

New Scientist

WEEKLY 24 August 2024

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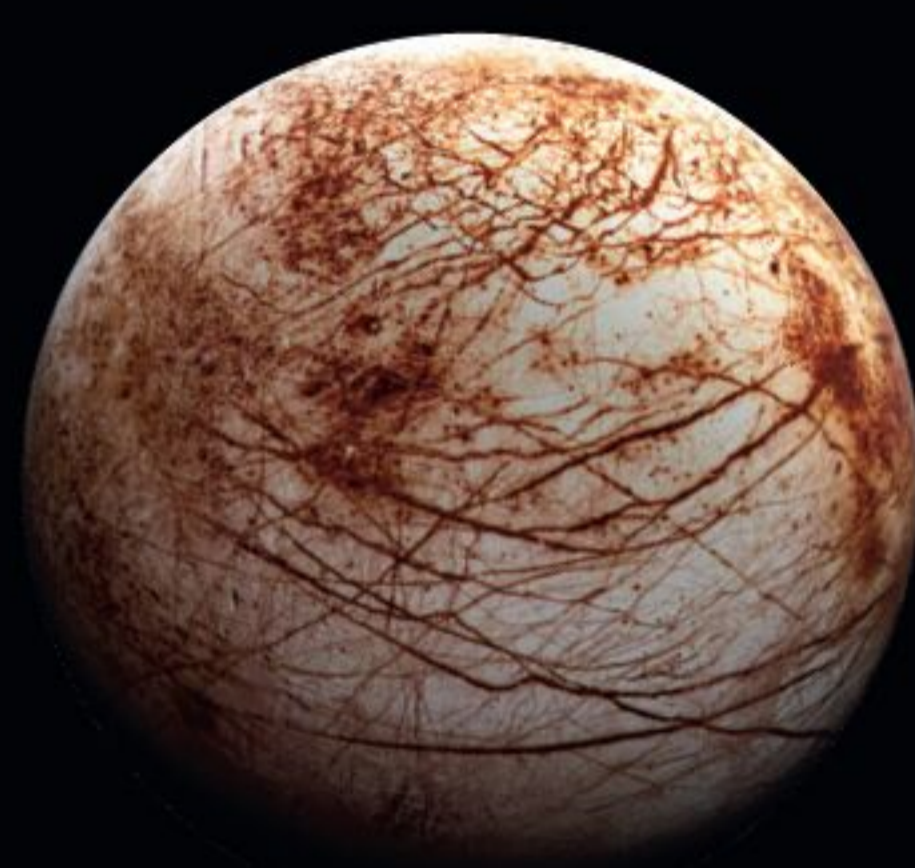
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Zoology

Cockroaches shrug off consumer insecticides

Madeleine Cuff

PEOPLE buying insecticide sprays to battle cockroaches are wasting their money because the insects have grown resistant to a key ingredient.

Johnalyn Gordon at the University of Florida and her colleagues have shown that while consumer sprays that contain pyrethroid insecticides kill lab-sourced German cockroaches (*Blattella germanica*), they are ineffective against insects collected from real-world infestations. This species is common throughout the world, and the one most likely to infest buildings.

The products are designed to be sprayed on to surfaces, killing the insects when they walk over the coating. But in the team's tests, coated surfaces killed fewer than 20 per cent of collected cockroaches after exposure for 20 minutes. "Even directly spraying them in an enclosed container with these products, we weren't getting 100 per cent mortality," says Gordon.

When the cockroaches were forced to remain on the treated surfaces, most of the products took between 8 and 24 hours to kill (*Journal of Economic Entomology*, doi.org/nc5w). Previous research has shown that these insects avoid lingering on surfaces treated with pyrethroids, though.

