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Scientists to barcode life on Earth

World collaboration will record the sequence of vital gene shared by birds, mammals, fish, plants and other organisms

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Scientists from 25 countries today took the first step towards the genetic fingerprinting of almost all life on Earth. A "barcode of life" project will record the sequence of just one vital gene shared by birds, mammals, fish, plants and other organisms, to provide a kind of biometric identity card for millions of species by 2010.

The scientists will start with the 1.7 million species already described and named. It will have an immediate payoff. Entomologists will be able to link accidental insect invaders at airports to the rogue's gallery of known crop pests, and environmental officers will be able to tell whether fillets of fish or joints of meat have been illegally taken from protected species.

But the real aim is to speed up the identification of an estimated 10 million species on the planet that have yet to be described and named.

DNA identification by traditional methods requires specialist laboratories, skilled geneticists and long delays. The scientists, meeting at the Natural History Museum in London, hope that a standardised goal, new technology and a "gene chip" will soon reduce the time needed to hours and, ultimately, to a pocket-sized gadget that could make an identification in seconds.

"The dream is that a six-year-old kid walking down the street hauls out of his back pocket something possibly the size of this comb, picks up that ant off of the ground, drops it in," said Daniel Janzen, a tropical ecologist at the University of Pennsylvania. "And it says, 'Oh, this is Pheidole such-and-such'. He drops that name into Google and everything we know about that ant is staring him in the face."

The scientists have chosen a 650-letter gene called cytochrome c oxidase 1 (Cox1) found in mitochondrial DNA in the cells of almost every living creature. Mitochondria are the power packs of every cell, and Cox1 is a vital part of this energy machinery.

Mitochondrial DNA varies from individual to individual and from species to species - and these variations reveal kinship and more distant evolutionary links. Using the Cox1 barcode, researchers have confirmed that the orang-utans of Indonesia are two separate species, and that all humans differ from each other by only one or two letters out of 648 (humans differ from chimpanzees in 60 places and from gorillas by 70). Ultimately, such research will help build a more precise picture of evolutionary history.

Researchers have used mitochondrial DNA comparison to link whales with cows, pigs and camels, and even more closely with hippos.

The Consortium for the Barcode of Life, including the Natural History Museum, the Smithsonian in the US, the University of Guelph in Canada, Rockefeller University in New York and a number of other institutions, plans to "barcode" the world's 10,000 known species of birds by 2010.

The first stage has already identified four probable new species in North America.

A separate initiative will involve spending five years assembling genetic barcodes for the world's fish species.

A third effort will go into barcoding the entire flora of Costa Rica.

The biggest challenge will be the insect world: most of life on Earth is tiny, has six legs, an exoskeleton and a complicated lifecycle.

Each of the first barcodes will be directly linked to a museum specimen - and to all biological research linked to that specimen. The data, stored in an international database called Genbank, which already holds 20m genetic records, will build into a set of tools that will help taxonomists document species new to science, help farmers recognise pest species and enable health workers to tell disease-carrying insects and microbes.