***Plant Risk Evaluator -- PRE™***
***Evaluation Report***

# *Echium vulgare* -- Oregon

*2022 Western IPM Grant Project*

**PRE Score:** 19 -- High Potential Risk
**Confidence:** 81 / 100
**Questions answered:** 20 of 20 -- Valid (80% or more questions answered)

**Privacy:** Private
**Status:** Completed

**Evaluation Date:** December 22, 2022

*This PDF was created on June 06, 2025*

*This project was funded in part by the USDA National Institute of Food and Agriculture through the Western Integrated Pest Management Center, grant number 2018-70006-28881.*

# Plant Evaluated

*Echium vulgare*

# Evaluation Overview

A PRE™ screener conducted a literature review for this plant (*Echium vulgare*) 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

Commonly known as blueweed or viper's bugloss, Echium vulgare is a biennial or short-lived monocarpic perennial herb that is native to Britain and Europe. It has been introduced and become naturalized to New Zealand, North America, Australia, and Chile. It is noted as being invasive in Australia, New Zealand, Chile, and the US. Another species from the same genus, Echium plantagineum is also found to be invasive in Australia. Echium vulgare is widespread and can tolerate a variety of climates. Echium vulgare has the potential to displace or dominate native plants, but this depends on the region. In southern Australia, plant diversity did not decrease with the presence of Echium vulgare, but in New South Whales, it was found to form dense stands in higher elevations. Echium vulgare foliage has prickly hairs, which has been shown to discourage animal consumption. Furthermore, it does produce toxic chemicals including pyrrolizidine alkaloids and N-oxidies, but there is a lack of evidence showing that Echium vulgare poses likely harm to animals or humans since consumption is rare. Echium vulgare commonly produces viable seeds, which is its only form of reproduction. Plants can produce thousands of seeds, but seed production does vary by region and depend on environmental conditions. The seeds float and can be dispersed long distances by water, animal fur, vehicles, or farm equipment. The seeds usually fall within five meters of the plant so long distance wind dispersal is rare. Although there was some conflicting evidence in this evaluation, the PRE score is 19, which puts it at the high potential risk level.

## General Information

**Status:** Completed
**Screener:** Justine Casebolt
**Evaluation Date:** December 22, 2022

## Plant Information

**Plant:** *Echium vulgare*

## Regional Information

**Region Name:** Oregon

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

**Answer / Justification:**

Echium vulgare, commonly known as blueweed or Viper's Bugloss, is native to Britain and Europe (Willis and Forrester, 2000). It is a biennial or short-lived monocarpic perennial herb (Klemow et al., 2002). It has been introduced and become naturalized to New Zealand, North America, and Australia, including New South Wales, Victoria, and Tasmania (Shaik et al., 2016; Willis & Forrester, 2000; Klemow et al., 2002; Hock et al., 2015). In the 18th century, it was introduced and is now naturalized in the US (Mack, 2003). Also, it has become naturalized in Chile (Carvallo et al., 2013).

**Reference(s):**


- Willis, A.j., Memmott J., & Forrester R.i. (2000). Is there evidence for the post-invasion evolution of increased size among invasive plant species?. Ecology Letters. 3, 275–283.
- Klemow, K. M., Clements D. R., Threadgill P. F., & Cavers P. B. (2002). The biology of Canadian weeds. 116. \textit{Echium vulgare L.. Canadian Journal of Plant Science. 82, 235–248.
- Shaik, R. S., Zhu X., Clements D. R., & Weston L. A. (2016). Understanding invasion history and predicting invasive niches using genetic sequencing technology in Australia: case studies from Cucurbitaceae and Boraginaceae. Conservation Physiology. 4, cow030.
- Mack, R. N. (2003). Plant Naturalizations and Invasions in the Eastern United States: 1634-1860. Annals of the Missouri Botanical Garden. 90, 77–90.
- Hock, M., Beckmann M., Hofmann R. R., Bruelheide H., & Erfmeier A. (2015). Effects of UV-B radiation on germination characteristics in invasive plants in New Zealand. NeoBiota. 26, 21–37.
- Carvallo, G. O., Rodrigo M., & Navarro L. (2013). Assessing the effects of native plants on the pollination of an exotic herb, the blueweed Echium vulgare (Boraginaceae). Arthropod-Plant Interactions. 7, 475–484.

