Plant Risk Evaluator -- PRE™
Evaluation Report

Reynoutria japonica -- Georgia

2017 Farm Bill PRE Project

PRE Score: 13 -- Evaluate this plant further
Confidence: 63 / 100
Questions answered: 20 of 20 -- Valid (80% or more questions answered)

Privacy: Public
Status: Submitted

Evaluation Date: October 4, 2017

This PDF was created on July 06, 2018

Plant Evaluated

Reynoutria japonica

Image by MdE, Wikipedia user

Evaluation Overview

A PRE™ screener conducted a literature review for this plant (*Reynoutria japonica*) 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

Fallopia japonica as a perennial herb that reproduces via rhizomes primarily has had great success spreading in the US, especially in states with colder winters and low humidity. In its native range reproduces via seed more efficiently. According to all literature has adapted too well to other areas becoming an aggressive invasive. But at the same time has provided nectar and pollen sources for insect pollinators where there are no other plant resources.

General Information

Status: Submitted
Screener: Melina Lozano Duran
Evaluation Date: October 4, 2017

Plant Information

Plant: *Reynoutria japonica*

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:

Native to Japan, Korea, and Taiwan. Distributed in the United Kindom and many other European countries. Has spread through most of North America, as far north as Alaska. Southern distribution extends to Louisiana, Central California. Particularly abundant in the eastern United States.

Reference(s):

- Center for Invasive Species and Ecosystem Health at the University of Georgia (2010). BCIPEUS/Fallopia japonica var. japonica - Bugwoodwiki.

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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: **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:

Japanese knotweed is primarily a very noxious invasive in the UK, Germany and Czech Republic. In the US is primarily found in the eastern part and in coastal areas of Washington and Oregon.

Reference(s):

- Center for Invasive Species and Ecosystem Health at the University of Georgia (2010). BCIPEUS/Fallopia japonica var. japonica - Bugwoodwiki.
- Global Invasive Species Database (0). Global Invasive Species Database-Fallopia japonica.

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

Answer / Justification:

Fallopia japonica has spread to Canadian territory, including British Columbia and most of eastern Canada. In the United Kingdom has spread widely and it's also a concern in France, Germany, Czech Republic and Norway.

Reference(s):

- Center for Invasive Species and Ecosystem Health at the University of Georgia (2010). BCIPEUS/Fallopia japonica var. japonica - Bugwoodwiki.
- Global Invasive Species Database (0). Global Invasive Species Database-Fallopia japonica.
- Groeneveld, E., & Belzile F. (2014). Sexual reproduction of Japanese knotweed (Fallopia japonica s.l.) at its northern distribution limit: new evidence of the effect of climate warming on an invasive species.

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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:

According to the climate match tool map, there are no matches for the region of concern. But climate match areas of GA like some parts of Japan are necessary to mention because Fallopia japonica is native to this Japanese matching climate area.

Reference(s):

- Global Invasive Species Database (0). Global Invasive Species Database-Fallopia japonica.
- Center for Invasive Species and Ecosystem Health at the University of Georgia (2010). BCIPEUS/Fallopia japonica var. japonica - Bugwoodwiki.

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

Answer / Justification:

According to literature, Fallopia japonica is also recognized in the nomenclature as Polygonum cuspidatum (Japan and England). Family Polygonaceae seems to have the several fallopia genus species that can turn into invasive in some areas in the US with GA similar climate. Examples: Fallopia dumetorum, fallopia baldschuanica.

Reference(s):

- Gobotany.newenglandwild.org (0). Fallopia baldschuanica (Chinese bindweed): Go Botany.
- GoBotany (2017). Fallopia convolvulus (black bindweed): Go Botany.

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

Answer / Justification:

Fallopia japonica is predominately found in the US specifically throughout Missouri and the New England region, where the climate is cooler and drier in comparison with GA where temperatures and humidity are higher most of the year. In Europe is predominant in the United Kindom, and this area is not a match for the region of concern.

