Plant Risk Evaluator -- PRE™
Evaluation Report

Quercus acutissima -- Georgia

2017 Farm Bill PRE Project

PRE Score: 12 -- Accept (low risk of invasiveness)
Confidence: 59 / 100
Questions answered: 18 of 20 -- Valid (80% or more questions answered)

Privacy: Public
Status: Submitted

Evaluation Date: November 2, 2017

This PDF was created on August 13, 2018

Plant Evaluated

Quercus acutissima

Image by Michael H. Parker

Evaluation Overview

A PRE™ screener conducted a literature review for this plant (*Quercus acutissima*) 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

Quercus acutissima (sawtooth oak) is a deciduous oak native to China, Korea, and Japan. It grows 40-60 feet tall, has alternate leaves with bristly teeth along margins, and is capable of producing a large amount of acorns. This species is invasive in Wisconsin, and is naturalized/exotic across many temperate climates of the U.S. and Canada. In recent years, Q. acutissima has been found to escape from its planting areas and invade wild areas, displacing native plants. It is currently listed as a category 4 plant by the GA-EPPC, where it does not pose as a problem in Georgias natural areas. Given its ability to produce many acorns, invade wild areas, and displace native plants, this species should be grown with caution. The National Parks Service advises that this plant not be grown, and that land managers choose a native oak to their area instead.

General Information

Status: Submitted
Screener: Lila Uzzell
Evaluation Date: November 2, 2017

Plant Information

Plant: *Quercus acutissima*

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:

Q. acutissima has become naturalized in parts of the U.S. (VA, MD, DC, DE, PA, OH, IN, IL, MO, AR, LA, MS, AL, TN, GA, and NC) and Canada. GBIF also shows that it is present in parts of Europe and New Zealand.

Reference(s):

- GBIF (2017). Quercus acutissima Carruth..
- Stokes, H. (2012). Quercus acutissima 2012 NPS.

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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:

Within the U.S. this species has become naturalized in many similar climate areas (zones 6-9). It also appears to grow in areas of New Zealand that are similar in climate.

Reference(s):

- Missouri Botanical Garden (2017). Quercus acutissima - MBG.
- GBIF (2017). Quercus acutissima Carruth..

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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 an invasive on Wisconsin's NR 40 Invasive species list. It is present as an exotic or naturalized in many other areas of the U.S. and world, but is not noted as invasive anywhere else.

Reference(s):

- Randall, R. Peter (2017). A Global Compendium of Weeds. Third Edition..
- Wisconsin Department of Natural Resources (2015). Wisconsin Ch. NR 4 Invasive Species List.

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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: **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:

This question may need more references/information. The Global Compendium of Weeds states this species as invasive in the United States, but the reference they use is not valid directly to this species (reference #628 from the Compendium). Though many states throughout the U.S. list this species as a naturalized and/or exotic, only WI directly states it as an invasive, and WI is outside of GA's climate zone.

Reference(s):

- Randall, R. Peter (2017). A Global Compendium of Weeds. Third Edition..
- Georgia Invasive Species Task Force (2017). List of Non-native Invasive Plants in Georgia - Georgia Invasive Species Task Force.
- Wisconsin Department of Natural Resources (2015). Wisconsin Ch. NR 4 Invasive Species List.

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

- 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:

Q. robur and Q. rubra have been labeled invasive in a similar climate. More reference may be needed for this question.

Reference(s):

- Randall, R. Peter (2017). A Global Compendium of Weeds. Third Edition..

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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 grows well in zones 6-9, which match GA's climate profile (7-9). GBIF notes that this species is found in China and Japan (native), New Zealand, parts of Europe, and other areas of the U.S. similar in climate. The only area noted outside of GAs climate range is Saudi Arabia and Wisconsin.

Reference(s):

- Missouri Botanical Garden (2017). Quercus acutissima - MBG.
- GBIF (2017). Quercus acutissima Carruth..
- Wisconsin Department of Natural Resources (2015). Wisconsin Ch. NR 4 Invasive Species List.

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:

" It spreads by seed that is produced in large numbers and has been found in recent years to be escaping from plantings to become invasive in wild areas, displacing native plants" (NPS 2010).

