Plant Risk Evaluator -- PRE™
Evaluation Report

Hedera helix -- Texas

2017 Farm Bill PRE Project

PRE Score: 17 -- Reject (high risk of invasiveness)
Confidence: 80 / 100
Questions answered: 19 of 20 -- Valid (80% or more questions answered)

Privacy: Public
Status: Completed

Evaluation Date: September 17, 2017

This PDF was created on August 13, 2018

Plant Evaluated

Hedera helix

Image by Petr Filippov

Evaluation Overview

A PRE™ screener conducted a literature review for this plant (*Hedera helix*) 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

Hedera helix is a woody vine which spreads vegetatively while young and then by seed as it matures. Young plants form dense groundcovers crowding out native vegetation. More mature plants will climb and can cause tree-fall. Fruits are dispersed by birds. Hedera helix is naturalized across much of the U.S. already, and is considered invasive in multiple locations around the world.

General Information

Status: Completed
Screener: Kim Taylor
Evaluation Date: September 17, 2017

Plant Information

Plant: *Hedera helix*

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 the species is naturalized across most of the eastern U.S. west to Texas, as well as the Pacific northwest, California, and the dessert Southwest. The U.S. National Plant Germplasm System indicates the species is also naturalized in parts of Australia, New Zealand, and Hawaii.

Reference(s):

- U.S. National Plant Germplasm Network (0). Taxonomy - GRIN-Global Web v 1.9.8.2 Hedera helix.
- 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:

Hedera helix is naturalized in parts of the southeastern and southwestern US which shares climate with 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:

Hedera helix is a category "B" designated weed in Oregon. Three cultivars ('Baltica', 'Pittsburgh', and 'Star') are Class C noxious weeds in Washington. It is listed as invasive by TexasInvasives.com, which also states "English ivy has been reported to be invasive in natural areas in 18 states and the District of Columbia." Hedera helix is listed as an "agricultural weed, casual alien, cultivation escape, environmental weed, garden thug, naturalised, noxious weed, sleeper weed, weed" by the Global Compendium of Weeds. The Invasive Species Compendium species datasheet indicates it is also invasive in Argentina, Chile, Australia, and New Zealand. EDD maps indicates the species is invasive in Illinois, Kentucky, Tennessee, Georgia, South Carolina, Alabama, Florida, Washington, Oregon, and California.

Reference(s):

- Invasive Plant Atlas of the United States (0). English ivy: Hedera helix (Apiales: Araliaceae): Invasive Plant Atlas of the United States.
- CABI (0). Hedera helix (ivy) CABI.
- Global Compendium of Weeds (GCW) (0). Hedera helix information from the Global Compendium of Weeds (GCW).
- TexasInvasives.org (0). Texas Invasives Hedera helix.
- 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:

EDD maps indicates the species is invasive in multiple states with similar climate to Texas, including Georgia, South Carolina, Alabama, Florida, and California.

Reference(s):

- Invasive Plant Atlas of the United States (0). English ivy: Hedera helix (Apiales: Araliaceae): Invasive Plant Atlas of the United States.

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

Answer / Justification:

Five additional species of Hedera are listed in the Global Compendium of Weeds, including H. algeriensis, H. canariensis, H. colchica, H. hibernica, and H. rhombea. Some of these species are naturalized in areas with a similar climate, but there is no indication as to whether or not they are invasive in those regions.

Reference(s):

- Global Compendium of Weeds (0). Global Compendium of Weeds: species index.

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

Answer / Justification:

