Plant Risk Evaluator -- PRE™
Evaluation Report

Euphorbia characias -- California

PlantRight

PRE Score: 10 -- Low Potential Risk
Confidence: 54 / 100
Questions answered: 20 of 20 -- Valid (80% or more questions answered)

Privacy: Public
Status: Submitted

Evaluation Date: January 20, 2020

This PDF was created on April 18, 2022

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Plant Evaluated

Euphorbia characias

Image by Nick Graver

Evaluation Overview

A PRE™ screener conducted a literature review for this plant (*Euphorbia characias*) 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

This plant is a medium-to-large perennial herb from the Mediterranean. It is grown in cultivation and there is some question about whether the plants seen escaping within the study region (California) are the subspecies E. characias ssp wulfenii. Although the species was noted on many gardening websites as being actively self-seeding, very few records of the species invading in wildlands were available at the time of this evaluation. Many records, e.g. those in GBIF seemed to lead to plants that were immediately adjacent to gardens. The ecology of the species is very poorly documented, with only a handful of papers available mentioning the species, focused on its relationship to ants. So it should be noted that several "no" answers about several aspects of its ecology may be due to this fact and could be changed if more information becomes available (whereas usually a "no" answer due to lack of information in a well-documented species may be more reliable). Still, the assessment should be as accurate as indicated by the confidence levels.

General Information

Status: Submitted
Screener: Lynn Sweet
Evaluation Date: January 20, 2020

Plant Information

Plant: *Euphorbia characias*

If the plant is a cultivar, how does its behavior differs from its parent's?
It is not clear that the invasive is not the cultivated subspecies E. characias wulfenii from the information available. Here is information from the Missouri Botanical Garden "Euphorbia characias is an upright euphorbia that is native to Southern Europe, the Balkans and Turkey. It typically grows on erect, woody-based, green stems to 3-4' tall and to 3' wide.... Subsp. wulfenii differs from the species by growing shorter to only 2-3' tall and by having more yellow in the flowers, darker purple on the glands and larger leaves."

Regional Information

Region Name: California

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.

Evaluation Questions

These questions are based on an article published by PLOS One, which can be found 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** point(s) to the total PRE score.
- The *screener* has a **High** confidence in this answer based on the available literature.

Answer / Justification:

The plant is naturalized in 10 counties in California based on Calflora documentation at this time. (Calflora) The plant is not listed as naturalized anywhere else in GRIN (USDA GRIN) There are GBIF records in the following non-native range areas for the species: New Zealand, Australia, India (1), North America.

Reference(s):

- Calflora (0). Calflora: Information on California plants for education, research and conservation, with data contributed by public and private institutions and individuals, including the Consortium of California Herbaria.
- U.S. National Plant Germplasm Network (0). Taxonomy - GRIN-Global Web v 1.9.8.2.
- GBIF (0). Global Biodiversity Information Facility (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** point(s) to the total PRE score.
- The *screener* has a **High** confidence in this answer based on the available literature.

Answer / Justification:

The plant is naturalized in 10 counties in California based on Calflora documentation at this time. (Calflora) There are GBIF records in the following non-native range areas for the species that are similar in climate: New Zealand (South Island), Southeast Australia and Tasmania, and California, USA. The plant was noted far from landscaping in Point Reyes National Seashore in 2017: "at the edge of a pullout on Mt Vision road in Point Reyes, and a few miles away escaping landscaping on Lower Dover road. " (NPS)

Reference(s):

- Calflora (0). Calflora: Information on California plants for education, research and conservation, with data contributed by public and private institutions and individuals, including the Consortium of California Herbaria.
- GBIF (0). Global Biodiversity Information Facility (GBIF).
- NPS (2017). Early Detection News - August 2017: Golden Gate National Recreation Area, John Muir National Historic Site, Pinnacles National Park, Point Reyes National Seashore.

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3. Is the species (or cultivar or variety) noted as being invasive in the U.S. or world?

- Answer: **No**, which contributes **0** point(s) to the total PRE score.
- The *screener* has a **Low** confidence in this answer based on the available literature.

