

The Endless Forms TCN



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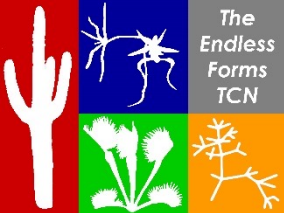


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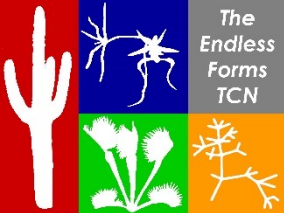




Synopsis of Year Two

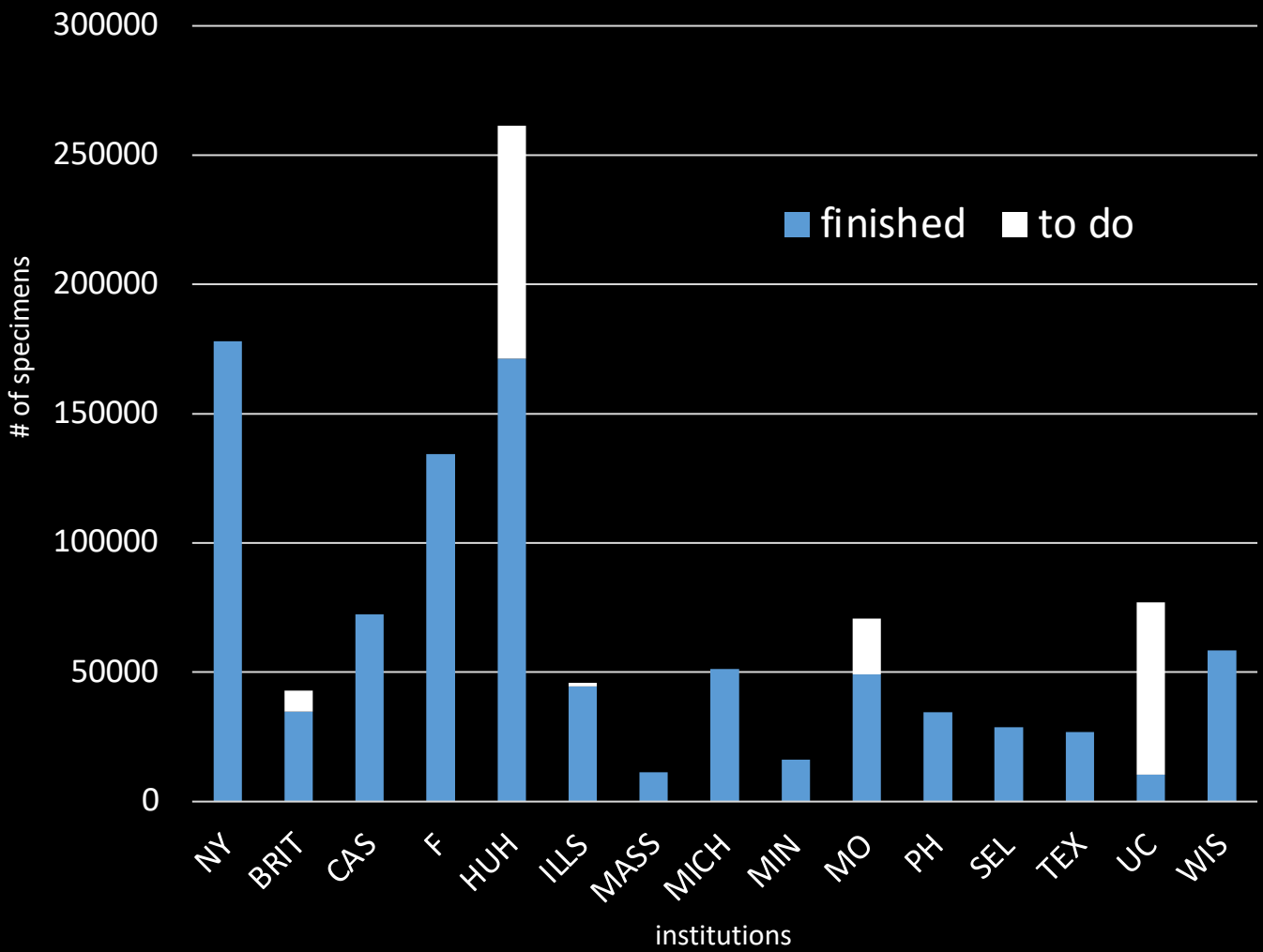
- 71% of the promised specimens were fully digitized within the first three years of this project across all institutions
- 8 institutions (53%) over-delivered on barcoded/imaged/digitized specimens, i.e., barcoded or imaged more specimen than promised
- 777 participants in Virtual Herbarium Expeditions, contributing 58,535 full-classifications and assigned an additional 15,911 specimens to country
- COVID-19 related shutdowns significantly disrupted progress; pivot to georeferencing and online transcription





