Zika spreads in Florida

PREGNANT women have been told not to travel to what has been called a Zika "transmission area" in Florida, in the wake of 10 new cases.

Zika primarily spreads through bites from tropical *Aedes* mosquitoes. Babies of women infected during pregnancy have been born with microcephaly and other birth defects.

Last week, four cases of Zika were confirmed as having been caught in Florida – the first infections in the US that aren't linked to travel outside the mainland. These people are thought to have contracted the virus through mosquito bites in a small area of Miami.

As *New Scientist* went to press, 10 further cases had been identified. The US Centers for Disease Control and Prevention has advised pregnant women to avoid visiting the Wynwood area of Miami.

Officials say the area – roughly 2.5 square kilometres – is large enough to provide a buffer around the suspected transmission zone. The mosquito that spreads Zika travels less than 185 metres in its lifetime.

Some have said the area is too small. "If you're pregnant, or think you might be pregnant, avoid travel to Miami, and possibly elsewhere in South Florida," says Peter Hotez at the Baylor College of Medicine in Houston, Texas.

However CDC director Tom Frieden argues that there is no need to advise avoiding a larger area. "There wouldn't be a technical or scientific basis to give a broader recommendation," he says.

AP PHOTO/ALAN DIAZ

Mosquito control

ABC proof opens up

IT HAS taken nearly four years, but now mathematicians are finally starting to comprehend a mammoth proof that could revolutionise our understanding of the deep nature of numbers.

The 500-page proof was published online by Shinichi Mochizuki of Kyoto University, Japan, in 2012. It claims to validate the long-standing ABC conjecture, which explores the fundamental relationships between numbers, addition and multiplication – beginning with the simple equation $a + b = c$.

"The magnitude of new ideas in Mochizuki's work will take mathematicians years to absorb"

The proof excited mathematicians, but they struggled to get to grips with Mochizuki's novel "inter-universal Teichmüller theory" (IUT), a realm of mathematics he developed over decades to solve the problem. A meeting last year at the University of Oxford that was intended to get to grips with IUT ended in failure, in part because Mochizuki doesn't want to streamline his work to make it easier to comprehend.

A second meeting, held last month in Kyoto, has proved more successful. The breakthrough seems to have come from Mochizuki explaining IUT in person. It was the key part of the meeting," says Ivan Fesenko of the University of Nottingham, UK, who helped organise the event. "He was climbing the summit of his theory, and pulling other participants with him, holding their hands."

At least 10 people now understand the theory in detail and Mochizuki's proof has almost passed peer review, so should be published in a journal in the next year or so. But it will probably be some time before the full impact of Mochizuki's work becomes clear. "The magnitude of the number of new structures and ideas in IUT will take years for the math community to absorb," says Jeffrey Lagarias of the University of Michigan, who was at the Kyoto meeting.

Zapping illness

CAN our health be hacked? A division of Alphabet, Google's parent company, seems to think so. It has teamed up with drug firm GlaxoSmithKline (GSK) to set up a company that will develop bioelectronic implants.

Galvani Bioelectronics will receive up to £540 million over the next seven years. The idea is that by modifying nerve signals, tiny devices will be able to fix health problems – a bit like heart pacemakers already do. The plan is to develop implants that will connect to the nerves linked to specific organs. These would be powered wirelessly and operate automatically.

"In 10 years' time, I think it's very realistic to imagine that if you have type 2 diabetes, you could go to your specialist to have bioelectronic medical treatment," said Kris Famm of GSK, who will be president of the new firm. "You'd be sent to a surgeon to have keyhole surgery to implant the device, and then go back to the specialist to have it programmed."

New Enceladus explorers sought

A FLEET of robots is poised to take over from NASA's Cassini orbiter in the search for life on Saturn's icy moon Enceladus. With Cassini due to make a death dive into Saturn next year, planetary scientists met in Boulder, Colorado, last week to design its successors.

Enceladus has an ocean under its frozen surface, and spews plumes of water into space. But Cassini isn't capable of testing these plumes for signs of life. Missions discussed at the meeting that could pick up where Cassini left off include delicate space nets to catch hydrogen and organics, probes that can land with the force of a bomb to punch through the ice, and ice-burrowing craft.

"As with any good spacecraft mission, [Cassini] leaves us with more questions than answers," says Angela Stickle at Johns Hopkins University in Baltimore, Maryland. "Having more missions will only help answer our questions."

