Plant Risk Evaluator -- PRE™
Evaluation Report

Celastrus orbiculatus -- Georgia

2017 Farm Bill PRE Project

PRE Score: 16 -- Reject (high risk of invasiveness)
Confidence: 77 / 100
Questions answered: 18 of 20 -- Valid (80% or more questions answered)

Privacy: Public
Status: Submitted

Evaluation Date: August 20, 2017

This PDF was created on August 13, 2018

Plant Evaluated

Celastrus orbiculatus

Image by Chris Evans

Evaluation Overview

A PRE™ screener conducted a literature review for this plant (*Celastrus orbiculatus*) 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

Oriental bittersweet is a climbing woody vine that can smother and outgrow tall trees, and infest shrubs and other vegetation. As a vigorous grower it can reproduce by seed that is carried long distances via birds, or colonize through vegetative sprouting from roots. Additionally it can hybridize with American bittersweet, which may someday threaten the genetic integrity of the native species. Despite its invasive qualities, and ability to hybridize, Oriental bittersweet is still being sold commercially. There is a clear potential invasive threat from this plant, and that seems to be reflected in this PRE Evaluation. AS the GAEPPC rates this plant as a Category 1 ALERT plant, this should not be sold in the region of concern, and management of existing plants should be tightly controlled, as it is evident it escapes cultivation quickly and easily and establishes in natural areas with ease. Lastly there seems to be multiple issues with dispersal regarding human activities. Oriental bittersweet is dispersed via improper disposal of garden waste, disposal of ornamental bittersweet wreaths, and purchase of incorrectly labelled plants which may be sold as the native American bittersweet. All of these add to the issue of invasive dispersal of this species.

General Information

Status: Submitted
Screener: Kylie Bucalo
Evaluation Date: August 20, 2017

Plant Information

Plant: *Celastrus orbiculatus*

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

Answer / Justification:

Oriental bittersweet has escaped its natural range and has been introduced into Asia, Europe, Oceania, and North America.

Reference(s):

- CABI (0). Celastrus orbiculatus (Asiatic bittersweet)_CABI.

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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:

Oriental bittersweet is present across the southeastern states of America. Many which are a match for Georgia

Reference(s):

- United States Department of Agriculture (0). Plants Profile for Celastrus orbiculatus (Oriental bittersweet).

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

Answer / Justification:

CABI reference lists Oriental bittersweet as invasive in New Zealand and approximately 29 states in America. NPS resource suggests oriental bittersweet has been reported to be invasive from Maine to North Carolina west to Wisconsin and Missouri.

Reference(s):

- CABI (0). Celastrus orbiculatus (Asiatic bittersweet)_CABI.
- NPS (0). Oriental Bittersweet (Celastrus orbiculatus)_NPS.

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

Answer / Justification:

CABI reference lists Oriental bittersweet as invasive in New Zealand (Parts of which are a climate match for Georgia). NPS resource suggests oriental bittersweet has been reported to be invasive from Maine to North Carolina west to Wisconsin and Missouri (North Carolina is a climate match for Georgia). The GAEPPC rates Oriental bittersweet as a category 1 Alert (Category 1 Alert - Exotic plant that is a not yet a serious problem in Georgia natural areas, but that has significant potential to become a serious problem.)

Reference(s):

- CABI (0). Celastrus orbiculatus (Asiatic bittersweet)_CABI.
- NPS (0). Oriental Bittersweet (Celastrus orbiculatus)_NPS.
- Georgia Invasive Species Task Force (0). List of Non-native Invasive Plants in Georgia - Georgia Invasive Species Task Force- LIST.

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

Answer / Justification:

No. Using the global compendium of weeds. The only other congeneric species listed is Celastrus scandens which is naitive to the southeast USA.

Reference(s):

- USDA Plants Database (0). Plants Profile for Celastrus scandens (American bittersweet).

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

Answer / Justification:

Using the georeferenced occurrences in GBIF the US distribution of oriental bittersweet is 50% for that country. Distribution in europe is

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:

"where its aggressive growth can smother trees, shrubs and other vegetation. " "As the plant grows in diameter, it literally chokes or girdles other plants that it is clinging to." "Oriental bittersweet climbs over and smothers herbaceous plants on the ground as well as tall trees and shrubs. "

Reference(s):

- NPS (0). Oriental Bittersweet (Celastrus orbiculatus)_NPS.
- Michigan State University Extension (0). Oriental bittersweet: An aggressive, invasive plant.
- Forest Invasive Plants Resource Center (0). Oriental bittersweet_Forest service.
- United States Department of Agriculture (0). Plants Profile for Celastrus orbiculatus (Oriental bittersweet).

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

Answer / Justification:

There is no evidence of this

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

Answer / Justification:

There is no evidence of this. However fruits of the American bittersweet Celastrus scandens are poisonous.

Reference(s):

- USDA Plants Database (0). Plants Profile for Celastrus scandens (American bittersweet).
- Missouri Botanical Garden PlantFinder (0). Celastrus scandens - Plant Finder.