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

**Answer / Justification:**

Yes, it is noted as being naturalized in the US, Canada, Australia, and New Zealand in areas with similar climate to Oregon (temperate mountain and temperate desert, from zone 4 to 11) (Mack, 2003; Shaik et al., 2016; Willis & Forrester, 2000; Klemow et al., 2002; Hock et al., 2015). Based on the climate matching tool, populations have been found in Washington, Idaho, Utah, and throughout the eastern US in areas with similar climate to Oregon.

**Reference(s):**


- Shaik, R. S., Zhu X., Clements D. R., & Weston L. A. (2016). Understanding invasion history and predicting invasive niches using genetic sequencing technology in Australia: case studies from Cucurbitaceae and Boraginaceae. Conservation Physiology. 4, cow030.
- Mack, R. N. (2003). Plant Naturalizations and Invasions in the Eastern United States: 1634-1860. Annals of the Missouri Botanical Garden. 90, 77–90.
- Willis, A.j., Memmott J., & Forrester R.i. (2000). Is there evidence for the post-invasion evolution of increased size among invasive plant species?. Ecology Letters. 3, 275–283.
- Klemow, K. M., Clements D. R., Threadgill P. F., & Cavers P. B. (2002). The biology of Canadian weeds. 116. \textit{Echium vulgare L.. Canadian Journal of Plant Science. 82, 235–248.
- GBIF—the Global Biodiversity Information Facility (0). Echium vulgare L. GBIF.
- Hock, M., Beckmann M., Hofmann R. R., Bruelheide H., & Erfmeier A. (2015). Effects of UV-B radiation on germination characteristics in invasive plants in New Zealand. NeoBiota. 26, 21–37.


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

**Answer / Justification:**

Yes, it is noted as being invasive in Australia (Shaik et al., 2016), New Zealand (Hock et al., 2015), Chile (Carvallo et al., 2013), and the US (Mack, 2003). It is noted as invasive due to it's higher germination success over the non-invasive species and ability to form mono-specific patches (Hock et al., 2015; Carvallo et al., 2013).

**Reference(s):**


- Hock, M., Beckmann M., Hofmann R. R., Bruelheide H., & Erfmeier A. (2015). Effects of UV-B radiation on germination characteristics in invasive plants in New Zealand. NeoBiota. 26, 21–37.
- Shaik, R. S., Zhu X., Clements D. R., & Weston L. A. (2016). Understanding invasion history and predicting invasive niches using genetic sequencing technology in Australia: case studies from Cucurbitaceae and Boraginaceae. Conservation Physiology. 4, cow030.
- Mack, R. N. (2003). Plant Naturalizations and Invasions in the Eastern United States: 1634-1860. Annals of the Missouri Botanical Garden. 90, 77–90.
- Carvallo, G. O., Rodrigo M., & Navarro L. (2013). Assessing the effects of native plants on the pollination of an exotic herb, the blueweed Echium vulgare (Boraginaceae). Arthropod-Plant Interactions. 7, 475–484.


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

**Answer / Justification:**

Yes, it is noted as being invasive in the US, Australia, and New Zealand in areas with similar climate to Oregon (Mack, 2003; Shaik et al., 2016; Hock et al., 2015). It is noted as invasive due to it's higher germination success over the non-invasive species and ability to form mono-specific patches (Hock et al., 2015; Carvallo et al., 2013).

**Reference(s):**


- Hock, M., Beckmann M., Hofmann R. R., Bruelheide H., & Erfmeier A. (2015). Effects of UV-B radiation on germination characteristics in invasive plants in New Zealand. NeoBiota. 26, 21–37.
- Shaik, R. S., Zhu X., Clements D. R., & Weston L. A. (2016). Understanding invasion history and predicting invasive niches using genetic sequencing technology in Australia: case studies from Cucurbitaceae and Boraginaceae. Conservation Physiology. 4, cow030.
- Mack, R. N. (2003). Plant Naturalizations and Invasions in the Eastern United States: 1634-1860. Annals of the Missouri Botanical Garden. 90, 77–90.
- Carvallo, G. O., Rodrigo M., & Navarro L. (2013). Assessing the effects of native plants on the pollination of an exotic herb, the blueweed Echium vulgare (Boraginaceae). Arthropod-Plant Interactions. 7, 475–484.


