PRE Pairing for Success

APGA Conference | June 23, 2017

PHOTO BY JASON HAWKES

INTRO
PRE PAIRING @ GARDENS
COMMON GROUND
Q & A
PHOTO BY JASON HAWKES

PRE™

Industry	Conservation	Government	Science
AmericanHort	The Nature Conservancy Protecting nature. Preserving life.™	California Department of Fish & Wildlife	HRI Horticultural Research Institute
Bailey Nurseries	CAL-IPC	U.S. National Arboretum	UF IFAS University of Florida
Ball	Sustainable Conservation	cdfa California Department of Food & Agriculture	UC Davis Plant Sciences
Monrovia Horticultural Craftsmen® since 1926			University of Washington Botanic Gardens

We are here!
Minnesota Landscape
ARBORETUM
CHICAGO
BOTANIC
GARDEN
ATLANTA
BOTANICAL
GARDEN
BRIT
BOTANIC GARDEN
FORT WORTH
Plant to planet.

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Context. . .

Audience: Non-native ornamental & research

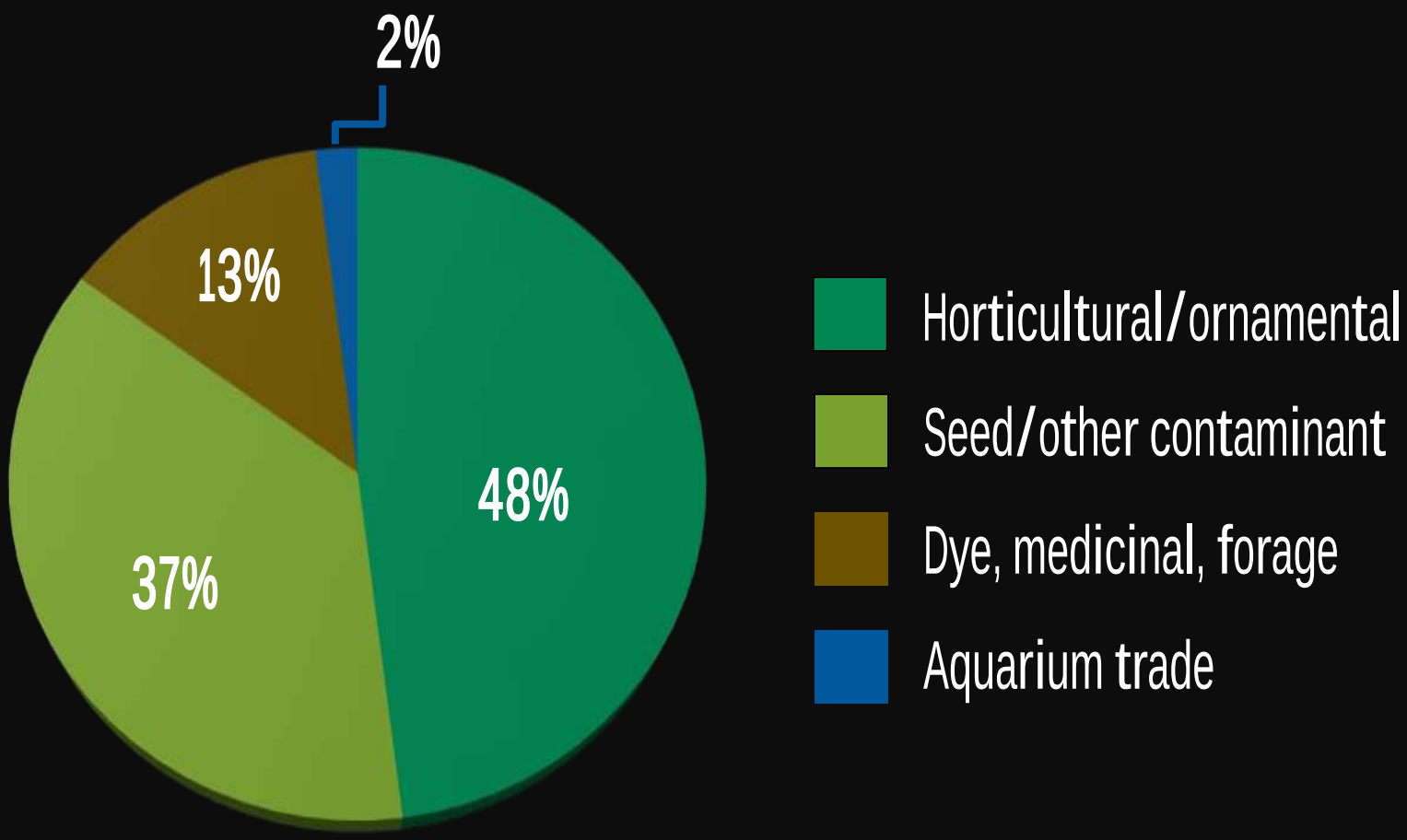
Concern: Revenue, reputation & environment

Source of problem:

* When/ how/ where good traits go bad
* Lack of practical & accurate tool
* Lack of collaborative platform

Solution: Plant Risk Evaluator for Horticulture

Invasive Pathways (CA)



(Bell et al., 2007)

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RESEARCH ARTICLE

The Development of a Plant Risk Evaluation (PRE) Tool for Assessing the Invasive Potential of Ornamental Plants

Christiana Conser, Lizbeth Seebacher, David W. Fujino, Sarah Reichard, Joseph M. DiTomaso

Published: March 24, 2015 • DOI: 10.1371/journal.pone.0121053

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Abstract
Introduction
Materials and Methods
Results and Discussion
Conclusions
Supporting Information
Acknowledgments
Author Contributions
References