"English ivy is a vigorous growing vine that impacts all levels of disturbed and undisturbed forested areas, growing both as a ground cover and a climbing vine. As the ivy climbs in search of increased light, it engulfs and kills branches by blocking light from reaching the host tree's leaves. Branch dieback proceeds from the lower to upper branches, often leaving the tree with just a small green "broccoli head." The host tree eventually succumbs entirely from this insidious and steady weakening. In addition, the added weight of the vines makes infested trees much more susceptible to blow-over during high rain and wind events and heavy snowfalls. Trees heavily draped with ivy can be hazardous if near roads, walkways, homes and other peopled areas. On the ground, English ivy forms dense and extensive monocultures that exclude native plants." " It forms dense populations that inhibit the regeneration of native herbaceous species, trees and shrubs. If growing as a climber, it may smother the host tree." "Creeping along the ground or climbing over vegetation. "Blankets the ground in moist sheltered areas, prevents germination, excludes light, harbours disease, damages and brings down mature trees, changes the ecosystem." " It reduces native plant diversity and associated fauna, threatens endangered species and alters nutrient dynamics of forest soils." "When fully grown in a tree, it may adversely affect the canopy of a variety of species by shading out part of the host's foliage. In exposed sites, the vine will increase the likelihood of windthrow of deciduous species, especially of trees in open conditions during winter when there is no foliage and storms are more frequent."

Reference(s):

- CABI (0). Hedera helix (ivy) CABI.
- Pacific Island Ecosystems at Risk (PIER) (0). Hedera helix (PIER species info).
- TexasInvasives.org (0). Texas Invasives Hedera helix.

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

Answer / Justification:

"Ivy is slow to burn and will not readily spread fire well."

Reference(s):

- Pacific Island Ecosystems at Risk (PIER) (0). Hedera helix (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:

The U.S. National Plant Germplasm System indicates the specis is poisonous to mammals. TexasInvasives.com indicates it is "toxic to humans when eaten and triggering dermatitis in sensitive individuals." "Drupes mildly toxic, discouraging over consumption by birds. Hedera helix is toxic to "cattle (leaves and berries), deer, sheep, dogs and chickens (latter by seeds)." "Seeds of this toxic plant are readily dispersed by birds." "All parts of the plant are toxic to man (Schepens, 1997). Generally when the fruits are eaten, this results in a combination of stomach pain, nausea, vomiting and diarrhoea. Ingested leaves induce a narcotic effect not unlike that of atropine (Jordan, 1976) and H. helix can cause contact dermatitis, with repeated exposure to wet leaves causing vesicular eruption of the face, hands and arms within 48 hours of contact (Benezra et al., 1985). People most likely to be affected are children who clamber up walls or trees covered with ivy or adults who cut back the plant. Schepens (1997) provides a detailed overview of the toxic properties of H. helix including the symptoms caused and necessary cures. In Australia, where it is introduced and a common plant used by the nursery and garden industry, it is listed as a plant of concern to human health."

Reference(s):

- CABI (0). Hedera helix (ivy) CABI.
- Pacific Island Ecosystems at Risk (PIER) (0). Hedera helix (PIER species info).
- U.S. National Plant Germplasm Network (0). Taxonomy - GRIN-Global Web v 1.9.8.2 Hedera helix.
- TexasInvasives.org (0). Texas Invasives Hedera helix.

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10. Does the plant produce impenetrable thickets, blocking or slowing movement of animals, livestock, or humans?

- 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:

Hedera helix does not produce dense thickets.

Reference(s):

- Pacific Island Ecosystems at Risk (PIER) (0). Hedera helix (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 **Very High** confidence in this answer based on the available literature.

Answer / Justification:

"English ivy spreads locally through vegetative growth and new plants can grow from cut or broken pieces of stems that are able to root in the soil." "Ivy also spreads vegetatively, by rooting at leaf nodes." "Once established it spreads vegetatively on the forest floor and then climbs trees up to the canopy where it flowers and fruits freely."

Reference(s):

- CABI (0). Hedera helix (ivy) CABI.
- Pacific Island Ecosystems at Risk (PIER) (0). Hedera helix (PIER species info).
- TexasInvasives.org (0). Texas Invasives Hedera helix.

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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: **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:

"English ivy spreads locally through vegetative growth and new plants can grow from cut or broken pieces of stems that are able to root in the soil." "Vegetative material which can easily root can be readily dispersed accidentally to new suitable habitats."

Reference(s):

- CABI (0). Hedera helix (ivy) CABI.
- TexasInvasives.org (0). Texas Invasives Hedera helix.

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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:

Seeds are viable. "Once established it spreads vegetatively on the forest floor and then climbs trees up to the canopy where it flowers and fruits freely."

Reference(s):

- CABI (0). Hedera helix (ivy) CABI.
- Pacific Island Ecosystems at Risk (PIER) (0). Hedera helix (PIER species info).

