



***Plant Risk Evaluator -- PRETM
Evaluation Report***

Acer platanoides 'Crimson King' -- Illinois

2017 Farm Bill PRE Project

PRE Score: 12 -- Accept (low risk of invasiveness)

Confidence: 70 / 100

Questions answered: 19 of 20 -- Valid (80% or more questions answered)

Privacy: Public

Status: Completed

Evaluation Date: October 10, 2017

This PDF was created on June 15, 2018



Plant Evaluated

Acer platanoides 'Crimson King'



Image by David J. Stang



Evaluation Overview

A PRE™ screener conducted a literature review for this plant (*Acer platanoides* 'Crimson King') 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

Acer platanoides is invasive in similar climates across the Midwest and Northeastern United States with detrimental effects on native plant communities. Though the species is naturalized in Illinois and listed as invasive, it has not yet developed into a major threat. Many cultivars are popular in the landscape trade, including 'Crimson King.' More research is needed on seed production, viability, and germination of cultivars to more clearly understand their risk of invasiveness.

General Information

Status: Completed

Screener: Emily Russell

Evaluation Date: October 10, 2017

Plant Information

Plant: *Acer platanoides* 'Crimson King'

If the plant is a cultivar, how does its behavior differs from its parent's?

'Crimson King' differs from the species in the color of its leaves and fruits, which are maroon. It is more compact than the species and tends to grow more slowly. This cultivar appears to produce less viable seed than the species, but offspring are not true to type. 'Crimson King' is often produced by grafting onto species rootstock, which can resprout after damage.

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

Answer / Justification:

Acer platanoides is naturalized in the Midwest, Mid-Atlantic, Northeast, and Northwest United States. It is unknown if or how much 'Crimson King' has contributed to these populations, though it has been popular in cultivation for decades and produces at least some viable seed. Confidence for this answer is medium since we are relying on data for the species.

Reference(s):

- Kartesz, J. T. (2015). The Biota of North America Program (BONAP).
-

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

Answer / Justification:

Acer platanoides is naturalized in Illinois, as well as the Midwest, Mid-Atlantic, and Northeast United States where there is climate overlap with Illinois.



Reference(s):

- Kartesz, J. T. (2015). The Biota of North America Program (BONAP).
-

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

Answer / Justification:

Acer platanoides is invasive in the Midwest, Mid-Atlantic and Northeast United States. All cultivars including 'Crimson King' are prohibited in Maine, Massachusetts, Vermont, and New Hampshire.

Reference(s):

- Midwest Invasive Plant Network (2015). Midwest Invasive Plant List.
 - Swearingen, J., Slattery B., Reshetiloff K., & Zwicker S. (2010). Plant Invaders of Mid-Atlantic Natural Areas. 168.
 - Maine Department of Agriculture, Conservation and Forestry (2017). CRITERIA FOR LISTING INVASIVE TERRESTRIAL PLANTS.
 - NH Department of Agriculture, Markets & Food, Division of Plant Industry (2017). Fact Sheet: Prohibited Invasive Plant Species Rules, Agr 3800.
 - Massachusetts Department of Agricultural Resources (2009). Massachusetts Prohibited Plant List.
 - Vermont Agency of Agriculture, Food & Markets (2013). Quarantine # 3 - Noxious Weeds.
-

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



Answer / Justification:

Acer platanoides is listed as invasive Illinois, as well as the Midwest, Mid-Atlantic and Northeast United States. All cultivars including 'Crimson King' are prohibited in Maine and Vermont, where there is some climate overlap with Illinois.

Reference(s):

- Swearingen, J., Slattery B., Reshetiloff K., & Zwicker S. (2010). Plant Invaders of Mid-Atlantic Natural Areas. 168.
 - Midwest Invasive Plant Network (2015). Midwest Invasive Plant List.
 - Maine Department of Agriculture, Conservation and Forestry (2017). CRITERIA FOR LISTING INVASIVE TERRESTRIAL PLANTS.
 - Vermont Agency of Agriculture, Food & Markets (2013). Quarantine # 3 - Noxious Weeds.
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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 *screeners* has a **Very High** confidence in this answer based on the available literature.

Answer / Justification:

Acer tataricum ssp. *ginnala* is invasive in the Midwest.

