, occasionally may infest electronic devices and even boxes of electrical wiring may cause a short circuit. The fire ants feed in all types of plants or animals and a variety of household foods.

***Monomorium pharaonis* (Pharaoh's ant):** The workers are monomorphic, with colors ranging from yellow to light brown, measuring 1.2 to 2.0 mm. They nest in cavities. Consume a variety of foods, preferably high in fat and also in sweet substances. Their colonies have many individuals and can contain multiple queens. The foundation of their colonies is caused mainly by fragmentation. It is difficult to control because it is highly dominant over the other species and has a rapidly growing colony.

***Pheidole* sp. (Big Headed ant):** They are dimorphic, being the biggest of which depicts the head disproportionately larger than the rest of the body (soldiers). But these are few in number in the colony. Can build nests in soil and cracks in sidewalks. They feed on protein-rich products.

***Wasmannia auropunctata* (Little fire ant):** Monomorphic workers with 1.5 mm long. The sting is present but rarely apparent. Golden brown coloration with the abdomen somewhat darker than the rest of the body. They build their nests in places ranging from very dry to very wet. The colony contains many individuals and may have more than one queen. Sting painfully and pain can last for several hours, but only bite when pressed. Their venom can cause allergies. Infest clothing, beds, cots or food. They feed on meat and oils.

***Camponotus* sp. (Carpenter ant):** They are polymorphic, showing various colors (from yellow to black). They may have many hairs or not, depending on the species. The thorax when viewed in profile is rounded. Some species excrete formic acid, a liquid with characteristic odor. Most of the carpenter ants build their nest in dead wood, but can also build them in the trunks of trees, but do not feed on wood. In urban areas nest in wood beams and door frames and floor. They can build secondary nests, smaller, connected to the main nest. They feed on sugary substances, eggs, meats and cakes.

***Paratrechina longicornis* (Crazy ant):** They are monomorphic, with the antennal scape very long, surpassing the margin of the head by up to half the size of the scape. These ants are dark, small and thin with long legs, run fast and in circle, hence the name, crazy ant. The colonies are small with multiple queens. They nest in soil under objects in the material deposited on the ground, such as wood chips and consume a variety of foods: meats, sweets, fruits, vegetables and even soda. Its control is difficult.

***Linepithema humile* (Argentine ant):** They are monomorphic and coloration varies from light brown to brown a little darker. The scape is not larger than the body and legs are proportionate to the body. This species builds its nest close to sources of food and water, sinks, potted plants, pipelines etc. They usually displace other ant species where they establish their nests. They feed on sugary substances, meat, dead insects, fruit juice and so on.

***Tapinoma melanocephalum* (Ghost ant):** Head, thorax and abdomen are dark and legs are yellowish. Individuals are very small, ranging from 1.3 to 1.5 mm long. They are found on soil, dead wood, parts of dead trees, tree cavities and in households. The colonies are medium sized to large, with many queens. New colonies are formed by migration of one or more queens accompanied by workers. They move in perfect rows. Prefer sweetened foods.

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