Reader Comments (0)
Media Coverage (0)
Figures

Abstract

Weed Risk Assessment (WRA) methods for evaluating invasiveness in plants have evolved rapidly in the last two decades. Many WRA tools exist, but none were specifically designed to screen ornamental plants prior to being released into the environment. To be accepted as a tool to evaluate ornamental plants for the nursery industry, it is critical that a WRA tool accurately predicts non-invasiveness without falsely categorizing them as invasive. We developed a new Plant Risk Evaluation (PRE) tool for ornamental plants. The 19 questions in the final PRE tool were narrowed down from 56 original questions from existing WRA tools. We evaluated the 56 WRA questions by screening 21 known invasive and 14 known non-invasive ornamental plants. After statistically comparing the predictability of each question and the frequency the question could be answered for both invasive and non-invasive species, we eliminated questions that provided no predictive power, were irrelevant in our current model, or could not be answered reliably at a high enough percentage. We also combined many similar questions. The final 19 remaining PRE questions were further tested for accuracy using 56 additional known invasive plants and 36 known non-invasive ornamental species. The resulting evaluation demonstrated that when "needs further evaluation" classifications were not included, the accuracy of the model was 100% for both predicting invasiveness and non-invasiveness. When "needs further evaluation" classifications were included as either false positive or false negative, the model was still 93% accurate in predicting invasiveness and 97% accurate in predicting non-invasiveness, with an overall accuracy of 95%. We conclude that the PRE tool should not only provide growers with a method to accurately screen their current stock and potential new introductions, but also increase the probability of the tool being accepted for use by the industry as the basis for a nursery certification program.

CrossMark

Subject Areas

Invasive species
Dicotyledons
Grasses
Poaceae
Fabaceae
Plants
Seeds

Research published 2015

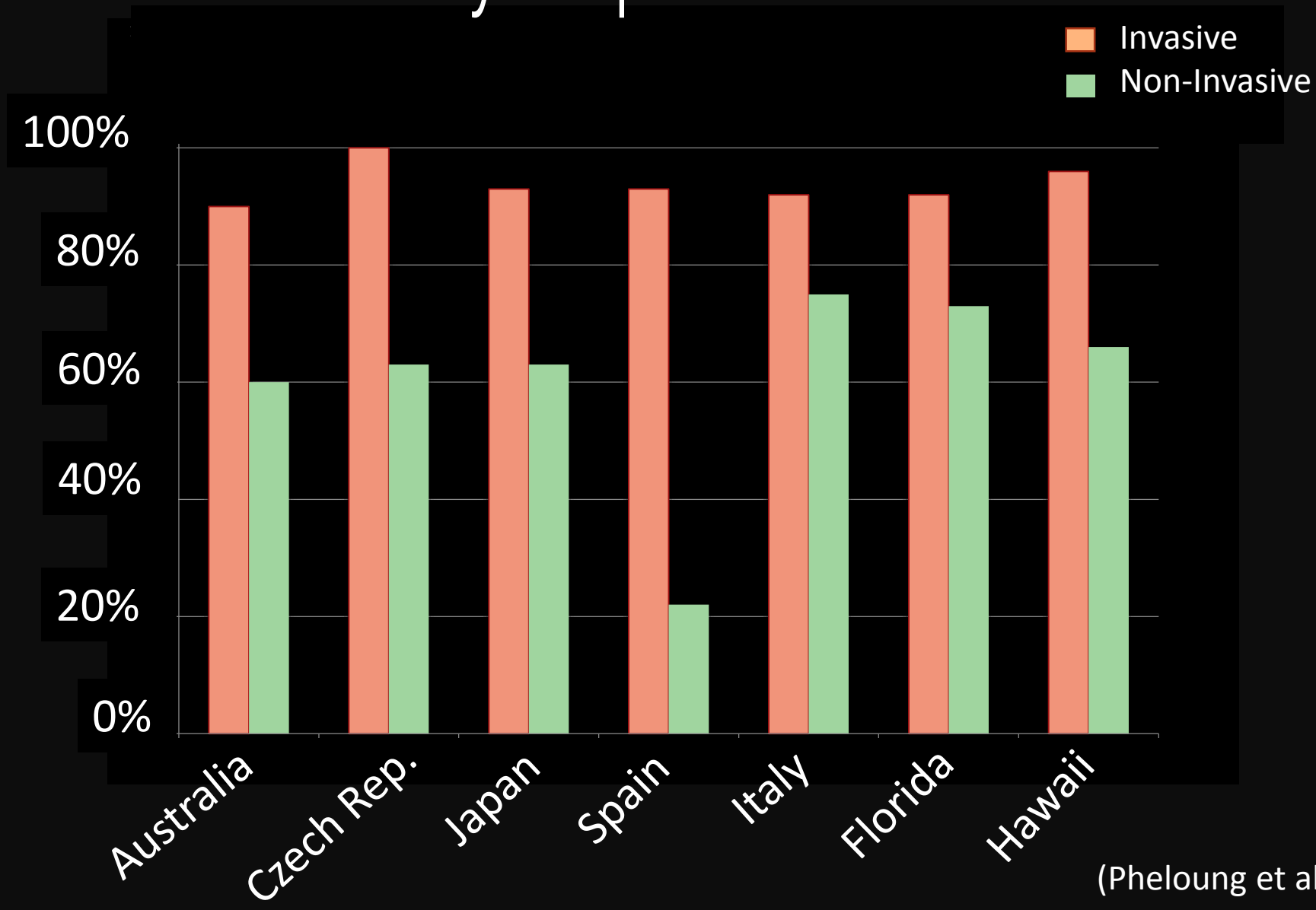
56 → 20 Questions

- Pheloung et al. 1999
- Reichard 2001
- Caley & Kuhnert 2006
- Virtue et al. 2008
- Koop et al. 2011
- *Conser et al. 2015*

95%

ACCURATE

Aus. WRA Accuracy Samples



(Pheloung et al.)

Aus WRA: PRE Comparison

(Conser et al.)

