Plant Risk Evaluator -- PRE™
Evaluation Report

Vernicia fordii -- Georgia

2017 Farm Bill PRE Project

PRE Score: 18 -- Reject (high risk of invasiveness)
Confidence: 66 / 100
Questions answered: 19 of 20 -- Valid (80% or more questions answered)

Privacy: Public
Status: Submitted

Evaluation Date: November 7, 2017

This PDF was created on August 13, 2018

Plant Evaluated

Vernicia fordii

Image by KENPEI, Wikipedia user

Evaluation Overview

A PRE™ screener conducted a literature review for this plant (*Vernicia fordii*) in an effort to understand the invasive history, reproductive strategies, and the impact, if any, on the region's native plants and animals. This research reflects the data available at the time this evaluation was conducted.

Summary

The Tung-oil tree (Vernicia fordii) is a small monoecious deciduous tree native to the subtropical and rainforest areas of China. It has become naturalized in the Southeastern U.S., South Africa, and Australia. It is listed as invasive in Florida and the Dominican Republic. In Georgia, this species is listed as a category 3 plant, an "Exotic plant that is a minor problem in Georgia natural areas, or is not yet known to be a problem in Georgia but is known to be a problem in adjacent states." Though it does not pose a major threat in Georgia's natural areas, caution should be taken in growing tung-oil in Georgia since it is invasive in nearby states.

General Information

Status: Submitted
Screener: Lila Uzzell
Evaluation Date: November 7, 2017

Plant Information

Plant: *Vernicia fordii*

Regional Information

Region Name: Georgia

Climate Matching Map

To answer four of the PRE questions for a regional evaluation, a climate map with three climate data layers (Precipitation, UN EcoZones, and Plant Hardiness) is needed. These maps were built using a toolkit created in collaboration with GreenInfo Network, USDA, PlantRight, California-Invasive Plant Council, and The Information Center for the Environment at UC Davis.

Click here to see the generated climate matching map for this region. This climate match database is hosted by GreenInfo Network and publicly accessible.

Evaluation Questions

These questions are based in an original article published at the University of California, Davis, and can be found on the PLOS One website, here: https://doi.org/10.1371/journal.pone.0121053

Invasive History and Climate Matching (Questions 1 - 6)

1. Has the species (or cultivar or variety, if applicable; applies to subsequent "species" questions) become naturalized where it is not native?

- Answer: **Yes**, which contributes **1** points to the total PRE score.
- The *screener* has a **High** confidence in this answer based on the available literature.

Answer / Justification:

"It has escaped from cultivation and become naturalized in natural habitats where it replaces native vegetation and competes for space, water, light, and nutrients...Currently, V. fordii is listed as a weed in South Africa, the USA and Australia and invasive in Florida and the Dominican Republic" (CABI).

Reference(s):

- [Anonymous] .

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2. Is the species (or cultivar or variety) noted as being naturalized in the US or world in a similar climate?

- Answer: **Yes**, which contributes **2** points to the total PRE score.
- The *screener* has a **High** confidence in this answer based on the available literature.

Answer / Justification:

This species grows in USDA hardiness zones 8-10 and is found in the majority of climates similar to Georgia.

Reference(s):

- Missouri Botanical Garden (0). Aleurites fordii - Plant Finder.
- GBIF (0). Vernicia fordii (Hemsl.) Airy Shaw.

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3. Is the species (or cultivar or variety) noted as being invasive in the U.S. or world?

- Answer: **Yes**, which contributes **2** points to the total PRE score.
- The *screener* has a **Medium** confidence in this answer based on the available literature.

Answer / Justification:

This species is listed as a category two plant by FL-EPPC, "Invasive exotics that have increased in abundance or frequency but have not yet altered Florida plant communities to the extent shown by Category I species. These species may become ranked Category I if ecological damage is demonstrated". It is also noted as being invasive in AL and the Dominican Republic.

Reference(s):

- Florida Exotic Pest Plant Council (2017). Florida Exotic Pest Plant Council's 2017 List of Invasive Plant Species.
- Rojas-Sandoval, J., & Acevedo-Rodríguez P. (2015). Vernicia fordii (tung-oil tree) CABI.

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4. Is the species (or cultivar or variety) noted as being invasive in the US or world in a similar climate?

- Answer: **Yes**, which contributes **3** points to the total PRE score.
- The *screener* has a **Medium** confidence in this answer based on the available literature.

Answer / Justification:

This species in invasive in Florida and Alabama.

Reference(s):

- Alabama Invasive Plant Council (2007). Alabama Invasive Plant Council's 2007 Plant List.
- Florida Exotic Pest Plant Council (2017). Florida Exotic Pest Plant Council's 2017 List of Invasive Plant Species.
- GBIF (0). Vernicia fordii (Hemsl.) Airy Shaw.
- Rojas-Sandoval, J., & Acevedo-Rodríguez P. (2015). Vernicia fordii (tung-oil tree) CABI.

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5. Are other species of the same genus (or closely related genera) invasive in a similar climate?

