



***Plant Risk Evaluator -- PRE™  
Evaluation Report***

***Poncirus trifoliata -- Georgia***

***2017 Farm Bill PRE Project***

**PRE Score:** 14 -- Evaluate this plant further

**Confidence:** 59 / 100

**Questions answered:** 16 of 20 -- Valid (80% or more questions answered)

**Privacy:** Public

**Status:** Completed

**Evaluation Date:** October 26, 2017

*This PDF was created on August 13, 2018*



## Plant Evaluated

*Poncirus trifoliata*



Image by Jebulon, Wikipedia user



## Evaluation Overview

A PRE™ screener conducted a literature review for this plant (*Poncirus trifoliata*) 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

Hardy orange (*Poncirus trifoliata*) is a thorny, deciduous shrub or small tree that produces 1-2.25" in diameter fruits. The fruits are yellow in color and typically bare as many as 30 seeds per fruit. Fruit are edible, but are usually left on the tree to serve as an ornamental. *P. trifoliata* is currently listed as a category 3 by the GA-EPPC in which it is described as an, "Exotic plant that is a minor problem in Georgia natural areas, or is not yet known to be a problem in Georgia but is known to be a problem in adjacent states". It is listed as a "severe threat" by the SC-EPPC, and thus should be under careful watch in Georgia for risk of becoming invasive. The long growth period *P. trifoliata* takes (3- 12 years) to fruiting maturity does not warrant it as a highly invasive species in my opinion, and should be evaluated further.

## General Information

**Status:** Completed

**Screener:** Lila Uzzell

**Evaluation Date:** October 26, 2017

## Plant Information

**Plant:** *Poncirus trifoliata*

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

#### Answer / Justification:

"The species is native to eastern Asia and has become naturalized in the USA in many habitats, including ruderal sites as well as intact natural communities" (Nesom 2014).

#### Reference(s):

- Nesom, G.. L. (2014). *Citrus trifoliata* (Rutaceae): Review of biology and distribution in the USA. *Phytoneuron*. 46, 1–14.
- 

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

#### Answer / Justification:

*P. trifoliata* appears to be present in areas of Southeastern Australia, Eastern Asia (native), Eastern and Northwestern America, Argentina, Southeastern Brazil, and Europe.



**Reference(s):**

- GBIF (2017). *Poncirus trifoliata* (L.) Raf..
  - Nesom, G. L. (2014). *Citrus trifoliata* (Rutaceae): Review of biology and distribution in the USA. *Phytoneuron*. 46, 1–14.
- 

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

**Answer / Justification:**

*P. trifoliata* doesn't seem to be a serious threat in AL or GA. It is listed as a "Category 3 - Exotic plant that is a minor problem in Georgia natural areas, or is not yet known to be a problem in Georgia but is known to be a problem in adjacent states" by the GA-EPPC. It is being "watched" in Alabama and is listed as a 2, "2= Scattered and localized infestations in AL". However, this species is listed as a Severe Threat by the SC-EPPC, where a severe threat is defined as an: "Invasive exotic plant species which are known to pose a severe threat to the composition structure, or function of natural areas in the state of South Carolina.

**Reference(s):**

- Alabama Invasive Plant Council (2007). Alabama Invasive Plant Council's 2007 Plant List.
  - South Carolina Exotic Pest Plant Council (2014). South Carolina Exotic Pest Plant Council Terrestrial Exotic Invasive Species List 2014.
  - Georgia Invasive Species Task Force (2017). List of Non-native Invasive Plants in Georgia - Georgia Invasive Species Task Force.
- 

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



**Answer / Justification:**

This plant is exotic throughout many areas of the US, but is only noted as invasive in South Carolina by the SC-EPPC as of 2014.

**Reference(s):**

- [Anonymous] .
- 

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

**Answer / Justification:**

*Poncirus trifoliata* seems to be only individual that is exotic or invasive. However, there are other members within the Rutaceae family that may be invasive ( such as the Amur corktree).