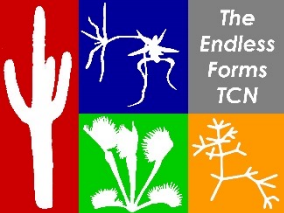
Digitization

Barcoding (as of July 2021)



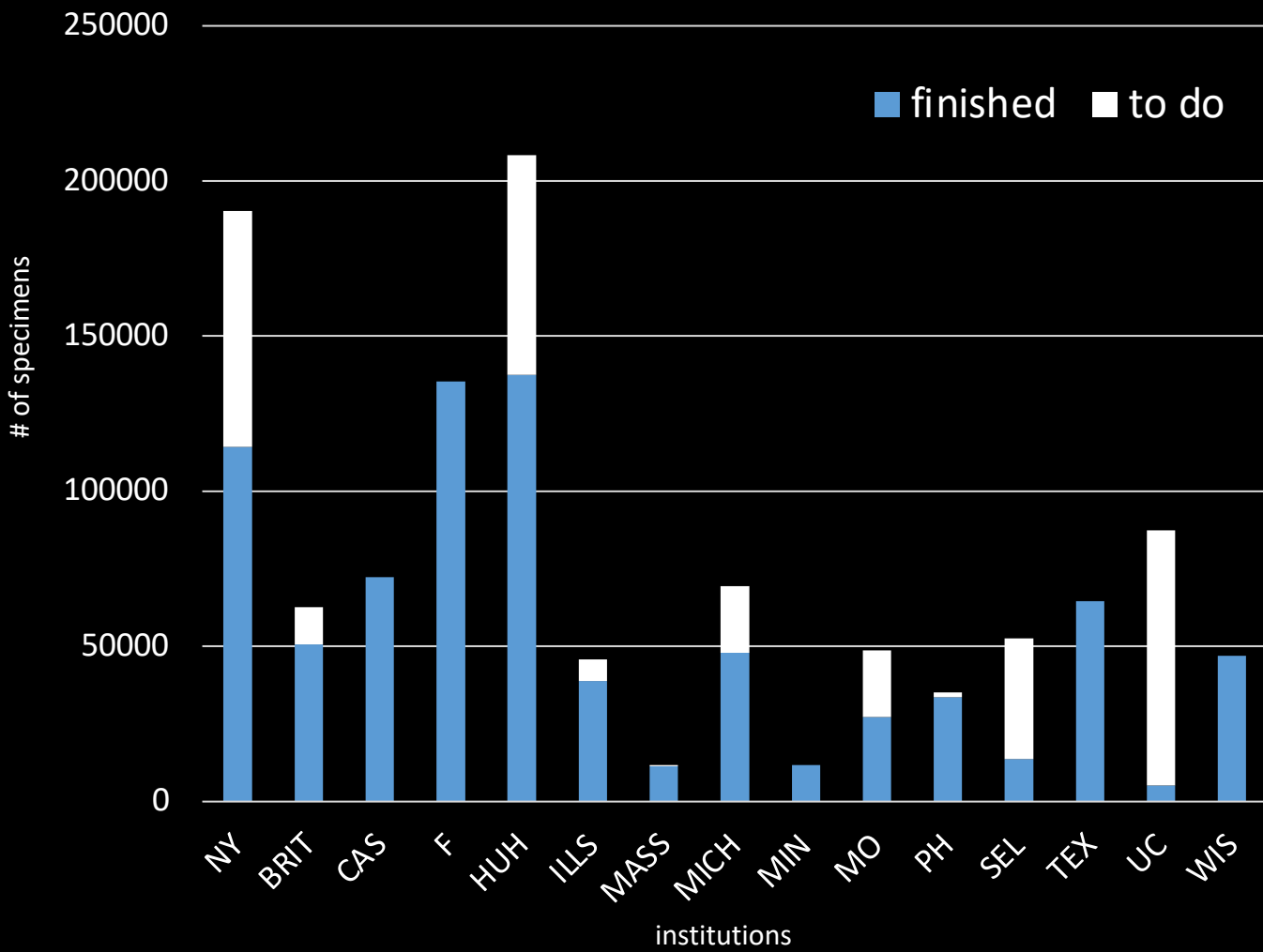
922,273 specimens barcoded (90% of total)