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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:**

Yes, Echium plantagineum is found in areas with similar climate to Oregon. Echium plantagineum is invasive in Australia, which has regions in the southeast that are similar in climate to Oregon (Konarzewski et al., 2012; Randall, 2017; Shaik et al., 2016).

**Reference(s):**


- Konarzewski, T. K., Murray B. R., & Godfree R. C. (2012). Rapid Development of Adaptive, Climate-Driven Clinal Variation in Seed Mass in the Invasive Annual Forb Echium plantagineum L.. PLOS ONE. 7, e49000.
- Randall, R.P. (2017). A Global Compendium of Weeds. Third Edition..
- Shaik, R. S., Zhu X., Clements D. R., & Weston L. A. (2016). Understanding invasion history and predicting invasive niches using genetic sequencing technology in Australia: case studies from Cucurbitaceae and Boraginaceae. Conservation Physiology. 4, cow030.


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

**Answer / Justification:**

Echium vulgare is widespread and less than half of the regions where it grows match the Oregon climate.

**Reference(s):**

- GBIF—the Global Biodiversity Information Facility (0). Echium vulgare L. GBIF.

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

**Answer / Justification:**

In southern Australia, plant diversity did not decrease when Echium vulgare was present (Zhu et al., 2017). In New South Whales, it can form dense stands at higher elevations (P. Cavers, pers. obs. as cited in Klemow et al. 2002) so there is potential for it to displace natives, but the evidence is lacking. In central Chile, it is noted as forming mono-specific patches (Carvallo et al., 2013). Based on the evidence, the potential for Echium vulgare to displace natives can be inferred and seems to vary depending on the region, which is why the confidence level is medium.

**Reference(s):**


- Klemow, K. M., Clements D. R., Threadgill P. F., & Cavers P. B. (2002). The biology of Canadian weeds. 116. \textit{Echium vulgare L.. Canadian Journal of Plant Science. 82, 235–248.
- Zhu, X., Weston P. A., Skoneczny D., Gopurenko D., Meyer L., Lepschi B. J., et al. (2017). Ecology and genetics affect relative invasion success of two Echium species in southern Australia. Scientific Reports (Nature Publisher Group). 7, 42792.
- Carvallo, G. O., Rodrigo M., & Navarro L. (2013). Assessing the effects of native plants on the pollination of an exotic herb, the blueweed Echium vulgare (Boraginaceae). Arthropod-Plant Interactions. 7, 475–484.


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

**Answer / Justification:**

Echium vulgare is a perennial herb that grows between 30 and 100 cm in height and produces 1-20 branching flowering stems. (Klemow et al., 2002). Is has oblanceolate rosette leaves with stems that contain fine hairs (Klemow et al., 2002). It grows primarily in temperate regions with moist climates (Klemow et al., 2002). Based on these characteristics there likely is a low probability that Echium vulgare promotes fire or changes fire regime, but there is a lack of evidence to support this.

**Reference(s):**


- Klemow, K. M., Clements D. R., Threadgill P. F., & Cavers P. B. (2002). The biology of Canadian weeds. 116. \textit{Echium vulgare L.. Canadian Journal of Plant Science. 82, 235–248.


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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:**

Echium vulgare produces pyrrolizidine alkaloids and N-oxidies (PANOs), which are toxic (Shoneczby et al., 2015; Zhu et al., 2017). Shoneczby et al. (2015) found high quantities of Erchimidine and echiumine N-oxides in Echium vulgare, which are toxic to grazing herbivores; however, the foliage and stems of Echium vulgare has prickly hairs, which discourages herbivore consumption (Marie Victorin, 1995 as cited in Klemow et al., 2002). According to Klemow et al., there have been no published reports of consumption by mammals and I did not find any additional evidence of this. However, it has the ability to cause harm through contract injury (via stem hairs) and consumption, but it is not a serious competitor to cultivated crops (Klemow et al. 2002. In central Chile, it is noted as forming mono-specific patches (Carvallo et al., 2013). Based on the evidence, the potential for Echium vulgare to impact grazing systems can be inferred, but seems to vary depending on the region.

