Plant Risk Evaluator -- PRE™
Evaluation Report

Clematis terniflora -- Texas

2017 Farm Bill PRE Project

PRE Score: 18 -- Reject (high risk of invasiveness)
Confidence: 76 / 100
Questions answered: 20 of 20 -- Valid (80% or more questions answered)

Privacy: Public
Status: Submitted

Evaluation Date: September 3, 2017

This PDF was created on July 06, 2018

Plant Evaluated

Clematis terniflora

Image by MBOT

Evaluation Overview

A PRE™ screener conducted a literature review for this plant (*Clematis terniflora*) 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

Clematis terniflora is an aggressive vine that can grow up to 30 feet overtoping and smothering trees and other vegetation. The plant is naturalized in the eastern half of the U.S. and listed invasive in several states. It is an aggressive seeder with wind dispersed seeds.

General Information

Status: Submitted
Screener: Kim Taylor
Evaluation Date: September 3, 2017

Plant Information

Plant: *Clematis terniflora*

If the plant is a cultivar, how does its behavior differs from its parent's?
This evaluation is for the species, not a particular cultivar.

Regional Information

Region Name: Texas

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

Answer / Justification:

The species is naturalized in the eastern half of the US from the Atlantic coast west to Texas, as well as a few counties in California.

Reference(s):

- Kartesz, J. T. (2015). The Biota of North America Program (BONAP).
- USDA, & NRCS (2017). The Plants Database.

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

Answer / Justification:

The species is naturalized in the eastern half of the US from the Atlantic coast west to Texas, as well as a few counties in California. Much of the southern US has a similar climate to Texas.

Reference(s):

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

Answer / Justification:

Clematis terniflora is listed by the Southeast Exotic Pest Plant Council, the Alabama Invasive Plant Council, Deleware Natural Resources and Environmental Control, Florida Exotic Pest Plant Council, Georgia Exotic Pest Plant Council, Maryland Department of Natural Resources, Mid-Atlantic Exotic Pest Plant Council, New Jersey Department of Agriculture, South Carolina Exotic Pest Plant Council, and Tennessee Exotic Pest Plant Council.

Reference(s):

- Swearingen, J., & Bargeron C. (2016). sweet autumn virginsbower: Clematis terniflora (Ranunculales: Ranunculaceae): Invasive Plant Atlas of the United States.
- USDA, & NRCS (2017). The Plants Database.

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

Answer / Justification:

Areas where Clematis terniflora is listed as invasive with a similar climate include the Southeast Exotic Pest Plant Council, the Alabama Invasive Plant Council, Florida Exotic Pest Plant Council, Georgia Exotic Pest Plant Council, and the South Carolina Exotic Pest Plant Council.

Reference(s):

- Swearingen, J., & Bargeron C. (2016). sweet autumn virginsbower: Clematis terniflora (Ranunculales: Ranunculaceae): Invasive Plant Atlas of the United States.
- USDA, & NRCS (2017). The Plants Database.

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

Answer / Justification:

Clematis orientalis is reported invasive in Colorado. Clematis vitalba is listed invasive in Washington and Oregon. While portions of Colorado share a similar climate with Texas, the counties where C. orientalis is listed as naturalized are outside of the climate matching zone.

Reference(s):

- Swearingen, J.., & Bargeron C.. (2016). evergreen clematis: Clematis vitalba (Ranunculales: Ranunculaceae): Invasive Plant Atlas of the United States.
- Swearingen, J.., & Bargeron C.. (2016). oriental virginsbower: Clematis orientalis (Ranunculales: Ranunculaceae): Invasive Plant Atlas of the United States.
- Kartesz, J. T. (2015). The Biota of North America Program (BONAP).

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

Answer / Justification:

Over half of the species distribution shares a similar climate to Texas, including the eastern US, China and Japan.

Reference(s):

- GBIF (0). Clematis terniflora DC. (gbif).

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

Answer / Justification:

Clematis terniflora is a "climbing, semi-evergreen" vine. This habit has a tendency to grow overtop and and smother native vegetation. "This species is found invading forest edges, right-of-ways and urban areas along streams and roads. It grows vigorously over other vegetation, forming dense blankets that block sunlight to the plants underneath." "C. terniflora has naturalized in many states, and it is often considered an invasive species, capable of killing saplings and sometimes fully grown trees (7). C. terniflora inhibits the growth of other plants, especially legumes ."

Reference(s):

- Santanna, C. (2013). Clematis terniflora CLIMBERS.
- NPS (0). Sweet Autumn Virginsbower (Clematis terniflora) - nps.gov.
- Swearingen, J., & Bargeron C. (2016). sweet autumn virginsbower: Clematis terniflora (Ranunculales: Ranunculaceae): Invasive Plant Atlas of the United States.

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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 of this.

