

The Indian Space Research Organization (ISRO) launched the country's heaviest (5,854 kilograms) satellite, the GSAT-11, into orbit on a French rocket early on Wednesday morning to help boost broadband Internet services.

In Brazil backlands, termites built millions of dirt mounds

Roy Funch, an American botanist who has lived and worked in Brazil's hard-scrabble northeast for decades, long looked at huge cone-shaped mounds of mud in the distance and wondered: What built them? How many were there? How long had they been there?



VICTOR R. CAIVANO/AP
American botanist Roy Funch sits on top of a giant termite mound near Palmeiras, Brazil, on November 24, 2018.

After years of failing to generate interest in the mounds, a chance meeting with an English expert on social insects, Stephen Martin, led to remarkable discoveries: There are over 200 million mounds built by termites that stretch across 88,800 square miles (230,000 square kilometers), about the size of Great Britain, AP wrote. What is more, some of the dirt heaps are nearly 4,000 years old.

"While the Romans were building their columns, their buildings, these termites were building their mounds," Funch said, adding that the dirt piles represent the largest bioconstruction of any species other than humans.

The mounds, seen in various places in a vast desert-like region called the Caatinga, stand between six and 13 feet (two meters to four meters) high and are spaced roughly equally apart – between 52 feet and 72 feet (16 meters to 22 meters).

To landowners who clear brush to plant crops, the mounds are a nuisance. Bulldozing them is difficult because over years of being baked in the hot sun, the already-hard dirt and clay become like stone. Poor people in the area use chunks of the mounds to build adobe houses.

Funch says he wrote two articles about the mounds in Brazilian publications, but they did not draw any attention. Without expertise in insects or the world of scientific publishing, he was not sure how to take his research to the next level.

Asking local people did not help. "Some would say they are termites, some would say ants, some would say: 'Well, they have always been there. They are part of nature,'" Funch said.

Enter Martin, an entomologist at the University of Salford in England. A few years ago, Martin was in northeastern Brazil studying honey bees and ants in the state of Bahia. He, too, was curious about the mounds.

"I was intrigued because of their patterns," he said.

By chance, Martin and Funch met next to a river in Lencois, a small town in Bahia about 30 miles (50 kilometers) west of the edge of the mound area.

When Martin mentioned seeing the mounds while he was driving around, Funch told him: "You just met the only guy in Brazil who is working on these mounds."

The two teamed up, and their research was published November 19 in Current Biology.

The pair concluded the mounds were built by *Syntherisma diris*, a large termite species that feeds on leaves and lives underground. While

the termites are found in the region, the researchers did not find them actively working in the larger mounds, but instead along the edges of areas with mounds.

Cutting into several mounds, they found only a small tube-like hole going to the top of each one, not an extensive pattern of tunnels throughout. That suggested the termites were simply finding a place to chuck earth from underground, where they built their tunnels. "These are just waste heaps," said Martin.

"Under normal circumstances we wouldn't see them because they wouldn't persist for such a long time."

In more humid areas where the same species lives, such as the Amazon, the mounds are eroded by rain and wind. But the Caatinga ecoregion gets rainfall only a few weeks a year. The desert shrubland vegetation covers and camouflages the mounds in large swaths of the area, one of the reasons they were essentially hiding in plain sight.

Funch said improvements in Google Earth's imaging in recent years helped them understand the extent of the formations via spatial mapping.

"The mounds go on forever in every direction," said Funch, who initially came to Brazil as a Peace Corps volunteer in 1977 and stayed.

The mounds are also very old. Radioactive testing determined they ranged in age from 690 to 3,820 years.

"It could have been a giant termite (that built the mounds)," joked Luciano Oliveira, a local who lives in a house made with earth taken from a mound. "Nobody knows."

While many people view termites as pests because some species eat wood, and thus homes, the social insects are also some of the world's best engineers, building vast networks of underground tunnels and huge heaps of dirt.

An Associated Press journalist who accompanied Funch to watch the nocturnal termites at work saw soldier termites about a half-inch long and with large pincers stand guard while smaller workers gathered dead leaves and cut them in smaller pieces, making "click, click, click" sounds as they worked. When a flashlight was shined on the termites for a few seconds, they scurried down small holes.

Rob Fringle, a Princeton biology professor who has studied termites and their mounds in Kenya, Mozambique and Namibia, said fighting between termite colonies can lead to patterns in the mounds they produce.

The fact that the Brazil study found the termites did not fight unless they were from colonies several kilometers apart means there is a lot more to discover about how termites create such patterns.

"We keep peeling back different manifestations of these incredible, huge-scale spatial patterns in nature," Fringle said.

Funch and Martin said there is much they still need to investigate.

Among the major questions are: Why don't the mounds appear to have active colonies underneath them? What causes the uniform spacing? And how long did it take termites to make the biggest mounds?

"These are Mayan temples that the locals knew were here," said Funch.

"But the critical eye of science is just beginning to discover them."

Volkswagen says next generation of combustion engine cars to be its last

German auto giant Volkswagen will begin rolling out its last generation of combustion engine cars in 2026, in its latest green pledge as it looks to turn the corner on the "dieselgate" emissions cheating scandal.

The carmaker, which last month announced a €44-billion (\$50 billion) electric offensive by 2023, said it would phase out its diesel and petrol cars as it looks to meet the emissions targets of the 2015 Paris climate deal by 2050, AFP reported.