**Reference(s):**


- Skoneczny, D., Weston P. A., Zhu X., Gurr G. M., Callaway R. M., & Weston L. A. (2015). Metabolic Profiling of Pyrrolizidine Alkaloids in Foliage of Two Echium spp. Invaders in Australia—A Case of Novel Weapons?. International Journal of Molecular Sciences. 16, 26721–26737.
- Klemow, K. M., Clements D. R., Threadgill P. F., & Cavers P. B. (2002). The biology of Canadian weeds. 116. \textit{Echium vulgare L.. Canadian Journal of Plant Science. 82, 235–248.
- Zhu, X., Weston P. A., Skoneczny D., Gopurenko D., Meyer L., Lepschi B. J., et al. (2017). Ecology and genetics affect relative invasion success of two Echium species in southern Australia. Scientific Reports (Nature Publisher Group). 7, 42792.
- Carvallo, G. O., Rodrigo M., & Navarro L. (2013). Assessing the effects of native plants on the pollination of an exotic herb, the blueweed Echium vulgare (Boraginaceae). Arthropod-Plant Interactions. 7, 475–484.


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

**Answer / Justification:**

Echium vulgare is an herb that grows between 30 and 100 centimeters in height (Klemow et al., 2002). Based on these characteristics, it can be inferred that Echium vulgare does not block or slow animal or human movement. There is a lack of evidence that claims it can block movement, which is why the confidence level is medium.

**Reference(s):**


- Klemow, K. M., Clements D. R., Threadgill P. F., & Cavers P. B. (2002). The biology of Canadian weeds. 116. \textit{Echium vulgare L.. Canadian Journal of Plant Science. 82, 235–248.


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

**Answer / Justification:**

According to Klemow et al. (2002), Echium vulgare does not reproduce or spread vegetatively.

**Reference(s):**


- Klemow, K. M., Clements D. R., Threadgill P. F., & Cavers P. B. (2002). The biology of Canadian weeds. 116. \textit{Echium vulgare L.. Canadian Journal of Plant Science. 82, 235–248.


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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:**

Echium vulgare does not spread vegetatively, reproduction occurs through seed (Klemow et al., 2002; van Breemen 1984). There is a lack of evidence to suggest that detached fragments are capable of producing new plants.

**Reference(s):**


- Klemow, K. M., Clements D. R., Threadgill P. F., & Cavers P. B. (2002). The biology of Canadian weeds. 116. \textit{Echium vulgare L.. Canadian Journal of Plant Science. 82, 235–248.
- van Breemen, A. M. M. (1984). Comparative germination ecology of three short-lived monocarpic Boraginaceae. Acta botanica neerlandica. 33, 283–305.


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

**Answer / Justification:**

In a seed germination study in the Netherlands, van Breemen (1984) studied Echium vulgare in natural conditions and found that 85% of the seeds germinated at a soil depth of 2 cm. Viable seeds were found at soil depths of 15 cm, but were mostly found within the top 1 cm.

**Reference(s):**


- van Breemen, A. M. M. (1984). Comparative germination ecology of three short-lived monocarpic Boraginaceae. Acta botanica neerlandica. 33, 283–305.


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

- 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:**

Yes, Echium vulgare is capable of producing thousands of seeds per plant, however, seed production can vary (van Breemen, 1984; Klemow et al., 2002). In Ontario, Threadgill (1986) found 25 plants that contained an average of 1200 flowers, which would produce an average of 1800 seeds under the assumption that each flower produces an average of 1.5 seeds. Conversely, Klemow and Raynal (1985) found that Echium vulgare only produced 150 to 370 viable seeds, but these plants were from an abandoned limestone quarry in Syracuse, New York.

**Reference(s):**


- van Breemen, A. M. M. (1984). Comparative germination ecology of three short-lived monocarpic Boraginaceae. Acta botanica neerlandica. 33, 283–305.
- Threadgill, P. F. (1986). Variations in the Biennial Life History Strategy Among 15 Ruderal Species in an Abandoned Gravel Pit Near London, Ontario.
- Klemow, K. M., Clements D. R., Threadgill P. F., & Cavers P. B. (2002). The biology of Canadian weeds. 116. \textit{Echium vulgare L.. Canadian Journal of Plant Science. 82, 235–248.
- Klemow, K. M., & Raynal D. J. (1985). Demography of Two Facultative Biennial Plant Species in an Unproductive Habitat. The Journal of Ecology. 73, 147.


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

**Answer / Justification:**

Van Breemen (1984) evaluated Echium vulgare germination in natural conditions and found that 85% of the seeds germinated at a soil depth of 2 cm. In comparing a variety of temperature and moisture conditions, van Breemen found that Echium vulgare germinated quickly, with the highest percentage of germination between 20-30C and 6-12% soil moisture.

