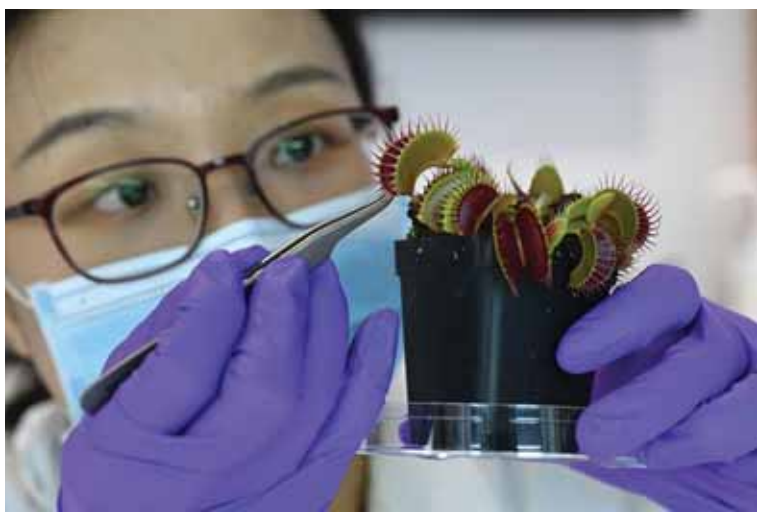


This photograph shows Luo Yifei, PhD student at Nanyang Technological University's (NTU) School of Materials Science and Engineering, attaching an electrode on the surface of a Venus flytrap plant at a laboratory in Singapore, as scientists develop a high-tech system for communicating with vegetation.

Luo Yifei attaching an electrode on the surface of a tobacco plant at a laboratory in Singapore, as scientists develop a high-tech system for communicating with vegetation.

A test of electrodes attached on the surface of a tobacco plant at a laboratory in Singapore, as scientists develop a high-tech system for communicating with vegetation. — AFP photos

Rise of the 'robo-plants', as scientists fuse nature with tech

Remote-controlled Venus flytrap "robo-plants" and crops that tell farmers when they are hit by disease could become reality after scientists developed a high-tech system for communicating with vegetation. Researchers in Singapore linked up plants to electrodes capable of monitoring the weak electrical pulses naturally emitted by the greenery. The scientists used the technology to trigger a Venus flytrap to snap its jaws shut at the push of a button on a smartphone app.

They then attached one of its jaws to a robotic arm and got the contraption to pick up a piece of wire half a millimeter thick, and catch a small falling object. The technology is in its early stages, but researchers believe it could eventually be used to build advanced "plant-based robots" that can pick up a host of fragile objects which are too delicate for rigid, robotic arms.

"These kinds of nature robots can be interfaced with other artificial robots (to make) hybrid systems," Chen Xiaodong, the lead author of a study on the research at Nanyang Technological University (NTU), told AFP. There are still challenges to be overcome. Scientists can stimulate the flytrap's jaws to slam shut but can't yet reopen them-a process that takes 10 or more hours to happen naturally.

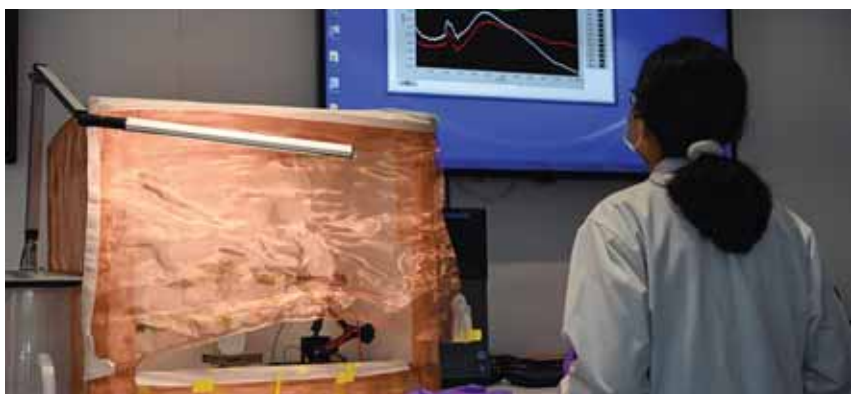
Crop defense

The system can also pick up signals emitted by plants, raising the possibility that farmers will be able to detect problems with their crops at an early stage. "By monitoring the plants' electrical signals, we may be able to detect possible distress signals and abnormalities," said Chen. "Farmers may find out when a disease is in progress, even before full-blown symptoms appear on the crops." Researchers believe such technology could be particularly useful as crops face increasing threats from climate change.

Scientists have long known that plants emit very weak electrical signals but their uneven and waxy surfaces makes it difficult to effectively mount sensors. The NTU researchers developed film-like, soft electrodes that fit tightly to the plant's surface and can detect signals more accurately. They are attached using a "thermogel", which is liquid at low temperatures but turns into a gel at room temperature. They are the latest to conduct research communicating with plants.

In 2016, a Massachusetts Institute of Technology team turned spinach leaves into sensors that can send an email alert to scientists when they detect explosive materials in groundwater. The team embedded carbon nanotubes that emit a signal when plant roots detect nitroaromatics-compounds often found in explosives. The signal is then read by an infrared camera that sends out a message to the scientists. — AFP

Luo Yifei testing an electrode on the surface of a Venus flytrap plant at a laboratory in Singapore.



Luo Yifei monitoring an application on the computer during a test of an electrode attached on the surface of a tobacco plant at a laboratory in Singapore.

