National Plant Germplasm System Ash Conservation Project

Jeffrey D. Carstens

USDA-ARS North Central Regional Plant Introduction Station

Ames, Iowa

Photo credit: Jennifer Koch (USFS)

Photo credit: Jason Kilgore (USFS)

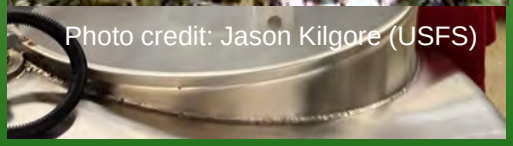

Photo credit: Lisa Hill (USDA)

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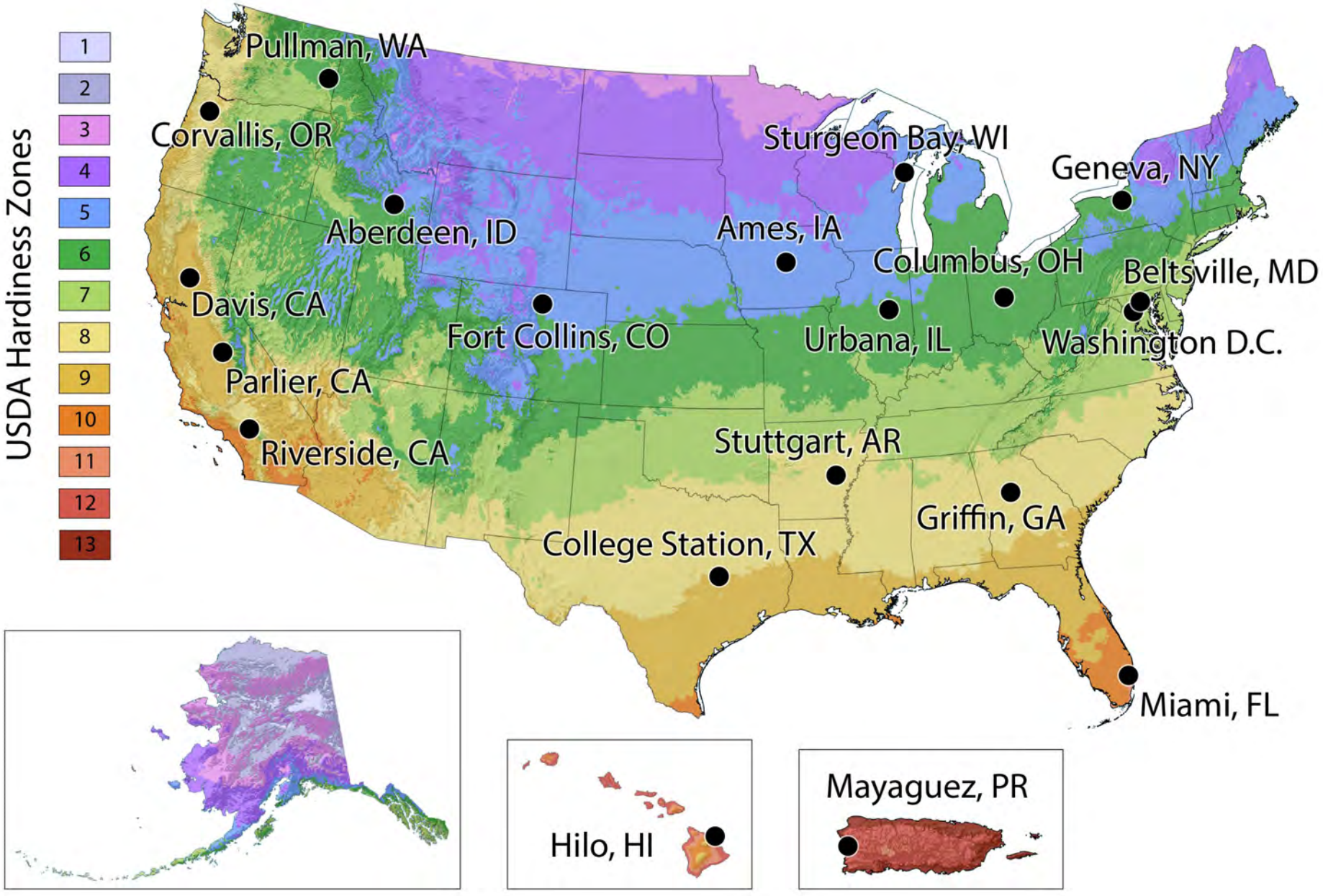
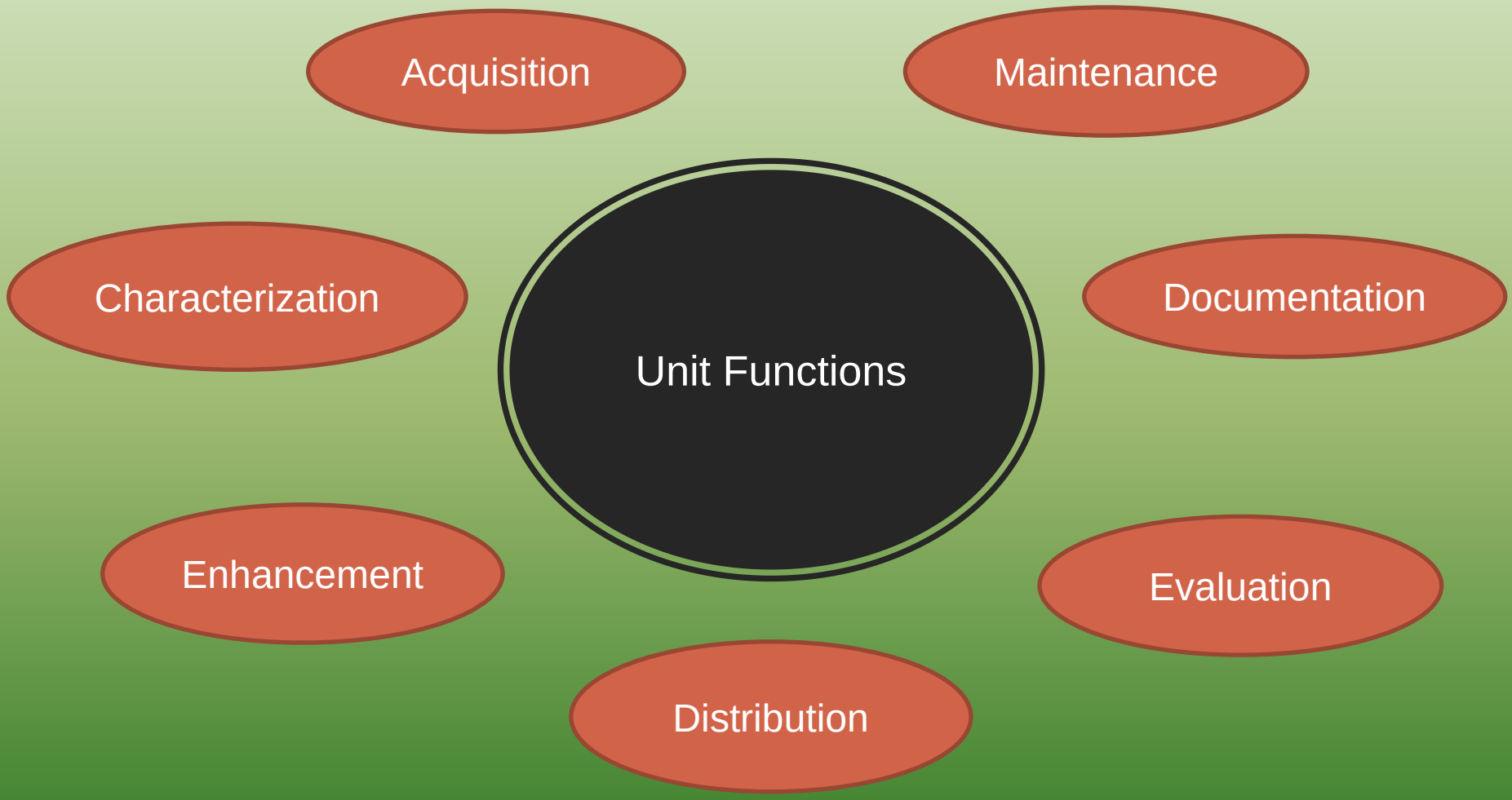
National Plant Germplasm System