By year 3, ten institutions (47%) have met or surpassed their committed specimen totals



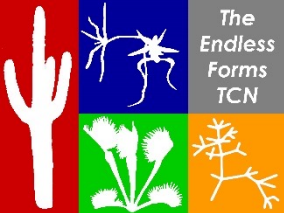
Digitization

Transcription (as of July 2021)



836,735 specimens imaged (71% of total)

Significantly leveraged volunteer & community science partners



Lessons Learned

Workflows matter

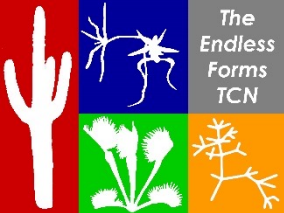
-barcoding and imaging should occur in tandem: e.g., as you finish barcoding Family A and start barcoding Family B, start imaging Family A

Transcription

- transcription should happen after imaging
- always transcribe from an image, not the physical specimen

The limits of student interns

-including student interns is a critical component of TCNs, however they have limits compared to FTEs (such as lead digitizers): e.g., many universities lost months of digitization time, as collections/campuses closed to students earlier than FTEs, due to COVID-19



Outreach

Realizing the full potential of DIGIVOL & Notes from Nature

-777 online volunteers / citizen scientists helped transcribe specimen records in FY 2020.

-New volunteer opportunities for institutions to engage previously on-site, in person volunteers, during shutdowns.

NYBG

The Milkweed Family: Monarch butterflies to carrion flowers

The Milkweed family, Apocynaceae, contains some of the most spectacular flowers of any plant group. Many species also have interesting relationships with pollinators. For example, the North American Butterflyweed, *Asclepias tuberosa*, is a critical host plant for the Monarch Butterfly; the butterfly pollinates this species and lays its eggs on the milkweed, which contains a toxic latex sap. Monarch caterpillars have evolved to eat the milkweed leaves and use the toxic chemicals in the sap as part of their own chemical defense system, making them unpalatable to birds and other predators. Other members of Apocynaceae, like *Stapelia*, have large red and brown flowers that smell... [Read more](#)

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0% Validated 44% Transcribed 2000 Tasks

34 Volunteers

NYBG

Gesundheit! The spicy world of the Piperaceae

The true peppers (family Piperaceae, distinct from chili peppers in the tomato family, Solanaceae), are some of the most important plants to human history and cuisine. The black pepper spice on your dinner table comes from the dried fruit and seed of *Piper nigrum*. It has formed a foundational component of Indian cooking for the last 4000 years, and was a delicacy to the ancient Romans. Peppercorns were even stuffed into the nose of Ramesses II as part of the mummification process. The trade in black pepper and other species between India, southeast Asia, China, The Middle East, and Europe helped to form links between cultures for the past 2000 years. Black pepper continues to be... [Read more](#)

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11% Validated 100% Transcribed 3026 Tasks

47 Volunteers

NYBG

Cacti: Dangerous Beauty

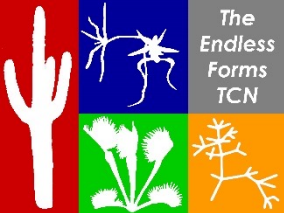
Cacti are remarkable plants: their leaves have evolved into sharp defensive spines, they grow in arid deserts where water is always in short supply, and they produce large, gorgeous flowers that are pollinated by bees and bats! Cacti are important members of their ecosystems, providing nectar for pollinators, fruits for tortoises and other animals, and nesting sites for myriad species of birds, from woodpeckers to eagles. From the iconic Saguaro to the diminutive hedgehog cactus, these amazing plants dominate the arid habitats of the North and South America. Yet these spectacular species are also under threat from poachers, mining, and other forms of habitat destruction. Herbarium specimens provide the baseline data used to describe biodiversity, document where these species... [Read more](#)

