

International

An irresistible scent makes locusts swarm, study finds

Locusts devastating crops in several parts of the world

TOKYO: The coronavirus isn't the only plague making headlines this year—locusts are devastating crops in several parts of the world, and now scientists are discovering why the pest forms destructive swarms. On its own, a locust is fairly harmless. But so-called solitary locusts can undergo a metamorphosis, changing color and joining together with millions of others in catastrophic clouds that strip fields.

So what prompts locusts to transform from solitary to “gregarious”? A study published Wednesday in the journal *Nature* reveals the secret lies in a pheromone. Almost like an irresistible perfume, the chemical compound is emitted by locusts when they find themselves in proximity to just a few others of their kind. The chemical attracts other locusts, who join the group and also begin emitting the scent, creating a feedback loop that results in enormous swarms.

The discovery offers several tantalizing possibilities, including genetically engineering locusts without the receptors that detect the swarming pheromone, or weaponising the pheromone to attract and trap the insects. The study comes as record numbers of locusts devour crops in east Africa and threaten the food supply in Pakistan. It focused on the migratory locust, the most widely distributed species of the insect, and examined several compounds produced by the bug.

It found that one in particular - 4-vinylanisole, or 4VA—appeared to attract locusts when emitted, and that the more locusts flocked together, the more 4VA

they emitted. The team, led by Le Kang, a professor at the Chinese Academy of Sciences, found solitary locusts began releasing 4VA when just four were placed together in a cage.

The team then examined how the locusts picked up the scent, and isolated the part of the locust antennae responsible for detecting the swarming pheromone. And from there, they found the gene necessary for the detection process and produced genetically modified locusts lacking the key Or35 gene. The “mutant locusts lost their attraction to 4VA compared with the wild-type locusts”, the study said.

The discoveries open up several possibilities for tackling the voracious pests, including using genetic modification, or tracking 4VA production to predict where swarms may be forming. There are other avenues too, including weaponising the chemical, by using a synthetic form of it to bait traps to catch locusts. Kang and his team tried this, setting up traps in both controlled settings and in the field, and in both cases found the locusts were effectively lured. “Optimization and adjustment are necessarily required from the experiments to practical application,” Kang said.

But he said the traps were “significantly efficient” and could be a comparatively easy first application of the research. Leslie Vosshall, head of Rockefeller University’s Laboratory of Neurogenetics and Behavior, said perhaps the most exciting application would be finding a chemical that would block reception of 4VA. “The discovery of such a molecule might



MOSCOW: A locust clammers on a daylily flower leaf in a garden outside Moscow. — AFP

provide a chemical antidote to insect aggregation and cause locusts to ‘stand down’ and return to their peaceful, solitary way of life,” she wrote in a review commissioned by *Nature*.

Vosshall pointed out that there are still several unknowns, including whether 4VA is the only thing that causes swarm formation, and whether other locust

species respond similarly to the compound. Kang said genetic modification of locusts might offer “sustainable and green control” but acknowledged such a project would require large-scale and long-term efforts. “This is an approach for long-term control of locusts, and needs strict biological security evaluation before application.”—AFP

Global warming makes tropical soils leak CO2

PARIS: Tropical forest soil warmed in experiments to levels consistent with end-of-century temperature projections released 55 percent more CO₂ than control plots, exposing a previously underestimated source of greenhouse gas emissions, researchers reported Wednesday. Before humanity began loading the atmosphere with carbon pollution by burning fossil fuels, the input and outflow of CO₂ into soil - one key element in Earth’s complex carbon cycle - remained roughly in balance. Gases emitted by deadwood and decaying leaves, in other words, were cancelled out by microorganisms that feed on such matter. But climate change has begun to upset that balance, according to a new study, published in *Nature*.

“Carbon held in tropical soils is more sensitive to warming than previously recognized,” lead author Andrew Nottingham, a researcher at the University of Edinburgh’s School of Geosciences, told

AFP. “Even a small increase in respiration from tropical forest soils could have a large effect on atmospheric CO₂ concentrations, with consequences for global climate.” The quantity of carbon cycling each year through soils worldwide is up to 10 times greater than human-generated greenhouse gas emissions. Just a one-percent imbalance - with more carbon going out than in - “would equal about ten percent of global anthropogenic (man-made) carbon emissions,” noted Eric Davidson, a researcher at the University of Maryland Center for Environmental Science. Earth’s average surface temperature has risen just over one degree Celsius (1C) above preindustrial levels, enough to boost the severity of droughts, heatwaves and superstorms made more destructive by rising seas. But the increase in temperatures over land alone - excluding oceans, which cover 70 percent of the planet - has been nearly 2C, or double the global average.

In the experiments, Nottingham and colleagues placed heating rods in a one-hectare plot of undisturbed primary forest on Barro Colorado Island, Panama. They warmed the soil to a depth of just over one meter (three feet) by 4C over a period of two years. Soil temperature is usually about a degree warmer than air temperature. While such experiments have been conducted in higher latitude forests, none had been carried out up to now in the tropics.—AFP

‘Love is not tourism’: Hope for couples kept apart by coronavirus

PARIS: Are the long months of lonesome waiting finally over? Coronavirus travel restrictions have kept lovers and unmarried couples apart since the outbreak, but governments around the world are now showing more understanding of their plight, with some introducing measures to allow a happy and long-awaited reunion. Before the pandemic, Frenchman Nicolas Perret would meet his partner - who lives in Russia - in one or the other country using a tourist visa.

They last saw each other several months ago. “At some point this will all come to an end. We know that much, but no one knows when, or how much harm it will have done,” the 50-year-old engineer told AFP, saying they have considered changing jobs, taking up studies again or even getting married in order to reunite.

Some governments permitted married couples and civil partners to get round travel bans and join their other half, but couples lacking official paperwork to prove their relationship were kept sepa-

rated. The rules - judged unfair by melancholy lovers - prompted a worldwide social media campaign called “Love is not tourism”. “It is obvious that we must halt tourism to protect us and others,” the lobby group said on a website set up to back the campaign. “But love is not tourism. This is not just about a summer holiday, it is about mental health and the future of people all around the world.” Non-essential travel to the European Union remains prohibited from a number of countries, including the United States, with exceptions for EU citizens, residents and their families. In theory, member states can choose to allow unmarried partners in documented relationships to enter the EU, but in practice few do so. On Friday, the European Commission urged member states to end many couples’ torment and allow entry for unmarried partners of European citizens and residents.

Germany, which holds the rotating EU presidency, has sent a questionnaire quizzing the 27 member states on their policy. Travel restrictions have prevented Emeric Tonri from returning from France to Vietnam where he lives with his wife and their four-year-old daughter. “It’s tragic, I haven’t seen her since December,” said Tonri, who has worked in the southeast Asian country for the past six years. Writer Lucie Azema had been living with her Azerbaijani boyfriend in Iran’s capital Tehran for over a year when the pandemic tore them apart.—AFP