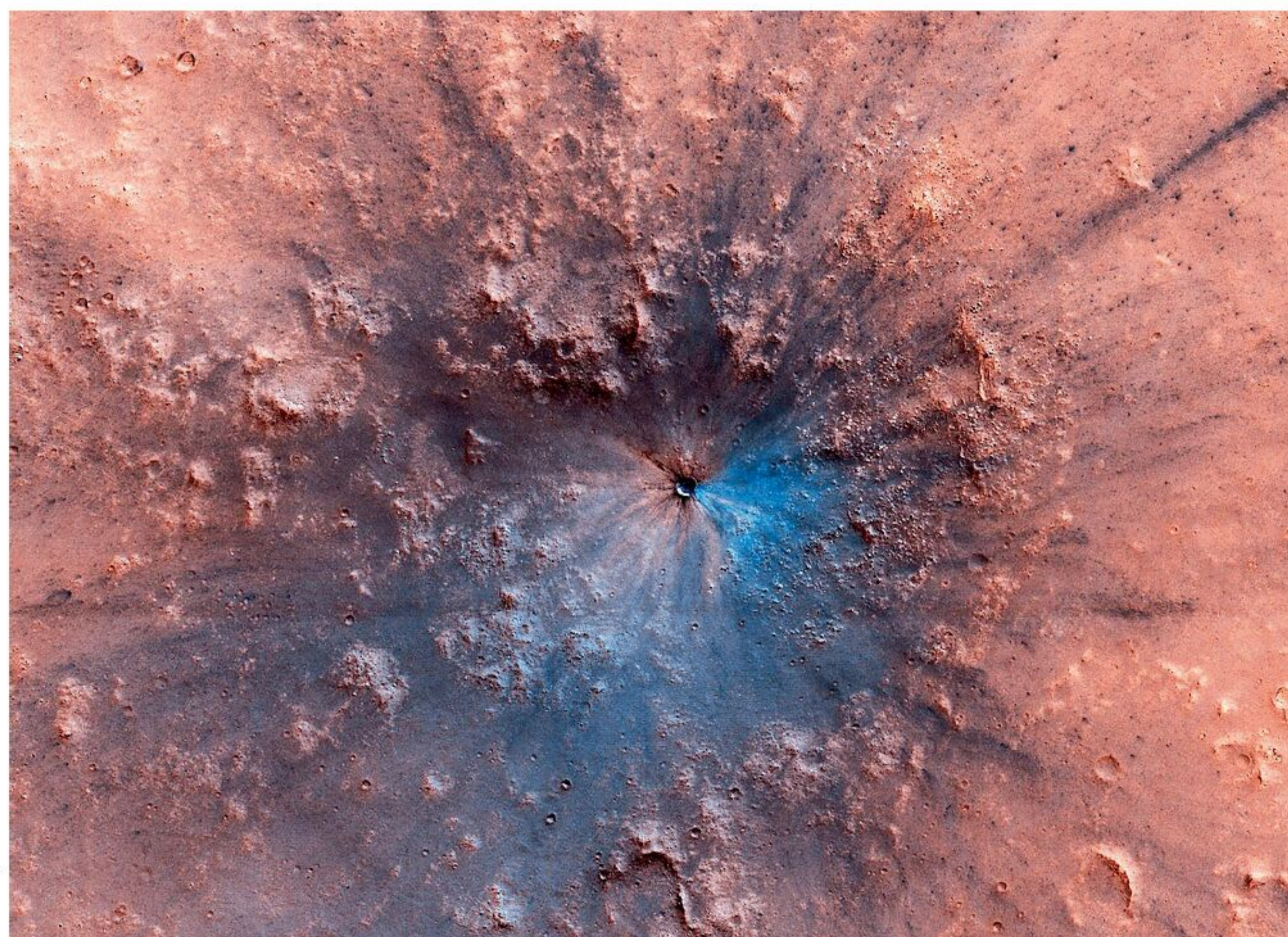
Pest-control products sold in the US must prove a 90 per cent efficacy rate, but there is no general requirement for testing on field-collected insects. This should change, says Gordon.

In the meantime, cockroach baits are probably the most effective consumer product for controlling infestations, she says, and to also minimise human exposure to pesticides. Other in-home strategies, such as removing food and water sources used by the insects and clearing clutter, can also help. Professional pest control, which relies on pesticides beyond pyrethroids, is also recommended. ■

Solar system

Strange meteorites traced to their source craters on Mars

Leah Crane



NASA/JPL-CALTECH/UNIVERSITY OF ARIZONA

SIX meteorites that crashed down on Earth have been traced back to the craters they were ejected from on Mars millions of years ago. Finding the sources of these alien rocks will allow us to place them in context, yielding insights about the history of the Red Planet.

"Being able to identify the impact launch sites for any Martian meteorites has been a challenging goal for a long time," says Hap McSween at the University of Tennessee, Knoxville, who wasn't involved in this work. "There have been numerous published attempts before, but none have been very convincing until now."

When a rock smashes into Mars or another planet, it causes a spray of debris, some of which can float away through space and eventually hit Earth as a meteorite. Anthony Lagain at Curtin University in Australia and his colleagues have used a model that matches what we know about the ages of the millions of Martian craters and of the six meteorites that were chipped off the planet's surface.

"On Mars, you've got about 80,000 craters larger than

3 kilometres, so about 80,000 craters that might be the source of these meteorites," says Lagain. The researchers' model narrowed this down to around 20 possible sources. Then, they studied the structure of the meteorites to find out how much force they had been suddenly subjected to when blasted into space, feeding that into another model of the craters themselves.

This led them to where these rocks were originally buried and how deep they probably were before the impacts that sent

Water inside Mars

A study using data from NASA's InSight lander has revealed a possible reservoir of water near Mars's equator. InSight found the water buried 11.5 to 20 kilometres underground by searching for marsquakes and measuring how fast those seismic waves travelled. This revealed that the rocks the quakes were propagating through seemed to be saturated with water (PNAS, doi.org/nc6z).

Impact crater on Mars, with darker material exposed beneath the reddish dust

them to Earth (*Science Advances*, doi.org/ndbk).

The meteorites are all igneous rocks, meaning they are pieces of solidified lava. Pete Mougini-Mark at the University of Hawai'i at Mānoa says that while there are questions about whether the properties of the lava flows in these craters completely match the meteorites, if these craters are the sources of the rocks, we can learn a lot about Martian volcanic activity from them.

In particular, two of the meteorites that seem to have come from the same crater imply that the area was volcanically active for longer than was thought likely. "We will have to rethink what we believe to be the internal 'plumbing system' of volcanoes on Mars and how they can stay molten for these extended periods of time," says Mougini-Mark.

There are only about 200 known Martian meteorites on Earth and they are the only Mars rocks that researchers can examine in detail. NASA's planned mission to bring back samples directly from Mars is facing issues that may lead to its delay, so these rocks might be our only chance to study Martian material in state-of-the-art laboratories for a long time.

"Here, we've got six Martian meteorites coming from five places, so it's like five sample return missions that you get for free," says Lagain. Studying these samples further could not only teach us about the evolution of Mars, but also help guide future exploration to the most scientifically interesting spots on the surface. ■