

The
Endless
Forms
TCN



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NYBG



CALIFORNIA
ACADEMY OF
SCIENCES



BOTANICAL RESEARCH
INSTITUTE OF TEXAS
Plant to planet!



MISSOURI
BOTANICAL
GARDEN



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UNIVERSITY OF WISCONSIN-MADISON



UNIVERSITY OF MINNESOTA



The Academy of
Natural Sciences
of DREXEL UNIVERSITY

Berkeley
UNIVERSITY OF CALIFORNIA



UMASS
AMHERST

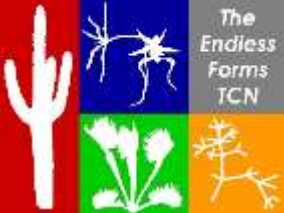


TEXAS
The University of Texas at Austin



ILLINOIS NATURAL
HISTORY SURVEY
PRAIRIE RESEARCH INSTITUTE





Project Introduction

- Collaborative grant between 15 herbaria, botanical gardens, museums, and universities
- The New York Botanical Garden is the lead institution

“There is grandeur in this view of life, with its several powers, having been originally breathed into a few forms or into one; and that, whilst this planet has gone cycling on according to the fixed law of gravity, from so simple a beginning endless forms most beautiful and most wonderful have been, and are being, evolved.”

— Charles Darwin, *The Origin of Species*





Introduction to the Project

- Digitize 2,000,000 herbarium specimens of carnivorous, epiphytic, and succulent plants in 15 families from all global regions
- Refinements of the digitization process through use of Optical Character Recognition (OCR) on labels
- Host a Ethical Data Sharing Workshop at SPNHC 2019
- Focus appreciation on EF plants and the role of collections in conservation in a general audience, especially youth in underrepresented groups





Introduction to the Project

- This TCN is unique because it is based on morphological adaptations and ecological traits rather than a geographic or taxonomic delimitation
- This project will create a dataset that can be used to test evolutionary and ecological hypotheses, will provide data that are needed for other projects, including trait evolution and development, taxon delimitation, national and regional floristic projects, and local and large scale species distribution modelling projects

