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A bar-code for every plant species

Imagine if you could walk up to any plant anywhere – seedling, sapling, 40 m tree, grass, root, pressed leaf, or fallen log – and know in a few seconds its scientific name. Such ability would be the botany what the World Wide Web is to humankind.

That capacity would transform far more than the science of plant biology, the conservation of plants, and the superficial ways we currently make use of the incredible diversity of form, physiology, genetics and chemistry of plants. It would be to plants what the printing press was to education, science, law, and medicine. A University of Johannesburg (UJ) project hopes to do exactly that by tracking down earth's plant species through DNA sequencing and genetic barcoding technology.

The endeavor – led by Dr Michelle van der Bank of the University's Department of Botany and Biotechnology and Dr Vincent Savolainen from the Royal Botanic Gardens in the United Kingdom (UK) – aimed to collect all the plants at the Kruger National Park. This project is the largest and most diverse sampling ever made for barcoding purposes in a protected area. DNA sequencing has become a popular tool to study organisms. In plants, it is used to track down the history of species diversification by drawing the "genealogical trees" of groups of organisms.

DNA barcoding depends on analyzing part of just one gene, the same gene in all cases, for every species. For plants it seems like we would need to analyze at least three different genes. If and when a DNA barcode database of all plant species is established, a field biologist could take a tiny piece of tissue, like a leaf, from the unknown specimen, and feed it into a hand-held device for analysis. Such a device, if it works as promised, will help field biologists identify known species and assist immensely in the urgent task of cataloging unknown species before their ranks are decimated by extinction.

In 2004, the Consortium for the Barcode of Life launched an initiative to promote DNA barcoding, a process enabling the rapid and inexpensive identification of the estimated 10-million species on earth. While the technique has been successfully applied to animals, in the case of plants the search for short fragments of DNA to act as "barcode" has so far proved unsuccessful.

Now, with the assistances of the UJ's project team, scientists from institutions around the world are searching for the elusive gene that will allow them to barcode all 300 000 plant species on earth.

As part of their effort, Van der Bank and Savolainen, together with UJ's postgraduates students Olivier Maurin, Renaud Lahaye and Sylvie duThoit - started collecting plants in the Kruger Park in September 2005 and have already collected 1 600 specimens so far.

All samples are taken to the University, where they are analysed, categorised and stored. DNA duplicates will also be stored at the DNA Bank at the Royal Botanic Gardens in the UK. Plans are also underway to have this data placed on the website of the Consortium for the Barcode of Life where it will be available for other scientists.

"The plant specimens provide a documented source for building the library of plant barcodes. Scientists found that one could obtain DNA barcodes from plant specimens over 100 years old. We hope to be the team to identify the genetic barcode for plants of the Kruger National Park. Such a discovery would allow botanists to do groundbreaking identification of species using the barcoding method," says Van der Bank.



A successful DNA bar-code from a tiny tissue sample of a leaf or flower must be:

- Short enough to be quickly sequenced
- Easily identified in all plant species; and
- Variable enough to provide a unique sequence for each species

posted @ Monday, December 10, 2007 12:50 AM by ZeldaS

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Tuesday, August 12, 2008

Third Quarter 2008

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Skills development provider, Stanley Hutcheson and Associates (SHA), the University of Johannesburg and Deloitte are proud to announce that, since its inception in 2005, the Thusanani work readiness programme has produced more than 600 graduates, with a placement rate of over 90%.

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UJ athletes carry SA flag in Beijing

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Tuesday, August 05, 2008

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