NPGS Mission

- Conserve genetically-diverse plant germplasm and associated information.
  - Seeds
  - Plants
  - Dormant buds


Acquisition
Maintenance
Characterization
Unit Functions
Documentation
Enhancement
Evaluation
Distribution

The Ash Conservation Project

A cooperative process involving

- USDA-ARS
- Forest Service
- Natural Resources Conservation Service
- Seeds of Success
- Canadian Forest Service
- Tribal governments
- State agencies

Project Goals

- Assemble comprehensive collections
  - Taxonomic diversity
  - Ecoregions
- Obtain good passport data
- Herbarium specimens/images
- Verify seed quality
- Optimized sampling strategy
  - Substantial distance between sites
  - Stratified sampling
  - Population based sampling

Plant Collection Trips

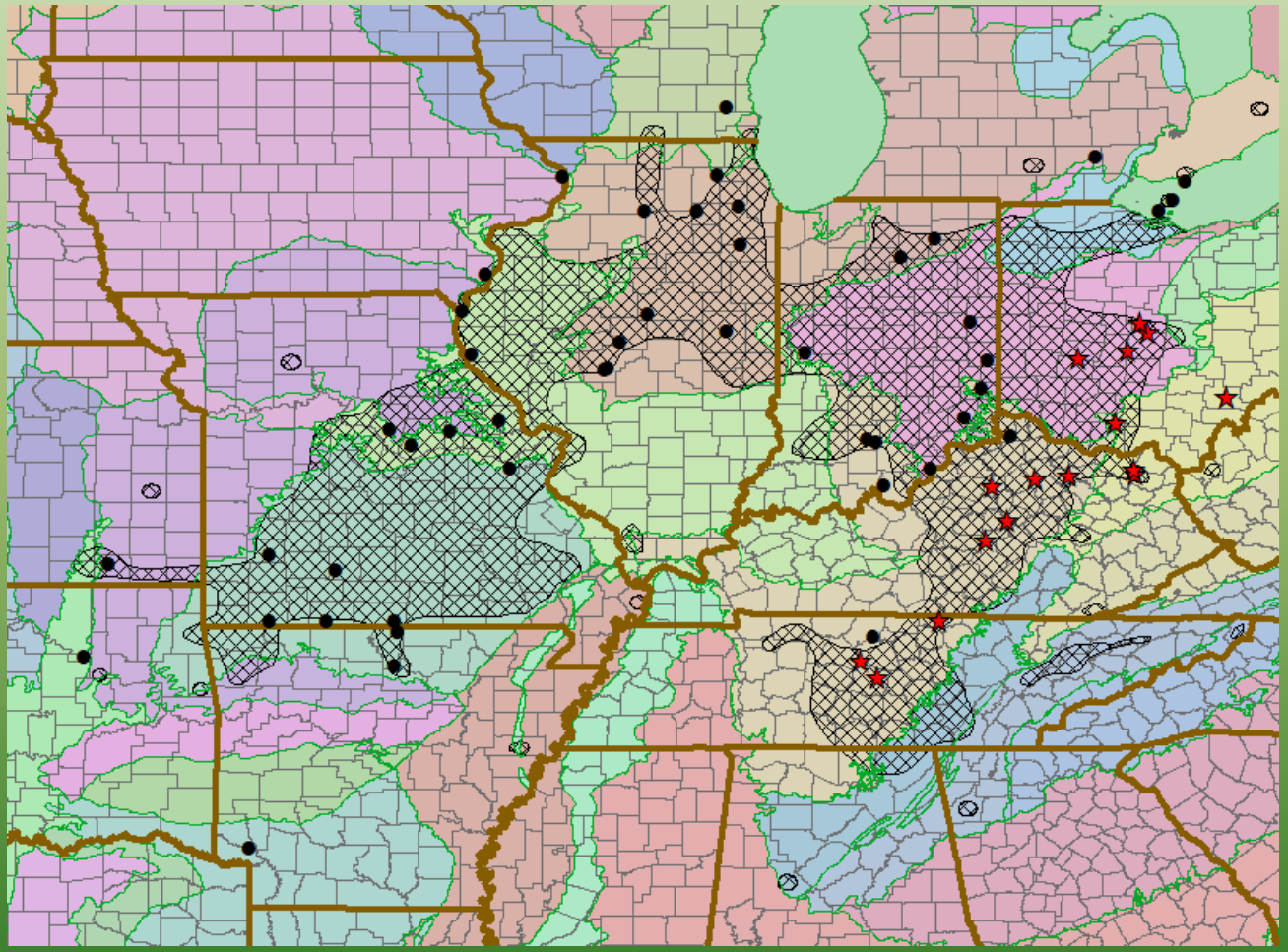
USDA-ARS Plant Exchange Office

- 13 trips
  - 23 US States
  - China
  - Ukraine
  - Japan

North America-China Plant Exploration Consortium

