International Barcode of Life Consortium (iBOL) Launches BIOSCAN

1. What is iBOL?

iBOL is a consortium involving scientists and research organizations in 30+ nations. It is developing and employing the DNA-based identification systems required to deliver a detailed understanding of global biodiversity. It works in partnership with academic, government, and private sector organizations.

Activated in 2010, iBOL leads large-scale research programs in biodiversity genomics, and develops the sequencing facilities, informatics platforms, and analytical protocols required to support them. Its first program was BARCODE 500K; its second is BIOSCAN.

2. What is iBOL's mission?

Recognizing the urgent need for a capacity to assess the impacts of environmental changes on biodiversity, iBOL's mission is to deliver a DNA-based identification system for all animals, fungi, and plants. This approach will make it possible to rapidly complete the inventory of species and to track shifts in their distributions, abundances, and interactions. Its long-term goal is to establish an Earth observation system for biodiversity.

3. What did BARCODE 500K accomplish?

The $125 million BARCODE 500K project met its goal of assembling barcode records for 500,000 species within five years (2010–2015). These results demonstrated that DNA barcoding is a very effective tool for species discrimination, one which is far more scalable and less expensive than traditional morphological approaches.

It also developed the BOLD informatics platform (boldsystems.org) that assembles barcode data into functional format, and delivers key analytical services. These collective achievements propelled DNA barcoding into a mainstream enterprise that now supports both basic and applied science.

4. What is BIOSCAN and what is its mission?

BIOSCAN is a seven-year (2019–2025), $180 million research program that includes three lines of investigation. It will expand the DNA barcode reference library to provide coverage for two million species; it will probe interactions among these species; and it will scan species assemblages at 2,500 sites to lay the foundation for a global biomonitoring system.

5. Why is BIOSCAN being launched now?

BIOSCAN is being launched now because advances in sequencing technologies have reduced the costs to barcode a single specimen to $1, while also introducing the capacity to analyze bulk samples. As a result, iBOL can now scale up past work, and launch new lines of investigation which will accelerate progress toward its mission.

6. What are iBOL's longer-term plans?

iBOL will launch a 20-year research program, the Planetary Biodiversity Mission, in 2026. It will both aim to complete the inventory of multi-cellular life and document many of their interactions. It will also activate an Earth observation system for biodiversity.

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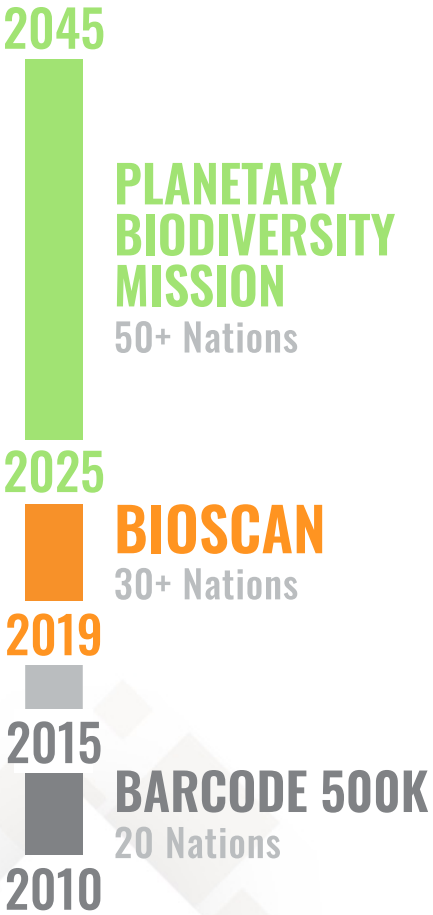
BIOSCAN



7. What is iBOL's data and resource sharing policy?

All specimens remain the property of their source nation, but DNA barcode sequences and information on their associated specimens become publically available after validation. DNA extracts are not available for genomic characterization without approval from their source nation.

iBOL works with the appropriate agency in each participating nation to ensure compliance with all regulations relating to the transfer of biomaterials.

8. Who will benefit from iBOL and how?

iBOL is laying the foundation for a global biodiversity observation system akin to the weather monitoring system that alerted us to global warming. By delivering the capacity to identify any species in any environment, iBOL will benefit science and society.

Consider just one axis of application – an enhanced capacity to recognize invasive species. Without early detection, financial losses linked to even a single invasive species can be massive. For instance, the Argentine fire ant has recurrently colonized Australia, but its establishment in Brisbane was overlooked for 20 years. If this species continues its spread, it will have a devastating impact on Australian environments, some $45 billion in damage each year. Given this threat, the Australian government committed $400 million in 2018 to launch an eradication program.

9. How does iBOL relate to other biodiversity initiatives?

iBOL is building a system for species identification based on the analysis of minimal sequence information, less than a millionth of the genome. Through this approach, it will provide a dynamic perspective on shifts in species distribution and abundance in a rapid, cost-effective way. By contrast, projects that seek to characterize whole genomes will deepen our understanding of evolutionary trajectories and nuclear gene arrays, but they are not suited for large-scale environmental monitoring.

Consider the following – does it make more sense to gain information on the species composition of an ecosystem by sequencing 500 base pairs of DNA in each of a million different specimens or 500 million base pairs in one? This dichotomy reveals why approaches targeting whole genomes are inefficient for scanning species composition.

iBOL will aid the push to establish a unified biodiversity information system by working in close collaboration with the Global Biodiversity Information Facility, the Secretariat for the Convention on Biological Diversity, and other initiatives that are extending knowledge of biodiversity.

10. Who can get involved in iBOL and how?

Each member nation in iBOL is represented by an institution which is the main point of contact at the national level for other institutions, researchers, or members of the public. Contact your national representative or email info@ibol.org for advice on the best path to involvement.

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