Plant Risk Evaluator -- Beta Version

American Public Gardens Association Evaluations

Organization | Evaluations | Issues

Status Submitted

Visibility - Any -

Apply

PRE Score	Title	Date	Questions Answered	Screener Confidence (%)	Issues (unresolved/total)
16	Firmiana simplex -- Texas *Screener:* Kim Taylor *Status:* Submitted	Jun 5, 2017	19	78	0/0
7	Abelia xgrandiflora -- Texas *Screener:* Kim Taylor *Status:* Submitted	May 22, 2017	19	69	0/0
17	Pyrus calleryana 'Bradford' -- Georgia *Screener:* Kylie Bucalo *Status:* Submitted	May 20, 2017	19	63	0/0
18	Buddleja davidii 'Black Knight' -- Georgia *Screener:* Kylie Bucalo *Status:* Submitted	May 16, 2017	18	61	1/1
2	Nandina domestica 'Firepower' -- Georgia *Screener:* Kylie Bucalo *Status:* Submitted	May 11, 2017	20	78	0/0

PRE Metrics

Rating (0 to 25)

- < 13 low risk
- 13-15 evaluate further
- > 15 high risk

PRE Metrics

“Valid” = 80%
Questions Answered

(16/20 Questions)

PRE Metrics

Screener Confidence

VERY LOW * LOW * MEDIUM * HIGH * VERY HIGH

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ATLANTA BOTANICAL GARDEN
ATLANTA, GEORGIA

Also on display...

Horticulture as a conservation tool.

Georgia
Plant
Conservation
Alliance

2016
southeastern
PARTNERS IN
Plant Conservation
at the Center for Southeastern Conservation

SANFORD STADIUM
IT'S TIME TO TEE IT UP BETWEEN THE HEDGES
FAN UP
NEXT MEET SEPT. 30TH 10 AM VS TEXAS A&M
FAN UP
NEXT MATCH SEPT. 21ST 7PM VS ALABAMA
GEORGIA
0
T.O.L.
90:00
T.O.L.
FAU
0
QTR 1
AND

MURRAY
11

Plant Evaluated

by Brighter Blooms

Plant: Ligustrum sinense 'Sunshine'

PRE Evaluation Summary

PRE Score: 1 ✔

Questions Answered: 20
This evaluation is valid

Screener's Confidence: 66 %

Status: Submitted
Issues (unresolved/total): 0/0

PRIVATE by 2017 Farm Bill PRE Project

Ligustrum sinense 'Sunshine'

PRE Score Legend

✔ < 13 low risk

Q 13-15 evaluate further

✖ > 15 high risk

Plant Evaluated

by Missouri Botanical Garden

Plant: Buddleja davidii 'Black Knight'

PRE Evaluation Summary

PRE Score: 18 ✖

Questions Answered: 18
This evaluation is valid

Screener's Confidence: 61.111 %

Status: Submitted
Issues (unresolved/total): 1/1

PRIVATE by 2017 Farm Bill PRE Project

Actions

Add Evaluation Issue

Buddleja davidii 'Black Knight'

PRE Score Legend

✔ < 13 low risk

Q 13-15 evaluate further

✖ > 15 high risk

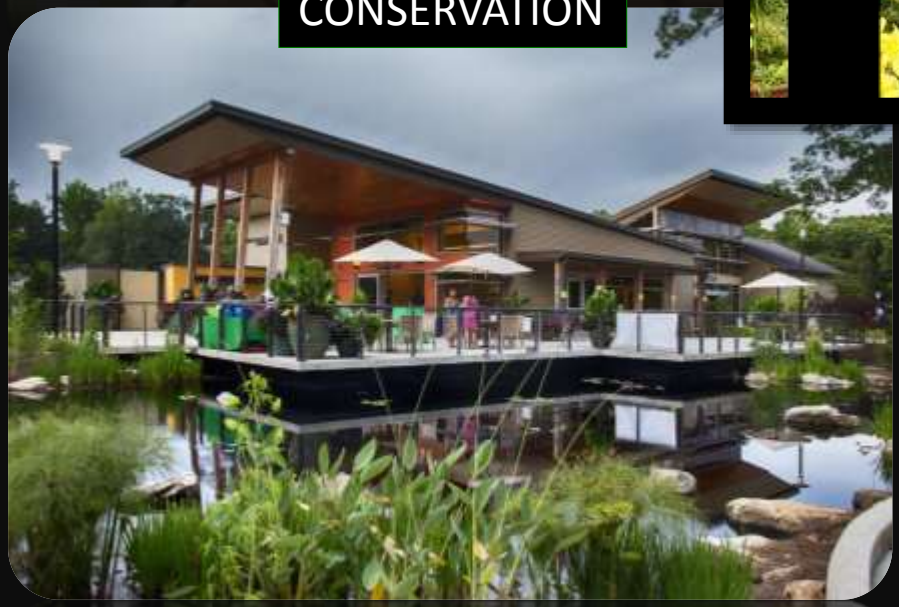
LINDSAY STREET PARK

DISPLAY GARDENS

EDUCATION

PRE

CONSERVATION



RESEARCH

Photo by Daderot © GFDL

BOTANIC GARDEN
FORT WORTH

Is this drought tolerant plant really what I want?...

…and how do I know?

BOTANICAL RESEARCH INSTITUTE OF TEXAS
BRIT

Teamwork puts “wise” in ‘water-wise’.

Plant Evaluated

by Cillas

Plant: Vitex agnus-castus

PRE Evaluation Summary

PRE Score: 15

Questions Answered: 18
This evaluation is valid

Screener's Confidence: 74.444 %

Status: Submitted
Issues (unresolved/total): 0/2

PUBLIC by Botanical Research Institute of Texas

Vitex agnus-castus

Issues

PRE Score Legend

- < 13 low risk
- 13-15 evaluate further
- > 15 high risk

Issues for Vitex agnus-castus -- Texas

Evaluation Issues

Minor

ID	Status	Evaluation Section / Issue Scope	Description
3113	Fixed	Q03. Is the species (or cultivar or variety) noted as being invasive elsewhere in the U.S. or world?	A passing, unsubstantiated mention of the plant being invasive in NC and SC (might be worth contacting the university to see if they have evidence): ttps://plants.ces.ncsu.edu/plants/all/vitex-agnus-castus/
3103	Fixed	Regional Information	Despite the capability of Vitex agnus-castus to become invasive in Texas, I have dealt with many people who raise bees commercially and count on the presence of Vitex for honey production. This also introduces the possibility that Vitex may assist the life cycle of honeybee pollinators in the area.