- 9 trips
  - China

F. quadrangulata



Fraxinus Holdings (GRIN)

Taxonomy	Accessions
Fraxinus angustifolia	9
Fraxinus apertisquamifera	0
Fraxinus baroniana	3
Fraxinus bungeana	8
Fraxinus chiisanensis	0
Fraxinus chinensis	32
Fraxinus dimorpha	0
Fraxinus excelsior	17
Fraxinus ferruginea	0
Fraxinus floribunda	0
Fraxinus griffithii	1
Fraxinus holotricha	0
Fraxinus hubeiensis	0
Fraxinus insularis	6
Fraxinus lanuginosa	3
Fraxinus longicuspis	2
Fraxinus malacophylla	0

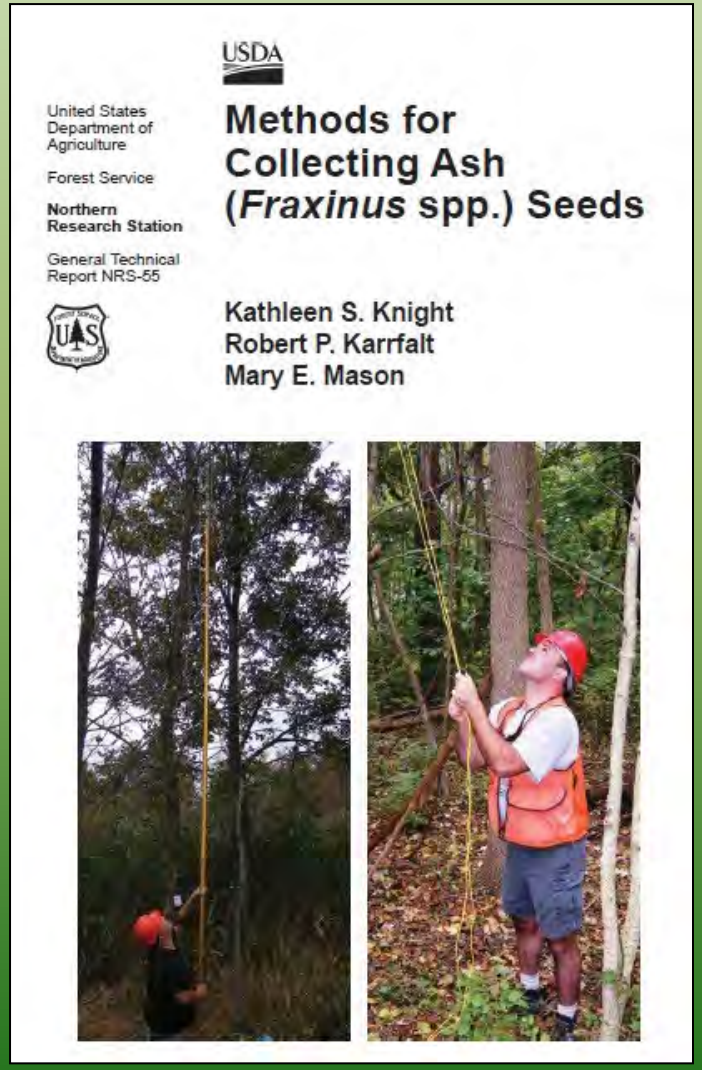
Taxonomy	Accessions
Fraxinus mandshurica	23
Fraxinus micrantha	0
Fraxinus odontocalyx	0
Fraxinus ornus	12
Fraxinus pallisiae	0
Fraxinus paxiana	10
Fraxinus petenensis	0
Fraxinus platypoda	4
Fraxinus purpusii	0
Fraxinus raibocarpa	1
Fraxinus rufescens	0
Fraxinus sieboldiana	7
Fraxinus sogdiana	0
Fraxinus spaethiana	0
Fraxinus stylosa	4
Fraxinus trifoliolata	0
Fraxinus uhdei	1
Fraxinus xanthoxyloides	1

