Plant Risk Evaluator -- PRE™
Evaluation Report

Robinia pseudoacacia -- Minnesota

2017 Farm Bill PRE Project

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

Privacy: Public
Status: Completed

Evaluation Date: May 9, 2017

This PDF was created on June 15, 2018

Plant Evaluated

Robinia pseudoacacia

Image by opencage.info

Evaluation Overview

A PRE™ screener conducted a literature review for this plant (*Robinia pseudoacacia*) 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

Robinia pseudoacacia has invasive qualities and characteristics. Specifically, it grows rapidly and reaches reproductive maturity relatively quickly (for a woody plant), spreads quickly and aggressively via root and stump suckers, and produces a large amount of seed. That said, the vast majority of the seed falls close to the parent plant and may not be particularly viable in the wild. The species is an early succession plant, meaning it will eventually give way to other hardwoods. However, given its rapid growth rate, the fact that it produces dense thickets, and it can shade out native understory plants makes it an invasive species outside of its native range in Southeastern US. Additionally, it possesses sharp spines on the stems and its bark, leaves, and seeds are poisonous to animals.

General Information

Status: Completed
Screener: Mike Monterusso
Evaluation Date: May 9, 2017

Plant Information

Plant: *Robinia pseudoacacia*

Regional Information

Region Name: Minnesota

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:

Robinia pseudoacacia has become naturalized throughout North America and in parts of South America, southern Africa, Asia, Australasia, and Europe.

Reference(s):

- [Anonymous] (0). Taxonomy - GRIN-Global Web v 1.9.8.2.

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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:

In the U.S., it is reported to be naturalized in Wisconsin, North Dakota, and Montana. It is also naturalized in Ukraine.

Reference(s):

- Buzhdygan, O. Y., Rudenko S. S., Kazanci C., & Patten B. C. (2016). Effect of invasive black locust (Robinia pseudoacacia L.) on nitrogen cycle in floodplain ecosystem. Ecological Modelling . 319, 170–177.
- Matson, E., & Resources W. Department (2011). Literature Review: Robinia pseudoacacia L.. (Boos, T., Ed.).
- U.S. Department of Agriculture, Natural Resources Conservation Service National Plant Data Team (0). Plants profile for Robinia pseudoacacia (Black Locust).

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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:

It is considered invasive in a number of regions throughout the world, including North America, Europe, the Pacific Islands, Australia, southern Africa, South America, and Central America.

Reference(s):

- Richardson, D. M., & Rejmánek M. (2011). Trees and shrubs as invasive alien species – a global review. Diversity and Distributions. 17, 788–809.

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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:

This plant is restricted in Wisconsin

Reference(s):

- Wisconsin Department of Natural Resources (0). Black locust (Robinia pseudoacacia).

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

Answer / Justification:

Robinia hispida is a restricted plant in Wisconsin.

Reference(s):

- Wisconsin Department of Natural Resources (0). Wisconsin Invasive Plant Profiles - Robinia hispida.

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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:

Comparing the GBIF map to PRE combined map results shows that occurrences of this plant are concentrated in areas with a climate different from Minnesota.

Reference(s):

- GBIF - Robinia pseudoacacia (0). GBIF - Robinia pseudoacacia L..

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

Answer / Justification:

Robinia pseudoacacia "Invades primarily disturbed habitats, degraded wood, thickets and old fields crowding out native vegetation of prairies, oak savannas and upland forests, forming single species stands."

Reference(s):

- Minnesota Department of Natural Resources (0). Black locust - Invasive species Minnesota DNR.

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8. Is the plant noted as promoting fire and/or changing fire regimes?

- 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:

Outside its native range, black locust may alter fuels in 2 ways that influence fire regimes. First, black locust may increase the extent and relative density of forest compared to native plant communities. This change in structure was noted specifically in open habitats in the Northeast and mid-Atlantic states.. Second, black locust may produce a litter layer that differs from that produced by native vegetation. Natural and planted stands of 21- to 35-year-old black locust in Illinois, Indiana, and Ohio contained 10,200 dry-weight pounds of litter/acre

Reference(s):

- Stone, K. R. (2009). Robinia pseudoacacia. In: Fire Effects Information System.

