Plant Risk Evaluator -- PRE™
Evaluation Report

Reynoutria japonica 'Variegata' -- Illinois

2017 Farm Bill PRE Project

PRE Score: 18 -- Reject (high risk of invasiveness)
Confidence: 73 / 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 June 15, 2018

Plant Evaluated

Reynoutria japonica 'Variegata'

Image by Kelley MacDonald

Evaluation Overview

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

Variegated Japanese knotweed has a high risk of invasiveness in Illinois. Though it is less vigorous than the parent species, it can still spread aggressively and shoots may revert to the non-variegated form. There is little research on seed production, but one scientific study plus some anecdotal evidence show that this cultivar produces viable seed that germinates readily. Plants spread primarily through fragments which root and form new colonies, especially along waterways and roads. Reynoutria japonica is cited as one of the worst invasive plants in the world, with serious impacts on native plants and animals. This evaluation concludes that variegated forms are still not a safe choice.

General Information

Status: Submitted
Screener: Emily Russell
Evaluation Date: October 4, 2017

Plant Information

Plant: *Reynoutria japonica 'Variegata'*

If the plant is a cultivar, how does its behavior differs from its parent's?
'Variegata' (or 'Milk Boy') differs from the parent species in having variegated leaves. Some gardeners report that it spreads less vigorously than the parent species and has a more clump-forming habit. Other gardeners report aggressive suckering, non-variegated seedlings, and reversion to a more aggressive green form (see Rice 2011 and Dave's Garden in bibliography).

Regional Information

Region Name: Illinois

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

Answer / Justification:

Reynoutria japonica is naturalized in Australia, New Zealand, Europe, North America, and Chile. Using parent species information for this answer so confidence level is medium.

Reference(s):

- USDA-Grin (2011). Reynoutria japonica. In: Taxonomy - GRIN-Global Web v 1.9.9.2.
- Shaw, D. (2017). Fallopia japonica (Japanese knotweed) Datasheet In: Invasive Species Compendium.
- Kartesz, J. T. (2015). The Biota of North America Program (BONAP).

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

Answer / Justification:

Reynoutria japonica is naturalized in the Eastern United States (including Illinois) and Eastern and Northern Europe where there is a climate match to Illinois. Using parent species information for this answer so confidence level is medium.

Reference(s):

- Shaw, D. (2017). Fallopia japonica (Japanese knotweed) Datasheet In: Invasive Species Compendium.
- USDA-Grin (2011). Reynoutria japonica. In: Taxonomy - GRIN-Global Web v 1.9.9.2.
- Kartesz, J. T. (2015). The Biota of North America Program (BONAP).

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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:

The Global Invasive Species Database named Japanese knotweed one of the world's top 100 invasive species. "There are several horticultural varieties (cultivars) of Japanese Knotweed, which may have different characteristics based on their breeding. These cultivars can also be invasive. If they are pollinated by Japanese, Bohemian or Giant Knotweed populations they can produce seeds and will also reproduce vegetatively." All cultivars including 'Variegata' are prohibited in AL, CA, CT, MA, MI, NE, NH, OH, OR, VT, and WA.

Reference(s):

- Anderson, H. (2012). Invasive Japanese Knotweed (Fallopia japonica (Houtt.)) Best Management Practices in Ontario.

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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:

Japanese knotweed is invasive in Illinois. All cultivars including 'Variegata' are prohibited in MI, NE, OH and VT, which share a climate with Illinois. "All potentially invasive members of the Knotweed "Alliance" have been designated a Nebraska noxious weed. This designation includes Japanese knotweed and Giant knotweed and their hybrid Bohemian knotweed and all cultivars and hybrids. There are several Japanese knotweed cultivars developed for the ornamental market included in this designation since they can contribute to the Japanese knotweed invasion by providing pollen necessary for Japanese knotweed to produce viable seed."

Reference(s):

- Midwest Invasive Plant Network (2015). Midwest Invasive Plant List.
- Shultz, R. (2010). FACT SHEET: KNOTWEED “ALLIANCE”.

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

Answer / Justification:

R. sachalinensis and R. x bohemica are also invasive in Illinois.

Reference(s):

- Midwest Invasive Plant Network (2015). Midwest Invasive Plant List.

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

Answer / Justification:

Variegated Japanese knotweed will grow in many climates.

Reference(s):

- GBIF Secretariat (2016). GBIF Backbone Taxonomy: Reynoutria japonica Houtt..

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:

"Dense thickets of Japanese Knotweed can reduce sunlight penetration by more than 90%, and its thick mats of dead and decaying vegetation in fall/spring prevent other plant species from growing, by shading them out. Studies done by Cornell University have found that knotweed negatively affects the diversity of vegetation, reducing native species groundcover within knotweed stands to 0%." Using parent species information for this answer so confidence level is medium.

Reference(s):

- Anderson, H. (2012). Invasive Japanese Knotweed (Fallopia japonica (Houtt.)) Best Management Practices in Ontario.
- IUCN (2010). Global Invasive Species Database (2017) Species profile: Polygonum cuspidatum.