**Reference(s):**


- van Breemen, A. M. M. (1984). Comparative germination ecology of three short-lived monocarpic Boraginaceae. Acta botanica neerlandica. 33, 283–305.


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

**Answer / Justification:**

It is a biennial or short-lived monocarpic perennial herb and is capable of producing thousands of seeds per plant, however, seed production can vary (van Breemen, 1984; Klemow et al., 2002). In natural conditions, found that 85% of Echium vulgare seeds germinated at a soil depth of 2 cm (van Breemen, 1984). Based on this research, it can be inferred that it produces viable seeds within the first 3 years after germination.

**Reference(s):**


- van Breemen, A. M. M. (1984). Comparative germination ecology of three short-lived monocarpic Boraginaceae. Acta botanica neerlandica. 33, 283–305.
- Klemow, K. M., & Raynal D. J. (1985). Demography of Two Facultative Biennial Plant Species in an Unproductive Habitat. The Journal of Ecology. 73, 147.


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

**Answer / Justification:**

Echium vulgare begin to flower in May and will bloom through late summer (Kuppler et al., 2023). According to Klemow et al. (2002), Echium vulgare flowers from early June through mid-September and seed dispersal occurs from August through November.

**Reference(s):**


- Kuppler, J., Neumüller U., Mayr A. Veronika, Hopfenmüller S., Weiss K., Prosi R., et al. (2023). Favourite plants of wild bees. Agriculture, Ecosystems & Environment. 342, 108266.
- Klemow, K. M., Clements D. R., Threadgill P. F., & Cavers P. B. (2002). The biology of Canadian weeds. 116. \textit{Echium vulgare L.. Canadian Journal of Plant Science. 82, 235–248.


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

**Answer / Justification:**

Yes, the seeds can be transported by attaching to the fur of animals (Threadgill, 1986). In addition, seeds can remain in the calyx of the plant and can attach to animal fur (Salisbury, 1961 as cited in Klemow et al., 2002).

**Reference(s):**


- Threadgill, P. F. (1986). Variations in the Biennial Life History Strategy Among 15 Ruderal Species in an Abandoned Gravel Pit Near London, Ontario.
- Klemow, K. M., Clements D. R., Threadgill P. F., & Cavers P. B. (2002). The biology of Canadian weeds. 116. \textit{Echium vulgare L.. Canadian Journal of Plant Science. 82, 235–248.


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

**Answer / Justification:**

Echium vulgare seeds do have the ability to float, therefore, can be transported long distances via flood or rainwater. Long distance wind transport is limited, the seeds typically fall within 5 meters of the plant.

**Reference(s):**


- Threadgill, P. F. (1986). Variations in the Biennial Life History Strategy Among 15 Ruderal Species in an Abandoned Gravel Pit Near London, Ontario.


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

**Answer / Justification:**

Yes, seeds can be dispersed long distances by vehicles and farm equipment.

**Reference(s):**


- Threadgill, P. F. (1986). Variations in the Biennial Life History Strategy Among 15 Ruderal Species in an Abandoned Gravel Pit Near London, Ontario.


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# Total PRE Score

**PRE Score:** 19 -- High Potential Risk
**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 : 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:** 2022 Western IPM Grant Project
**Content Privacy:** Private

## 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:

| | |
|---|---|
| • Jutta Burger | February 17, 2023 |
| • Troy Abercrombie | February 14, 2023 |
| • Nicole Valentine | January 10, 2023 |
| • Alex Simmons | January 6, 2023 |

This evaluation has a total of 4 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 info@plantright.org if additional action is required to resolve open issues.

## Issue ID # 8836

**Date Created:** February 17, 2023 - 11:48am
**Date Updated:** February 18, 2023 - 11:51am

**Submitted by:** Jutta Burger

**Status:** Fixed
**Type:** Suggestion
**Severity:** Major
**Scope:** Q16. Does this plant produce viable seed within the first three years (for an herbaceous species) to five years (for a woody species) after germination?

**Issue Description**

The answer to this question should be "yes" with very high confidence because it is an annual and reproduces by seed (you can use the same references as for seed production plus a botanical ref). - JB

**Issue Resolution (Screener's Response to Issue)**

Changed confidence to very high and added botanical and seed information (with references).