Reference(s):

- Global Invasive Species Database (0). Global Invasive Species Database-Fallopia japonica.
- Groeneveld, E., & Belzile F. (2014). Sexual reproduction of Japanese knotweed (Fallopia japonica s.l.) at its northern distribution limit: new evidence of the effect of climate warming on an invasive species.

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

Answer / Justification:

Fallopia japonica can tolerate a wide range of conditions and its normally found near a water source and can colonized coastal shores and islands, not letting native plant populations grow. Forming dense thickets and extensive rhizome system, that can reach 15 to 20 meters in lenght.

Reference(s):

- wiki.bugwood.org (2014). BCIPEUS/Fallopia japonica var. japonica - Bugwoodwiki.
- USDA Plants Database (0). Japanese knotweed fact sheet-MLD.

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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 in the literature about this matter.

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: **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:

Fallopia japonica outside its native range is not a health risk to humans, but according to literature it can reduce invertebrate biodiversity by half, and reduce ecosystem quality for amphibians, reptiles, birds, and mammals whose diets rely on arthropods.

Reference(s):

- Global Invasive Species Database (0). Global Invasive Species Database-Fallopia japonica.

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

Answer / Justification:

Fallopia japonica forms dense thickets excluding other native plants species and when it dies dead stems remain to further inhibit native plant regeneration. In a recreational area dense stand of knotweed can block access to parks and rivers.

Reference(s):

- Global Invasive Species Database (0). Global Invasive Species Database-Fallopia japonica.
- wiki.bugwood.org (2014). BCIPEUS/Fallopia japonica var. japonica - Bugwoodwiki.
- Groeneveld, E., & Belzile F. (2014). Sexual reproduction of Japanese knotweed (Fallopia japonica s.l.) at its northern distribution limit: new evidence of the effect of climate warming on an invasive species.

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:

Japanese knotweed primary mode of reproduction is through extensive rhizomes. Stem material can grow after cutting; plants can regenerate with less than 5 g of root material and rhizomes beneath a square meter stand of knotweed can produce 238 new shots.

Reference(s):

- Global Invasive Species Database (0). Global Invasive Species Database-Fallopia japonica.

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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:

According to literature, japanese knotweed is known due to its ability for spread aggressively via vegetative reproduction.

Reference(s):

- Groeneveld, E., & Belzile F. (2014). Sexual reproduction of Japanese knotweed (Fallopia japonica s.l.) at its northern distribution limit: new evidence of the effect of climate warming on an invasive species.

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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:

According to a germination experiment in Massachusetts, results showed that wild F. japonica produces large quantities of seed with high germinability.

Reference(s):

- Groeneveld, E., & Belzile F. (2014). Sexual reproduction of Japanese knotweed (Fallopia japonica s.l.) at its northern distribution limit: new evidence of the effect of climate warming on an invasive species.

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

- 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:

Seedling establishment in the field of the European range is rarely observed despite a significant production of viable seed, but there is no record of seed quantity. In the US seedling appear on a regular basis, but there is no record of the number of seeds either.

Reference(s):

- Buhk, C., Funkenberg T., & Roderus D. (2012). Effects of climatic factors on Fallopia japonica s.l. seedling establishment: evidence from laboratory experiments. PLANT SPECIES BIOLOGY. 27, 218–225.

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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: **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:

According to one Author, what happens after seed dispersal in Europe, Japan and US are different, and it's not well known. In Japan, seeds are sensitive to desiccation, in Europe seed are sensitive to late Spring and early Autumn. In the USA, its suggested that the availability of adequate resources such as light and water is relevant to seedling survival. Furthermore, there is dieback of the above-ground biomass of seedlings facing temperatures below freezing point.

Reference(s):

- Buhk, C., Funkenberg T., & Roderus D. (2012). Effects of climatic factors on Fallopia japonica s.l. seedling establishment: evidence from laboratory experiments. PLANT SPECIES BIOLOGY. 27, 218–225.

