Plant Risk Evaluator -- PRE™
Evaluation Report

Vitex agnus-castus -- Texas

2017 Farm Bill PRE Project

PRE Score: 15 -- Evaluate this plant further
Confidence: 69 / 100
Questions answered: 18 of 20 -- Valid (80% or more questions answered)

Privacy: Public
Status: Completed

Evaluation Date: March 21, 2017

This PDF was created on August 13, 2018

Plant Evaluated

Vitex agnus-castus

Image by Cillas

Evaluation Overview

A PRE™ screener conducted a literature review for this plant (*Vitex agnus-castus*) 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

Vitex agnus-castus possesses several characteristics that could increase it's tendency to become invasive, seed dispersal by both birds and water and the formation of impenetrable thickets. There are naturalized populations in Texas and the species is listed as invasive in Central Texas. There is a lack of information on the quantity of seed produced and the germination rates. This information would likely raise the PRE score and push the plant into the invasive category.

General Information

Status: Completed
Screener: Kim Taylor
Evaluation Date: March 21, 2017

Plant Information

Plant: *Vitex agnus-castus*

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:

Naturalized in North America, particularly in the Southern half of the US as well as Hawaii. Also naturalized in South America in Brazil. There are records in GBIF from Australia and New Zealand but it is unclear if these are naturalized or cultivated.

Reference(s):

- Kartesz, J. T. (2015). The Biota of North America Program (BONAP).
- United States Department of Agriculture (2014). USDA-NRCS Plants Database.
- [Anonymous] (0). Vitex agnus-castus (PIER species info).
- [Anonymous] (0). Vitex agnus-castus L. Plants of the World Online.
- [Anonymous] (0). Vitex agnus-castus L. (GBIF).

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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:

Naturalized regions within the Southern US have similar climate.

Reference(s):

- Kartesz, J. T. (2015). The Biota of North America Program (BONAP).
- United States Department of Agriculture (2014). USDA-NRCS Plants Database.

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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:

This plant is listed on the Invasive Plant Atlas of the US and is noted as occuring in limestone outcrops and dry creek beds in Central Texas. IPAUS notes that is should be listed as an EDRR (Early Detection & Rapid Response) species across the southern US where it is warm enough to survive the winters. NC State Extension notes that it has been reported invasive in several North and South Carolina counties.

Reference(s):

- [Anonymous] (0). lilac chastetree: Vitex agnus-castus (Lamiales: Verbenaceae): Invasive Plant Atlas of the United States.
- [Anonymous] (0). Texas Invasives.
- [Anonymous] (0). Vitex agnus-castus NCSU.

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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:

Vitex is only noted as being invasive in Texas and potentially in several counties in North and South Carolina. There is also the potential for invasiveness across the SE US.

Reference(s):

- [Anonymous] (0). lilac chastetree: Vitex agnus-castus (Lamiales: Verbenaceae): Invasive Plant Atlas of the United States.
- [Anonymous] (0). Texas Invasives.
- [Anonymous] (0). Vitex agnus-castus NCSU.

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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:

Several species of Vitex have escaped in the southern US, including V. glabrata, V. negundo, V. rotundifolia, and V. trifolia. Vitex rotundifolia appears to be invasive on sand dunes in Florida.

Reference(s):

- Kartesz, J. T. (2015). The Biota of North America Program (BONAP).
- Murren, C. J., Purvis K. Grant, Glasgow D., Messervy J., Penrod M., & Strand A. E. (2014). Investigating Lag Phase and Invasion Potential of Vitex rotundifolia: A Coastal Dune Exotic. Journal of Coastal Research. 30, 815–824.

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

Answer / Justification:

Less than half of the range has a climate match.

Reference(s):

- [Anonymous] (0). Vitex agnus-castus L. (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:

Nesom describes V. agnus castus as an F2 invasive species in Texas, indicating it is abundant and widespread, commonly invasive in disturbed habitats, much less commonly in natural habitats. He does place the species on the watch list indicating it has the potential to spread and become ecologically problematic.

Reference(s):

- [Anonymous] (0). Texas Invasives.
- Nesom, G. L. (2009). ASSESSMENT OF INVASIVENESS AND ECOLOGICAL IMPACT IN NON-NATIVE PLANTS OF TEXAS. Journal of the Botanical Research Institute of Texas. 3, 971–991.