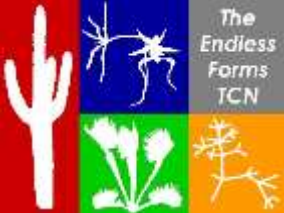




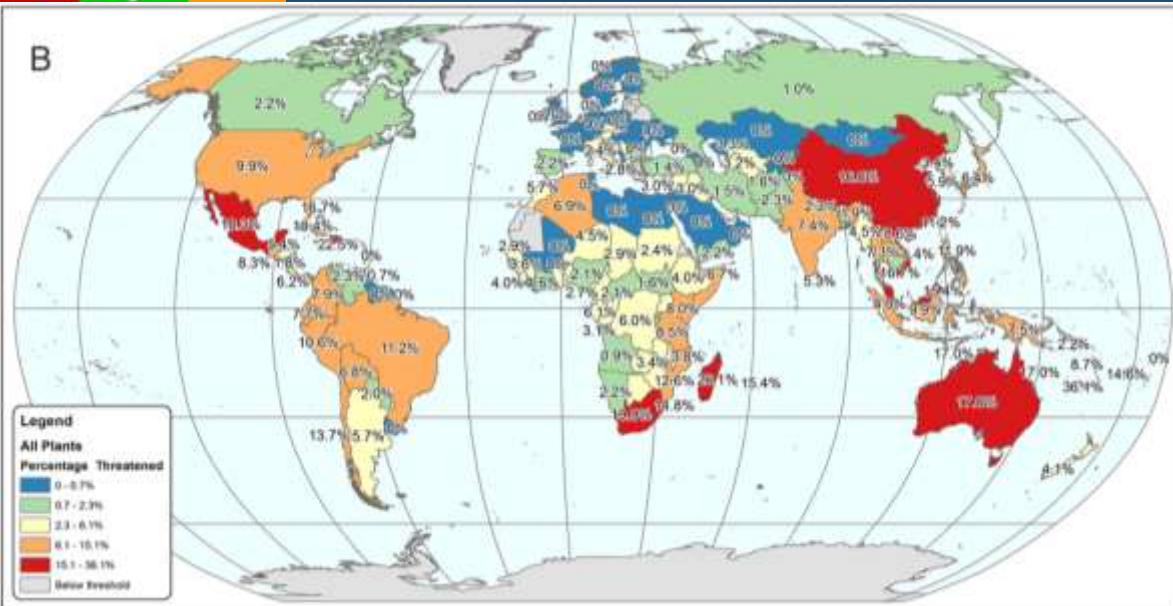
Importance of the Project

- The data from these specimens will be of great value to international projects in which participating institutions are involved
- Outreach to the horticulture and hobbyist communities through appeals to help transcribe data will help to foster better connections and appreciation of the role of specimens by non-scientists (help them understand why names change, etc.)

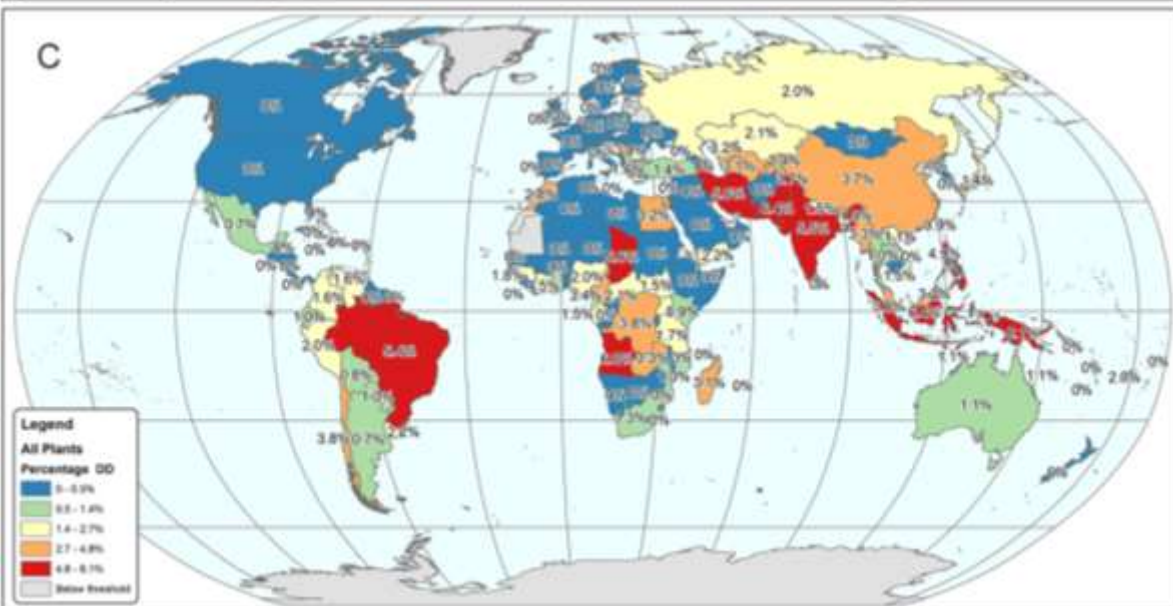




The Need for Data Access

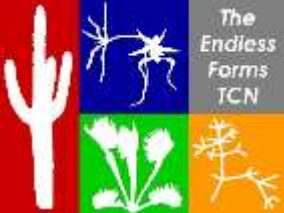


B. Percentage of assessed species that are threatened per country.



C. Percentage of assessed species that are Data Deficient per country.

Brummitt et al. 2015. Green Plants in the Red: A Baseline Global Assessment for the IUCN Sampled Red List Index for Plants. PlosOne