Fraxinus Holdings (GRIN)

Taxonomy	Accessions
Fraxinus albicans	1
Fraxinus americana	1230
Fraxinus anomala	15
Fraxinus berlandieriana	1
Fraxinus biltmoreana	5
Fraxinus caroliniana	6
Fraxinus cuspidata	8
Fraxinus dipetala	34
Fraxinus gooddingii	1
Fraxinus greggii	0
Fraxinus latifolia	93
Fraxinus nigra	375
Fraxinus papillosa	0
Fraxinus pennsylvanica	1025
Fraxinus profunda	108
Fraxinus quadrangulata	94
Fraxinus velutina	30

Lessons Learned

- Sampling techniques

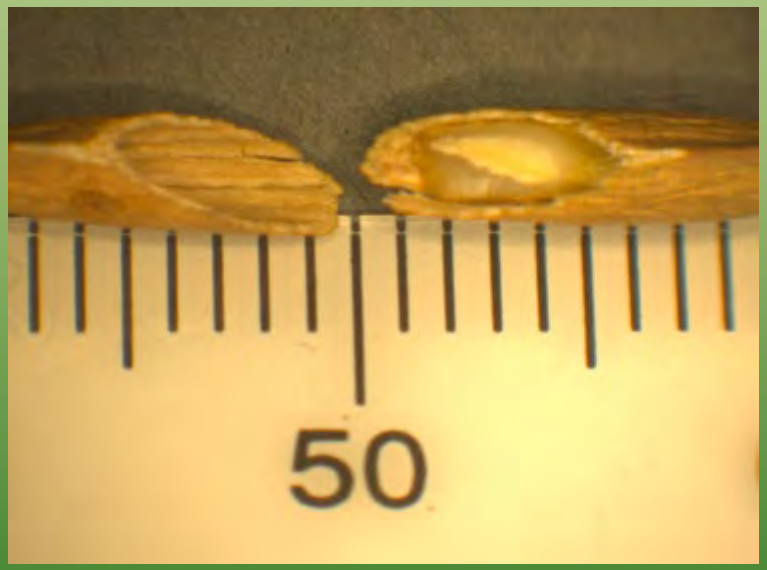


Lessons Learned

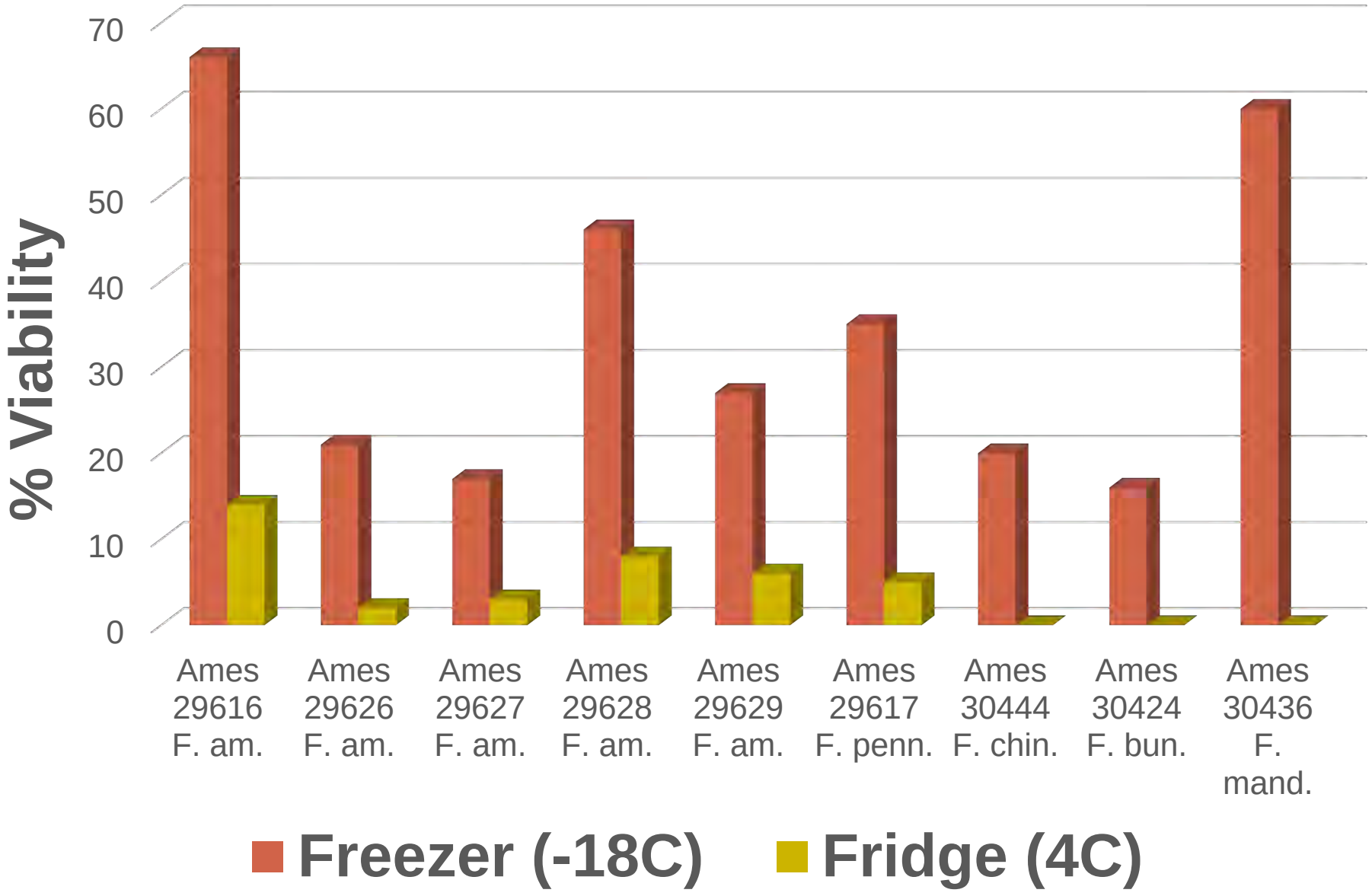
- Sampling techniques
- Value of local contacts
- Timing is everything

Lessons Learned

- Sampling techniques
- Value of local contacts
- Timing is everything
- Habitat preferences
- Seed quality checks
- Storage conditions