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## Issue ID # 8835

**Date Created:** February 17, 2023 - 11:40am
**Date Updated:** February 18, 2023 - 11:58am

**Submitted by:** Jutta Burger

**Status:** Fixed

**Type:** Suggestion
**Severity:** Minor
**Scope:** Q13. Does the species (or cultivar or variety) commonly produce viable seed?

**Issue Description**

Documented, peer-reviewed evidence for viable seed production warrants a "very high" confidence. - JB

**Issue Resolution (Screener's Response to Issue)**

Changed confidence level from high to very high

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## Issue ID # 8834

**Date Created:** February 17, 2023 - 11:38am
**Date Updated:** February 19, 2023 - 2:50pm

**Submitted by:** Jutta Burger

**Status:** Fixed
**Type:** Suggestion
**Severity:** Minor
**Scope:** Q08. Is the plant noted as promoting fire and/or changing fire regimes?

**Issue Description**

You can add reference to its herbaceous habit to help justify this answer with inference. - JB

**Issue Resolution (Screener's Response to Issue)**

Added botanical and primary habitat information and changed the confidence to medium, based on inference.

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## Issue ID # 8734

**Date Created:** January 10, 2023 - 1:25pm
**Date Updated:** February 19, 2023 - 3:06pm

**Submitted by:** Nicole Valentine

**Status:** Fixed
**Type:** Suggestion
**Severity:** Minor
**Scope:** Q09. Is the plant a health risk to humans or animals/fish? Has the species been noted as impacting grazing systems?

**Issue Description**

Impact on grazing systems, was not mentioned. If it displaces rangeland species, it could impact grazing systems. -NV

**Issue Resolution (Screener's Response to Issue)**

After re-evaluating this question, I believe there is enough evidence to warrant a yes answer. I added additional informational to support my reasoning with a medium confidence level.

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## Issue ID # 8733

**Date Created:** January 10, 2023 - 1:18pm
**Date Updated:** February 18, 2023 - 12:27pm

**Submitted by:** Nicole Valentine

**Status:** Fixed
**Type:** Suggestion
**Severity:** Minor
**Scope:** Q07. Does this plant displace native plants and dominate the plant community in areas where it has been established?

**Issue Description**

For Q7 and Q10 inferences can be up to medium confidence, depending on how the supporting evidence is.

https://pretool.org/help/how-choose-confidence-levels

-NV

**Issue Resolution (Screener's Response to Issue)**

Changed confidence to medium for both questions

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## Issue ID # 8732

**Date Created:** January 10, 2023 - 1:09pm
**Date Updated:** February 18, 2023 - 12:25pm

**Submitted by:** Nicole Valentine

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

**Issue Description**

For Qs 3 and 4 could generally describe what type of "significant economic or environmental damage" it causes. -NV

**Issue Resolution (Screener's Response to Issue)**

Added more information about invasiveness "It is noted as invasive due to it's higher germination success over the non-invasive species and ability to form mono-specific patches (Hock et al., 2015; Carvallo et al., 2013)."

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## Issue ID # 8731

**Date Created:** January 10, 2023 - 9:56am

**Date Updated:** February 18, 2023 - 11:56am

**Submitted by:** Nicole Valentine

**Status:** Fixed
**Type:** Suggestion
**Severity:** Minor
**Scope:** Regional Information

**Issue Description**

The climate map link isn't specific to species or region. You have to hit share and download then share link to get the actual link.

https://weedmap.cal-ipc.org/climatematch/?areaType=states&areaList=41&mapView=4%2C-93.50000%2C37.99508&datalayer=PRE+Combined&datalayeropacity=60&gbif_taxonkey=2925892&gbif_search=echium+vulgare

NV

**Issue Resolution (Screener's Response to Issue)**

Added correct link, thanks for catching that!

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# About PRE and this Plant Evaluation Report

The Plant Risk Evaluator (PRE) is an online database and platform designed to assess the risk of a plant becoming invasive in a given region.This tool offers many benefits, and we encourage you to visit the PRE website (https://pretool.org) for more information.

If you would like to learn more about PRE, please email us at info@plantright.org, requesting a PRE Account.

PRE beta funding was provided by Sustainable Conservation (https://www.suscon.org/) and a USDA Farm Bill grant. Additional funding has been provided by the Western Integrated Pest Management Center.