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



Answer / Justification:

Acer platanoides 'Crimson King' will grow in many climates.

Reference(s):

- GBIF Secretariat (2016). GBIF Backbone Taxonomy: *Acer platanoides* L..
 - Gilman, E. F., & Watson D. G. (2014). *Acer platanoides* 'Crimson King': 'Crimson King' Norway Maple.
-

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:

Acer platanoides 'Crimson King' casts deep shade that inhibits growth of other plants, even turfgrass. "The thick canopy of leaves and shallow roots severely limits what can be grown within the drip line of the tree." (MOBOT) The species displaces both understory and canopy species in forests where it has established, causing changes in diversity, species composition and community structure.

Reference(s):

- Reinhart, K. O., Greene E., & Callaway R. M. (2005). Effects of *Acer platanoides* Invasion on Understory Plant Communities and Tree Regeneration in the Northern Rocky Mountains. *Ecography*. 28, 573–582.
 - Wyckoff, P. H., & Webb S. L. (1996). Understory Influence of the Invasive Norway Maple (*Acer platanoides*). *Bulletin of the Torrey Botanical Club*. 123, 197–205.
 - Missouri Botanical Garden (2017). *Acer platanoides* 'Crimson King' - Plant Finder.
-



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

Answer / Justification:

Acer platanoides is especially competitive in cool, moist, shaded forests that rarely burn. "It is likely that Norway maple increases in the absence of fire."

Reference(s):

- Munger, G. T. (2003). *Acer platanoides*. In: Fire Effects Information System.
-

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

Answer / Justification:

There is no evidence of health risks to humans or animals.

Reference(s):

- [Anonymous] .
-

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



Answer / Justification:

There is no evidence of impenetrable thickets.

Reference(s):

- [Anonymous] .
-

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

Answer / Justification:

A. platanoides will resprout after cutting, but there is no evidence that it will spread to new areas vegetatively. 'Crimson King' is often grafted onto species rootstock, which may sprout vigorously after cutting. (ArboristSite.com) "USDA Natural Resources Conservation Service Plants Database indicates that at least one cultivar of Norway maple (Crimson King) has the ability to 'resprout,' but none have 'coppice potential.'" (FEIS) For the species: "Spreads to new areas by vegetative reproduction and seed" (NPS) but there are no descriptions or documentation of vegetative reproduction available.

Reference(s):

- Munger, G. T. (2003). *Acer platanoides*. In: Fire Effects Information System.
 - Swearingen, J., Slattery B., Reshetiloff K., & Zwicker S. (2010). Plant Invaders of Mid-Atlantic Natural Areas. 168.
 - ArboristSite.com (2012). Crimson King Maple- New Growth Question.
-

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



Answer / Justification:

There is no evidence of reproducing from fragments in the wild.

Reference(s):

- [Anonymous] .
-

13. Does the species (or cultivar or variety) commonly produce viable seed?

- Answer: **Yes**, which contributes **1** points to the total PRE score.
- The *screeners* has a **High** confidence in this answer based on the available literature.

Answer / Justification:

Seed is the primary means of reproduction for *Acer platanoides*. More research is needed on seed production, viability, and germination for 'Crimson King,' but it appears that this cultivar produces viable seed in smaller quantities than the species.

Reference(s):

- Conklin, J. R., & Sellmer J. C. (2009). Flower and Seed Production of Norway Maple Cultivars. *HortTechnology*. 19, 91–95.
 - CultivatorsCorner.com (2010). Red Crimson King Maple Tree Seeds.
-

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

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

Answer / Justification:

Acer platanoides produces copious viable seeds. Pennsylvania studies by Conklin and Selmer found that 'Crimson King' produced an average of 229 seeds each year with only 3-10% viability. One homeowner reported about 400 seedlings beneath a mature 'Crimson King.'