Plant Evaluated

by Fanghong

Plant: Lonicera maackii

PRE Evaluation Summary

PRE Score: 15

Questions Answered: 20
This evaluation is valid

Screener's Confidence: 86 %

Status: Submitted
Issues (unresolved/total): 0/1

PUBLIC by Botanical Research Institute of Texas

Lonicera maackii

Issues

PRE Score Legend

- < 13 low risk
- 13-15 evaluate further
- > 15 high risk

Plant Risk Evaluator -- Beta Version

Issues for Lonicera maackii -- Texas

Evaluation Issues

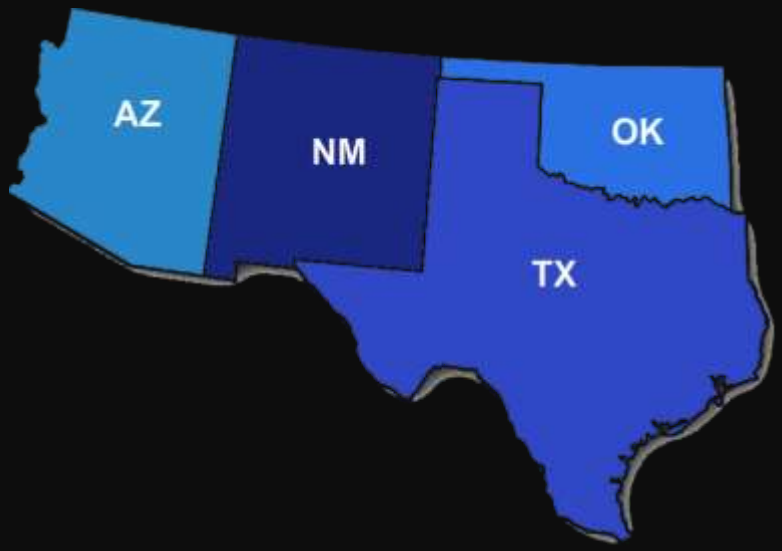
Minor

ID	Status	Evaluation Section / Issue Scope	Description
3108	Fixed	Plant Information	While this plant possesses landscape value, my personal experience is that it is very easily spread throughout a landscape in North Texas. Fruit production is heavy most years, and seed seem to germinate readily, especially in a maintained landscape.

BOTANIC GARDEN
FORT WORTH

PRE

BRIT
Plant to planet.™



- Nursery Trade
- Public Gardens
- Extension
- Conservation

Plant Hunting with Chicago Botanic Garden

Lilium monadelphum

Muscari armeniacum

Tulipa undulatifolia

Bellevalia makuensis

Campanula lactiflora

Gentiana schistocalyx

Stachys macrantha

Stokesia major

Dianthus cretaceous

Iris iberica ssp. *elegantissima*

Verbascum pyramidatum

Colchicum trigyna

Plant Explorers

aim to save rare species

and

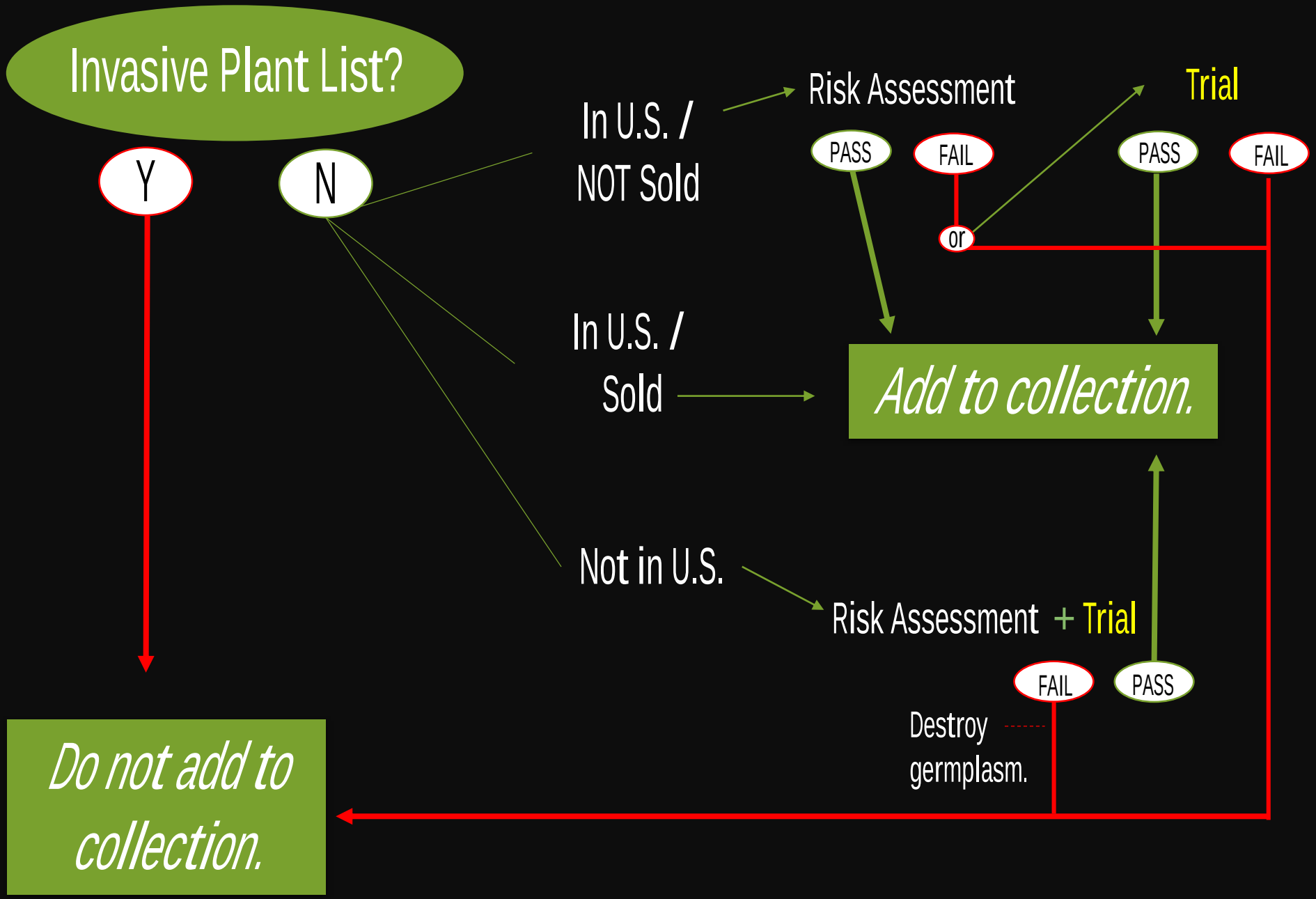
discover the best new garden plants,

BUT...