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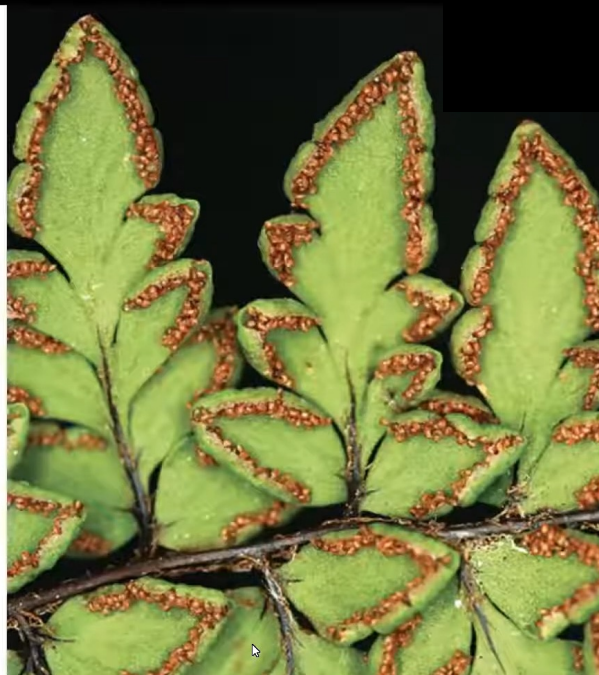
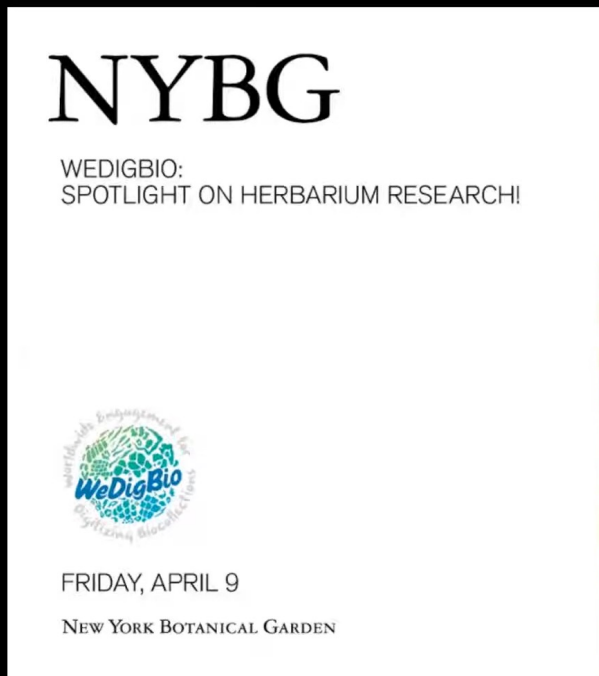
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73% Validated 100% Transcribed 2739 Tasks

57 Volunteers



Outreach



Joint 2021 NYBG WeDigBio Seminar: Endless Forms and Pteridological Collections Consortium focusing on epiphytes

Bruce Baldwin (UC) taught a virtual Jepson workshop to 100 students, focusing in part on the importance of herbaria