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

Answer / Justification:

"All parts of plant are poisonous if ingested. Handling plant may cause skin irritation or allergic reaction." "Although no reports of toxicity have been seen for this species, some if not all members of this genus are mildly poisonous. The toxic principle is dissipated by heat or by drying." "The vine, however, contains a glycoside that can cause adverse reactions in cats and dogs. Vomiting, salivation and diarrhea are the most typical symptoms."

Reference(s):

- Blackmore, H. (0). Clematis (Toxic Tuesdays: A Weekly Guide to Poison Gardens) Britannica Blog.
- Plants For A Future (PFAF) (0). Clematis terniflora Sennin-So, Sweet autumn virginsbower, Sweet Autumn Clematis, Fall Clematis PFAF Plant Database.
- Dave's Garden (0). Dave's Garden PlantFiles: Clematis Species, Sweet Autumn Clematis, Virgin's Bower, Japanese Clematis.

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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:

The species can grow to 30 feet overtoping trees. It is possible that this habit could block movement.

Reference(s):

- Missouri Botanical Garden PlantFinder (0). Clematis terniflora - Plant Finder.

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

Answer / Justification:

"Clematis terniflora reproduces both vegetatively and by seed." While there is mention that the species reproduces vegetatively there is no indication of how. Cuttings can be grown but it is not clear that the plant can reproduce vegetatively in nature. More information is needed on the mechanism of vegetative reproduction.

Reference(s):

- Forest Health Staff (2007). Weed of the Week - Sweet Autumn Virginsbower.
- Global Invasive Species Database (2017). GISD Species Profile: Clematis terniflora.

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

Answer / Justification:

There is no evidence of this.

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

Answer / Justification:

"Sweet autumn clematis can aggressively self-seed in the landscape," "Clematis terniflora reproduces both vegetatively and by seed."

Reference(s):

- Missouri Botanical Garden PlantFinder (0). Clematis terniflora - Plant Finder.
- Global Invasive Species Database (2017). GISD Species Profile: Clematis terniflora.

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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:

seed production is "prolific". "seeds are produced in profusion "

Reference(s):

- NPS (0). Sweet Autumn Virginsbower (Clematis terniflora) - nps.gov.
- Swearingen, J., & Bargeron C. (2016). sweet autumn virginsbower: Clematis terniflora (Ranunculales: Ranunculaceae): Invasive Plant Atlas of the United States.

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

Answer / Justification:

"Ripe seeds germinate within 1-9 months." "Sweet autumn clematis grows well from seed, although the seeds germinate erratically and often produce vines with fewer, less fragrant flowers than those started from cuttings. The seeds must be chilled to break their dormancy and allow for prompt, successful germination." "Propagation Seed - best sown as soon as it is ripe in a cold frame[164, 200]. Sow stored seed as soon as it is obtained in a cold frame. Pre-soak the seed for 12 hours in warm water and remove as much of the tail and outer coat as possible[164]. A period of cold stratification is beneficial[164]. The seed germinates in 1 - 9 months or more at 20°c."

Reference(s):

- Plants For A Future (PFAF) (0). Clematis terniflora Sennin-So, Sweet autumn virginsbower, Sweet Autumn Clematis, Fall Clematis PFAF Plant Database.
- Global Invasive Species Database (2017). GISD Species Profile: Clematis terniflora.
- McMullen, S. (0). How to Plant Sweet Autumn Clematis Seeds.

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

Answer / Justification:

This plan blooms on the current year's growth, but Clematis in general do not tend to bloom the first year. There is some indication that flowers may appear in the second or third year.

Reference(s):

- Silver, T. (0). Do Clematis Bloom the Year You Plant Them?.
- BEAULIEU, DAVID. (0). Is Sweet Autumn Clematis Really So Sweet? spruce.com.

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

Answer / Justification:

Flowers "appear in the late summer through fall." Blooms from August to September. Seeds ripen from October to November

Reference(s):

- Missouri Botanical Garden PlantFinder (0). Clematis terniflora - Plant Finder.
- Plants For A Future (PFAF) (0). Clematis terniflora Sennin-So, Sweet autumn virginsbower, Sweet Autumn Clematis, Fall Clematis PFAF Plant Database.
- Swearingen, J., & Bargeron C. (2016). sweet autumn virginsbower: Clematis terniflora (Ranunculales: Ranunculaceae): Invasive Plant Atlas of the United States.

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

Answer / Justification:

There is no indication of this. Seeds are wind dispersed.

Reference(s):

- [Anonymous] .

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

Answer / Justification:

Seeds have "long, silvery-gray, feather-like hairs attached" which aid in wid dispersal.

Reference(s):

- Santanna, C. (2013). Clematis terniflora CLIMBERS.
- NPS (0). Sweet Autumn Virginsbower (Clematis terniflora) - nps.gov.

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

Answer / Justification:

There is no indication of this.

Reference(s):

- [Anonymous] .

Total PRE Score

PRE Score: 18 -- Reject (high risk of invasiveness)
Confidence: 76 / 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:

- Steve Moore September 7, 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.