15 Years in Storage

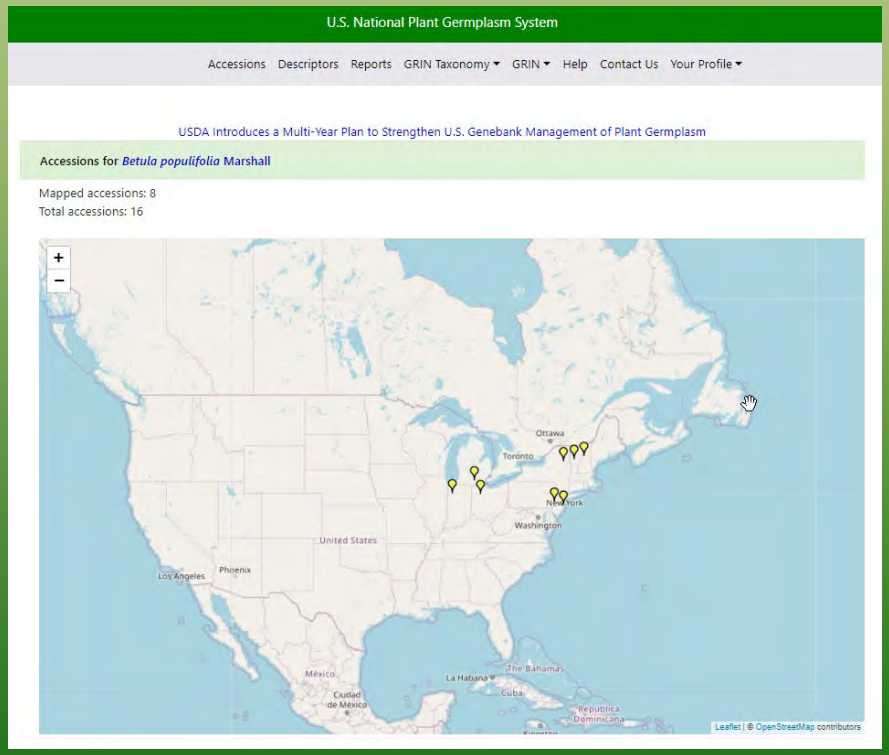


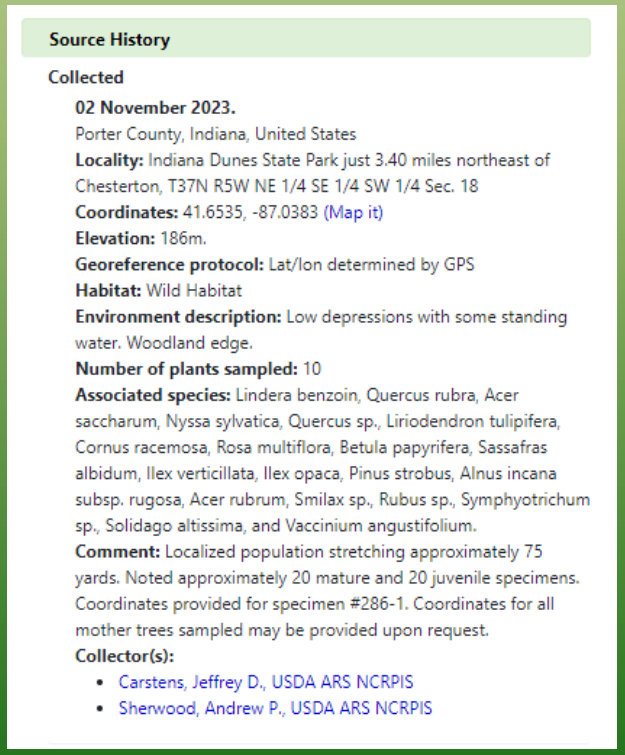
Lessons Learned

- Sampling techniques
- Value of local contacts
- Timing is everything
- Seed quality checks
- Habitat preferences
- Storage conditions
- Database mgmt

Grin-Global Database

- Documents acquisitions
  - Maps of current/historical holdings
  - Passport data





Grin-Global Database

- Documents acquisitions
- Taxonomy hub

Grin-Global Database

- Documents acquisitions
- Taxonomy hub
- Observation data

Distribution of Values for INFLORESCENCES PER STEM (INFLORESCENCES PER STEM)

Range	Number of Accessions
1.50000 - 3.07000	7
3.07000 - 4.64000	1
4.64000 - 6.21000	0
6.21000 - 7.78000	3
7.78000 - 9.35000	2
9.35000 - 10.92000	4
10.92000 - 12.49000	1
12.49000 - 14.06000	0
14.06000 - 15.63000	0
15.63000 - 17.20000	1

BRACT COLOR

Number of accessions (19)

Equal to

PINK/WHT=Pink and whitish midrib of bract with green background.
PINK=Pink midrib of bract with green background.
RED=Red or reddish midrib of bract with green background.
WHT=White or silverish midrib of bract with green background.

INFLORESCENCES PER STEM

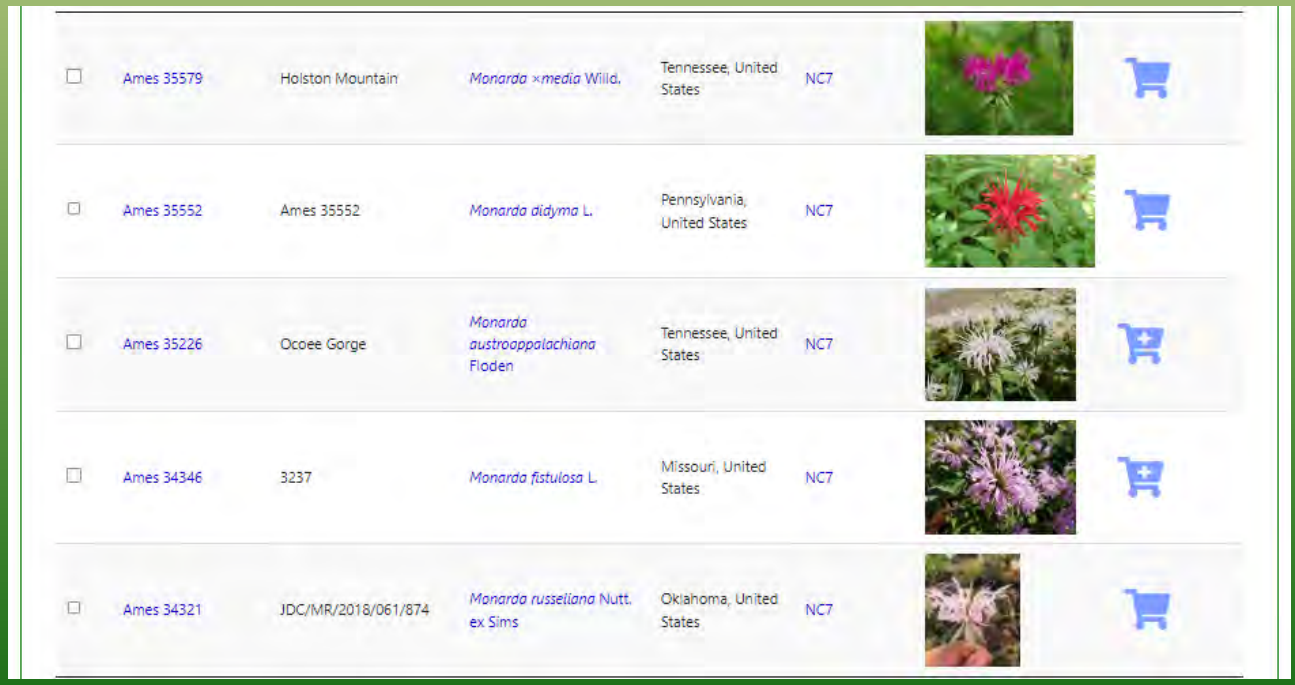
Number of accessions (19)

