

Plant detectives view life in terms of barcodes

UJ academics hope to create database of DNA information on all the world's tree species

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IT'S LIKE Africa's own version of *CSI* – but the forensic mysteries that two Joburg scientists hope to unravel may help stem crimes committed against the region's flora.

This is part of the work of Michelle van der Bank and Olivier Maurin of the department of botany and plant biotechnology at the University of Johannesburg, who are leading Africa's Tree Barcode of Life, or Tree-BOL, initiative.

This global project aims to create a database of DNA information for all of the world's tree species and highlight those in danger of extinction. It works by using a section of a tree's DNA as a barcode, similar to scanning products at supermarket.

Since the project's launch last year, the pair have collected samples of 80 percent of the trees in southern Africa and are now planning to use their expertise to help trace the illicit trade in cycads and timber as well as the use of endangered plants in traditional medicine.

They hope their research into highly prized cycads will get under way this month. "Cycads are threatened with illegal use," explains Maurin. "Once we have the DNA, we can build a cycad database of southern Africa."

Barcoding can also help track the illegal timber trade where identification of tree species is nearly impossible after the trees have been processed into timber products, explains Van der Bank.

"We're getting a student to look at a reference database for all the trade in trees. It would involve identifying specimens that come into our harbours – that is where barcoding is really helpful. You need DNA to stand these cases up in court."

The muti branch of their work hopes to gauge whether threatened plants are being used in traditional medicine. "It's a big thing in South Africa – everything is used medicinally but what plants are used is a trade secret," Van der Bank points out.

"You can't identify what's on the market because it's in bits and pieces. But we can go

to muti markets and get small pieces and extract DNA. The material doesn't need to be fresh. We can start building a database for medicinal plants."

They also hope to barcode all the grasses in South Africa within the next six months, possibly drawing on the material already contained at the SA National Bio-

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diversity Institute.

Both Maurin and Van der Bank have just returned from the International Barcode of Life conference in Mexico where it was agreed a portion of the *matK* gene and *rbcL* would be the two standard DNA barcodes used for plants.

This is a nod to Van Der Bank, whose pioneering research on the Kruger Park 's

shrubs and trees helped identify the *matK* gene, which distinguishes between most plant species on Earth.

"The scientific community has to agree on what the official plant barcode is. They officially agreed so botanists are on track," she says. "We've sent 1 500 samples to the database. They're praising what we're doing. We're really populating their database."

In October, they spent a month with Toyota Outreach travelling through Malawi, Zimbabwe and Mozambique, but what they encountered in Malawi drew the most concern.

"There were hardly any trees. They chop the trees for charcoal. It was a shock. People say they never saw baobabs there before (because there were so many trees). Now you just see baobabs everywhere."

"Mozambique was slightly better while Zimbabwe had surprisingly good populations of trees."

The project is focused on building scientific capacity across Africa and there are

now formal collaborations with nine African countries, says Van der Bank.

Africa's biodiversity is among the most extraordinary in the world but it's also among the most threatened because of over-exploitation, population growth, climate change and desertification.

As much as 13 000km² of African forests are cleared each year, destroying valuable carbon sinks.

Van der Bank adds there is growing interest from students to enter her department. "We never had this interest before. Now there are too many students," she laughs. "It's an international project that is attracting many people. And it is like tree *CSI*. I think this is why students are interested."

The project stills need a "big sponsor", though. For their fieldwork to regions like the Kruger, they use her Hyundai. "We always use my car, which is not really a field car. We fund a lot of the projects out of our own pockets, but it's a passion," adds Van der Bank.



TREE DETECTIVES: Professor Michelle van der Bank, left, and Olivier Maurin of the University of Johannesburg's botany and plant biotechnology department check the voucher number of a specimen in the lab where they collect DNA information on hundreds of trees and plants.

PICTURE: CARA VERECKI