Reference(s):

- Huang, Y. Zhang Chen, Bartholomew B., Huang Y. Zhang Chen, & Bartholomew B. (1999). Quercus acutissima. Fagaceae. 4, 314–400.
- Swearingen, J., Slattery B., Reshetiloff K., & Zwicker S. (2010). Plant Invaders of Mid-Atlantic Natural Areas. 168.

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

Answer / Justification:

Lack of evidence.

Reference(s):

- [Anonymous] .

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

Answer / Justification:

Quercus acutissima actually serves an important food source for wildlife.

Reference(s):

- Missouri Botanical Garden (2017). Quercus acutissima - MBG.

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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 of this tree producing impenetrable thickets. This tree can grow up to 60 ft tall, so should not block humans or livestock.

Reference(s):

- Missouri Botanical Garden (2017). Quercus acutissima - MBG.
- Watson, E. F. Gilman, & G. D. (2015). Quercus acutissima: Sawtooth Oak.

Reproductive Strategies (Questions 11 - 17)

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

- 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:

There is no evidence of this tree spreading vegetatively.

Reference(s):

- [Anonymous] .

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

Answer / Justification:

References do not directly state seed viability, but many sources claim that seeds are produced in large numbers and escape from plantings to grow in wild areas. It seems that this species produces many viable acorns that are capable of germinating quickly.

Reference(s):

- Huang, Y. Zhang Chen, Bartholomew B., Huang Y. Zhang Chen, & Bartholomew B. (1999). Quercus acutissima. Fagaceae. 4, 314–400.
- The University of Georgia Center for Invasive Species and Ecosystem Health (2017). sawtooth oak, Quercus acutissima N/A Fagales: Fagaceae.
- Swearingen, J., Slattery B., Reshetiloff K., & Zwicker S. (2010). Plant Invaders of Mid-Atlantic Natural Areas. 168.

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

Answer / Justification:

This species does not appear to require any unusual growing conditions. However, it may good to note: "Sawtooth oak seedlings do not do well in poorly drained soils or in areas subject to flooding. If under water for 24 hours in the summer, they will not survive" (Huang et al. 1999).

Reference(s):

- Huang, Y. Zhang Chen, Bartholomew B., Huang Y. Zhang Chen, & Bartholomew B. (1999). Quercus acutissima. Fagaceae. 4, 314–400.
- Missouri Botanical Garden (2017). Quercus acutissima - MBG.

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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: **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:

This species doesnt produce viable seed until around 10 years of growth. "First respectable crops of acorns may occur as early as 10 years." More sources may be needed to verify.

Reference(s):

- Missouri Botanical Garden (2017). Quercus acutissima - MBG.

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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 / Justification:

lack of information.

Reference(s):

- [Anonymous] .

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:

Acorns are usually spread by squirrels and birds.

Reference(s):

- Huang, Y. Zhang Chen, Bartholomew B., Huang Y. Zhang Chen, & Bartholomew B. (1999). Quercus acutissima. Fagaceae. 4, 314–400.
- Watson, E. F. Gilman, & G. D. (2015). Quercus acutissima: Sawtooth Oak.

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

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

Answer / Justification:

There is no evidence that this species disperses its acorns by wind or water.

Reference(s):

- Huang, Y. Zhang Chen, Bartholomew B., Huang Y. Zhang Chen, & Bartholomew B. (1999). Quercus acutissima. Fagaceae. 4, 314–400.
- Missouri Botanical Garden (2017). Quercus acutissima - MBG.
- Watson, E. F. Gilman, & G. D. (2015). Quercus acutissima: Sawtooth Oak.

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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 supporting this, and acorns are usually to large and smooth to be dispersed via vehicle, boats, or clothing/shoes.

Reference(s):

- Huang, Y. Zhang Chen, Bartholomew B., Huang Y. Zhang Chen, & Bartholomew B. (1999). Quercus acutissima. Fagaceae. 4, 314–400.
- Missouri Botanical Garden (2017). Quercus acutissima - MBG.
- Watson, E. F. Gilman, & G. D. (2015). Quercus acutissima: Sawtooth Oak.

Total PRE Score

PRE Score: 12 -- Accept (low risk of invasiveness)
Confidence: 59 / 100
Questions answered: 18 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.