Europe's kill list

TIME to exit the EU? Thirty-seven species of mammals, exotic pets, birds, crustaceans and plants are officially unwanted in Europe as of this week, after the European Commission's first list of invasive

"Chipmunks, raccoons, squirrels and ibises are all on the list of animals banished from the EU"

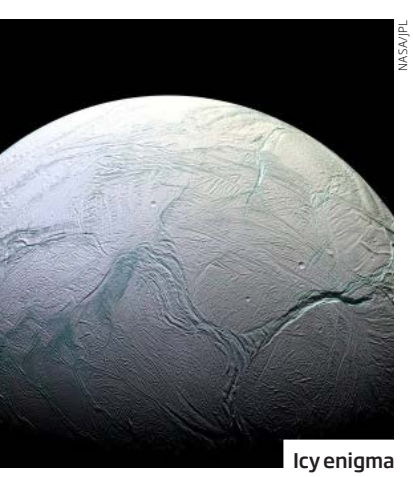
alien species came into force.

If you're in the EU and own a Siberian chipmunk or raccoon, it's likely to be your last. The 37-strong blacklist emerges from the EU's invasive alien species regulation, under which member states must put in place surveillance, rapid response and management plans.

"We are acting on a problem that cannot be ignored as it costs us over €12 billion every year," says Karmenu Vella, European environment commissioner. Action was needed at EU level because invasive species don't stop at borders, he says.

Member states don't have to eradicate species that are already widespread, but must prevent their spread. Pets can be kept until they die, and shops and zoos have two years to run down stocks.

The list includes three types of squirrel, five species of crayfish, the African sacred ibis, South American coati and 14 plant species.



NASA/JPL

Icy enigma

STEVE MORGAN / ALAMY

Under bacterial attack

Anthrax outbreak

A DEADLY outbreak of anthrax among reindeer herders on the Yamal peninsula in Siberia, Russia, is being put down to the thawed corpse of a reindeer or human.

The outbreak claimed its first victim this week – a 12-year-old boy – and some 90 people have been sent to hospital with suspected anthrax infection, more than half of them children. It is the first outbreak in the

"Some 90 people have been hospitalised because of the outbreak, more than half of them children"

region since 1941.

Investigators from the Russian army's elite biological warfare unit speculate that the outbreak stems from the thawing of a reindeer corpse infected by the *Bacillus anthracis* bacterium. Temperatures topped 35 °C in a recent heatwave, which could have melted the ice, exposing the corpse to the open air.

The corpse could have infected other reindeer, spreading anthrax to herders in infected meat. Some 2350 reindeer have died, and 4500 have been vaccinated to contain the outbreak.

Another possibility is that the source is a human corpse from a local burial ground, say the investigators. The herders place their dead in wooden boxes above ground, so spores could have been released by the heatwave and dispersed by the wind.

To contain the outbreak, the authorities are vaccinating all herders at risk in the area and 41,000 reindeer, as well as burning reindeer corpses.

Stop HIV now

THE NHS can legally fund a preventative HIV drug, a UK High Court ruled this week.

NHS England argued it had no legal power to fund pre-exposure prophylaxis (PrEP), an anti-retroviral treatment that has proved to be highly successful in stopping HIV taking hold in the event of transmission. It said preventative drugs should be funded by a patient's local authority. But on Tuesday a judge ruled that NHS England was wrong in this case as the drug amounted to treatment.

PrEP has been shown to reduce the risk of HIV infection by more than 90 per cent in people who are at high risk. It contains two antiviral drugs, which stop the virus multiplying. It is already taken as a daily pill under the trade name Truvada by men and women in the US. NHS England says it will appeal the decision.

60 SECONDS

New whale species

A new species of beaked whale has been found in the Pacific. Known to Japanese whalers as karasu or ravens, the small, black whale has been confirmed as previously unknown to science. Beaked whales can reach 12 metres but are difficult to study because they rarely breach (*Marine Mammal Science*, doi.org/bm7b).

Crows' clever tools

New Caledonian crows are the first non-human animals spotted using tools to carry objects. Two captive individuals were filmed slipping a stick into a metal nut and a hole in a large wooden ball, carrying away both the tool and the object (*Animal Cognition*, doi.org/bm92). One possible use could be transporting unwieldy food items.

Go for launch

Virgin Galactic, the space tourism firm, is set to resume tests of its SpaceShipTwo spaceplane after receiving a launch licence from the US Federal Aviation Administration. Flights have been on hold since a crash in October 2014 killed one of the spaceplane's pilots. The new licence doesn't allow the firm to fly paying customers.

Know what you eat

Consumers in the US will soon have a better idea of what's in their food. On 29 July, US president Barack Obama signed a bill requiring companies to disclose which foods contain genetically modified ingredients. Exactly what counts as GM, though, is still to be decided.

Oh that's why

The origins of the female orgasm may have been revealed. Examining the mammal family tree, researchers have suggested it evolved to induce ovulation via a hormonal surge (*Journal of Experimental Zoology*, DOI: 10.1002/jez.b.22690). Similar chemical surges still prompt eggs to be released in cats and rabbits.