Plant experts unveil DNA barcode

By Mark Kinver
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Hundreds of experts from 50 nations are set to agree on a "DNA barcode" system that gives every plant on Earth a unique genetic fingerprint.

The technology will be used in a number of ways, including identifying the illegal trade in endangered species.

The data will be stored on a global database that will be available to scientists around the world.

The agreement will be signed at the third International Barcode of Life conference in Mexico City on Tuesday.

"Barcoding is a tool to identify species faster, more cheaply and more precisely than traditional methods, " explained Patricia Escalante, head of the zoology department at Mexico's National University (UNAM), which is hosting the gathering.

In an effort to limit the impact on the planet's biodiversity, Dr Escalante said it was vital to establish a reliable monitoring system.

"We need an accurate inventory," she observed, "to recognize parasites of medical, economic or ecological importance."

Mexican researchers, she added, were involved in a network to produce barcodes in key taxonomic groups , such as trees, fungi, bees and aquatic insects.

Cracking the code

"Biodiversity scientists are using DNA technology to unravel mysteries, much like detectives use it to solve crimes," said David Schindel, executive secretary for the Consortium for the Barcode of Life (COBL).

"You start with a specimen that has been identified by a specialist, so you have a known species," he explained.

"You then take a tiny piece of tissue; let's say we are dealing with a mosquito, we'd take half of one leg, put it in a little tube and grind it up. You'd then extract the DNA.

"We are only looking at a tiny, tiny part of the whole genome - just 650 base pairs. In comparison, the human genome has three billion base pairs.

"So the next stage is finding that tiny little region, cutting it out and making millions of copies - which is known as magnifying - in order to analyse the region.

"What you get out of that process is a string of 650 letters - and if the process is working then you will get identical sequences or very, very similar sequences for the same species."

The information is then added to a global database, which can be accessed by scientists around the globe.

DNA breakthrough

Researchers have been able to use this technique to identify animal species since 2003. But, until now, the system has not worked for plant species.

It has been necessary to identify a different region of DNA that also provided a number of important characteristics. These characteristics included:

- technologically easy to process
- readily obtainable from degraded material
- variable between species, but not too variable

A team of researchers had been assessing seven potential barcodes. This was then narrowed down to just two possibilities.

The announcement in Mexico will mark the end of the process, with the international biodiversity scientific community reaching an agreement on the best way to identify plants.

Dr Schindel said one of the benefits of the technology was the speed and ease of identifying species.

"Now - within just a few hours - you can get an answer," he told BBC News.

This would lead to much more effective use of resources when it came to tackling problems such as crop pests or the spread of diseases, he explained.

It would no longer be necessary to wait for a specialist botanist to examine the sample in order to get an accurate identification of the species.

The technology would also allow species to be identified from a fragment of material.

Illegally harvested timber is often processed into furniture before being shipped overseas, making it very difficult to assess the origin of the wood.

However, identifying the timber's "DNA barcode" would quickly reveal whether the wood was sourced from a legitimate source.

As part of the International Barcode of Life Project, scientists hope that five million specimens from 500,000 species will be catalogued in the next five years.