

THE GREATEST CITY IN THE WORLD

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IN THE CITY That never sleeps, millions of workers are constantly on the go. There's lots to do: building new apartments, delivering food, taking care of newborns and the sick, cleaning the streets, getting through traffic. Oh, the traffic! This isn't New York or Mumbai, though — it's a subterranean city of ants.

Ants, of which there are 14,000 known species, inhabit every continent except Antarctica. And although some ants make their nests in dead, rotting logs or in tree cavities, or construct monuments of dirt above the ground, most ant nests remain all but invisible to those of us living above the earth's surface. The architecture of these underground nests is remarkably similar across species. They are constructed of one or a few long vertical shafts, with a variety of chambers branching off those shafts at different depths.

The most astounding thing about all this is that there's no leader of these vast cities. No single ant carries the blueprint for the nest — or the rules and roles of its society — in its mind. Yet every ant knows its job and cooperates with the others! For instance, the entire nest is excavated without a plan, in the dark, in a series of thousands of tiny steps. Scientists think that is crazy cool and call ant societies "superorganisms," meaning they are many individuals acting like one big organism. Superorganisms can help us understand how brains and human cities work and build things like better traffic systems and communicating robots. Scientists are especially excited now about studying individual ant species and how they respond to different environments, like whether it's wet or dry, says Deborah Gordon, an ecologist at Stanford University. Doing so could help us understand, for example, how different types of cancers behave in different parts of the body. It's all in a day's work for an ant. ♦

THE GRAND HANDOFF

The nest-construction process mostly remains a mystery, but researchers have learned that harvester ants work in a chain. One ant removes a clump of soil, moves it upward and drops it so the next ant can pick it up again. The process repeats until the pellet is finally deposited outside the nest.

IMMENSE STRENGTH

Ants are strong. For example, the Allegheny mound ant, a common species in the eastern United States, has a neck joint that can support objects up to 5,000 times the ant's weight. Imagine a 150-pound human lifting a Boeing 747!

DIG, DIG, DIG

Thanks to all their digging, ants are responsible for more soil-mixing than almost any other group of animals. According to a recent study conducted in Florida, more than 1,000 *Trachymyrmex septentrionalis* nests were found within just 2.5 acres. Together, those ants can move 2,200 pounds of soil each year!

THE DEAD

When an ant dies in a high-traffic area, workers cart the corpse out of the nest to a "middens," where they also toss out food remains and other trash.

THE VETERANS

The oldest ants live and work near the surface, where they engage in two of the riskiest jobs. For one, they help defend the nest when predators, or other ant colonies, attack. They're also in charge of leaving the nest to find food. Like all workers, the ants carrying out these tasks are female.

KNOW YOUR ANTS: BULLET ANT

Many experts consider the sting of the bullet ant, found in rain forests in Central and South America, to be one of the most painful of any insect. The pain, which can last for up to 24 hours, has been compared to being shot, which gives the creature its common name.

THE WORKERS

Middle-aged workers can usually be found in the central parts of the nest, where their jobs involve cleaning the nest, digging new tunnels and carrying food.

KNOW YOUR ANTS: TRAP-JAW ANT

The mandibles of trap-jaw ants can open a full 180 degrees. When they detect prey, their mandibles snap shut at speeds up to 143 miles per hour. They can even use this ability to launch themselves away from danger.

KNOW YOUR ANTS: ARGENTINE ANT

Argentine ants were once limited to waterways surrounding the Paraná River, which flows through Brazil, Paraguay and Argentina. But this highly successful invader can now be found on six continents (only Antarctica is untouched) and many islands. Researchers recently found that colonies in Europe, California and Japan could actually be considered as one massive global megacolony.

THE BABIES

In some species, the ant babies are kept in the deepest parts of the nest, where they are safest from disturbances near the surface. The youngest workers spend most of their time nearby, as their main job is to feed, clean and transport the eggs and babies, also known as the brood.

SICKNESS

Ants that leave the nest to forage are the ones most likely to become sick, so they generally keep to themselves, almost never interacting with the queen or the babies — to avoid the risk of passing infections to their most vulnerable compatriots.

NEIGHBORS

Ants aren't the only creatures that make a home underground. Sometimes ants nest near burrows excavated by other animals, like rodents, and they're more than happy to incorporate those spaces into their architecture. Nobody knows, however, whether the ants evict the previous tenants or simply take advantage of an abandoned hole.

KNOW YOUR ANTS: HONEYPOT ANT

Like bees, honeypot ants collect nectar — only instead of storing it in their homes, they store the liquids inside their bodies. Special workers gorge on so much flower nectar (and occasionally body fat from prey insects) that their abdomens enlarge. If food becomes scarce, these ants can vomit up the liquids for the colony to feast upon.

NAP TIME

Ants are often thought of as hard workers, but the truth is that at any one time, a large proportion of the colony remains in reserve within the nest, not working but ready to spring into action if necessary. Researchers have seen ants like these at rest — that is, not moving around — but nobody really knows whether or how ants sleep.

WHO'S IN CHARGE?

The queen's only job is to lay eggs. She's not in command of the colony. In fact, there's nobody in charge! Instead, individual ants use their antennae to sense chemical signals from other ants to work together. By combining these simple signals, the colony as a whole winds up making very complex decisions.

FARMERS

More than 200 types of ants grow their own food by farming fungus on decaying plant matter. They prefer to do their farming in taller, egg-shaped chambers. That's because the fungi grow in vertical strands, eventually forming curtains that hang from the ceiling.

TEMPERATURE CONTROL

By constructing chambers at varying depths, ants can take advantage of differences in temperature and humidity. If the deeper parts of the nest become too cold, workers might temporarily relocate the baby ants to shallower, warmer areas. Some species, including the fire ant, move their brood around on a cycle as favorable conditions shift. ♦

KNOW YOUR ANTS: ARMY ANT

More than 200 ant species are called army ants, but the best example is found in Central America and the Amazon jungle. These ants don't build a permanent nest. Instead, they construct a nest by interlocking their bodies, keeping the queen and larvae safe, while allowing the colony to remain ready to move in search of more food.

ANT ANATOMY

ANTENNAE

COMPOUND EYES

MANDIBLES

THORAX

ABDOMEN

THE QUEEN

All members of a typical ant colony (up to several million of them) are brothers and sisters, offspring of the founding queen. Depending on the species, there can be just one, a few, or even many reproductive queens in a single colony. Queen ants are some of the longest-lived insects around, able to survive in the wild for up to 30 years!

EGG

LARVA

PUPA

ADULT

ANTS' AGE
You can generally tell an ant's age by its location in the nest, with younger ants deeper down, and older ants near the surface.