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

Answer / Justification:

"2-3-seeded". It is not clear how many fruits are produced by a single plant.

Reference(s):

- Pacific Island Ecosystems at Risk (PIER) (0). Hedera helix (PIER species info).

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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:

"Seeds normally start to germinate within 6–14 days of planting, although dormancy of cleaned seeds (manually cleaned or seeds regurgitated by blackbirds or starlings) may last for up to 30 days; cleaning results in nearly 100% germination. Seeds planted within the fruits may remain dormant for up to 57 days, associated with c. 40% seed mortality. Drying of fruits kills all seeds. Germination is epigeal, and may to some extent be inhibited by light. There does not appear to be any extended period of seed dormancy or the formation of a soil seed bank." "Germination is epigeal and it takes 6 days for 50% of samples to germinate, and is to some extent inhibited by light." "Up to 70% of the seeds are viable but scarification appears to be essential for germination and this is achieved when seeds pass through a bird's digestive system."

Reference(s):

- CABI (0). Hedera helix (ivy) CABI.
- Pacific Island Ecosystems at Risk (PIER) (0). Hedera helix (PIER species info).

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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: **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:

"Maturing at about 10 years into erect plants or branches with unlobed leaves and terminal flower clusters that yield purplish berries." "Age of first reproduction is variable but can be in the region of 10 years."

Reference(s):

- CABI (0). Hedera helix (ivy) CABI.
- TexasInvasives.org (0). Texas Invasives Hedera helix.

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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:

"Seeds are dispersed from November/December until as late as June, although Snow & Snow (1988) recorded a feeding peak in April and most European records are of berry consumption in April and May. In a hard winter the majority of fruit are taken in January and February. The prime dispersers are the thrushes, though other birds including woodpigeons will take fruit and may disperse seed; woodpigeons also take large numbers of unripe berries and may destroy 78% of the seed crop." " Flowering and fruiting occur over a number of months with flowering taking place during autumn and early winter. On some plants the distal part of the inflorescence may bear fruits that are already fully-grown when the last flowers on the rest of the inflorescence are just at anthesis. Berry-like fruits ripen in the following spring, April to June in Western Europe." "This mild toxicity can prevent consumption of too many fruits in one period of foraging and regulate seed retention time, thus ensuring better seed dispersal."

Reference(s):

- CABI (0). Hedera helix (ivy) CABI.
- Pacific Island Ecosystems at Risk (PIER) (0). Hedera helix (PIER species info).

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:

"It disperses longer distances via seed which is carried to new areas by frugivorous birds including the Cedar Waxwing, Northern Robin, Stellar Jay, Mockingbird, European Starling, and House Sparrow." "The seeds are dispersed by birds which readily eat the fruits" "Birds eat the berries and excrete the seeds, often in bushland." "Fleshy fruit adapted for bird dispersal." "Seeds of this toxic plant are readily dispersed by birds."

Reference(s):

- CABI (0). Hedera helix (ivy) CABI.
- Pacific Island Ecosystems at Risk (PIER) (0). Hedera helix (PIER species info).
- TexasInvasives.org (0). Texas Invasives Hedera helix.

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

Answer / Justification:

"It may be possible that fruits and/or vegetative fragments are dispersed along watercourses. The ability of H. helix to spread adventitiously and its dispersal from birds causes concern when the plant is used in close proximity to forest or riparian zones" "Stem fragments may possibly be dispersed by running water but there are no documented cases of local dispersal by these means."

Reference(s):

- CABI (0). Hedera helix (ivy) CABI.
- Pacific Island Ecosystems at Risk (PIER) (0). Hedera helix (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: **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:

"Vegetative material which can easily root can be readily dispersed accidentally to new suitable habitats. Careless dumping of surplus trimmings from gardens is a major risk but soil movement or transport of logs bearing H. helix stems may also result in the establishment of new infestations."

Reference(s):

- CABI (0). Hedera helix (ivy) CABI.

Total PRE Score

PRE Score: 17 -- Reject (high risk of invasiveness)
Confidence: 80 / 100
Questions answered: 19 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	September 26, 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.