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

Answer / Justification:

Knotweed reproduces and spreads primarily by rhizomes, producing a small quantity of viable seed with a germination rate of 61-95% in light and room temperature.

Reference(s):

- Huebner, C. D., Olson C., & Smith H. C. (2014). Invasive Plants Field and Reference Guide: An Ecological Perspective of Plant Invaders of Forests and Woodlands.
- Pennsylvania Department of Conservation and Natural Resources (2013). Invasive Plants in Pennsylvania Japanese and Giant Knotweed.

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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:

Knotweed flowers mid-late summer once a year.

Reference(s):

- Huebner, C. D., Olson C., & Smith H. C. (2014). Invasive Plants Field and Reference Guide: An Ecological Perspective of Plant Invaders of Forests and Woodlands.

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

Answer / Justification:

Only one bibliographic resource mentioned that at least one bird species eat the seed, but it does not say if by doing this the animal is dispersing the seed. Also, reproduction by seed seems like the last resource for this species.

Reference(s):

- Huebner, C. D., Olson C., & Smith H. C. (2014). Invasive Plants Field and Reference Guide: An Ecological Perspective of Plant Invaders of Forests and Woodlands.
- Groeneveld, E., & Belzile F. (2014). Sexual reproduction of Japanese knotweed (Fallopia japonica s.l.) at its northern distribution limit: new evidence of the effect of climate warming on an invasive species.

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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:

Knotweed in the US establishes close to water sources, and because it reproduces primarily by rhizomes, it is highly probable that if a stem breaks it would be carried away by water.

Reference(s):

- Global Invasive Species Database (0). Global Invasive Species Database-Fallopia japonica.
- USDA Plants Database (0). Japanese knotweed fact sheet-MLD.

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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: **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:

Knotweed spreads primarily by rhizomes, a tiny piece of it can be transported to another site. Routine mowing and fill dirt are often ways of spreading seed and rhizomes.

Reference(s):

- USDA Plants Database (0). Japanese knotweed fact sheet-MLD.
- Global Invasive Species Database (0). Global Invasive Species Database-Fallopia japonica.

Total PRE Score

PRE Score: 13 -- Evaluate this plant further
Confidence: 63 / 100
Questions answered: 20 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:

- Professor Allan Armitage December 19, 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.

Issue ID # 6167

Date Created: December 19, 2017 - 1:11pm
Date Updated: February 21, 2018 - 1:42pm

Submitted by: Professor Allan Armitage

Status: Fixed
Type: Comment
Severity: Minor
Scope: Q04. Is the species (or cultivar or variety) noted as being invasive in the US or world in a similar climate?

Issue Description

While I have not seen invasive populations in woodlands or streams, this is a very aggressive plant in north Georgia. I do not see seedling populations however I consider it much like Kudzu, Pueraria, in that the root system aggressively allows plants to expand their territory.

Issue Resolution (Screener's Response to Issue)

Issue resolved by PRE Data Manager -- added stakeholder comment to Evaluation Notes

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Issue ID # 6166

Date Created: December 19, 2017 - 1:02pm
Date Updated: February 5, 2018 - 3:26pm

Submitted by: Professor Allan Armitage

Status: Fixed
Type: Suggestion
Severity: Major
Scope: Plant Information

Issue Description

The genus Fallopia has undergone some taxonomic investigation, and in particulalr F. japonica is likely properly classified as Reynoutria japonica. Taxonomic updates are seldom unanimous, I use The Plant List (theplantlist.org) when I am checking revisions. It does not matter what species is used, it is still the same plant, but the synonyms should be mentioned somewhere in case people are searching.

Issue Resolution (Screener's Response to Issue)

Issue resolved by PRE Data Manager -- changed plant name and added synonym to plant profile. It's also recommended that PRE screeners check The Plant List, but in this case both names are listed as "in review" with the same confidence level. However, F. japonica is also listed as a synonym in GBIF. Based on this and the stakeholder issue, the name has been updated.

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.