international
BARCODE
OF LIFE

The International Barcode of Life Project

Bringing Genomics to the Battle Against Plant Pests and Invasive Species

The International Barcode of Life Project is building the global infrastructure for rapid, accurate and inexpensive species recognition using a DNA-based identification system. DNA barcoding is a new technology with immense potential for economically, socially and environmentally beneficial applications – none more important than agricultural and forestry pest management, identification of invasive species and customs/border protection. In insect pest outbreaks, the rapid identification of the organism is critical for the implementation of control strategies to minimize lost production. The ability to identify parasitoid species that are either important in controlling outbreaks or in biological control is also crucial.

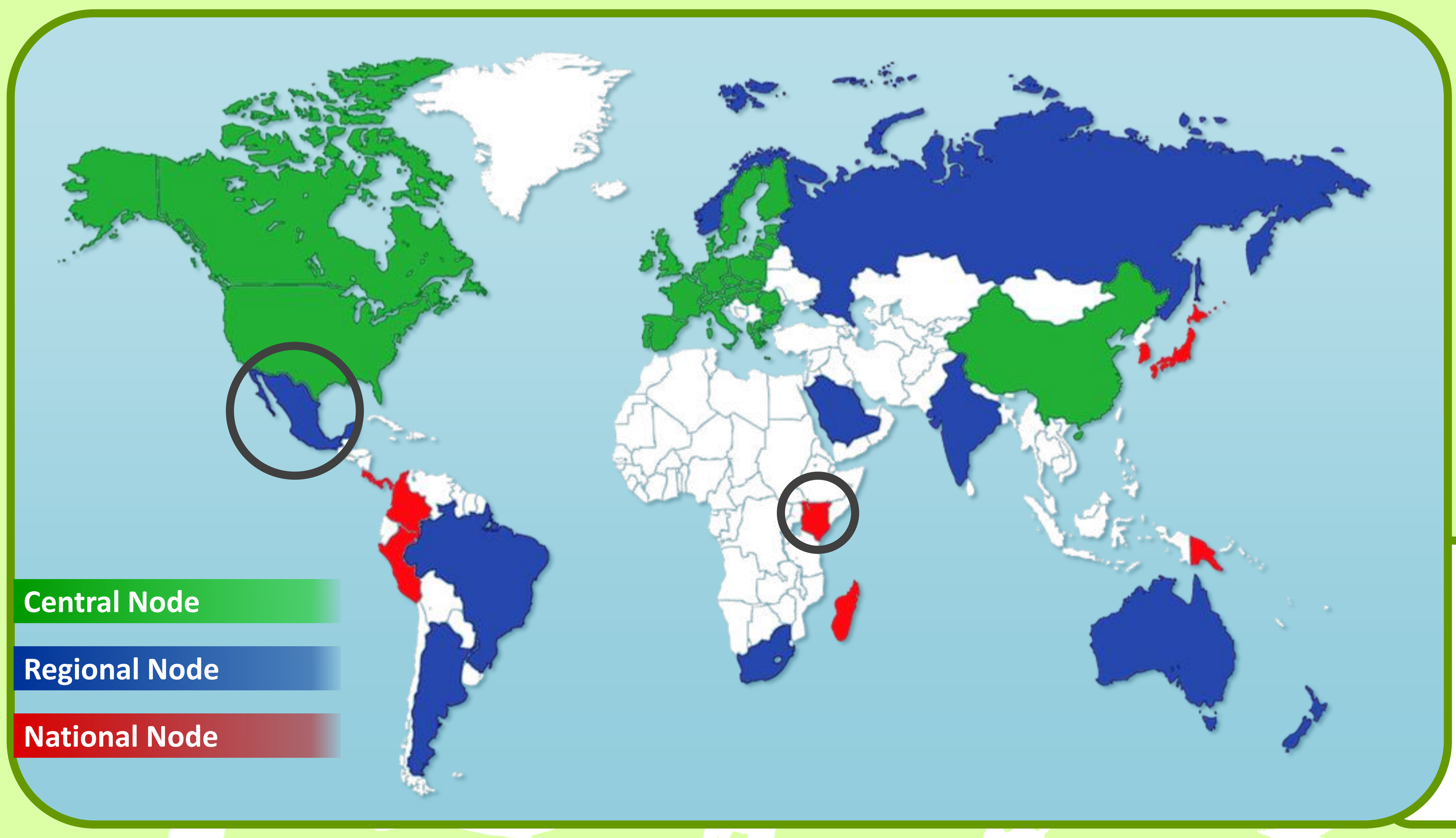
iBOL Working Group 1.5

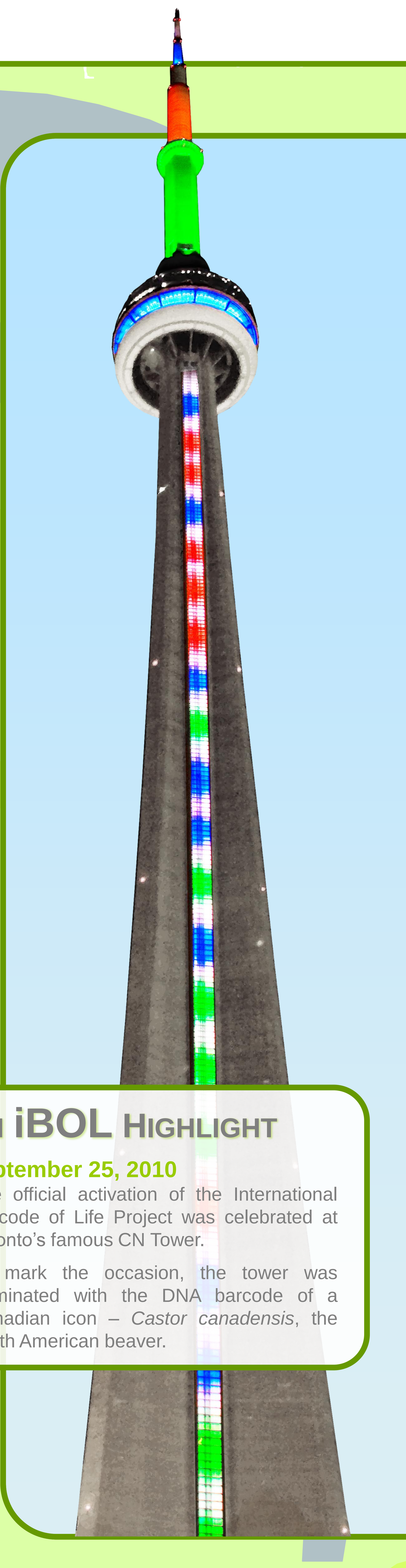
Agricultural and Forestry Pests and their Parasitoids

Researchers associated with iBOL Working Group 1.5 are assembling a DNA barcode repository of agricultural and forestry pests and their parasitoids. By 2015, this digital reference library will contain barcodes for at least 25,000 of the most economically important pest species from every region of the world. Despite the broad range of groups involved, a collection of digital records for 25,000 species will provide a comprehensive and extremely effective pest/parasitoid identification system.

Agricultural and Forestry Pests and Their Parasitoids

Groups	Species Targets	iBOL Q1 to Q5 Progress		Overall Progress to Target	
		Species	Progress	Species	Progress
True Bugs	5,000	712	14%	2,505	50%
Earwigs	100	16	16%	20	20%
Grasshoppers	500	151	30%	689	138%
Lacewings & kin	500	129	26%	277	55%
Mantises	100	9	9%	155	155%
Parasitic Flies	3,000	956	32%	1,829	61%
Parasitic Hymenoptera	8,000	2,293	29%	6,351	79%
Pest Flies	2,000	874	44%	1,699	85%
Predatory Beetles	4,000	1,515	38%	3,755	94%
Sawflies	700	80	11%	284	41%
Stick Insects	100	23	23%	29	29%
Thrips	1,000	96	10%	200	20%
Grand Total	25,000	6,854	27%	17,793	71%





