Plant Risk Evaluator -- PRE™
Evaluation Report

Ricinus communis -- Texas

2017 Farm Bill PRE Project

PRE Score: 19 -- Reject (high risk of invasiveness)
Confidence: 81 / 100
Questions answered: 20 of 20 -- Valid (80% or more questions answered)

Privacy: Public
Status: Completed

Evaluation Date: October 1, 2017

This PDF was created on July 06, 2018

Plant Evaluated

Ricinus communis

Image by Ton Rulkens

Evaluation Overview

A PRE™ screener conducted a literature review for this plant (*Ricinus communis*) 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

Ricinus communis is a highly toxic herbaceous annual to short lived perennial which produces large quantities of seeds. It forms dense monocultures shading out native vegetation. It has already naturalized across the eastern U.S. and is considered invasive in several states.

General Information

Status: Completed
Screener: Kim Taylor
Evaluation Date: October 1, 2017

Plant Information

Plant: *Ricinus communis*

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:

Kartesz indicates Ricinus communis is naturlized across the eastern U.S., west to Texas, as well as in Arizona, California, Washington, and Idaho. USDA Plants indicates it is also naturalized in Hawaii, Virgin Islands, Puerto Rico, and Navassa Island. GRIN indicates the specis is naturalized "throughout tropic and substropics".

Reference(s):

- U.S. National Plant Germplasm Network (0). Ricinus communis L. (GRIN).
- 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:

Kartesz indicates Ricinus communis is naturlized across the eastern U.S., west to Texas, as well as in Arizona, California, Washington, and Idaho.

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:

The Global Compendium of Weeds identifies the species as "agricultural weed, casual alien, cultivation escape, environmental weed, garden thug, naturalised, noxious weed, weed". Ricinus communis is listed invasive by the California Invasive Plant Council, the Florida Exotic Pest Plant Council, and Whitson et al. (Weeds of the West). The species is listed by TexasInvasives.org. The Florida Exotic Pest Plant Council identifies the species as a "Category II" species. EDD Maps indicates the species is invasive in California and Florida. "A noxious weed in South Africa. A declared noxious weed in the Northern Territory, Australia. Planting of this species is prohibited in Miami-Dade County, Florida (U.S.)"

Reference(s):

- Invasive Plant Atlas of the United States (0). castorbean: Ricinus communis (Euphorbiales: Euphorbiaceae): Invasive Plant Atlas of the United States.
- Pacific Island Ecosystems at Risk (PIER) (0). Ricinus communis (PIER species info).
- Global Compendium of Weeds (GCW) (0). Ricinus communis information from the Global Compendium of Weeds (GCW).
- TexasInvasives.org (0). Texas Invasives Ricinus communis.
- USDA, & NRCS (2017). The Plants Database.
- FLEPPC (2017). List of Invasive Plant Species.

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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:

The Global Compendium of Weeds identifies the species as "agricultural weed, casual alien, cultivation escape, environmental weed, garden thug, naturalised, noxious weed, weed". Ricinus communis is listed invasive by the California Invasive Plant Council, the Florida Exotic Pest Plant Council, and Whitson et al. (Weeds of the West). The species is listed by TexasInvasives.org. The Florida Exotic Pest Plant Council identifies the species as a "Category II" species. EDD Maps indicates the species is invasive in California and Florida. "A noxious weed in South Africa. A declared noxious weed in the Northern Territory, Australia. Planting of this species is prohibited in Miami-Dade County, Florida (U.S.)"

Reference(s):

- USDA, & NRCS (2017). The Plants Database.
- FLEPPC (2017). List of Invasive Plant Species.
- Invasive Plant Atlas of the United States (0). castorbean: Ricinus communis (Euphorbiales: Euphorbiaceae): Invasive Plant Atlas of the United States.
- Pacific Island Ecosystems at Risk (PIER) (0). Ricinus communis (PIER species info).
- Global Compendium of Weeds (GCW) (0). Ricinus communis information from the Global Compendium of Weeds (GCW).
- TexasInvasives.org (0). Texas Invasives Ricinus communis.

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

Answer / Justification:

No other members of the genus are naturalized in the U.S. or listed in the Global Compendium of Weeds.

Reference(s):

- Global Compendium of Weeds (0). Global Compendium of Weeds: species index.
- 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: **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 species range has a similar climate to Texas.

Reference(s):

- GBIF (0). Ricinus communis 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:

"Stands of castorbean displace native vegetation." "It is a fast growing and short-lived thicket forming plant that shades out native species." "It forms somewhat ephemeral thickets which can shade out other species."

Reference(s):

- Pacific Island Ecosystems at Risk (PIER) (0). Ricinus communis (PIER species info).
- TexasInvasives.org (0). Texas Invasives Ricinus communis.

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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):

- Pacific Island Ecosystems at Risk (PIER) (0). Ricinus communis (PIER species info).