No one
wants to
introduce the
next invasive
monster!
PRE

Plant Science & Conservation

Current Risk Assessment


Invasive Plant List?
Y
N
In U.S. / NOT Sold
Risk Assessment
PASS
FAIL
or
Trial
PASS
FAIL
In U.S. / Sold
Add to collection.
Not in U.S.
Risk Assessment + Trial
FAIL
PASS
Destroy germplasm.
Do not add to collection.

Georgia Taxa to Screen

- *Sambucus tigranii*
- *Lilium szovitsianum*
- *Gentiana cruciata*
- *Rosa oxyodon*
- *Polygonatum glabberimum*

Plant Evaluated

by Ori Fragman-Sapir

Plant: Sambucus tigranii

PRE Evaluation Summary

PRE Score: 11 ✔

Questions Answered: 20
This evaluation is valid

Screener's Confidence: 49 %

Status: Submitted
Issues (unresolved/total): 0/0

PUBLIC by 2017 Farm Bill PRE Project

Sambucus tigranii

PRE Score Legend

✔ < 13 low risk

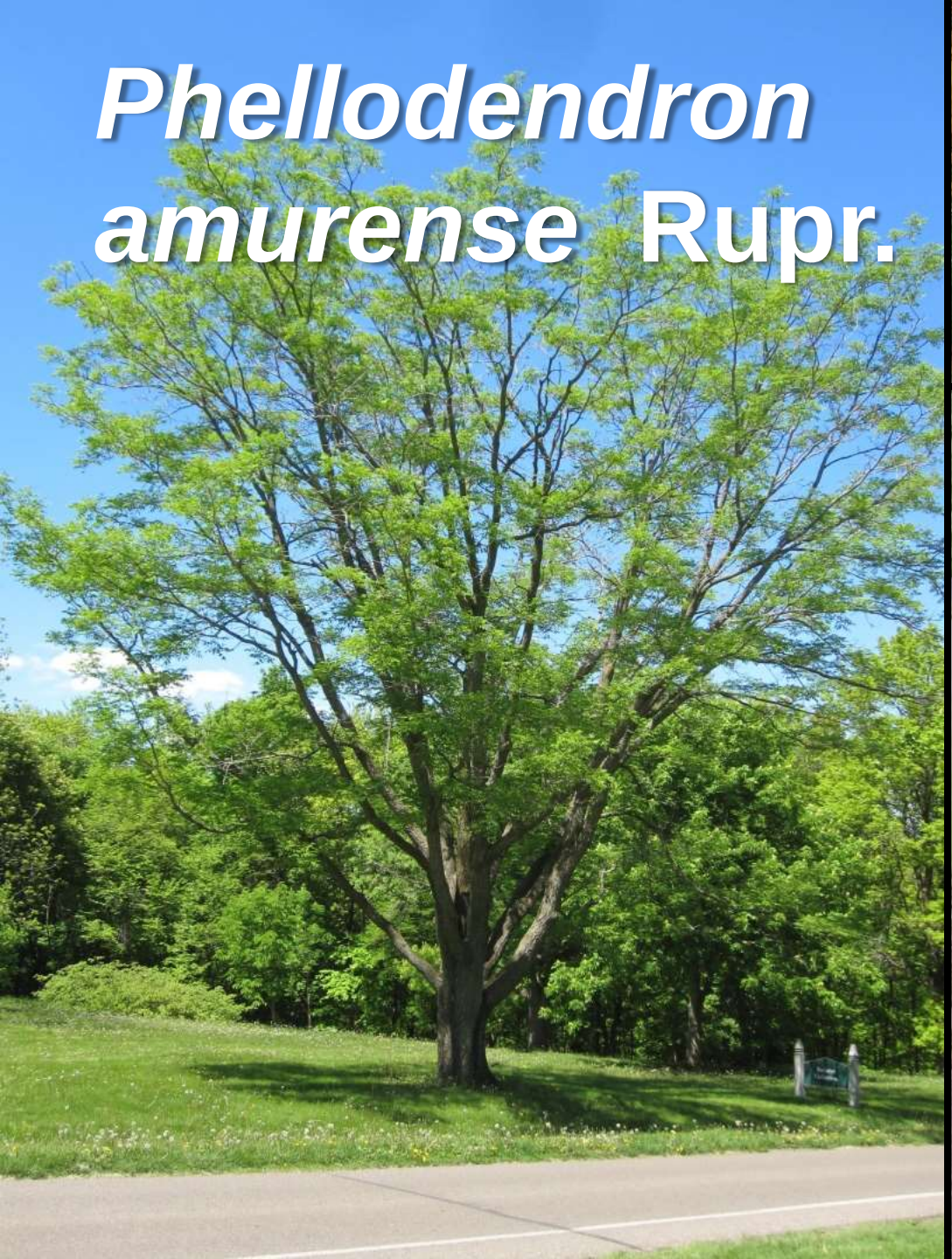
Q 13-15 evaluate further

✖ > 15 high risk

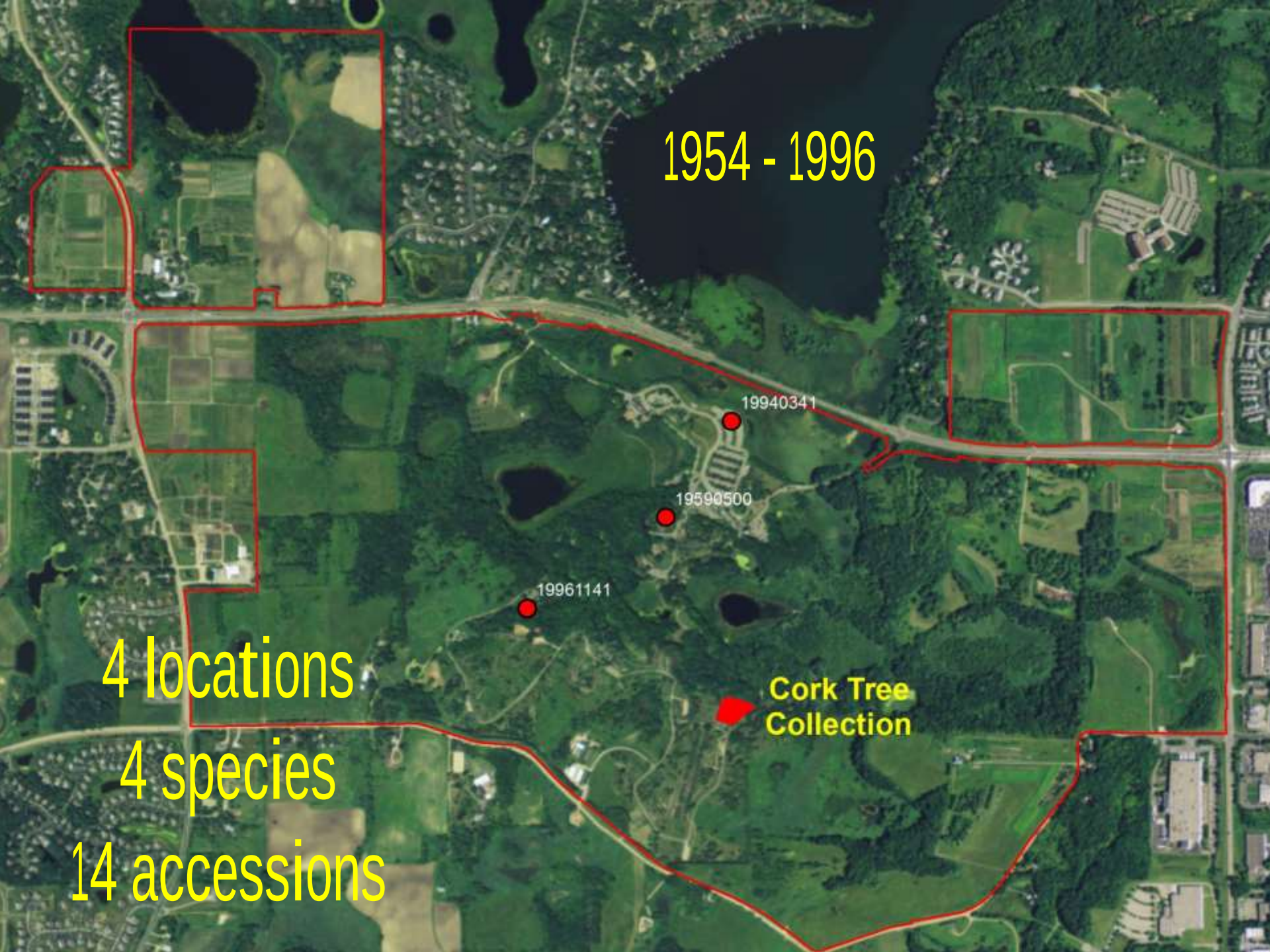
Evaluation Garden

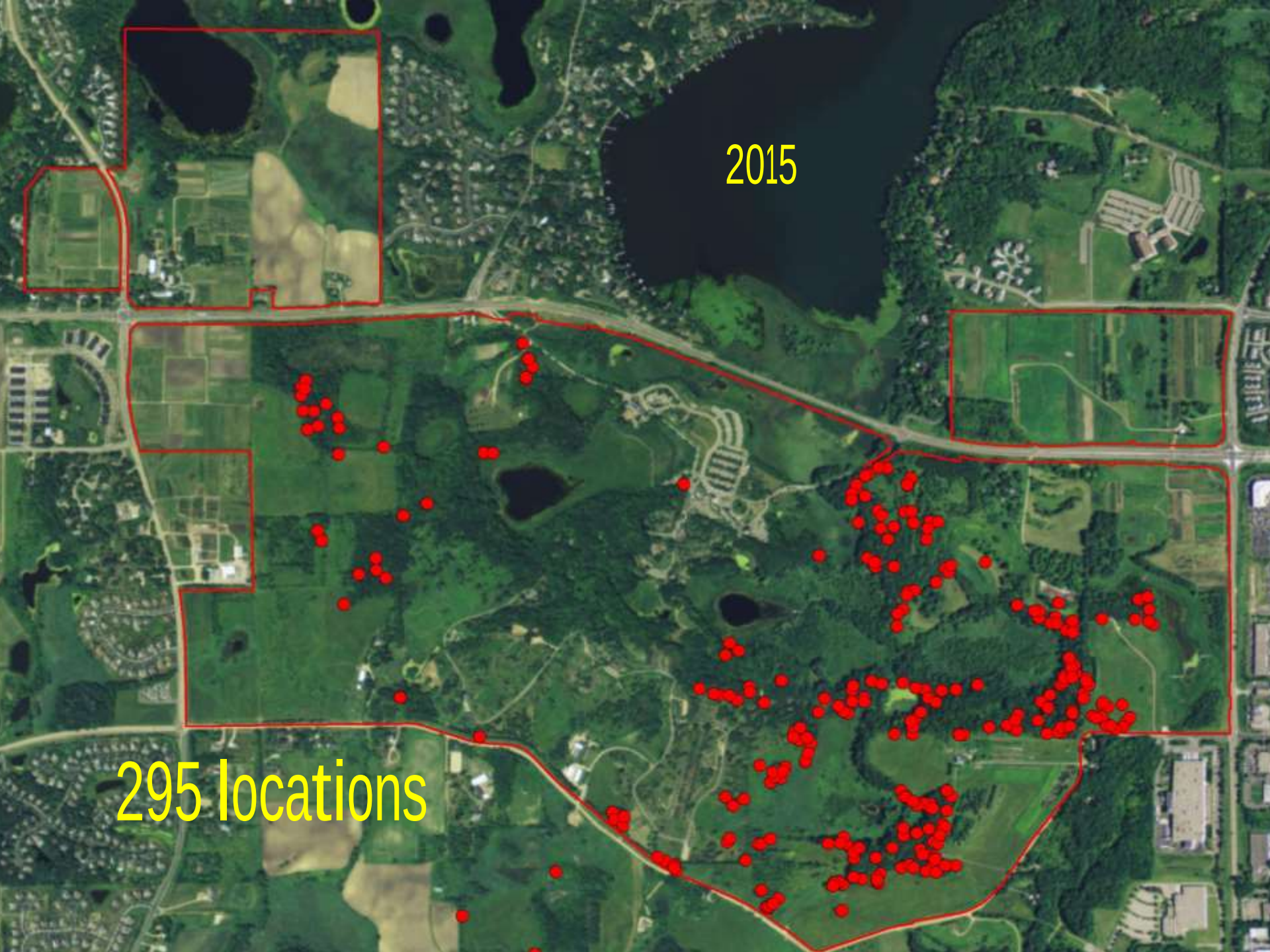
Minnesota Landscape
ARBORETUM