Developing a
Revolutionary ID System for Life

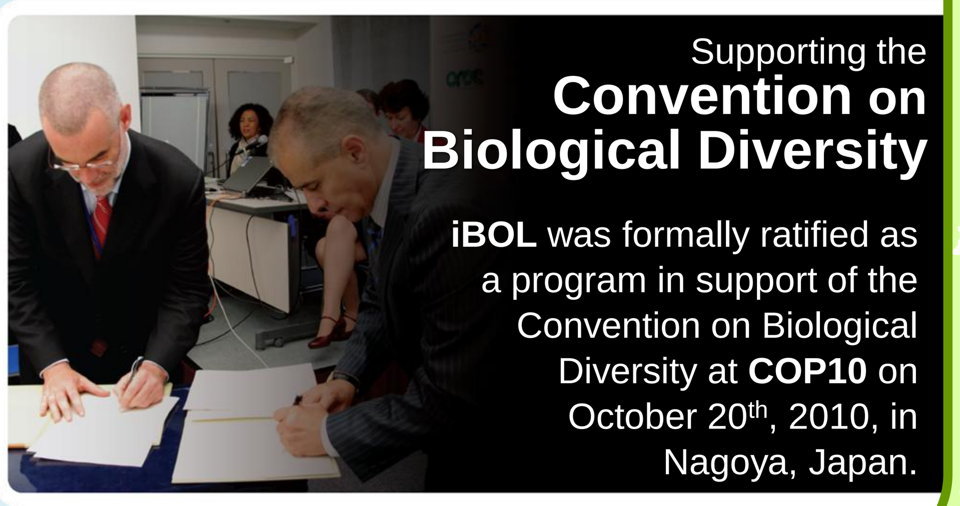
DNA barcoding uses sequence diversity in a short, standard gene region to tell species apart, permitting the automation of their identification.

Protecting
Ecosystems

Conservationists are employing DNA barcodes to track shifts in species distribution in response to global warming, pollution, and habitat loss.

Exposing
Illegal Trade

Inspectors and retailers are using DNA barcodes to verify food items and prevent substitution. Customs officials have a new tool to stop trade in endangered species.



Supporting the
Convention on Biological Diversity

iBOL was formally ratified as a program in support of the Convention on Biological Diversity at **COP10** on October 20th, 2010, in Nagoya, Japan.

An iBOL Highlight

September 25, 2010

The official activation of the International Barcode of Life Project was celebrated at Toronto's famous CN Tower.

To mark the occasion, the tower was illuminated with the DNA barcode of a Canadian icon – *Castor canadensis*, the North American beaver.

Spotlight on Kenya

Kenya is rapidly building a barcode reference database of the country's insects. Among the hundreds of species barcoded to date are numerous species of Tephritidae, including the Mediterranean fruit fly (*Ceratitis capitata*) and several species of cereal stem borers (Noctuidae), economically important farm pests throughout Africa. Research plans include a project that will use DNA barcodes to match pests and their parasitoids to facilitate bio-control measures.

Spotlight on Mexico

Numerous projects involving DNA barcoding of agricultural pests and invasive species are underway in Mexico:

- Barcoding several species of Tephritidae and their parasitoids
- Working with pesticide resistant *T. urticae* in berry crops
- Using barcoding, GIS and ecological niche modeling to track the invasive African Orchid (*Oeceoclades maculat)*
- A study of 50 endophytic strains of citrus fungi, more than half presenting evidence of citrus pathogens

A Rapid and Reliable Diagnostic Protocol

In 2006, this highly degraded specimen was found in a regulatory trap in British Columbia. A DNA barcode, obtained from an antenna removed from the sticky trap coating, identified it as the destructive forest defoliator *Lymantria dispar* -- commonly known as the gypsy moth. DNA barcoding can accurately and rapidly identify a pest species not only from a tissue fragment (as in this case) but also from an egg, a larva or a pupa.