Reference(s):

- Conklin, J. R., & Sellmer J. C. (2009). Flower and Seed Production of Norway Maple Cultivars. HortTechnology. 19, 91–95.
 - Conklin, J. R., & Sellmer J. C. (2009). Germination and Seed Viability of Norway Maple Cultivars, Hybrids, and Species. HortTechnology. 19, 120–126.
 - CultivatorsCorner.com (2010). Red Crimson King Maple Tree Seeds.
-

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:

Conflicting information in the literature makes it impossible to answer this question with confidence. Seeds of 'Crimson King' did not germinate over a three-year study in Pennsylvania, in either a growth chamber or on the forest floor. However, the species did not germinate in the growth chamber either and had very low germination on the forest floor, though seed viability was determined to be 75%. The authors (Conklin and Sellmer) offer several possible explanations, including a possible fungal pathogen and system failure in the growth chambers. Other sources report that *Acer platanoides* generally germinates in spring after 90-120 days of cold stratification at higher percentages (USDA FS, Dirr). One homeowner reported about 400 seedlings beneath a mature 'Crimson King.' More studies are needed to confirm germination rates of 'Crimson King.'

Reference(s):

- USDA Forest Service (2008). USDA FS Agriculture Handbook 727 - The Woody Plant Seed Manual.
 - Dirr, M. A. (1998). Manual of Woody Landscape Plants: Their Identification, Ornamental Characteristics, Culture, Propagation and Uses.
 - Conklin, J. R., & Sellmer J. C. (2009). Germination and Seed Viability of Norway Maple Cultivars, Hybrids, and Species. HortTechnology. 19, 120–126.
 - CultivatorsCorner.com (2010). Red Crimson King Maple Tree Seeds.
-



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

Answer / Justification:

Acer platanoides does not have a short juvenile period.

Reference(s):

- [Anonymous] .
-

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

Answer / Justification:

Acer platanoides 'Crimson King' flowers once in the spring for a period of weeks.

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

Answer / Justification:

Birds and small mammals eat the seeds but there are not reports of long distance dispersal.

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

Answer / Justification:

Samaras are dispersed by wind, but are unlikely to travel long distances. "Estimated lateral distance traveled by samaras in a 6.2 miles/hour (10 km/hr) breeze when dropped from a height of "approximately 3/4 of the maximum height of the species" was 165 feet (50.3 m)"

Reference(s):

- Munger, G. T. (2003). *Acer platanoides*. In: Fire Effects Information System.
-



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:

"Roads and trails provided important corridors for propagule movement away from developed areas over the course of the invasion. They also appeared to facilitate longer distance dispersals than would be expected given the biology of the species."

Reference(s):

- Wangen, S. R., & Webster C. R. (2006). Potential for Multiple Lag Phases during Biotic Invasions: Reconstructing an Invasion of the Exotic Tree *Acer platanoides*. *Journal of Applied Ecology*. 43, 258–268.
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Total PRE Score

PRE Score: 12 -- Accept (low risk of invasiveness)

Confidence: 70 / 100

Questions answered: 19 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:

- | | |
|--------------------|-------------------|
| • Steve Worth | December 22, 2017 |
| • Jeff Mengler | December 20, 2017 |
| • Michael Yanny | December 6, 2017 |
| • Linda Mackechnie | November 12, 2017 |
| • Kim Shearer | October 17, 2017 |

This evaluation has a total of 5 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 # 6200

Date Created: December 21, 2017 - 2:09pm

Date Updated: January 29, 2018 - 1:18pm

Submitted by: Steve Worth

Status: Fixed

Type: Comment

Severity: Minor

Scope: Regional Information

Issue Description

Please see my comments on the Royal Red Maple. Royal Red is simply an improved Crimson King, and my comments apply to this cultivar as well.

Issue Resolution (Screener's Response to Issue)

I incorporated your comments into the answer text and also the Evaluation Summary.

Issue ID # 6174

Date Created: December 20, 2017 - 7:54am

Date Updated: January 29, 2018 - 2:13pm

Submitted by: Jeff Mengler

Status: Fixed

Type: Suggestion



Severity: Minor

Scope: Q19. Are the plant's propagules frequently dispersed long distance (>100 m) by wind or water?

Issue Description

The information provided on wind dispersal of *Acer* samaras is not consistent between *Acer tartarica* ginnala and *Acer platanoides* Crimson King - though neither are relying on information specific to the cultivar being evaluated. Each reviewer found and relied on different reports for related *Acer*.

Issue Resolution (Screener's Response to Issue)

Is it possible that samaras from different *Acer* species can travel different distances?