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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:

"It has been suggested that Japanese knotweed (Polygonum cuspidatum) populations pose a fire hazard during the dormant season due to dense accumulations of dead plant material (Ahrens 1975). However, tissues of Japanese knotweed have relatively low heat content (Dibble and others 2004), so fires in these populations may be of relatively low intensity and severity. More research is needed to determine whether knotweed populations may influence fire behavior, severity, or frequency."

Reference(s):

- Anzinger, D., & Radosevich S. R. (2008). Chapter 10: Fire and nonnative invasive plants in the Northwest Coastal bioregion. USDA Forest Service Gen. Tech. Rep. RMRS-GTR-42. 6, 197-224.

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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:

No evidence of health impacts to humans or animals. Rhizomes and new shoots are edible. Plant is palatable for grazing.

Reference(s):

- [Anonymous] .

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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:

"Japanese Knotweed can block or interfere with access to water for activities such as canoeing, boating, angling and swimming." Using parent species information for this answer so confidence level is medium.

Reference(s):

- Anderson, H. (2012). Invasive Japanese Knotweed (Fallopia japonica (Houtt.)) Best Management Practices in Ontario.

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

Answer / Justification:

Variegated Japanese knotweed spreads via rhizomes. For the species: "Rhizomes can regenerate when buried up to 1 metre deep and have been observed growing through 5cm of asphalt."

Reference(s):

- IUCN (2010). Global Invasive Species Database (2017) Species profile: Polygonum cuspidatum.
- Dave's Garden (2015). PlantFiles: Variegated Japanese Knotweed, Speckled Mexican Bamboo.

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

Answer / Justification:

"Vegetative spread is normally through tiny pieces of rhizome, stems and even internodal sections of stem capable of establishing roots even in water. Rhizome fragments weighing as little as 0.7 g are capable of regenerating into a new plant."

Reference(s):

- Shultz, R. (2010). FACT SHEET: KNOTWEED “ALLIANCE”.
- Shaw, D. (2017). Fallopia japonica (Japanese knotweed) Datasheet In: Invasive Species Compendium.
- Anderson, H. (2012). Invasive Japanese Knotweed (Fallopia japonica (Houtt.)) Best Management Practices in Ontario.

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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:

"Since horticultural varieties of knotweed produce viable seed and can have viable pollen, alternatives should be found in the nursery and landscaping industries so that these plants are no longer introduced in areas where they could outcross with wild populations."

Reference(s):

- Forman, J., & Kesseli R. V. (2003). Sexual reproduction in the invasive species Fallopia japonica (Polygonaceae). American Journal of Botany. 90, 586–592.

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

Answer / Justification:

"The two variegated plants in the UMB greenhouse are functionally male, and have a very low fruit set compared to female plants, bearing only one or two fruits on an inflorescence with over 100 flowers."

Reference(s):

- Forman, J., & Kesseli R. V. (2003). Sexual reproduction in the invasive species Fallopia japonica (Polygonaceae). American Journal of Botany. 90, 586–592.

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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:

Variegated plants had 27-60% germination within 21 days in a 2003 Massachusetts study.

Reference(s):

- Forman, J., & Kesseli R. V. (2003). Sexual reproduction in the invasive species Fallopia japonica (Polygonaceae). American Journal of Botany. 90, 586–592.

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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:

"Under optimal conditions, seedlings grew quickly and flowered within a single growing season."

Reference(s):

- Forman, J., & Kesseli R. V. (2003). Sexual reproduction in the invasive species Fallopia japonica (Polygonaceae). American Journal of Botany. 90, 586–592.

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

Answer / Justification:

Variegated Japanese knotweed flowers in late summer in Illinois.

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: **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 are no reports of animals disseminating propagules in the introduced range, though means of seed dispersal in the native range has not been investigated. It is possible that hooved animals could redistribute small pieces of rhizome in much the same way as vehicle tyres can."

Reference(s):

- Shaw, D. (2017). Fallopia japonica (Japanese knotweed) Datasheet In: Invasive Species Compendium.

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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:

"It spreads primarily along riparian areas or ditches where plant and rhizome fragments can be dispersed in moving water (i.e. along canals, beaches, streams and rivers)." "Flooding events can facilitate the spread of F. japonica, as whole plants and/or stem parts can be dislodged and transported to new areas downstream, where they can establish easily."

Reference(s):

- Shaw, D. (2017). Fallopia japonica (Japanese knotweed) Datasheet In: Invasive Species Compendium.
- Anderson, H. (2012). Invasive Japanese Knotweed (Fallopia japonica (Houtt.)) Best Management Practices in Ontario.

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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:

"Road and railroad rights of way and waterways are the main geographic pathways for spread within Ontario. It is not known how prevalent it is in the horticultural industry. Road maintenance, forestry operations and construction activities may spread these plants further."

Reference(s):

- Anderson, H. (2012). Invasive Japanese Knotweed (Fallopia japonica (Houtt.)) Best Management Practices in Ontario.

Total PRE Score

PRE Score: 18 -- Reject (high risk of invasiveness)
Confidence: 73 / 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:

- Richard Hawke October 30, 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.