

DNA fingerprinting is key to saving our forests

Ambitious barcoding project will track trees at risk of extinction

BY UFRIEDA HO

A University of Johannesburg laboratory will be a hive of activity next month as scientists from seven African countries descend on the Kingsway campus to kickstart the local TreeBol (Barcode of Life) project.

Dr Michelle van der Bank and Olivier Maurin are leaders of the African team of the barcoding project. Behind the concrete maze at the campus that leads to the botany and plant biotechnology department, Van der Bank will help map out an ambitious project to collect the DNA fingerprints of all the continent's trees. Having this depth of information means the trees can be tracked for their risk of extinction.

Van der Bank's work, done in conjunction with Dr Vincent Savolainen of Imperial College in the UK, astonished the scientific community in February this year. They found a suitable section of a gene that has enough variability to barcode trees. DNA barcoding was invented in 2003 by Canadian scientist Professor Paul Hebert, but prior to the identification of the MatK region of the genome, the possibility of barcoding trees and plants did not exist.

"It's very exciting that with the MatK gene we can now have DNA classification for trees and plants. It has huge implications for science, conservation, policy decisions and

even for the average tree hobbyist," says Van der Bank.

Now the work turns to building capacity in Africa. To put this into perspective, Van der Bank says with a smile, "In Europe there are about 340 trees they have to barcode for TreeBol, but in Africa we have 29 000 species."

The University of Johannesburg (UJ) team has already been working on a parallel project to barcode the trees of the Kruger National Park. UJ, the backbone of the project in Africa, is home to a hi-tech genetic analyser, one of a tiny handful on the continent, because of its hefty price tag of over R1.2-million.

Van der Bank says proudly that the UJ laboratory is a mini-replica of the top research facilities in Kew Gardens, London.

Olivier Maurin adds that in Africa, they often have to work with scant existing taxonomical data. "There is little existing reference to work with, but it's exciting that we're going to be creating this new DNA database," says Maurin. He says that ultimately it will mean less duplication of fieldwork and, therefore, less damage to ecosystems.

"We will eventually be able to give people the forensic information they need in an instant. It will cut down on smuggling and the trade in indigenous plant species," he says.

Currently, more than 300 species of timber tree are Cites protected, or being considered for protection. Many

tree ferns, cycads, palms and columnar cacti are also on protected species lists.

Van der Bank adds, "Border-control officials are often helpless in monitoring illegal trafficking of products derived from protected tree species. The identification of immature trees is nearly impossible in the absence of flowers or fruits, and species identification is even more problematic when those plants are cut, stripped or processed. Living trees are also difficult to identify from fragments of an individual specimen. But DNA barcoding an accurate identification is possible."

Africa's forests are already under enormous strain.

"Sadly, the pressure on biodiversity in this region continues to increase and we are losing biodiversity at alarming rates," Van der Bank says.

There are also applications to use the barcoding to identify traditional herbal preparations - vital for preserving indigenous knowledge.

DNA barcoding for plants will also be a boon for bio-prospecting, which investigates the value of plant properties for a wider range of uses, and is recognised as one of the ways to realise the key economic driver of beneficiation.

Van der Bank says DNA barcoding has also given taxonomy a new lease of life, and that's good news for science.

Visit UJ's Kruger Park barcoding project at www.florakrugerpark.org.



TREE LOVERS: Olivier Maurin and Michelle van der Bank hold a kudu-berg sapling at the University of Johannesburg, where they are leading the continent's tree-barcoding project to identify and ultimately preserve our trees more efficiently. **PICTURE:** DUMISANI SIBEKO