Equal to

1.6
1.9
2.1
2.2
2.5

Grin-Global Database

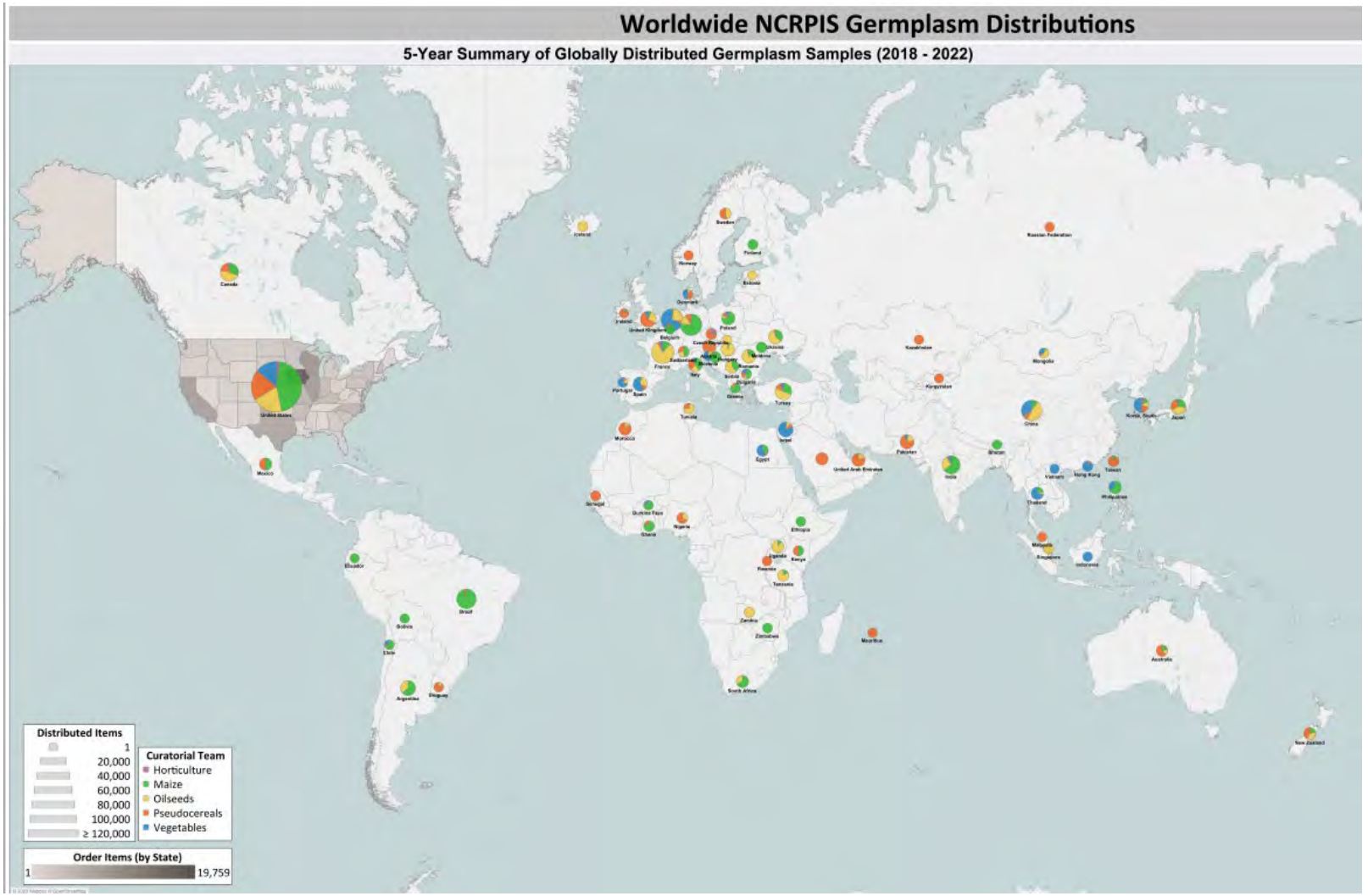
- Documents acquisitions
- Taxonomy hub
- Observation data
- Germplasm requests



☐	Ames 35579	Holston Mountain	*Monarda ×media* Willd.	Tennessee, United States	NC7	
☐	Ames 35552	Ames 35552	*Monarda didyma* L.	Pennsylvania, United States	NC7	
☐	Ames 35226	Ocoee Gorge	*Monarda austroappalachiana* Floden	Tennessee, United States	NC7	
☐	Ames 34346	3237	*Monarda fistulosa* L.	Missouri, United States	NC7	
☐	Ames 34321	JDC/MR/2018/061/874	*Monarda russeliana* Nutt. ex Sims	Oklahoma, United States	NC7	