A dead fly trapped inside a Venus flytrap plant, used to test an electrode attached on the surface of the plant at a laboratory in Singapore.

Climate change driving marine species poleward

Warming waters have driven thousands of ocean species poleward from the equator, threatening marine ecosystems and the livelihoods of people who depend on them, researchers reported Monday. Comparison of data on nearly 50,000 species over three 20-year periods up to 2015 revealed that the exodus from tropical waters is accelerating, they reported in the journal PNAS.

The tropics have long harbored an outsized proportion of marine life, but could see that diversity disappear if climate change is not brought to heel, the authors warned. "Global warming has been changing life in the ocean for at least 60 years," senior author Mark Costello, a professor of marine biology at the University of Auckland, said.

"Our findings show a drop of about 1,500 species at the equator," he added. "This will continue throughout the century, but the pace will depend on how we reduce-or not-greenhouse gas emissions." Poleward migration was more pronounced north of the equator, where oceans have warmed more quickly than in the southern hemisphere.

It was also more prevalent among open water fish than so-called benthic species living on the ocean floor. "Benthic species can only move during their floating life-stage, and thus their shift (poleward) is between generations," Costello explained. By contrast, species living in the high seas "can move with the water masses in their lifetime." Marine life in tropical waters declines when annual average sea temperature rises above 20 to 25 degrees Celsius, depending on the species, the study found.

40 percent drop by mid-century

"The 'missing' tropical species are likely following their thermal habitat as subtropical waters warm," noted co-author David Schoeman, a professor of ecology at Nelson Mandela University in Port Elizabeth, South Africa. Fossil records show that the same thing happened 140,000 years ago, the last time global surface temperatures were as hot as they are now.

Based on data in the open-access Ocean Biodiversity Information System, the statistical study does not look at how individual species will adapt to new environments. In general, open-water species are likely to fare better, earlier research has found. The impact on commercial fish stocks in the tropics is not addressed either, though it is clear which parts of the world will be hit the hardest.

"Indonesia and other nations near the equator, such as in West Africa, have the most to lose because their stocks can only decrease," as no new species will replace those leaving, Costello said.

Worldwide, about 1.3 billion people live in coastal tropical areas, many of which rely on fisheries for food. A recent review article in Nature estimated that the maximum catch potential of tropical fish stocks in so-called exclusive economic zones — 200 nautical miles (370 kilometers) from the coast-would decline 40 percent by mid-century if global warming continues unabated. In most Pacific island nations, combined catch of skipjack and yellowfin tuna-the two most exported fish-would drop up to 40 percent under the same scenario, while coral reef fish consumed locally could decline even more. The study in PNAS began with the University of Auckland doctoral dissertation of Chhaya Chaudhary. — AFP

LEGENDARY MOSCOW MOVIE HALL TO REOPEN AFTER EXTENSIVE RENOVATION

Moscow's oldest cinema hall, built over a century ago, will reopen next week after an extensive years-long renovation, the management said Friday. The Khudozhestvenny, an Art Nouveau one-storey cinema designed by architect Nikolai Blagoveshchensky, is located in the Russian capital's historic Arbat quarter and once drew such luminaries as Leo Tolstoy. It closed for an extensive renovation in 2014 to restore the bas-reliefs on its facade. The interiors were also completely redone.

The management said it would reopen to the public next Friday. During the Soviet era it hosted up to a 1,000 spectators. The world premiere of the iconic film "Battleship Potemkin" by Sergei Eisentein was held here in 1926. The foyer was lit by intricate chandeliers and even had a fountain and an orchestra that played for the public before the film show, according to Russian media reports. It was the only cinema with a home delivery ticket service. The renovations began when the theatre was owned by the Rambler group of Russian billionaire Alexander Mamut. The Rambler group has now been bought by Sberbank, Russia's largest bank. "Sberbank has completely restored the legendary cinema," Sberbank said, without saying how much the renovations cost. — AFP

Thandie Newton reverts to original name spelling, 'Thandiwe'

In this file photo British actress Thandie Newton arrives for the Los Angeles season three premiere of the HBO series "Westworld" at the TCL Chinese theatre in Hollywood, California.

British actress Thandie Newton says she is reverting to the original Zimbabwean spelling of her name, Thandiwe, after decades in Hollywood. Newton, the daughter of a British lab technician and a Zimbabwean princess, told Vogue magazine the spelling-which means "beloved" in the African country's Shona language and is pronounced "tan-DEE-way"-was changed in the credits for her first acting role, in 1991's "Flirting," when she was just 16. Now, the 48-year-old "Westworld" star said, she is changing it back.

"That's my name. It's always been my name. I'm taking back what's mine," she was quoted as telling the British magazine in her May 2021 cover interview. Newton, who has long been an advocate for women who have been sexually assaulted, has been outspoken about racist and sexual abuse in Hollywood. In the Vogue interview Newton said "Flirting" director John Duigan asked her to "be a bit darker" for the role, and repeated allegations that the then-39-year-old embarked on what she has previously described as a "coerced" sexual relationship with her.

She recalled other derogatory incidents of racism and sexual abuse, including a director who abused her and then showed footage of the incident to others. "I was traumatized," she told the magazine. And she spoke frankly about her battles with an eating disorder, calling it "the most horrific dance with something that's supposed to bring you life." "Black women are truly the nexus where all of this overlaps," she said. "Think of what else has the potential to heal if we support and care for Black women."— AFP