Plant Risk Evaluator -- PRE™
Evaluation Report

Triadica sebifera -- Texas

2017 Farm Bill PRE Project

PRE Score: 20 -- 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: September 30, 2017

This PDF was created on July 06, 2018

Plant Evaluated

Triadica sebifera

Image by Pollinator at English Wikipedia

Evaluation Overview

A PRE™ screener conducted a literature review for this plant (*Triadica sebifera*) 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

Triadica sebifera is naturalized across the Southeastern U.S. and considered invasive in Tennessee, South Carolina, Georgia, Florida, Alabama, Mississippi, Louisiana, California, and Texas. This fast growing tree produces large quantities of bird and water dispersed fruit that have a germination rate of at least 90%. It spreads locally by vegetative spread, forming dense thickets. It alters fire regimes, outcompetes native species, and has poisonous sap.

General Information

Status: Completed
Screener: Kim Taylor
Evaluation Date: September 30, 2017

Plant Information

Plant: *Triadica sebifera*

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 Triadica sebifera is naturalized across the Southeastern U.S. as well as California and Wisconsin. GRIN indicates it is also naturalized in Japan, India, Pakistan, Indonesia, and Singapore.

Reference(s):

- U.S. National Plant Germplasm Network (0). Taxonomy - GRIN-Global Web v 1.9.8.2 Triadica sebifera.
- Kartesz, J. T. (2015). The Biota of North America Program (BONAP).

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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 Triadica sebifera is naturalized across the Southeastern U.S. as well as California and Wisconsin. This includes 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:

The Global Compendium of Weeds identifies the species as "environmental weed, naturalised, noxious weed, weed". Triadica sebifera is listed as a "noxious weed" in Florida, Louisiana, and Mississippi, and a "noxious plant" in Texas. The species is listed by TexasInvasives.org. The Florida Exotic Pest Plant Council identifies the species as a "Category I" species. EDD Maps indicates the species is invasive in Tennessee, South Carolina, Georgia, Florida, Alabama, Mississippi, Louisiana, California, and Texas.

Reference(s):

- Invasive Plant Atlas of the United States (0). Chinese tallowtree: Triadica sebifera (Euphorbiales: Euphorbiaceae): Invasive Plant Atlas of the United States.
- TexasInvasives.org (0). Texas Invasives Triadica sebifera.
- USDA, & NRCS (2017). The Plants Database.
- Global Compendium of Weeds (GCW) (0). Triadica sebifera information from the Global Compendium of Weeds (GCW).
- 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 **High** confidence in this answer based on the available literature.

Answer / Justification:

Triadica sebifera is listed as a "noxious weed" in Florida, Louisiana, and Mississippi, and a "noxious plant" in Texas.

Reference(s):

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

Answer / Justification:

No other members of the genus are naturalized in the U.S.

Reference(s):

- 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). Triadica sebifera (L.) Small - 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 **Very High** confidence in this answer based on the available literature.

Answer / Justification:

" Chinese tallow will transform native habitats into monospecific (single species) tallow forests in the absence of land management practices. Chinese tallow alters light availability for other plant species. Fallen tallow leaves contain toxins that create unfavorable soil conditions for native plant species. Chinese tallow will outcompete native plant species, reducing habitat for wildlife as well as forage areas for livestock." "Triadica sebifera invades wet areas such as stream banks and ditches but can also invade drier upland sites. Triadica sebifera is a serious threat because of its ability to invade high quality, undisturbed forests. It can displace native vegetation as well as alter soil conditions due to the high amount of tannins present in the leaf litter." "it readily becomes naturalized and is a stand-replacing invasive of native forests, riparian areas, and prairies."

Reference(s):

- Invasive Plant Atlas of the United States (0). Chinese tallowtree: Triadica sebifera (Euphorbiales: Euphorbiaceae): Invasive Plant Atlas of the United States.
- TexasInvasives.org (0). Texas Invasives Triadica sebifera.
- efloras.org (0). Triadica sebifera in Flora of North America @ efloras.org.

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8. Is the plant noted as promoting fire and/or changing fire regimes?