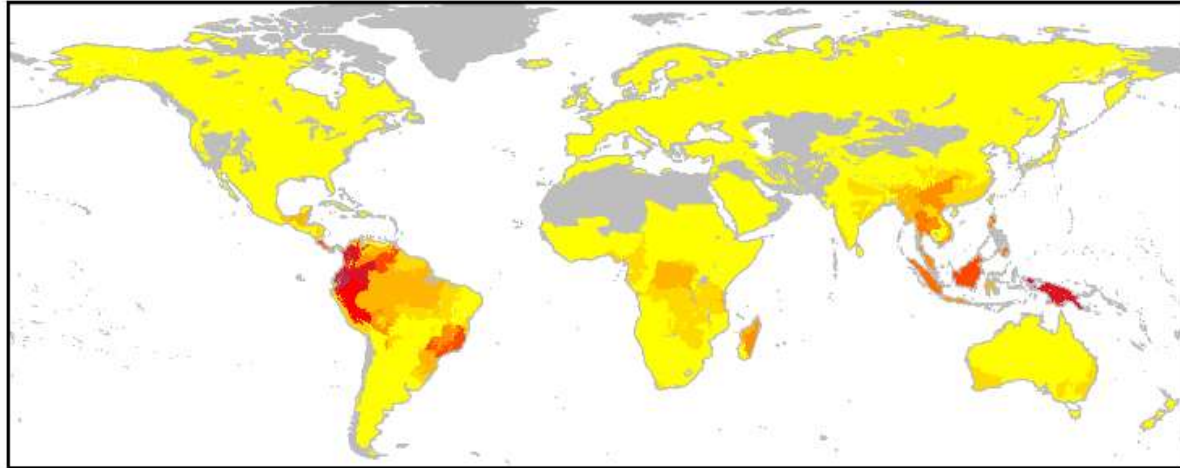


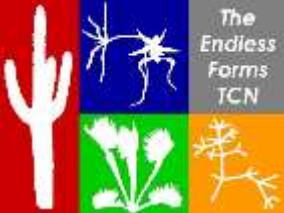
The Need for Data Access

Geographic species
diversity of Orchidaceae
McInnes et al. 2013

Orchidaceae specimens
in GBIF, Sep 2018

D) Orchidaceae, N = 3603





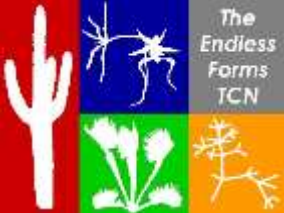
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The Need for Data Access



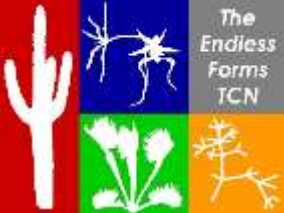
28 spp. of *Microchilis* in Peru, but only 19 specimens from 2 institutions (F & MO), representing 10 spp., in iDigBio.





The Challenges of Data Access

- It is increasingly difficult to do international fieldwork, particularly on CITES registered species
- Overly broad taxon inclusion in CITES appendices (e.g., all of Orchidaceae)
- Few herbaria in tropical nations are CITES registered institutions
- Issues of 'gate keeping'.
 - Time and effort to unlock data
 - Expense associated with loaning specimens
 - Difficulties in obtaining visas, reduced government funding, etc



Ethical Use of Specimen Data

National Geographic
4 hrs · 🌐

A photographer and a scientist hope that evocative photos will ignite a passion for protecting threatened animals.



📘 About this article

NATIONALGEOGRAPHIC.COM

What Will Make Us Care Enough to Save Endangered Species?



BBC NEWS

Follow

'Twitter mining' for ants, spiders and birds

BY JONATHAN AMOS
SEPTEMBER 6, 2018 · 2 MIN READ

Twitter is set to become a very useful resource in the study of certain animal behaviours, scientists say.

A new study trawled the public's postinas

High Country News

The Butterfly Sting

How a federal wildlife agent brought down one of the world's most notorious insect thieves.

Craig Welch · April 12, 2018 · [Print the post online](#)



PhytoKeys 96: 87–97 (2018)
doi: 10.3897/phytokeys.96.23667
<http://phytokeys.pensoft.net>

RESEARCH ARTICLE

PhytoKeys
A peer-reviewed, open access journal
Launched to accelerate biodiversity research

The hidden *Heuchera*: How science Twitter uncovered a globally imperiled species in Pennsylvania, USA