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

Answer / Justification:

"Oriental bittersweet climbs and overtops existing vegetation, shading and eventually killing saplings and trees. Dense, smothering stands may form under the right light and moisture conditions. Vines can cause structural damage by girdling branches and trunks and even toppling trees. "

Reference(s):

- CABI (0). Celastrus orbiculatus (Asiatic bittersweet)_CABI.
- NPS (0). Oriental Bittersweet (Celastrus orbiculatus)_NPS.
- Michigan State University Extension (0). Oriental bittersweet: An aggressive, invasive plant.
- Forest Invasive Plants Resource Center (0). Oriental bittersweet_Forest service.

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:

"C. orbiculatus produces root suckers prolifically, and thus a single individual can expand to a dense thicket in a relatively short time. Small pieces of root left during clearing operations resprout quickly to form new plants." " Spreads to new locations by seed and expands within colonies both by seeds and vegetative sprouting from roots." "it expands locally by stolons and rhizomes and through root suckering (the ability to send shoots up from the roots)."

Reference(s):

- CABI (0). Celastrus orbiculatus (Asiatic bittersweet)_CABI.
- NPS (0). Oriental Bittersweet (Celastrus orbiculatus)_NPS.
- Michigan State University Extension (0). Oriental bittersweet: An aggressive, invasive plant.
- Forest Invasive Plants Resource Center (0). Oriental bittersweet_Forest service.

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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: **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:

"C. orbiculatus produces root suckers prolifically, and thus a single individual can expand to a dense thicket in a relatively short time. Small pieces of root left during clearing operations resprout quickly to form new plants."

Reference(s):

- CABI (0). Celastrus orbiculatus (Asiatic bittersweet)_CABI.
- NPS (0). Oriental Bittersweet (Celastrus orbiculatus)_NPS.
- Michigan State University Extension (0). Oriental bittersweet: An aggressive, invasive plant.
- Forest Invasive Plants Resource Center (0). Oriental bittersweet_Forest service.

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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.

Reference(s):

- CABI (0). Celastrus orbiculatus (Asiatic bittersweet)_CABI.
- NPS (0). Oriental Bittersweet (Celastrus orbiculatus)_NPS.
- Michigan State University Extension (0). Oriental bittersweet: An aggressive, invasive plant.
- Forest Invasive Plants Resource Center (0). Oriental bittersweet_Forest service.

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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:

inferred from reference. no seed count. verbage describing abundant fruit set. "abundant clusters of small greenish flowers emerge from most leaf axils; globular, green to yellow fruits split open at maturity to reveal fleshy red-orange arils that cover the seeds;"Some vines are laden with fruit, which can persist throughout winter."

Reference(s):

- CABI (0). Celastrus orbiculatus (Asiatic bittersweet)_CABI.
- NPS (0). Oriental Bittersweet (Celastrus orbiculatus)_NPS.
- Michigan State University Extension (0). Oriental bittersweet: An aggressive, invasive plant.
- Forest Invasive Plants Resource Center (0). Oriental bittersweet_Forest service.

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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 / Justification:

unknown. leave blank. found some info on germination rates, but i think the info was for germination in the lab (culture), not in nature.

Reference(s):

- [Anonymous] .

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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:

unknown leave blank

Reference(s):

- [Anonymous] .

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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: **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:

Clusters of 1-3 fruits attach at leaf axils along the stem. They are green in summer, becoming bright yellow/orange in late summer. The outer membrane splits in September and bends back, revealing a bright red, fleshy inner-fruit that contains1-2 seeds. Some vines are laden with fruit, which can persist throughout winter.

Reference(s):

- Forest Invasive Plants Resource Center (0). Oriental bittersweet_Forest service.

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

Answer / Justification:

"number of birds, including black-capped chickadees, the northern mockingbird, European starling and blue jay all feed on C. orbiculatus fruit during the winter in the USA." "Birds, small mammals and other wildlife are attracted to the multicoloured fruit and are a primary means of dispersal. "

Reference(s):

- CABI (0). Celastrus orbiculatus (Asiatic bittersweet)_CABI.

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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 of this. Main methods of dispersal are covered in questions 18 and 20.

Reference(s):

- [Anonymous] .

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

Answer / Justification:

This is a no, but i wanted to include the below information as other sources for long distance dispersal that is human induced "Commercial plant nurseries are still propagating and selling this plant and this is the principal means of long-distance dispersal. In the USA, plants are bought from nurseries and mail order companies, that often mistakenly represent it as the native North American species, C. scandens. People also collect and dry fruiting stems for decorative purposes, moving the seeds to new locations where the material is later discarded. In addition to seeds, pieces of root, moved in soil for landfill and other purposes, can also spread the plant to new locations."

Reference(s):

- CABI (0). Celastrus orbiculatus (Asiatic bittersweet)_CABI.

Total PRE Score

PRE Score: 16 -- Reject (high risk of invasiveness)
Confidence: 77 / 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:

- Eamonn Leonard December 7, 2017

This evaluation has a total of 1 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.