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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:

Dry heat was shown to benefit seed germination and emergence, implying potential benefits from fire, but no information was found regarding promotion or altering of fire regimes.

Reference(s):

- Travlos, I.. S., & Karamanos A.. J. (2007). Influence of Heat on Seed Germination and Seedling Emergence of Chaste Tree (Vitex agnus castus L.). Journal of Agronomy. 6, 4.
- Travlos, I.. S. (2009). Seed germination of several invasive species potentially useful for biomass production or revegetation purposes under semiarid conditions.. Acta Biologica Cracoviensia. Series Botanica. 51(1), 3.

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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:

Vitex is often used medicinally to treat premenstural syndrom and symptoms of menopause. Side effects include irritation of the digestive tract and acne, but no real health risks are evident. There are some reports of adverse influences on nursing animals but is probably not problematic in most normal circumstances.

Reference(s):

- [Anonymous] (0). Toxicity of vitex - botanical-online.
- [Anonymous] (0). Vitex agnus-castus (PIER species info).

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

Answer / Justification:

The shrub habit allows the plant to form dense thickets, thriving on the banks of rivers and in coastal areas.

Reference(s):

- [Anonymous] (0). A.Vogel: Plant Encyclopaedia > Vitex agnus-castus L. (Chaste tree or Monk's Pepper).
- [Anonymous] (0). Vitex agnus-castus (PIER species info).

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

Answer / Justification:

There is no recorded vegetative reproduction.

Reference(s):

- [Anonymous] .

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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:

Not capable of reproduction by vegetative fragmentation.

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:

Seedlings are frequently found in the vicinity of plantings and seeds are the primary means of reproduction.

Reference(s):

- Watson, E. F. Gilman, & G. D. (2015). Vitex agnus-castus: Chastetree.

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

Answer / Justification:

I was not able to find information on number of seeds produced.

Reference(s):

- [Anonymous] .

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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 / Justification:

Some sources state rapid and easy germination while others suggest the existence of dormancy.

Reference(s):

- Travlos, I.. S. (2009). Seed germination of several invasive species potentially useful for biomass production or revegetation purposes under semiarid conditions.. Acta Biologica Cracoviensia. Series Botanica. 51(1), 3.

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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:

Growth rate is rapid and the plant probably flowers in under 4 years.

Reference(s):

- [Anonymous] (0). Vitex agnus-castus (PIER species info).

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

Answer / Justification:

Vitex flowers from July to August.

Reference(s):

- [Anonymous] (0). Vitex agnus-castus - MoBOT Plant Finder.

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

Answer / Justification:

Fruits are often ingested by birds and can reportedly survive passage through the gut.

Reference(s):

- [Anonymous] (0). Vitex agnus-castus (PIER species info).

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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:

Vitex often grows in riparian areas and there are reports of spread via water.

Reference(s):

- [Anonymous] (0). Vitex agnus-castus (PIER species info).

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 evidence of spread in this manner.

Reference(s):

- [Anonymous] .

Total PRE Score

PRE Score: 15 -- Evaluate this plant further
Confidence: 69 / 100
Questions answered: 18 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:

- Trey Wyatt November 1, 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.

Issue ID # 3113

Date Created: May 9, 2017 - 11:52am
Date Updated: June 5, 2017 - 2:45pm

Submitted by: Charlotte Reemts

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

Issue Description

A passing, unsubstantiated mention of the plant being invasive in NC and SC (might be worth contacting the university to see if they have evidence): ttps://plants.ces.ncsu.edu/plants/all/vitex-agnus-castus/

Issue Resolution (Screener's Response to Issue)

This reference and a mention of the potential invasiveness in North and South Carolina was added to questions 3 and 4.

Issue ID # 3103

Date Created: May 9, 2017 - 9:20am
Date Updated: June 6, 2017 - 2:14pm

Submitted by: Steve Moore

Status: Fixed

Type:
Severity: Minor
Scope: Regional Information

Issue Description

Despite the capability of Vitex agnus-castus to become invasive in Texas, I have dealt with many people who raise bees commercially and count on the presence of Vitex for honey production. This also introduces the possibility that Vitex may assist the life cycle of honeybee pollinators in the area.

Issue Resolution (Screener's Response to Issue)

The economic benefits of the species are not under consideration in this evaluation. The potential for invasiveness is evaluated here independent of economic drivers.

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.