Scott Schuette¹, Ryan A. Folk², Jason T. Cantley³, Christopher T. Martine⁴

¹ Pennsylvania Natural Heritage Program, Western Pennsylvania Conservancy, 800 Waterfront Drive, Pittsburgh, PA 15222, USA ² Florida Museum of Natural History, Dickinson Hall, University of Florida, Gainesville, FL 32611, USA ³ Department of Biology, San Francisco State University, 1600 Holloway Ave. San Francisco, CA 94132, USA ⁴ Department of Biology, Wayne E. Manning Herbarium, Bucknell University, 1 Dent Drive, Lewisburg, PA USA

EDITOR'S CHOICE

Data-Intensive Ecological Research Is Catalyzed by Open Science and Team Science

Randee Spence-Cheswell¹, Patricia A. Soranno²

iScience, bioRxiv, <https://doi.org/10.1101/388881>, bioRxiv

Published: 12 September 2018

Abstract

Many problems facing society and the environment need ecologists to use increasingly larger volumes and heterogeneous types of data and approaches designed to harness such data—that is, data-intensive science. In the present article, we argue that data-intensive science will be most successful when used in combination with open science and team science. However, there are cultural barriers to adopting each of these types of science in ecology. We describe the benefits and cultural barriers that exist for each type of science and the powerful synergies realized by practicing team science and open science in conjunction with data-intensive science. Finally, we suggest that each type of science is made up of myriad practices that can be aligned along gradients from low to high level of adoption and advocate for incremental adoption of each type of science to meet the needs of the project and researchers.

\$40,000 Insect and Lizard Theft Was an Inside Job, Police Say



The Philadelphia Insectarium and Butterfly Pavilion last year. Three current or former employees are suspected of stealing thousands of insects and lizards, the police said.
Brianna Spause/The Philadelphia Inquirer, Associated Press



Ethical Use of Specimen Data

Verizon 3:26 PM

Valerie Anderson ▸ Florida Flora and Ecosystematics
22 mins · 🌐

Plant Experts: [iNaturalist.org](https://www.inaturalist.org) needs your input on which plant species should be auto-obscured.

I have harassed them enough that they are doing an import of the following spreadsheet once we've combed it over. [link in comments]

The goal here is to get species that may not be officially listed but we know are rare obscured so that they don't get poached.

Please fill in the 'Geoprivacy' (light orange) column.

Feel free to add species. — with Edwin Bridges and 5 others.

Like Comment Share

Be the first to like this

Valerie Anderson
<https://goo.gl/buCsq8>

Florida T&E Plants for iNaturalist Import
docs.google.com

Write a comment... GIF 😊 ➤

Valerie's Post

21m Like Reply

Edwin Bridges
I would suggest a list of no more than 50 or so species need to be obscured. There is absolutely no way that anyone would "poach" the vast majority of these species other than orchids, bromeliads, and Sarracenia species.

19m Like Reply

Valerie Anderson
Perfect.

18m Like Reply

Roger Hammer
I agree, Edwin, although some of the rare ferns might also be targeted by collectors. Orchid collectors are the most fanatical.

7m Like Reply

Edwin Bridges
I also realized we should also hide some of the cacti locations

5m Like Reply

Write a comment... GIF 😊 ➤

Valerie's Post

7m Like Reply

Edwin Bridges
I also realized we should also hide some of the cacti locations

5m Like Reply

Write a reply...

Edwin Bridges
I ran through the first 200 or so and marked my opinion about which should be obscured as "yes - ELB" I realize that might be best done as a separate column in the spreadsheet so that we can solicit other opinions as well

6m Like Reply

Aaron Calidris
I'm really glad this is being done. I worry about putting my carnivorous plants on inaturalist and know many people who won't because of collectors

2m Like Reply

Write a comment... GIF 😊 ➤



Ethical Use of Specimen Data



SPNHC

ADVANCING COLLECTIONS CARE

- We will be hosting an Ethical Use of Specimen Data Workshop at SPNHC in Chicago, 2019
- We are looking for topics to cover and potential speakers
- All groups and collections types will be covered
- Speakers and participants from outside of the museum community are welcomed

THE NEW YORK
BOTANICAL GARDEN

Herb. 1 2 3 4 5 6 7 8 9 10





The Endless Forms TCN

Thank you!

Melissa Tulig

Kim Watson

Cesar Nufio

Elizabeth Rivas

Nadine Hill



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INSTITUTE OF TEXAS
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