- Answer: **No**, which contributes **0** points to the total PRE score.
- The *screener* has a **Medium** confidence in this answer based on the available literature.

Answer / Justification:

There does not seem to be any other species within the Vernicia genus that are invasive.

Reference(s):

- [Anonymous] .

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6. Is the species (or cultivar or variety) found predominately in a climate matching the region of concern?

- Answer: **Yes**, which contributes **2** points to the total PRE score.
- The *screener* has a **High** confidence in this answer based on the available literature.

Answer / Justification:

This species occurs predominately in a climate matching Georgias. It grows in USDA zones 8-10.

Reference(s):

- Missouri Botanical Garden (0). Aleurites fordii - Plant Finder.
- GBIF (0). Vernicia fordii (Hemsl.) Airy Shaw.

Impact on Native Plants and Animals (Questions 7 - 10)

7. Does this plant displace native plants and dominate (overtop or smother) the plant community in areas where it has established?

- Answer: **Yes**, which contributes **1** points to the total PRE score.
- The *screener* has a **High** confidence in this answer based on the available literature.

Answer / Justification:

This species can outcompete native species in areas it invades. " It has been listed as invasive in Florida and the Dominican Republic where it grows forming dense stands which displace and outcompete native vegetation for space, water, light, and nutrients."

Reference(s):

- Rojas-Sandoval, J., & Acevedo-Rodríguez P. (2015). Vernicia fordii (tung-oil tree) CABI.

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8. Is the plant noted as promoting fire and/or changing fire regimes?

- Answer: **No**, which contributes **0** points to the total PRE score.
- The *screener* has a **Medium** confidence in this answer based on the available literature.

Answer / Justification:

There is no evidence of this.

Reference(s):

- [Anonymous] .

9. Is the plant a health risk to humans or animals/fish? Has the species been noted as impacting grazing systems?

- Answer: **Yes**, which contributes **1** points to the total PRE score.
- The *screener* has a **High** confidence in this answer based on the available literature.

Answer / Justification:

"Seed oil, seeds, and leaves are poisonous due to its toxic saponins content." However, the oil is used in many fuels,wood finishes, and in treatments for skin diseases. According to the Texas Invasive Species Institute, all parts of this tree are toxic and harmful to humans.

Reference(s):

- Plants For A Future (PFAF) (2012). Vernicia fordii Tung Tree, Tung Nut PFAF Plant Database.
- Texas Invasive Species Institute (2014). Tungoil tree: Texas Invasive Species Institute.

10. Does the plant produce impenetrable thickets, blocking or slowing movement of animals, livestock, or humans?

- Answer: **No**, which contributes **0** points to the total PRE score.
- The *screener* has a **Medium** confidence in this answer based on the available literature.

Answer / Justification:

There is no evidence that this species blocks movement of animals.

Reference(s):

- [Anonymous] .

Reproductive Strategies (Questions 11 - 17)

11. Does this species (or cultivar or variety) reproduce and spread vegetatively?

- Answer: **Yes**, which contributes **1** points to the total PRE score.
- The *screener* has a **High** confidence in this answer based on the available literature.

Answer / Justification:

"Trees are able to reproduce by seeds within the fruits, and through vegetative reproduction from underground stems."

Reference(s):

- Texas Invasive Species Institute (2014). Tungoil tree: Texas Invasive Species Institute.

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12. If naturally detached fragments from this plant are capable of producing new plants, is this a common method of reproduction for the plant?

- Answer: **No**, which contributes **0** points to the total PRE score.
- The *screener* has a **Low** confidence in this answer based on the available literature.

Answer / Justification:

Lack of evidence.

Reference(s):

- [Anonymous] .

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13. Does the species (or cultivar or variety) commonly produce viable seed?

- Answer: **Yes**, which contributes **1** points to the total PRE score.
- The *screener* has a **High** confidence in this answer based on the available literature.

Answer / Justification:

This species produces 4-5 seeds per fruit and they are highly viable, "Germination rate of 100% was attained with cold stratified or soaked seeds and 83% with untreated seeds".

Reference(s):

- Keim, D.. Richard (2017). Louisiana Plant ID: Vernicia fordii (tung-oil tree).
- Rojas-Sandoval, J., & Acevedo-Rodríguez P. (2015). Vernicia fordii (tung-oil tree) CABI.

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14. Does this plant produce copious viable seeds each year (> 1000)?

Answer / Justification:

lack of information.

Reference(s):

- [Anonymous] .

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15. Is there significant germination (>25%) of seeds the next growing season, with no requirement of an infrequent environmental condition for seeds to germinate (i.e. fire) or long dormancy period?

- Answer: **Yes**, which contributes **1** points to the total PRE score.
- The *screener* has a **High** confidence in this answer based on the available literature.

Answer / Justification:

"Fruits of V. fordii fall in early winter and germination takes place in the spring (Duke, 1983).Germination rate of 100% was attained with cold stratified or soaked seeds and 83% with untreated seeds (Langeland et al., 2008)."