Answer / Justification:

In Australia in similar climates, it is not clear that any of the records represent invasive populations. For one it is noted that the plant was collected from a garden waste dump area and the Tasmanian observations similarly localized near gardens. (Australia's Virtual Herbarium) This plant is not listed in any of the common invasive species websites (CABI, Weeds in Australia, etc.). A google scholar search and a regular google search did not turn up any documented evidence of this species spreading in an invasive manner.

Reference(s):

- Australia's Virtual Herbarium (0). Australia's Virtual Herbarium.

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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: **No**, which contributes **0** point(s) to the total PRE score.
- The *screener* has a **Low** confidence in this answer based on the available literature.

Answer / Justification:

In Australia in similar climates, it is not clear that any of the records represent invasive populations. For one it is noted that the plant was collected from a garden waste dump area and the Tasmanian observations similarly localized near gardens. (Australia's Virtual Herbarium) This plant is not listed in any of the common invasive species websites (CABI, Weeds in Australia, etc.). A google scholar search and a regular google search did not turn up any documented evidence of this species spreading in an invasive manner. UC ANR/Extension says this species does show "unwanted self-sowing."

Reference(s):

- Australia's Virtual Herbarium (0). Australia's Virtual Herbarium.
- UC ANR (2019). Euphorbia — Spurges. UC Master Gardener Program of Sonoma County Plant of the Month. 2020,

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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** point(s) to the total PRE score.
- The *screener* has a **Very High** confidence in this answer based on the available literature.

Answer / Justification:

Euphorbia terracina is invasive in Australia in a similar climate. (Weeds in Australia) Seven plants in the genus Euphorbia are on the California Noxious Weed list, the same as the region of interest.

Reference(s):

- CDFA (2015). California Noxious Weed List.
- Department of Environment and Energy, Australian Government (0). Weeds in Australia.

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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** point(s) to the total PRE score.
- The *screener* has a **Medium** confidence in this answer based on the available literature.

Answer / Justification:

The species is native to areas that are similar in climate to the study area: North Africa, Southeastern Europe, Southwestern Europe (USDA GRIN) The plant is naturalized in 10 counties in California based on Calflora documentation at this time. (Calflora) There are GBIF records in the following non-native range areas for the species that are similar in climate: New Zealand (South Island), Southeast Australia and Tasmania, and California, USA. The following areas documented in GBIF have a dissimilar climate: South Island of New Zealand, Scandinavia, India, and British Columbia, Canada.

Reference(s):

- U.S. National Plant Germplasm Network (0). Taxonomy - GRIN-Global Web v 1.9.8.2.
- GBIF (0). Global Biodiversity Information Facility (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: **No**, which contributes **0** point(s) to the total PRE score.
- The *screener* has a **Low** confidence in this answer based on the available literature.

Answer / Justification:

There was no description of the ecology of this plant found, and no other references to its community relationships.

Reference(s):

- [Anonymous] .

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

- Answer: **No**, which contributes **0** point(s) to the total PRE score.
- The *screener* has a **Low** confidence in this answer based on the available literature.

Answer / Justification:

No particular evidence of flammability or wildfire promotion.

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** point(s) to the total PRE score.
- The *screener* has a **Medium** confidence in this answer based on the available literature.

Answer / Justification:

Known to have sap that causes severe reactions in humans and other animals.

Reference(s):

- Annuals, A's. (0). Annie's Annuals: Euphorbia characias 'Dwarf'.

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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** point(s) to the total PRE score.
- The *screener* has a **Low** confidence in this answer based on the available literature.

Answer / Justification:

This plant grows to 1m or less, and should not impact movement of animals.

Reference(s):

- UC ANR (2019). Euphorbia — Spurges. UC Master Gardener Program of Sonoma County Plant of the Month. 2020,

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Reproductive Strategies (Questions 11 - 17)

11. Does this species (or cultivar or variety) reproduce and spread vegetatively?

- Answer: **No**, which contributes **0** point(s) to the total PRE score.
- The *screener* has a **Low** confidence in this answer based on the available literature.

Answer / Justification:

No indication of spread via rhizome. One gardening article about propagating plants that is fairly thorough lists this plant within a category of "These perennials are best not divided"

Reference(s):

- Meier, T. (0). Dividing Perennials: Tools, Techniques, and Timing.

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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** point(s) to the total PRE score.
- The *screener* has a **Medium** confidence in this answer based on the available literature.

