

# A Journey into an Ant Colony

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**A**lmost everyone has definitely spent some time observing ants as they forage for food, faithfully sprinting back and forth to their nests to deliver and store their goods, whether it be a single crumb of bread, a drop of water, a grain of sugar, or even a piece of meat. Although they can become a real nuisance in the kitchen, it is hard not to be fascinated by the incredible speed, dexterity, coordination, determination, and ingenuity that ants display. The social structure of ants is extensively studied, and admired, by scientists and laypeople alike. Despite the popularity of commercial ant farms, however, how ants actually live inside their hills and colonies has largely remained a mystery.

Thanks to a recently produced award-winning Austrian documentary (Ants: Nature's Secret Power), ant enthusiasts everywhere can now enjoy a glimpse into the tiny creature's hidden world. In a widely circulated YouTube clip, complex underground dwellings that look more like images of a futuristic spaceship than those of an ant nest are revealed. Dr. Luiz Carlos Forti, a professor at Brazil's UNESP

(Paulo State University), leads an excavation of what the narrator calls a "megalopolis" — a huge subterranean city built by leaf cutter ants that spanned an area of more than 538 square feet and delved 26 feet into the earth.

## Ants' Architecture

Leaf cutter ants live primarily in the tropical and semi-tropical rainforests of South and Central America, but they have also been found in Texas and other US states. They are essential to the ecosystem as aerators of soil and also aid in crucial nutrient redistribution in the forests they inhabit. The ants are, however, problematic for farmers, often ravaging crops at breakneck speed. They are also capable of destroying the foundations

of leaves, which they will later chew into a pulp and mix with their feces of ants and other insects in order to cultivate a specific type of fungus that forms the basis of their diet. They further pose a hazard to livestock, competing for the grasses they eat. Animals as large as cows have also been known to fall into abandoned nests. (Klappenbach)

Much of Forti's research has been centered on how to improve control over destructive populations of leaf cutter ants. By studying the architecture of their nests, it becomes possible to make more effective use of insecticides, reducing both cost and damage to the environment. There are other benefits, too. More information about the nests means more information about ants themselves — and an increased understand-

ing of the biological principle of self-organization (how simple units of nature form larger patterns through interactions with one another). One method of studying the structure of an ant nest is to make a cement mold — a technique that has been used by myrmecologists (scientists who study ants) for decades. (McClintock; Moreira)

As the documentary shows, Forti's team created such a mold by pouring a mixture of cement and water into a nest's entrance holes, which were detected using steam from a thermal fogger and then mapped out. The amount of cement required to make the mold was enormous; over a three-day period, the team poured 10 tons of cement into the tubes leading into the nest. After allowing the cement time to dry, the team returned a month later to remove the soil surrounding the structure with

the aid of heavy machinery, taking weeks to uncover the unique architecture of the ant nest — an intricate network of subterranean highways connecting chambers of various shapes and functions, including fungus gardens (where the ants grow their food) and rubbish pits. (Klappenbach; Moreira)

According to the film, the tunnels work to ensure good ventilation as well as to provide the shortest possible transport routes for the ants that use them. A similar excavation conducted in the US state of Louisiana also revealed the presence of several vertical tunnels below the nest's deepest cavity, extending to unknown depths. Some have speculated that such tunnels might serve as wells that allow a nest's inhabitants more convenient access to water. (Moser)

of buildings and cause millions of dollars worth of damage each year as they forage



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