Overview, progress, and future

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Coordinating Center for Advancing Digitization of Biodiversity Collections (ADBC)

ADBC: $100 million over 10 years from U.S. National Science Foundation
University of Florida

**Larry Page:** Project Director  
**Jose Fortes:** Cyberinfrastructure  
**Pam Soltis:** Research opportunities  
**Bruce MacFadden:** Outreach activities

Florida State University

**Greg Riccardi:** Digitization activities
**Biodiversity Collections**

The single largest source of information on biological diversity (outside nature)

1,300 – 1,500 collections in U.S.A.

1 billion specimens in USA

3 billion specimens globally
Biodiversity Collections

• Morphology/anatomy
• Taxonomy
  • Every species name is based on 1 or more specimens
• What, when & where
  • Distributions – maps (spatial)
  • Changes over time (temporal; climate-change)
• DNA --> phylogenetics
• Fossils: All that we know about prehistoric life
• Associated data
  • Syntopic species
  • Parasites
  • Diet
  • Reproductive cycles/phenology
  • Development/ontogeny
Biodiversity

Collections: specimens, DNA, ancillary information

1 billion specimens

Environmental Policy
Management, Use, Protection

Benefits

New Discoveries
Understanding
Appreciation

Research
Education
Outreach
PROBLEM:

The data in biodiversity collections are inaccessible to most potential users.
Biodiversity

Collections: specimens, DNA, ancillary information

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1 billion specimens
The goal of **ADBC is to remove this inaccessibility** through **digitization**: putting information online so that researchers, educators, students, natural resource managers, environmentalists, and policymakers have access.
U.S. National Science Foundation

Advancing Digitization of Biodiversity Collections Program (ADBC)

The ADBC Program was developed in response to the Network Integrated Biocollections Alliance (NIBA) Strategic Plan for a sustained effort to digitize the nation’s biodiversity collections

$100 million over 10 years non-federal collections
Biodiversity

Collections: specimens, DNA, ancillary information

Benefits

Environmental Policy
Management, Use, Protection

New Discoveries
Understanding
Appreciation

ADBC: Digitization
Databases
Georeferencing
Images

Research
Education
Outreach
Advancing Digitization of Biodiversity Collections

Funds

‘Thematic Collections Networks’ or TCNs – groups of institutions that digitize data organized around a research question

(climate change, invasive species, agricultural pests, etc.)
13 (15) Thematic Collections Networks (TCNs)

- **InvertNet**: An Integrative Platform for Research on Environmental Change, Species Discovery and Identification (*Illinois Natural History Survey, University of Illinois*)

- **Plants, Herbivores, and Parasitoids**: A Model System for the Study of Tri-Trophic Associations (*American Museum of Natural History*)

- North American **Lichens and Bryophytes**: Sensitive Indicators of Environmental Quality and Change (*University of Wisconsin Madison*)

- Digitizing **Fossils** to Enable New Syntheses in Biogeography-Creating a PALEONICHES-TCN (*University of Kansas*)

- The **Macrofungi** Collection Consortium: Unlocking a Biodiversity Resource for Understanding Biotic Interactions, Nutrient Cycling and Human Affairs (*New York Botanical Garden*)

- Mobilizing New England **Vascular Plant** Specimen Data to Track Environmental Change (*Yale University*)

- Southwest Collections of **Arthropods** Network (SCAN): A Model for Collections Digitization to Promote Taxonomic and Ecological Research (*Northern Arizona University*)

- The Macroalgal **Herbarium** Consortium: Accessing 150 Years of Specimen Data to Understand Changes in the Marine/Aquatic Environment (*University of New Hampshire*)

- Developing a Centralized Digital Archive of Vouchered Animal **Communication Signals** (*Cornell University*)

- **Fossil Insect** Collaborative: A Deep-Time Approach to Studying Diversification and Response to Environmental Change (*University of Colorado at Boulder*)

- **Great Lakes Invasives**: Documenting the Occurrence through Space and Time of Aquatic Non-indigenous Fish, Mollusks, Algae, and Plants Threatening North America's Great Lakes (*University of Wisconsin Madison*)

- **InvertEBase**: Reaching Back to See the Future: Species-rich Invertebrate Faunas Document Causes and Consequences of Biodiversity Shifts (*Field Museum of Natural History*)

- **The Key to the Cabinets**: Building and Sustaining a Research Database for a Global Biodiversity Hotspot (*Appalachian State University*)
13 TCNS: 200 institutions in 50 states
Advancing Digitization of Biodiversity Collections

Facilitate use of biodiversity data to address environmental and economic challenges

- Researchers
- Educators
- General public, citizen scientists
- Policy-makers

- Develop digitization standards and workflows
- Respond to cyberinfrastructure needs
- Develop research and outreach collaborations
- Plan for long-term sustainability of the national digitization effort
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Facilitate use of biodiversity data to address environmental and economic challenges

Year 4.......
Facilitate use of biodiversity data to address environmental and economic challenges

- Where do we go from here ... in our 5th - 10th years?
- Emphasis on digitization will continue (this is what distinguishes...)
- Increased emphasis on:
  1. Data use: research and outreach collaborations
  2. Data management (attribution, corrections, annotations)
  3. Sustainability of the national digitization effort (RCN)
Advancing Digitization of Biodiversity Collections

Facilitate use of biodiversity data to address environmental and economic challenges

• *Where do we go from here ... in our 5\textsuperscript{th} - 10\textsuperscript{th} years?*

• A proposal for renewal of support for iDigBio...years for 6-10

• More TCNs will be funded

• Other digitization efforts in U.S.A.
Advancing Digitization of Biodiversity Collections

Facilitate use of biodiversity data to address environmental and economic challenges

• Where do we go from here ... in our 5th - 10th years?

International collaborations
Opportunities

• New research and education initiatives
• Millions (billions?) of records – huge source of biodiversity data
• Opportunities for previously intractable large-scale research requiring large amounts of spatial and temporal data

Big-science questions related to human health, climate change, agriculture, species discovery, species extinctions, rates of evolutionary change, and ecosystem services
BIODIVERSITY

Thank you

Photos: M. Jeffords & G. Paulay