**Reference(s):**

- Randall, R. Peter (2017). A Global Compendium of Weeds. Third Edition..
- 

**6. Is the species (or cultivar or variety) found predominately in a climate matching the region of concern?**

- 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:**

GBIF and USDA PLANTS Database maps show that this species is typically found in areas that match Georgia's climate. *P. trifoliata* is found in zones 5-9. The only places this species grows outside of Georgia's matching climate is Mexico and Northern Australia.



**Reference(s):**

- GBIF (2017). *Poncirus trifoliata* (L.) Raf..
  - USDA (2017). *Poncirus trifoliata* (L.) Raf. hardy orange.
  - Garden, M. Botanic (2017). *Poncirus trifoliata* - Plant Finder.
- 

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

**Answer / Justification:**

Trifoliolate orange invades woodlands, forest edges, fence rows and urban green spaces. Nesom (2014) states: In Arkansas, it is "capable of forming dense, thorny thickets which displace native plant species" (Serviss 2014).

**Reference(s):**

- Nesom, G.. L. (2014). *Citrus trifoliata* (Rutaceae): Review of biology and distribution in the USA. *Phytoneuron*. 46, 1–14.
  - The University of Georgia Center for Invasive Species and Ecosystem Health (2017). *trifoliolate orange, Citrus trifoliata* N/A Sapindales: Rutaceae.
- 

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

**Answer / Justification:**

Lack of evidence.





**Reference(s):**

- [Anonymous] .
- 

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

**Answer / Justification:**

This species is edible, and has several medical uses.

**Reference(s):**

- [Anonymous] .
- 

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

**Answer / Justification:**

This species is very thorny, and is often grown as a hedge by people. "Large colonies [of trifoliolate orange] are often observed in places where it is naturalized, and dense populations can be essentially impenetrable'(Serviss 2014)" (Nesom 2014).

**Reference(s):**

- [Anonymous] .
-



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

#### Answer / Justification:

The most common method of reproduction is by seed. However, it is noted that this tree can reproduce by root suckers. "Trifoliolate orange also reproduces by basal sprouting and root suckers" (Nesom 2014).

#### Reference(s):

- [Anonymous] .
- 

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

#### Answer / Justification:

This does not appear to be the common method of reproduction for *P. trifoliata*.

#### Reference(s):

- [Anonymous] .
- 

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



**Answer / Justification:**

lack of information.

**Reference(s):**

- [Anonymous] .
- 

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

**Answer / Justification:**

lack of information.

**Reference(s):**

- [Anonymous] .
- 

**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:**

lack of information.

**Reference(s):**

- [Anonymous] .
-



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

**Answer / Justification:**

"Trifoliate orange has been reported to begin flowering and fruiting when 3–4 years old or as late as 10–12 years old" (Nesom 2014). Flower/fruiting times vary for this shrub. Given that it can take up to 12 years for some individuals of this species, and looking at its overall growth time from Nesom (2014), I answered "no" and left my confidence level low for this question.

**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 / Justification:**

lack of information.

**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: **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 dispersal is described in various literature as through birds and other animals, but 'seedlings will germinate from rotten fruits without dispersal or mechanical breach of the pericarp'(Serviss 2014)."

#### Reference(s):

- Nesom, G.. L. (2014). *Citrus trifoliata* (Rutaceae): Review of biology and distribution in the USA. *Phytoneuron*. 46, 1–14.
- 

### 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:

Seeds of *P. trifoliata* are typically dispersed via birds and mammals.

#### Reference(s):

- Nesom, G.. L. (2014). *Citrus trifoliata* (Rutaceae): Review of biology and distribution in the USA. *Phytoneuron*. 46, 1–14.
-



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

**Answer / Justification:**

Lack of evidence. Given that the fruit is sticky and the seeds are large, the propagules are most likely not dispersed in this way.

**Reference(s):**

- [Anonymous] .
- 

**Total PRE Score**

**PRE Score:** 14 -- Evaluate this plant further

**Confidence:** 59 / 100

**Questions answered:** 16 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:

- Shelly Matthew Prescott January 4, 2018

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](mailto: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](mailto: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.