Answer / Justification:

No evidence of frequent fragmentation, or that this is a viable method for the plant to reproduce at all, even in cultivated conditions.

Reference(s):

- [Anonymous] .

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13. Does the species (or cultivar or variety) commonly produce viable seed?

- Answer: **Yes**, which contributes **1** point(s) to the total PRE score.
- The *screener* has a **Medium** confidence in this answer based on the available literature.

Answer / Justification:

Said to self-sow. (Annie's Annuals and UC ANR)

Reference(s):

- Annuals, A's. (0). Annie's Annuals: Euphorbia characias 'Dwarf'.
- UC ANR (2019). Euphorbia — Spurges. UC Master Gardener Program of Sonoma County Plant of the Month. 2020,

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

- Answer: **No**, which contributes **0** point(s) to the total PRE score.
- The *screener* has a **Medium** confidence in this answer based on the available literature.

Answer / Justification:

Seed production for 193 plants was estlimated at 155,000 per year, which is less than 1000. (Espalader & Gomez, 1996)

Reference(s):

- Espadaler, X., & Gómez C. (1996). Seed production, predation and dispersal in the Mediterranean myrmecochore Euphorbia characias (Euphorbiaceae). Ecography. 19, 7–15.

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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** point(s) to the total PRE score.
- The *screener* has a **Low** confidence in this answer based on the available literature.

Answer / Justification:

Noted to not have a seed bank and that most seed would germinate in the first season. (Espalader & Gomez 1996) 82% germination rate shown for ssp. characias (Kew)

Reference(s):

- Espadaler, X., & Gómez C. (1996). Seed production, predation and dispersal in the Mediterranean myrmecochore Euphorbia characias (Euphorbiaceae). Ecography. 19, 7–15.
- Kew Botanic Garden (0). Kew Seed Information 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** point(s) to the total PRE score.
- The *screener* has a **High** confidence in this answer based on the available literature.

Answer / Justification:

"E. characias start to flower on two-year-old wood"

Reference(s):

- Royal Horticultural Society (2017). AGM Euphorbia RHS Grower Guide.

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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** point(s) to the total PRE score.
- The *screener* has a **Low** confidence in this answer based on the available literature.

Answer / Justification:

Bloom time noted as May-June (Missouri Botanical Garden)

Reference(s):

- Missouri Botanical Garden (2014). Missouri Botanical Garden 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: **No**, which contributes **0** point(s) to the total PRE score.
- The *screener* has a **Low** confidence in this answer based on the available literature.

Answer / Justification:

Known to be dispersed by ants. In fact, experimentally in a fully factorial experiment excluding ants, mammals and birds in various combinations (in a clearing in northeast Spain, the native range) ants were the "single group involved in seed disappearance." Anecdotal evidence from California indicates that the species seems to arrive in new locations quite a distance from known plants.

Reference(s):

- Espadaler, X., & Gómez C. (1996). Seed production, predation and dispersal in the Mediterranean myrmecochore Euphorbia characias (Euphorbiaceae). Ecography. 19, 7–15.

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19. Are the plant's propagules frequently dispersed long distance (>100 m) by wind or water?

- Answer: **No**, which contributes **0** point(s) to the total PRE score.
- The *screener* has a **Low** confidence in this answer based on the available literature.

Answer / Justification:

No specific adaptations noted for these dispersal mechanisms. Scientific article focused on dispersal by ants although "explosive" dispersal was mentioned, the paper did not mention wind or water as dispersal mechanisms.

Reference(s):

- Espadaler, X., & Gómez C. (1996). Seed production, predation and dispersal in the Mediterranean myrmecochore Euphorbia characias (Euphorbiaceae). Ecography. 19, 7–15.

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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** point(s) to the total PRE score.
- The *screener* has a **Low** confidence in this answer based on the available literature.

Answer / Justification:

Since the plant is propagated widely and "self-sows", presumably it comes into frequent contact with people/clothing/equipment. However, No specific biological mechanism to adhere to clothing or equipment.

Reference(s):

- [Anonymous] .

Total PRE Score

PRE Score: 10 -- Low Potential Risk
Confidence: 54 / 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 : Low Potential Risk
13 - 15 : Moderate Potential Risk
> 15 : High Potential Risk

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: PlantRight
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:

This evaluation does not have any reviewers.

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.