Distributions

2018-2022 Distribution Summary



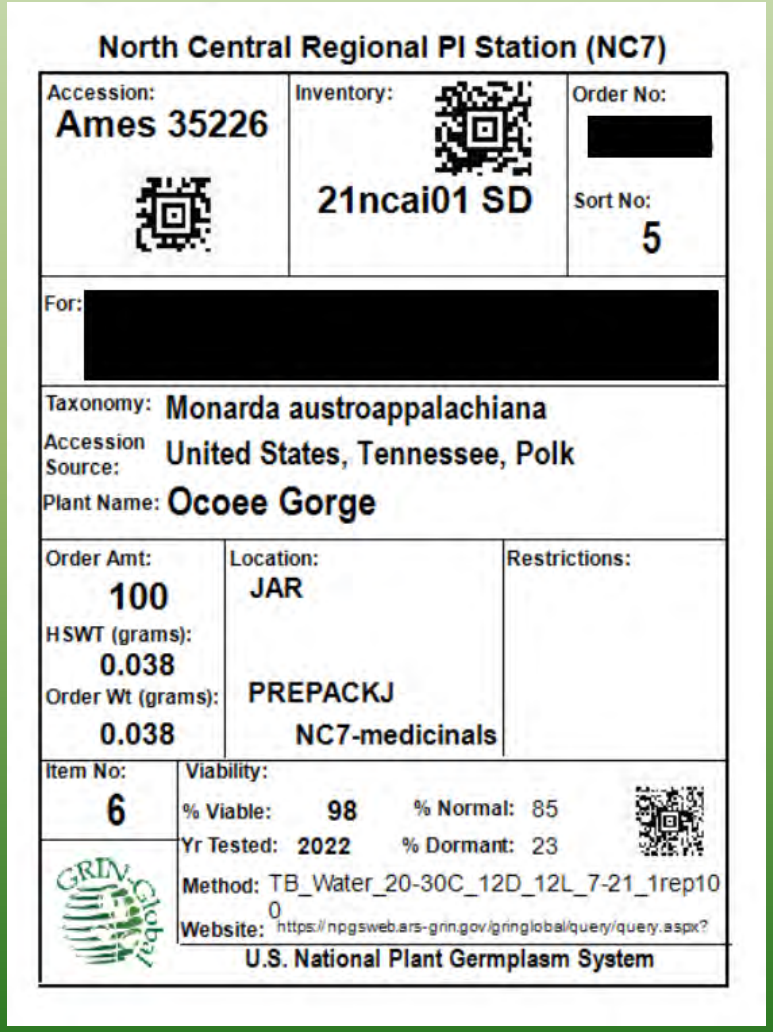
Data and graphics: Stacey Estrada (USDA-ARS)

Seed Packet Information

NPGS identifier

Secondary identifier

Quantity



Source

Viability data

Moving Forward

- Future targets (*Fraxinus*)
  - Southwestern and Southeastern U.S.
  - “Lingering” *Fraxinus* genotypes
  - Numerous taxonomic/geographic gaps

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Fraxinus albicans	1
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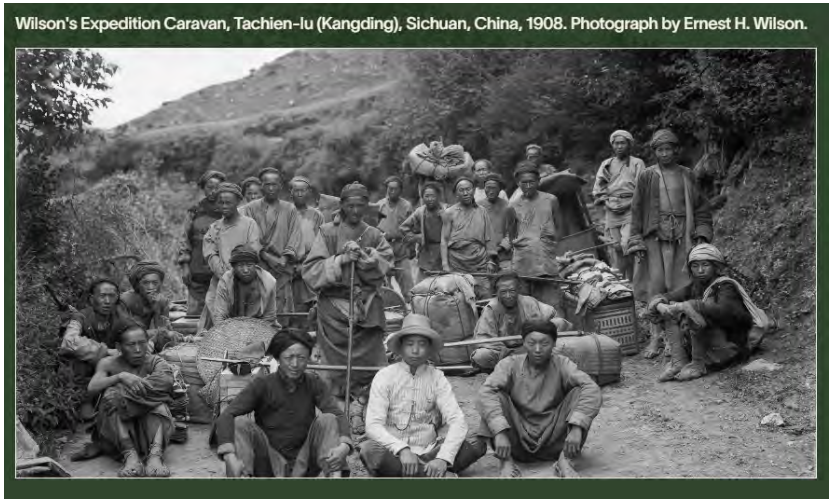
Moving Forward

- Future targets (*Fraxinus*)
  - Southwestern and Southeastern U.S.
  - “Lingering” *Fraxinus* genotypes
  - Numerous taxonomic/geographic gaps
- Help always needed
  - Collection assistance
  - Insights on seed production
  - Knowledge of local flora

Collecting *Fraxinus quadrangulata:* Carstens and Ouellette

Plant Collecting

- Historical



- Current

Collecting *Gymnocladus dioicus:* Carstens & Schmitz (The Brenton Arboretum)

Plant Collecting

- Historical
- Current
- Future?

Plant Collecting

- Historical
- Current
- Future?
  - Emergency Response System?

Plant Collecting

- Historical
- Current
- Future?
  - Emergency Response System?
  - Data Warehouse?

GRIN-Global

Flora of North America

EPA United States Environmental Protection Agency

Level III and IV Ecoregions of the Continental United States

Earth Point Tools for Google Earth

The Biota of North America Program

iNaturalist

SERNEC Southeast Regional Network of Expertise and Collections

NATIVEPLANTS JOURNAL

CHICAGO BOTANIC GARDEN

DIXON NATIONAL TALLGRASS PRAIRIE SEED BANK

Conservation Blueprint Seed Cleaning Guide

SER Society for Ecological Restoration

United Nations Decade on Ecosystem Restoration 2021-2030 Global Partner

Seed Information Database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