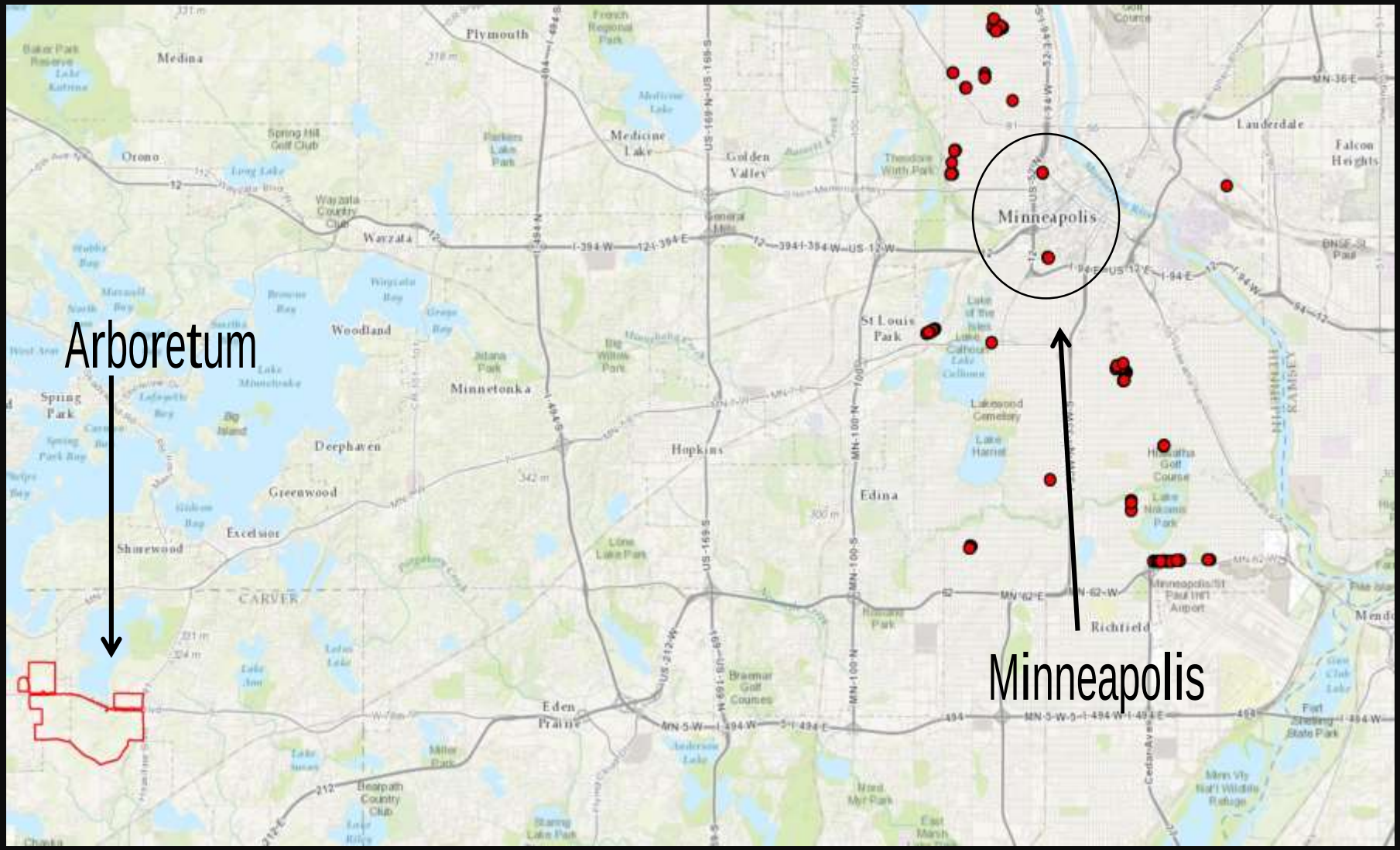
Phellodendron amurense Rupr.



I like his profile.


1954 - 1996
19940341
19590500
19961141
Cork Tree Collection
4 locations
4 species
14 accessions


2015
295 locations


Arboretum
Minneapolis
Medina
Plymouth
Orono
Wayzata
Minnetonka
Woodland
Deephaven
Greenwood
Excelsior
Shorewood
Spring Park
Hopkins
Edina
St Louis Park
Golden Valley
Medicine Lake
Minneapolis
Lauderdale
Falcon Heights
Richfield
Eden Prairie
CARVER

Plant Evaluated

by Richard Webb

Plant: Phellodendron amurense Rupr.