Issue ID # 6173

Date Created: December 20, 2017 - 7:51am

Date Updated: January 29, 2018 - 1:05pm

Submitted by: Jeff Mengler

Status: Fixed

Type: Comment

Severity: Major

Scope: Plant Information

Issue Description

Much of the evaluation of *Acer platanoides* "Crimson King" relies solely on information for the species, not the cultivar though the evaluation does indicate more research is needed on Crimson King. This may overstate the invasive potential given differences in seed production etc.

Issue Resolution (Screener's Response to Issue)

Thank you for your comment.



Issue ID # 5442

Date Created: October 17, 2017 - 5:19pm

Date Updated: December 10, 2017 - 6:28pm

Submitted by: Kim Shearer

Status: Fixed

Type: Suggestion

Severity: Major

Scope: Q15. 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?

Issue Description

Please see Janine Conklin's 2009 pub at this [link](#) and revise the statement in response to this question.

Issue Resolution (Screener's Response to Issue)

The 2009 Germination study by Conklin and Sellmer was already included in the answer justification and citation. This study conflicts with information from the USDA and Dirr on germination of the species, and therefore, a clear answer to this question is still lacking. Conklin also noted that germination may have been low in the study due to fungal pathogens and a system failure in the growth chambers. I added a sentence to the answer justification that hopefully better summarizes the results of the Conklin study and clarifies the need for further research.

Issue ID # 5441

Date Created: October 17, 2017 - 5:14pm

Date Updated: December 10, 2017 - 5:58pm

Submitted by: Kim Shearer

Status: Fixed

Type: Suggestion

Severity: Major

Scope: Q13. Does the species (or cultivar or variety) commonly produce viable seed?

Issue Description



Since this question is regarding seed viability, I recommend referencing Janine Conklin's paper [Germination and Seed Viability of Norway Maple Cultivars, Hybrids, and Species](#) (also published in 2009 in HortTech) in addition to her other paper that is referenced relative to seed production.

Issue Resolution (Screener's Response to Issue)

That paper is already included in the citations.

Issue ID # 5440

Date Created: October 17, 2017 - 4:55pm

Date Updated: January 29, 2018 - 11:12am

Submitted by: Kim Shearer

Status: Fixed

Type: Suggestion

Severity: Major

Scope: Q11. Does this species (or cultivar or variety) reproduce and spread vegetatively?

Issue Description

Resprouting from stumps is not spreading into new areas vegetatively. If the species or cultivar sprouts from the roots away from the stump, then that would definitely be spreading into new areas vegetatively. I would recommend removing the comments regarding resprouting relative to vegetative spread and reproduction. As for the NPS quote about spreading vegetatively, if that is the case then there should be another reference that supports this. Doing a quick search, I was not able to find any propagation information relative to propagating Norway maple from root cuttings. This does not mean that information is not out there, but I did not find it. If the species can be propagated from root cuttings (not resprouting from a stump), then I would think spreading/reproducing vegetatively would be possible. An example of this happening is the Kentucky coffee tree which colonizes areas through root sprouts and can produce plantlets from remaining roots after stump removal. Again, I have not witnessed this in Norway maple, but that does not mean it doesn't happen. Perhaps someone from the nursery industry who has dug field planted Norway maples will provide greater insight into this.

Issue Resolution (Screener's Response to Issue)

Clarified intention of the question with PlantRight and corrected answer to "no": this tree will resprout



from a cut stump, but not spread to new areas vegetatively.

Issue ID # 5439

Date Created: October 17, 2017 - 1:43pm

Date Updated: December 10, 2017 - 6:49pm

Submitted by: Kim Shearer

Status: Fixed

Type: Suggestion

Severity: Minor

Scope: Q03. Is the species (or cultivar or variety) noted as being invasive in the U.S. or world?

Issue Description

"*Acer platanoides* is invasive in the Midwest, Mid-Atlantic and Northeast United States. All cultivars including 'Crimson King' are prohibited in Maine, Massachusetts, Connecticut, Vermont, and New Hampshire."

Need a reference for prohibition in Connecticut.

Issue Resolution (Screener's Response to Issue)

Removed Connecticut.



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.