- 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:

"In established Chinese tallow stands, fine fuel loads have been observed to decrease over time as Chinese tallow shades out understory grasses. According to a comprehensive review, forbs increase in dominance in Chinese tallow stands compared to native wetland or upland grassland vegetation. This results in a patchier, discontinuous fuel layer comprised of less flammable species than the original community. Sometimes Chinese tallow seedlings establish at such high densities that fine fuels are lacking even in a stand of smaller trees. These changes in fuel characteristics result in patchier and/or less severe fires, which are less likely to impact Chinese tallow. According to Grace , "it is common to watch a prescribed fire burn right up to the edge of a tallow stand and simply go out because of a lack of fuel." "stands reduce fuel loads in invaded areas and prevent the spread of fires"

Reference(s):

- Meyer, R. (2011). Triadica sebifera. In: Fire Effects Information System.
- Pacific Island Ecosystems at Risk (PIER) (0). Triadica sebifera (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 **High** confidence in this answer based on the available literature.

Answer / Justification:

GRIN indicates the species in economically important as a mammal poison. "Fallen tallow leaves contain toxins that create unfavorable soil conditions for native plant species. Chinese tallow will outcompete native plant species, reducing habitat for wildlife as well as forage areas for livestock." "Stems produce a milky sap that is poisonous." "The sap is poisonous"

Reference(s):

- Missouri Botanical Garden PlantFinder (0). Sapium sebiferum - Plant Finder.
- U.S. National Plant Germplasm Network (0). Taxonomy - GRIN-Global Web v 1.9.8.2 Triadica sebifera.
- TexasInvasives.org (0). Texas Invasives Triadica sebifera.
- Plants For A Future (PFAF) (0). Triadica sebifera Vegetable Tallow, Chinese tallow, Popcorn Tree, Chinese Tallow Tree PFAF Plant Database.

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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, single species stands formed by this fast growing species displace other vegetation in where S. sebiferum has become invasive" "These new, anthropogenic woodlands are virtually monospecific stands of tallow"

Reference(s):

- CABI (0). Sapium sebiferum (Chinese tallow tree) - cabi.
- Pacific Island Ecosystems at Risk (PIER) (0). Triadica sebifera (PIER species info).

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

Answer / Justification:

"Also propagates via cuttings, stumps, and roots." "Spreading by bird- and water-dispersed seeds and colonizing by prolific surface root sprouts." "It is typically seen in the wild as a suckering, multi-trunked tree." "Chinese tallow is a quick-growing, deciduous tree capable of root and basal sprouting" "Chinese tallow spreads locally by root sprouts and has strong sprouting capabilities following damage. Root sprouting up to 16 feet (5 m) from the tree trunk has been reported. Near the coast in eastern Texas, Chinese tallow sprouted prolifically within a month of cutting. On an abandoned agricultural field in southern Florida, experimentally planted Chinese tallow coppiced consistently and exhibited 37% survival after 36 months" "The tree suckers from roots and resprouts vigorously if damaged"

Reference(s):

- Missouri Botanical Garden PlantFinder (0). Sapium sebiferum - Plant Finder.
- TexasInvasives.org (0). Texas Invasives Triadica sebifera.
- Meyer, R. (2011). Triadica sebifera. In: Fire Effects Information System.
- Pacific Island Ecosystems at Risk (PIER) (0). Triadica sebifera (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 **Low** 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:

Triadica sebifera produces viable seed. "Freely self-seeds, and can be somewhat weedy and invasive in optimum growing conditions."

Reference(s):

- Missouri Botanical Garden PlantFinder (0). Sapium sebiferum - Plant Finder.
- Pacific Island Ecosystems at Risk (PIER) (0). Triadica sebifera (PIER species info).

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

Answer / Justification:

"prolifically produces seeds." "Chinese tallow can produce large amounts of seed. Tree age, inflorescences type, and habitat influence seed production. Average yields of Chinese tallow in Taiwan were approximately 1 pound (0.5 kg) for 5-year-old trees, 7.4 pounds (3.4 kg) for 10-year-old trees, and a maximum of approximately 26.4 pounds (12.0 kg) for 20-year-old trees. Mean seed weight over all sites for seeds from "eagle claw" inflorescences was 0.112 g and from "grape like" inflorescences was 0.121 g, giving an approximate average seed production of 100,000 seeds from a 20-year-old tree. In northern India seed production ranged from 3,276 seeds in a tree with a diameter of 2.4 inches (6 cm) to 45,276 seeds in a tree with a diameter of 8.0 inches (20.4 cm). Mean Chinese tallow seed crop in a 16,900-foot² (1,570 m²) area of coastal South Carolina was estimated at 1,681,000 seeds. In a Chinese tallow-dominated forest in southeastern Texas, estimated Chinese tallow seed production was 327,670 seeds/year or 273 seeds/m²/year. Dominance in seed input may explain Chinese tallow's dominance in the understory, since Chinese tallow had a lower seedling establishment rate (seedling:seed) than native species. In 2007, Chinese tallow trees on a riparian site in central California had fruit loads similar to those of horticultural trees in Davis, Woodland, and West Sacramento, California, averaging 39,538 seeds/tree. Viability of evaluated seeds from horticultural trees was 95%. According to the Woody Plant Seed Manual, Chinese tallow seed viability is 90%" " A production of 100,000 seeds per tree is typical in the USA"

