



***Plant Risk Evaluator -- PRE™
Evaluation Report***

Ailanthus altissima -- Georgia

2017 Farm Bill PRE Project

PRE Score: 16 -- Reject (high risk of invasiveness)

Confidence: 76 / 100

Questions answered: 19 of 20 -- Valid (80% or more questions answered)

Privacy: Public

Status: Submitted

Evaluation Date: July 14, 2017

This PDF was created on August 13, 2018



Plant Evaluated

Ailanthus altissima





Evaluation Overview

A PRE™ screener conducted a literature review for this plant (*Ailanthus altissima*) 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

Ailanthus altissima is a widely distributed tree that has been introduced into temperate environments across the globe. It was introduced into the US as an ornamental, and has since become extensively naturalized. Each tree produces copious number of seed in the form of a samara which are easily dispersed by wind and water, and can also spread vegetively through root, root crown and bole sprouts. The result of this PRE, along with the invasive biology of this tree, make it a poor choice for the region of concern.

General Information

Status: Submitted

Screener: Kylie Bucalo

Evaluation Date: July 14, 2017

Plant Information

Plant: *Ailanthus altissima*

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 *screeener* has a **High** confidence in this answer based on the available literature.

Answer / Justification:

USDA profile shows *Ailanthus altissima* has been introduced in many states across America. CABI resource excerpt "A. altissima was introduced into the USA in 1784 and has become extensively naturalized in North America (Luken and Thieret, 1997), from Massachusetts to southern Ontario (Canada), Iowa and Kansas, and south to Texas and Florida, as well as from the southern Rocky Mountains to the Pacific Coast (Feret, 1985; Shah, 1997). It was reported to be already widespread and naturalized in Tennessee in the late 1800s (SE-EPPC, 2002) and in some parts of the USA it is so well established that it appears to be a part of the native flora (Schopmeyer, 1974)." Globally CABI resource suggests "A. altissima has become naturalized in many of the temperate regions it has been introduced to, including Australia, India, Japan, Malaysia and Indonesia."

Reference(s):

- USDA Plants Database (0). Plants Profile for *Ailanthus altissima* (tree of heaven)_USDA.
- CABI (0). *Ailanthus altissima* (tree-of-heaven)_CABI.

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 *screeener* has a **High** confidence in this answer based on the available literature.



Answer / Justification:

USDA profile shows *Ailanthus altissima* has been introduced extensively across America including all of the southeastern states which are a climate match for the region of concern. The GAEPPC rank the Tree of Heaven a category 1 plant which is described as "Exotic plant that is a serious problem in Georgia natural areas by extensively invading native plant communities and displacing native species" indicating it is very prevalent in native areas within the region of concern, and is causing problems in those areas.

Reference(s):

- CABI (0). *Ailanthus altissima* (tree-of-heaven)_CABI.
 - USDA Plants Database (0). Plants Profile for *Ailanthus altissima* (tree of heaven)_USDA.
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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 *screeener* has a **High** confidence in this answer based on the available literature.

Answer / Justification:

Summary of invasiveness from CABI resource "Prolific fruiting, ready germination, adaptability to infertile sites and rapid growth rate make *A. altissima* a noxious weed in many countries where it has been introduced (Feret, 1985; Shah, 1997). In the USA, it is declared invasive in Hawaii (University of Hawaii Botany Department, 1998) and several southern states, and monitored in 13 other states (Miller et al., 2003). However, the Invaders Database System (Rice, 2002) reports that it is not noxious in the five northwest states and that it is not listed on the US federal noxious weed list. In Australia, *A. altissima* is listed as a noxious weed with levels of control varying among states (Anon., 1998). In Victoria, it is designated a regionally controlled weed under the Catchment and Land Protection Act 1994 (CaLP Act), a category W2/W3 weed under the Noxious Weeds Act 1993 (NWA) in New South Wales, in Western Australia it is prohibited until assessed, and it is a declared weed in other states and territories (Anon., 1998). In South Africa it is a category 3 weed according to the Conservation of Agricultural Resources Act 1983, so landowners are responsible for curtailing its spread and it is prohibited within the vicinity of watercourses."

Reference(s):

- CABI (0). *Ailanthus altissima* (tree-of-heaven)_CABI.
-



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 *screeners* has a **High** confidence in this answer based on the available literature.

Answer / Justification:

Excerpt from Weed of the week resource . "It is reported invasive in AZ, CA, CT, DC, DE, FL, HI, IN, KY, LA, MA, MD, MI, MO, NC, NH, NJ, NM, NY, OH, OK, OR, PA, RI, SC, TN, VA, WA, WI, and WV" Many of these are a climate match to Georgia. The CABI resource lists *Ailanthus altissima* as invasive within the US in the following states: Alaska, Hawaii, Kentucky, Massachusetts, Tennessee, Texas and Virginia, of which Kentucky, Tennessee, Virginia and Texas have partial highlighting on the climate matching map. The GAEPPC rank the Tree of Heaven a category 1 plant (highest rank given) which is described as "Exotic plant that is a serious problem in Georgia natural areas by extensively invading native plant communities and displacing native species."

Reference(s):

- US Forest Service (0). Tree of Heaven_ Weed of the week.
- CABI (0). *Ailanthus altissima* (tree-of-heaven)_CABI.
- Georgia Invasive Species Task Force (0). List of Non-native Invasive Plants in Georgia - Georgia Invasive Species Task Force- LIST.

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 *screeners* has a **High** confidence in this answer based on the available literature.

Answer / Justification:

Global Compendium of Weeds resource shows no other species under the genus *Alianthus*.