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

Answer / Justification:

GRIN indicates the species in economically important as a mammal poison. "Besides its toxicity, it is noted to cause allergic asthma." "this plant is extremely toxic to humans and consuming just a few seeds can be fatal." "Every part of this plant is POISONOUS if ingested, particularly the seeds which contain highly toxic ricin." "Contact with plant foliage may cause allergic skin reactions in some individuals." "The seeds are highly toxic." The seeds are highly poisonous due to the poisons ricin and albumin. "he whole plant is very poisonous, even one seed has been known to be lethal to children. The seedcoat contains an extremely lethal poison that was once used by the KGB to dispose of their enemies. The leaves are only mildly poisonous. The toxic principle is water-soluble so is not found in the oil. Abdominal discomfort, cramping, nausea, loss of fluid and electrolytes. Possible allergens present. Do not use during pregnancy as may induce premature labour and miscarriage"

Reference(s):

- Invasive Plant Atlas of the United States (0). castorbean: Ricinus communis (Euphorbiales: Euphorbiaceae): Invasive Plant Atlas of the United States.
- Cornell University Department of Animal Science (0). Plants Poisonous to Livestock - Animal Science - Cornell University.
- Missouri Botanical Garden PlantFinder (0). Ricinus communis - Plant Finder.
- Plants for a Future (0). Ricinus communis Castor-Oil Plant, Castorbean, Palma Christi, Wonder Tree, Castor Oil Plant PFAF Plant Database.
- efloras.org (0). Ricinus communis in Flora of China @ efloras.org.
- U.S. National Plant Germplasm Network (0). Ricinus communis L. (GRIN).
- TexasInvasives.org (0). Texas Invasives Ricinus communis.

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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:

"dense thickets shade out native flora" "It forms somewhat ephemeral thickets which can shade out other species."

Reference(s):

- CABI (0). Ricinus communis (castor bean) - cabi.
- Pacific Island Ecosystems at Risk (PIER) (0). Ricinus communis (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 **High** confidence in this answer based on the available literature.

Answer / Justification:

Does not spread vegetatively.

Reference(s):

- Pacific Island Ecosystems at Risk (PIER) (0). Ricinus communis (PIER species info).

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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:

"Readily reproduces by seed which remain viable for 2 to 3 years and germinate in early spring."

Reference(s):

- TexasInvasives.org (0). Texas Invasives Ricinus communis.

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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:

"Female flowers have reddish-brown oblong capsules, are 1 inch long, each containing 3 seeds." "a highly prolific and precocious producer of toxic seeds" "Average seed yields are between 400 and 1000 kg/ha seeds with maximum yields of approximately 3000 kg/ha"

Reference(s):

- CABI (0). Ricinus communis (castor bean) - cabi.
- TexasInvasives.org (0). Texas Invasives Ricinus communis.

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

Answer / Justification:

"Readily reproduces by seed which remain viable for 2 to 3 years and germinate in early spring." "Each plant produces large quantities of seed with germination rates ranging from 83% to 90%."

Reference(s):

- CABI (0). Ricinus communis (castor bean) - cabi.
- TexasInvasives.org (0). Texas Invasives Ricinus communis.

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

Answer / Justification:

"Becomes reproductive in the first 6 months." "It will grow rapidly in a single season to 6-10’ tall." "The first flowers open 140-170 days after sowing."

Reference(s):

- CABI (0). Ricinus communis (castor bean) - cabi.
- Missouri Botanical Garden PlantFinder (0). Ricinus communis - Plant Finder.
- TexasInvasives.org (0). Texas Invasives Ricinus communis.

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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: **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:

"flowers from the summer into the fall." "Blooming occurs from August to November." "Bloom Time: June to October" "Fl. Jun-Sep, or Jan-Dec." "It is in flower from Jul to September, and the seeds ripen from Sep to November."

Reference(s):

- Invasive Plant Atlas of the United States (0). castorbean: Ricinus communis (Euphorbiales: Euphorbiaceae): Invasive Plant Atlas of the United States.
- Missouri Botanical Garden PlantFinder (0). Ricinus communis - Plant Finder.
- Plants for a Future (0). Ricinus communis Castor-Oil Plant, Castorbean, Palma Christi, Wonder Tree, Castor Oil Plant PFAF Plant Database.
- efloras.org (0). Ricinus communis in Flora of China @ efloras.org.
- TexasInvasives.org (0). Texas Invasives Ricinus communis.

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:

"Gravity disperses seeds from the pods when the ripe pods explode open. Birds, rodents, other mammals and humans spread the seeds"

Reference(s):

- CABI (0). Ricinus communis (castor bean) - cabi.

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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:

"Seed is spread by floodwaters, in mud adhering to boots, vehicles or machinery, and in garden waste and soil"

Reference(s):

- Pacific Island Ecosystems at Risk (PIER) (0). Ricinus communis (PIER species info).

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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: **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:

GRIN indicates the species is a "potential seed contaminant". "Seed is spread by floodwaters, in mud adhering to boots, vehicles or machinery, and in garden waste and soil"

Reference(s):

- Pacific Island Ecosystems at Risk (PIER) (0). Ricinus communis (PIER species info).
- U.S. National Plant Germplasm Network (0). Ricinus communis L. (GRIN).

Total PRE Score

PRE Score: 19 -- Reject (high risk of invasiveness)
Confidence: 81 / 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:

• Hans Landel	December 18, 2017
• Trey Wyatt	November 1, 2017
• Steve Moore	October 4, 2017

This evaluation has a total of 3 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.