Michael Jost, Volkswagen's strategy chief, told an industry conference on Tuesday that the firm's employees were working on "the last platform for vehicles that aren't CO2 neutral."

"We're gradually fading out combustion engines to the absolute minimum," he said at the conference. "We're gradually fading out combustion engines to the absolute minimum," he said at the conference.

The group, whose brands range from luxury Porsche and Audi to the budget-conscious Skoda and Seat, has set itself the ambitious target of offering more than 50 electric models by 2025, up from six today.

Just said that last generation of vehicles would



TOBIAS SCHWARZ/AFP

begin to roll out in 2026 and predicted that the last vehicle with a combustion engine would be sold around 2040, according to the German newspaper Handelsblatt, whose car conference he spoke at.

In November's announcement the group said its "electric offensive" would focus on electric, self-driving and connected cars as well as mobility services like car sharing.

The move underscores just how serious the automaker is about closing the gap with Asian competitors and US tech giant Tesla who have had a head start in the e-car race.

Volkswagen's pivot towards e-cars has in part been spurred by efforts to shake off its ongoing "dieselgate" scandal.

The group was forced to admit in 2015 that it

had installed cheating software in 11 million diesel vehicles designed to dupe pollution tests.

Suspicious of trickery later spread to other carmakers too, badly hurting the industry's reputation.

The saga also fueled a backlash against diesel, with a string of German cities now facing driving bans for the oldest, most polluting diesel cars.

Faced with increasingly

angry drivers, the German government has come under pressure to avoid the bans but its efforts to get carmakers to commit to cleaning up engines have had limited success.

The "dieselgate" fallout has so far cost Volkswagen more than €28 billion in fines, buybacks and compensation and the company remains mired in legal woes around the world.

CEO: Russia to sell first batch of Ka-62 choppers in 2020

Russian Helicopters company is planning to launch serial production of multipurpose Ka-62 choppers and sell the first four aircraft in 2020, the company CEO, Andrey Boginsky, said on Wednesday.

"Certification tests are now underway. We have tasked ourselves with demonstrating an experimental aircraft at the MAKS [international air show] flight program. We are actively working on preliminary contracts for a series. We plan to produce and sell four choppers in 2020," Boginsky said, Sputnik reported.

The Ka-62 medium multirole helicopter is designed for transporting

passengers, offshore works, providing emergency medical care, carrying out search and rescue operations, transportation of cargo, patrolling and ecological monitoring.

The Ka-62 is fitted with two Arden 3G engines made by Turbomeca with modular design and dual-channel FADEC system that ensure high reliability, heightened ease of operation and low fuel use. The helicopter also boasts five-bladed main rotor and enclosed multi-blade anti-torque rotor in the vertical tail fin.

In August, Boginsky said that Ka-62 will receive an international certificate in 2020.



ALEXEY FILIPPOV/SPUTNIK

Ash woodlands 'may flourish once again'

Scientists say there is hope that some ash forests will be able to survive a devastating tree disease.

Surveys around Europe reveal mortality rates from ash dieback as high as 70 percent in woodlands and 85 percent in plantations, BBC reported.



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A previous study found almost all ash trees could be wiped out.

The disease has swept across Europe over the past 20 years, causing widespread damage to woodlands. In many cases the fungus will eventually kill infected plants.

"Although the numbers seem grim, the percentage of trees that are still alive is encouraging from a long-term perspective," said Professor Richard Buggs, of Royal Botanic Gardens Kew and Queen Mary University of London.

"If this survival is due to heritable resistance, then conservation policies targeting breeding programs or natural selection may allow ash populations to flourish once again."

The researchers pulled together surveys of ash dieback across Europe, including England, Ukraine, Scandinavia and the Baltic States. They found that even in forests that had been exposed to the disease for 20 years, not all trees were lost.

"Although we may witness terrible devastation of ash woodlands in Europe, our grandchildren may see viable ash populations," said the researchers.

There is typically a delay of 10 years from the disease entering the country to the widespread death of ash trees. This means that in the UK, the full extent of ash dieback will not become clear until 2022.

Rats, pigeons 'replace iconic species'

The modification of land for farming and building cities is favoring the same species everywhere, according to a new study. Animals like rats and pigeons



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are taking over from less common ones, which can survive only in certain habitats, said scientists, BBC reported.

Researchers looked at 20,000

animals and plants in 81 countries.

They found that species occupying a large area tend to increase in places where humans use the land.

However, fauna and flora that occupies a small area is lost.

"We show around the world that when humans modify habitats, these unique species are consistently lost and are replaced by species that are found everywhere, such as pigeons in cities and rats in farmland," said Dr. Tim Newbold, a research fellow at University College London.

Co-researcher, Professor Andy Purvis of the Natural History Museum, London, compared the changes in biodiversity to what is happening on the British high street.

"As small, independent retail-

ers are going out of business, large chains dominate," he said.

"It makes all towns look the same, and it's less easy to tell where you are. Likewise, people are affecting nature everywhere they go, and everywhere there are localized species which are struggling to make a living."

The findings are important for conservation efforts. Plants and animals that live only on small areas of land are already at higher risk of extinction than species which have adapted to live all over the world.

Previous research has shown that animals and plants occupying small areas also provide distinct and important roles within the web of life, and may be vital for our food security.

The study was published in PLOS Biology.