Charlie Zimmerman



Matthew Pace

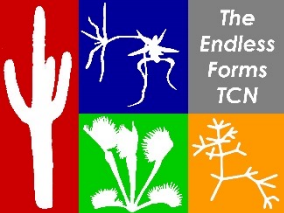


Alejandra Vasco



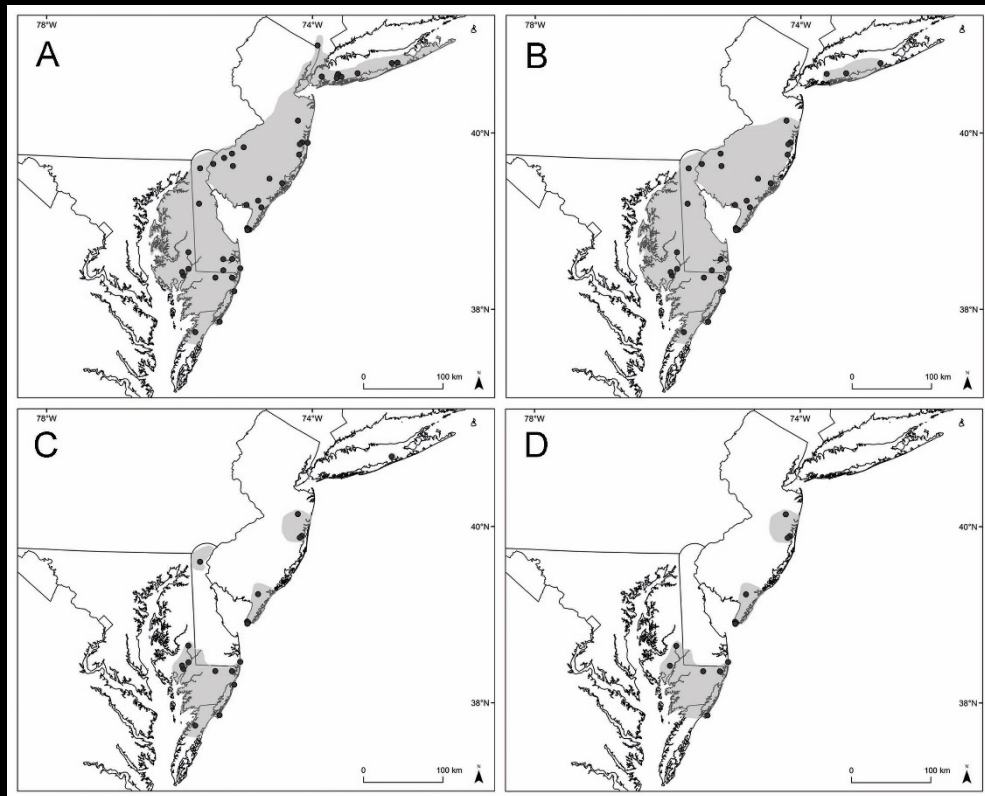
Julián Aguirre-Santoro





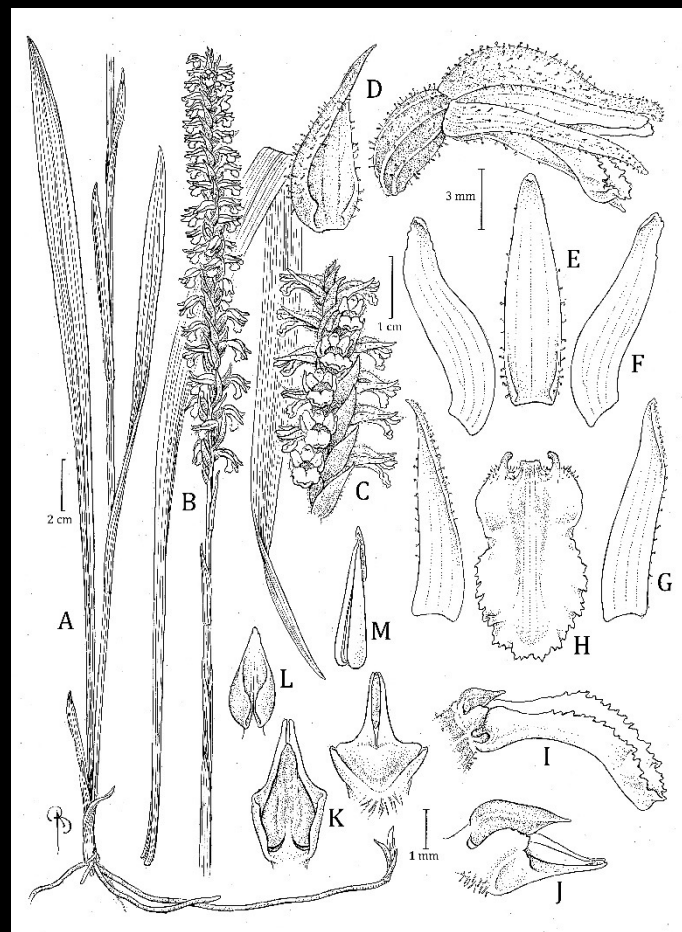
Scientific Output

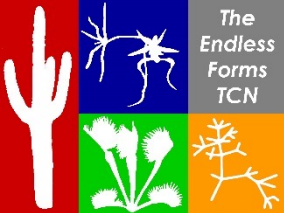
New species described and science outreach



Spiranthes bightensis was newly described based on specimens digitized in this award.

Herbarium specimens show a population collapse over time.

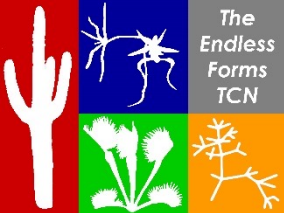




Thank You!

Thank you & congratulations to Barbara Thiers, Endless Forms co-PI, on her retirement!





The Endless Forms TCN

Thank you!



Kim Watson
Charlie Zimmerman
Lin Li
Elizabeth Rivas



Award #1802034



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