Reference(s):

- Rojas-Sandoval, J., & Acevedo-Rodríguez P. (2015). Vernicia fordii (tung-oil tree) CABI.

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16. Does this plant produce viable seed within the first three years (for an herbaceous species) to five years (for a woody species) after germination?

- Answer: **Yes**, which contributes **1** points to the total PRE score.
- The *screener* has a **High** confidence in this answer based on the available literature.

Answer / Justification:

"... fruit and viable seeds can be produced by the third year."

Reference(s):

- Rojas-Sandoval, J., & Acevedo-Rodríguez P. (2015). Vernicia fordii (tung-oil tree) CABI.

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17. Does this plant continuously produce seed for >3 months each year or does seed production occur more than once a year?

- Answer: **No**, which contributes **0** points to the total PRE score.
- The *screener* has a **Medium** confidence in this answer based on the available literature.

Answer / Justification:

"In China, V. fordii flowers from March to April and produces fruits from August to November...In the USA, it has been recorded flowering from March to April and fruiting from September to November." In China, this species produces seed for up to 4 months each year, but in the USA seed production occurs up to 3 months exactly. I answered no to this question since the area of concern for this plant is in the USA- where it does not produce seed for >3 months.

Reference(s):

- Rojas-Sandoval, J., & Acevedo-Rodríguez P. (2015). Vernicia fordii (tung-oil tree) CABI.

Dispersal (Questions 18 - 20)

18. Are the plant's propagules frequently dispersed long distance (>100 m) by mammals or birds or via domestic animals?

- Answer: **Yes**, which contributes **1** points to the total PRE score.
- The *screener* has a **Medium** confidence in this answer based on the available literature.

Answer / Justification:

Seeds are dispersed by animals and water.

Reference(s):

- Rojas-Sandoval, J., & Acevedo-Rodríguez P. (2015). Vernicia fordii (tung-oil tree) CABI.

19. Are the plant's propagules frequently dispersed long distance (>100 m) by wind or water?

- Answer: **Yes**, which contributes **1** points to the total PRE score.
- The *screener* has a **Medium** confidence in this answer based on the available literature.

Answer / Justification:

Seeds are dispersed by animals and water.

Reference(s):

- Rojas-Sandoval, J., & Acevedo-Rodríguez P. (2015). Vernicia fordii (tung-oil tree) CABI.

20. Are the plant's propagules frequently dispersed via contaminated seed (agriculture or wildflower packets), equipment, vehicles, boats or clothing/shoes?

- Answer: **No**, which contributes **0** points to the total PRE score.
- The *screener* has a **Medium** confidence in this answer based on the available literature.

Answer / Justification:

Lack of evidence for this.

Reference(s):

- [Anonymous] .

Total PRE Score

PRE Score: 18 -- Reject (high risk of invasiveness)
Confidence: 66 / 100
Questions answered: 19 of 20 -- Valid (80% or more questions answered)

PRE Score Legend

The PRE Score is calculated by adding the point totals for each (answered) question.
< 13 : accept (low risk of invasiveness)
13 - 15 : evaluate further
> 15 : reject (high risk of invasiveness)

Questions Answered Legend

It is important to answer at least 16 questions to consider a PRE Score as "valid".
>= 16 : valid (80% or more questions answered)
<= 15 : invalid (not enough questions answered)

Organization Ownership and Content Privacy

Organization: 2017 Farm Bill PRE Project
Content Privacy: Public

Evaluation Reviewers

The PRE approach is to base decisions on science and make decisions by consensus of diverse horticultural stakeholders. The literature review and process of answering PRE's questions are based on science; the decisions of which plants to prioritize are based on consensus. To ensure this process is in place and that PRE is collaborative, volunteer stakeholders are recruited from each region to review evaluations. The following experts in their profession (plant science, conservation, or horticultural trade) have participated as volunteer PRE reviewers for this evaluation:

This evaluation does not have any reviewers.

Evaluation Issues

The following section lists all public issues for this evaluation. Issues provide a way for stakeholder reviewers to communicate any concerns or suggestions they might have with the plant or evaluation. Please email PlantRight@suscon.org if additional action is required to resolve open issues.

There are currently no issues associated with this evaluation.

About PRE and this Plant Evaluation Report

The PlantRight Plant Risk Evaluator -- PRE is an online database and platform enabling those involved in non-native, terrestrial plant production to know before they grow if a plant poses a regional invasive risk. This tool offers many benefits, and we encourage you to visit the PRE website (https://pre.ice.ucdavis.edu) for more information.

If you are a nursery trade association, or involved in the research, development or distribution of horticultural plants we invite you to join the PRE community. If you are a plant scientist, affiliated with a horticultural college or botanic garden, and would like to learn more about becoming a PRE Screener, please drop us an email, PlantRight@suscon.org, requesting a PRE Account.

PRE beta funding is provided by Sustainable Conservation (http://www.suscon.org/) and a USDA Farm Bill grant.