and harsh conditions — it is often called the third pole because it hosts the world's third-largest stock of ice — mean that even basic weather stations are few. Satellite data are also plagued by large errors owing to lack of calibration from ground observations.

"Climate models have the greatest uncertainties in Tibet and the Himalayas, and are especially weak at simulating monsoons," says Xu Xiangde, an atmospheric scientist at the Chinese Academy of Meteorological Sciences in Beijing and investigator on the project. This dearth of information about the plateau, acknowledged by the Intergovernmental Panel on Climate Change, affects scientists' ability to predict how the climate is changing, and the consequences for people living in vulnerable regions.

The plateau's altitude means that it receives more sunlight and so gets hotter than land at sea level. And because land absorbs more solar radiation than air, the plateau acts like a giant heating plate. This heat pumps air upwards, which disperses in the upper troposphere, giving the plateau an outsized influence over atmospheric circulation, and thus climate. The heating effect also intensifies monsoons, which arise as a result of a temperature difference between land and the oceans that sets up a pressure gradient in the atmosphere. In 2008, Wu reported that the surface heating of the plateau had been weakening since the 1980s (A. Duan & G. Wu *J. Clim.* **21,** 3149–3164; 2008), consistent with a weakening in the strength of Asian monsoons. But monsoons seem to be getting stronger again, and occurring in places where they were previously rare, says Klaus Fraedrich, an atmospheric scientist at the University of Hamburg in Germany.

In early September, a deadly flood caused by a monsoon hit border regions between India and Pakistan that are normally dry, killing hundreds and affecting millions more. If the Chinese project can help to explain why monsoons are changing, it "could help instigate early evacuation plans and save many lives", says Fraedrich.

The project could have yet broader effects. A team led by Hai Lin, an atmospheric scientist at Environment Canada in Quebec, found that the greater the snow cover in Tibet, the warmer the winter in Canada (H. Lin & Z. Wu *J. Clim.* **24,** 2801–2813; 2011). The latest initiative could confirm Lin's suspicion that increased snow cover causes the plateau to reflect more sunlight, reducing its heating capability and strengthening a pressure system that causes warmer-than-usual winters in North America. Ma Yaoming, an atmospheric scientist at the CAS Institute of Tibetan Plateau Research in Beijing, says that combined with data on glaciers, permafrost, rivers and lakes, the project will contribute to a better picture of Asia's entire water cycle. ■

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**The illegal trade in South Africa's cycads is threatening to push the endangered species to extinction.**

BOTANY

# Forensic chemistry could stop plant thieves

*Scientists hope to save rare cycads using isotope analysis.*

**BY LINDA NORDLING IN CAPE TOWN**

Scarred earth meets visitors at the Kirstenbosch National Botanical Garden where some of South Africa's rarest plants once stood. In August, 24 of the garden's cycads were stolen, probably to be sold on the black market as landscaping ornaments. As with the country's emblematic rhinos, time is running out for the plants. But scientists hope that a forensic method that is also used to track ivory might help to deter plant poachers.

South Africa's endemic cycads rank among the most endangered plants in the world. Of the country's 38 species, 3 are extinct in the wild and 12 are critically endangered. The plants grow slowly and can live for hundreds of years. Their striking looks and rarity make them prized collectors' items, with individual plants fetching tens of thousands of US dollars.

This profitability fuels illegal poaching, which has proved hard to stop even though it carries a ten-year prison sentence. Microchip tags embedded in the plants have been spotted by thieves armed with X-ray machines, and gouged out. And it is not feasible to treat every plant in a collection — let alone in the wild — with a more successful method that sprays plants with microdot paint containing identification tags that are too small to be seen with the naked eye.

A team led by plant scientist Adam West of the University of Cape Town hopes that chemistry can help. The forensic method used by the team depends on the fact that the relative abundances of a chemical element's isotopes vary naturally from place to place. As organisms grow, they incorporate these isotope signatures, providing a trace of where they have lived. Stable-isotope analysis has helped to identify the origins of smuggled ivory, counterfeit money and drugs.

When West's team used the method to compare the isotope signatures of cycads that they knew had been relocated with those of wild plants that had never been moved, they found that it was possible to identify the relocated plants. Their results, to be published in the November issue of the *Journal of Forensic Sciences*, suggest that the method can reveal a plant relocation that happened decades ago. "If you got your cycad from the wild 30 years ago, we can still tell," says West. The team is now testing suspect plants that were flagged in police raids, to see whether the isotope signatures are consistent with the owner's story or with a wild origin. West hopes that the ability to read a plant's history might deter illegal dealers.

It is "an elegant piece of work", says Jason Sampson, curator of the Manie van der Schijff Botanical Garden in Pretoria. But he says that more also needs to be done to sate the demand for rare cycads, for instance by accelerating breeding programmes. ■

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