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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:

Robinia pseudoacacia has spines that could cause severe injury. The inner bark, leaves, and seeds are poisonous. While there is no direct evidence of this plant impacting existing grazing systems, it does form dense stands in grasslands that shade out understory grasses and other plants.

Reference(s):

- NC State Extension (0). NC State Extension - Robinia pseudoacacia.

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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:

Robinia pseudoacacia produces numerous root suckers that can form a dense thicket. In early successional communities, black locust often grows in dense thickets or clones.

Reference(s):

- US Forest Service (0). Robinia pseudoacacia (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 **Very High** confidence in this answer based on the available literature.

Answer / Justification:

Robinia pseudoacacia spreads readily by root suckers. Vegetative regeneration is important to the establishment, spread, and persistence of black locust. It is thought to be a more common means of reproduction than seed. Black locust commonly sprouts from roots or the stump.

Reference(s):

- US Forest Service (0). Robinia pseudoacacia (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: **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:

Robinia pseudoacacia does not regularly generate fragments

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

Answer / Justification:

Black locust begins producing seeds at about 6 years of age. Seed production is best between 15 and 40 years of age and continues through approximately age 60. Seeds are produced every year, but good crops are produced at intervals of 1 to 2 or 2 to 3 years.

Reference(s):

- US Forest Service (0). Robinia pseudoacacia (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 **Medium** confidence in this answer based on the available literature.

Answer / Justification:

Heavy seed production can be expected annually or biannually. The legume type seed is produced in a flat, brown to black pod, which is 2 to 4 inches long. There is an average of 25,500 seeds per pound.

Reference(s):

- Dickerson, J. (2002). Plant Fact Sheet - Black Locust.

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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:

... most sources suggest that seed germination is low due to high seed coat impermeability and shade intolerance. Direct-seeded black locust on limestone and acid-shale sites in Ohio had low germination rates, ranging from 3% to 17%. Survival of these germinants ranged from 23% to 78%. Fifteen to 33 days after planting in a greenhouse, fall-collected black locust seeds from New Haven, Connecticut, exhibited 45% germination. While impermeable seed coats, which require scarification to germinate, do increase the soil bank for that species over time, this characteristic has little impact on the "next growing season". Also, scarification as result of soil disturbance could be considered "an infrequent environmental condition".

Reference(s):

- US Forest Service (0). Robinia pseudoacacia (Forest Service).

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

Answer / Justification:

Robinia pseudoacacia begins producing seeds at about 6 years of age... Seed production is best between 15 and 40 years of age.

Reference(s):

- US Forest Service (0). Robinia pseudoacacia (Forest Service).

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:

The flowers open in May or June for 7–10 days, after the leaves have developed

Reference(s):

- Dirr, M. A. (1990). Manual of Woody Landscape Plants Their Identification, Ornamental Characteristics, Culture, Propogation and Uses.

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:

This dispersal mechanism is possible but there is no evidence indicating that it occurs with any appreciable frequency.

Reference(s):

- [Anonymous] .

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:

Black locust seeds are dispersed by gravity, wind, and potentially by birds. Large size causes most black locust seeds to fall near the parent plant, and black locust is generally considered to have a low dispersal rate

Reference(s):

- US Forest Service (0). Robinia pseudoacacia (Forest Service).

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

Answer / Justification:

There is no evidence to support that the propagules are dispersed via these vectors.

Reference(s):

- [Anonymous] .

Total PRE Score

PRE Score: 16 -- Reject (high risk of invasiveness)
Confidence: 80 / 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:

• Laura Van Riper	November 30, 2017
• Tom Buechel	November 10, 2017

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.

Issue ID # 3388

Date Created: June 7, 2017 - 6:04am
Date Updated: June 13, 2017 - 1:10pm

Submitted by: Tim Vogel

Status: Fixed
Type:
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

Addtional information to the spread of Robinia across different Climates here in America, more than just restricted in Wisconsin- from the Missouri Botanica Garden Website:

~~Noteworthy Characteristics

Robinia pseudoacacia, commonly called black locust, is medium sized, suckering, deciduous tree that typically grows to 30-50’ (less frequently to 80’) tall. Although originally native to the Allegheny Mountains, it has escaped gardens and naturalized over time to cover much of the United States and southern Canada plus parts of Europe, Asia and South America

Issue Resolution (Screener's Response to Issue)

Additional supporting information was noted by not added due to time constraints

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.