PRE Evaluation Summary

PRE Score: 16 ✖

Questions Answered: 20
This evaluation is valid

Screener's Confidence: 70 %

Status: Submitted
Issues (unresolved/total): 1/1

PUBLIC by University of Minnesota Landscape Arboretum

Phellodendron amurense Rupr.

PRE Score Legend

✔ < 13 low risk
Q 13-15 evaluate further
✖ > 15 high risk

Plant Evaluated

by Bob's Blog (Bob Vila - Tried, True, Trustworthy Home Advise)

Plant: Miscanthus sinensis 'Purpurascens'

PRE Evaluation Summary

PRE Score: 8 ✔

Questions Answered: 20
This evaluation is valid

Screener's Confidence: 73 %

Status: Submitted
Issues (unresolved/total): 2/2

PUBLIC by University of Minnesota Landscape Arboretum

Miscanthus sinensis "Purpurascens"

PRE Score Legend

✔ < 13 low risk

Q 13-15 evaluate further

✖ > 15 high risk

Plant Evaluated

by Bob's Blog (Bob Vila - Tried, True, Trustworthy Home Advise)

Plant: Miscanthus sinensis 'Purpurascens'

PRE Evaluation Summary

PRE Score: 8 ✔

Questions Answered: 20
This evaluation is valid

Screener's Confidence: 73 %

Status: Submitted
Issues (unresolved/total): 2/2

PUBLIC by University of Minnesota Landscape Arboretum

Comparing Cultivars

Plant Evaluated

by Missouri Botanical Garden

Plant: Miscanthus sinensis 'Morning Light'

PRE Evaluation Summary

PRE Score: 15

Questions Answered: 20
This evaluation is valid

Screener's Confidence: 62 %

Status: Submitted
Issues (unresolved/total): 1/1

PUBLIC by 2017 Farm Bill PRE Project

Regional Collaboration

Introductions & Arrivals

Restoration

PRE

INTRO
PRE PAIRING @ GARDENS
COMMON GROUND
Q & A
PHOTO BY JASON HAWKES

“In the policy arena, it’s too often ‘win-lose.’ We continue to collaborate on PRE because it emphasizes the need for solutions to be both responsible and practical.”

~ Craig Regelbrugge,
AmericanHort / HRI

Plant Risk Evaluator -- Beta Version

American Public Gardens Association Evaluations

Organization | Evaluations | Issues

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FINDING COMMON GROUND
GUILTY PLANT
INNOCENT PLANT
SPRINGER©2004
WWW.springercreative.com

Stakeholder Review

Industry | Conservation | Science

"From landscape observations….."

Stakeholder Review

Industry | Conservation | Science

"I recommend these additional sources….."

Stakeholder Review

Industry | Conservation | Science

"These gardens are conducting trials and their data is relevant to this question..."

“The PRE tool is a crucial asset for invasive plant prevention that every plant developer should adopt.”

~ Dr. Peter H. Raven,
Missouri Botanical Garden

Guest Access

Log in at: https://pre.ice.ucdavis.edu
username: guest
password: PlantRightToday

Request Account

email: PlantRight@suscon.org

with

apPREciations!

PRE Screeners

- Kylie Bucalo, Atlanta Botanical Garden
- Kim Taylor, Fort Worth Botanic Garden / BRIT
- Emily Russell, Chicago Botanic Garden
- Frank McDonough, Los Angeles County Arboretum
- Mike Monterusso, Univ. MN Landscape Arboretum

Chicago Botanic Garden

Fort Worth Botanic Garden & Botanical Research Institute of Texas

Minnesota Landscape Arboretum

LA County Arboretum

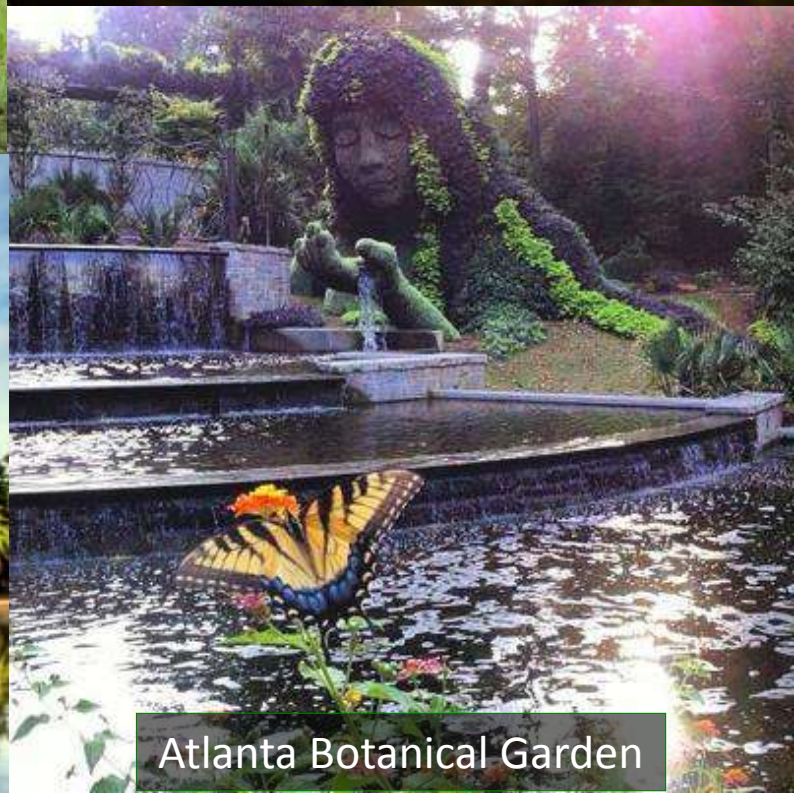
Atlanta Botanical Garden

PHOTO BY JASON HAWKES

Presenters

- Carrie Radcliffe, Atlanta Botanical Garden
- Bob Byers, Fort Worth Botanic Garden / BRIT
- Andrew Bunting, Chicago Botanic Garden
- Frank McDonough, Los Angeles County Arboretum
- Mike Monterusso, Univ. MN Landscape Arboretum