Reference(s):

- CABI (0). Sapium sebiferum (Chinese tallow tree) - cabi.
- TexasInvasives.org (0). Texas Invasives Triadica sebifera.
- Meyer, R. (2011). Triadica sebifera. In: Fire Effects Information System.

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:

"Seed - do not cold stratify the seed since this can lead to secondary dormancy. Sown in April in a warm greenhouse, it usually germinates within 4 weeks" "Viability of evaluated seeds from horticultural trees was 95%. According to the Woody Plant Seed Manual, Chinese tallow seed viability is 90%"

Reference(s):

- CABI (0). Sapium sebiferum (Chinese tallow tree) - cabi.
- Plants For A Future (PFAF) (0). Triadica sebifera Vegetable Tallow, Chinese tallow, Popcorn Tree, Chinese Tallow Tree PFAF Plant Database.

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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:

"Can reach reproductive age in as little as three years." "Chinese tallow likely begins producing seed when 3 to 8 years old" "about 50% of Chinese tallow populations developed flowers in their third growing season. Some Chinese tallow seeds planted in a greenhouse reached maturity in a year" "More generally S. sebiferum reaches maturity between the ages of three and five years, and although with a life span of 20 years generally, it may live for 100 years"

Reference(s):

- CABI (0). Sapium sebiferum (Chinese tallow tree) - cabi.
- TexasInvasives.org (0). Texas Invasives Triadica sebifera.
- Meyer, R. (2011). Triadica sebifera. In: Fire Effects Information System.

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

Answer / Justification:

"Flowering occurs from April to June." " Flowers mature March through May and fruit ripens August through November." "Flowering Apr–Jun; fruiting Aug–Nov." "Chinese tallow flowers from April until June and produces fruit from August to January in the southeastern United States"

Reference(s):

- Invasive Plant Atlas of the United States (0). Chinese tallowtree: Triadica sebifera (Euphorbiales: Euphorbiaceae): Invasive Plant Atlas of the United States.
- TexasInvasives.org (0). Texas Invasives Triadica sebifera.
- Meyer, R. (2011). Triadica sebifera. In: Fire Effects Information System.
- efloras.org (0). Triadica sebifera in Flora of North America @ efloras.org.

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

Answer / Justification:

"Can reach reproductive age in as little as three years and prolifically produces seeds, which are readily transported by water and birds." "Chinese tallow seeds are dispersed by water and birds" "Conway and others observed 24 different bird species eating Chinese tallow seeds in coastal Texas; Renne and others saw 14 species feeding on Chinese tallow seeds in South Carolina; and Samuels reported 21 bird species dispersing Chinese tallow seeds away from parent trees in northern Florida. Red-bellied woodpeckers, northern cardinals, northern flickers, and red-winged blackbirds are common dispersal agents in the Southeast. Eight species were observed consuming Chinese tallow fruits in riparian areas of central California, including American robins, European starlings, cedar waxwings, and northern flickers" "Seeds that fall into water can float to new locations (Anon, 2003a), but birds appear to be the main dispersal agents"

Reference(s):

- CABI (0). Sapium sebiferum (Chinese tallow tree) - cabi.
- TexasInvasives.org (0). Texas Invasives Triadica sebifera.
- Meyer, R. (2011). Triadica sebifera. In: Fire Effects Information System.

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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:

"Can reach reproductive age in as little as three years and prolifically produces seeds, which are readily transported by water and birds." "Chinese tallow seeds are dispersed by water and birds" "Seeds that fall into water can float to new locations (Anon, 2003a), but birds appear to be the main dispersal agents"

Reference(s):

- CABI (0). Sapium sebiferum (Chinese tallow tree) - cabi.
- TexasInvasives.org (0). Texas Invasives Triadica sebifera.
- Meyer, R. (2011). Triadica sebifera. In: Fire Effects Information System.

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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 evidence of this.

Reference(s):

- [Anonymous] .

Total PRE Score

PRE Score: 20 -- 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:

• Charlotte Reemts	November 13, 2017
• Steve Moore	October 4, 2017

This evaluation has a total of 2 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.