Reference(s):

- Global Compendium of Weeds (0). Global compendium of weeds-PDF.



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

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

Answer / Justification:

Firstly the domestic distribution of *Ailanthus altissima* in the US is too widespread to be considered > than a 50% match to climate matching regions. GBIF shows that the global distribution of *Ailanthus altissima* is very broad, with over 16,000 occurrences listed in France, Spain, United States, Germany, Belgium, Portugal, Australia, China, South Africa, Japan and Italy. Of these countries the distribution of *Ailanthus altissima* within China is the only one that matches highlighted area on the climate matching map at over 50%. The distribution within South Africa, Australia, Japan and Europe is to wide spread and prolific.

Reference(s):

- GBIF (0). *Ailanthus altissima* (Miller) Swingle_GBIF.
 - CABI (0). *Ailanthus altissima* (tree-of-heaven)_CABI.
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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 *screeener* has a **High** confidence in this answer based on the available literature.

Answer / Justification:

Excerpt from weed of the week "Tree-of-heaven is a prolific seed producer, grows rapidly, forms thickets, dense stands, and can overrun native vegetation. "



Reference(s):

- US Forest Service (0). *Ailanthus altissima*_FS_FED.
 - NPS (0). Tree of Heaven (*Ailanthus altissima*)_NPS.
 - US Forest Service (0). Tree of Heaven_Weed of the week.
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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 *screeener* has a **Medium** confidence in this answer based on the available literature.

Answer / Justification:

No evidence of this in the references.

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

Answer / Justification:

The plant is mostly unpalatable to grazing animals as the bark and leaves contain saponins, quassinoids, and other bitter compounds that discourage consumption.

Reference(s):

- US Forest Service (0). *Ailanthus altissima*_FS_FED.
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10. Does the plant produce impenetrable thickets, blocking or slowing movement of animals, livestock, or humans?

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

Answer / Justification:

Excerpt from Weed of the Week resource. "Tree-of-heaven is a prolific seed producer, grows rapidly, forms thickets, dense stands, and can overrun native vegetation. It colonizes by root sprouts and spreads by prolific wind- and water-dispersed seeds. Once established, it can quickly take over a site and form an impenetrable thicket. They produce toxins that prevent the establishment of other plant species.

Reference(s):

- US Forest Service (0). Tree of Heaven_Weed of the week.
-

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 *screeners* has a **Very High** confidence in this answer based on the available literature.

Answer / Justification:

Excerpt from Forest Service resource. "Tree-of-heaven sprouts from the roots, root crown, and bole [93,145,163,185,211,275]. Although reproduction from seed is not rare, sprouting is its most common method of regeneration [163]. "

Reference(s):

- US Forest Service (0). *Ailanthus altissima*_FS_FED.
-



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 **Medium** confidence in this answer based on the available literature.

Reference(s):

- [Anonymous] .
-

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.

Reference(s):

- CABI (0). *Ailanthus altissima* (tree-of-heaven)_CABI.
 - Georgia Invasive Species Task Force (0). *Ailanthus altissima* - Georgia Invasive Species Task Force.
 - US Forest Service (0). *Ailanthus altissima*_FS_FED.
 - NPS (0). Tree of Heaven (*Ailanthus altissima*)_NPS.
 - Ecological Landscape Alliance (0). Tree of Heaven: An Exotic Invasive Plant Fact Sheet_Ecological Landscape Alliance.
 - US Forest Service (0). Tree of Heaven_Weed of the week.
-

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

- 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:

Excerpt from NPS resource. "in summer, flat, twisted, single-seeded winged fruits or samaras are produced on female trees and may remain on trees for long periods of time; individual trees may produce an estimated 325,000 seeds per year".

Reference(s):

- US Forest Service (0). *Ailanthus altissima*_FS_FED.
 - NPS (0). Tree of Heaven (*Ailanthus altissima*)_NPS.
-

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 *screeener* has a **Medium** confidence in this answer based on the available literature.

Answer / Justification:

Seeds are salt tolerant, can establish in heavily compacted soil, however an overwintering period seems common, but there is no indication this period needs to be long or is necessary for germination.

Reference(s):

- US Forest Service (0). *Ailanthus altissima*_FS_FED.
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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 / Justification:

No information. leave blank.



Reference(s):

- [Anonymous] .
-

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

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

Answer / Justification:

Excerpt from NPS resource. "in summer, flat, twisted, single-seeded winged fruits or samaras are produced on female trees and may remain on trees for long periods of time; individual trees may produce an estimated 325,000 seeds per year".

Reference(s):

- NPS (0). Tree of Heaven (*Ailanthus altissima*)_NPS.
-

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

Answer / Justification:

Dispersed via wind and water



Reference(s):

- [Anonymous] .
-

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 **High** confidence in this answer based on the available literature.

Answer / Justification:

Excerpt from Forest service resource. "The winged schizocarps are easily and widely dispersed by wind [53,82,163,170,180,181,261]. Entire schizocarp clusters may break off and disperse as a unit."

Reference(s):

- CABI (0). *Ailanthus altissima* (tree-of-heaven)_CABI.
 - US Forest Service (0). *Ailanthus altissima*_FS_FED.
 - NPS (0). Tree of Heaven (*Ailanthus altissima*)_NPS.
 - US Forest Service (0). Tree of Heaven_Weed of the week.
-

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:

There is no evidence of this.

Reference(s):

- [Anonymous] .



Total PRE Score

PRE Score: 16 -- Reject (high risk of invasiveness)

Confidence: 76 / 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:

- David Coyle February 21, 2018
- Timothy Daly January 2, 2018

This evaluation has a total of 2 reviewer(s).



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.