Plant Risk Evaluator -- PRE™
Evaluation Report

Geranium sanguineum var. striatum -- Illinois

2017 Farm Bill PRE Project

PRE Score: 10 -- Accept (low risk of invasiveness)
Confidence: 61 / 100
Questions answered: 20 of 20 -- Valid (80% or more questions answered)

Privacy: Public
Status: Submitted

Evaluation Date: September 16, 2017

This PDF was created on June 15, 2018

Plant Evaluated

Geranium sanguineum var. striatum

Image by Dominicus Johannes Bergsma

Evaluation Overview

A PRE™ screener conducted a literature review for this plant (*Geranium sanguineum var. striatum*) 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

Most of the information used in this evaluation is for Geranium sanguineum, with confidence levels set to medium. While there are some sporadic populations of G. sanguineum in the Midwest and Northeast, they do not seem to be causing harm and the species does not appear on any invasive lists. There are other plants in the genus that are widely naturalized or noxious weeds due to rampant seeding. There is documentation of long distance dispersal of invasive Geranium species by water, livestock, trains, and contaminated seed, but evidence was lacking for long distance dispersal of G. sanguineum.

General Information

Status: Submitted
Screener: Emily Russell
Evaluation Date: September 16, 2017

Plant Information

Plant: *Geranium sanguineum var. striatum*

If the plant is a cultivar, how does its behavior differs from its parent's?
Var. striatum is slightly more compact than the species and has pale pink flowers with red veins. There are no known differences in reproductive traits. Some taxonomists do not recognize var. striatum. Most of the information used in this evaluation is for G. sanguineum, with confidence levels set to medium.

Regional Information

Region Name: Illinois

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

Answer / Justification:

Geranium sanguineum "occasionally escapes cultivation in North America, mainly in portions of the Northeast and Midwest." (Go Botany) "Geranium sanguineum (Long-Stalked Geranium), is rarely observed as a naturalized plant in Illinois." (Hilty)

Reference(s):

- Kartesz, J. T. (2015). The Biota of North America Program (BONAP).
- New England Wild Flower Society (2017). Geranium sanguineum (bloody crane's-bill): Go Botany.

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

Answer / Justification:

Geranium sanguineum "occasionally escapes cultivation in North America, mainly in portions of the Northeast and Midwest." (Go Botany) "Geranium sanguineum (Long-Stalked Geranium), is rarely observed as a naturalized plant in Illinois." (Hilty)

Reference(s):

- Kartesz, J. T. (2015). The Biota of North America Program (BONAP).
- New England Wild Flower Society (2017). Geranium sanguineum (bloody crane's-bill): Go Botany.
- Hilty, J. (0). Wild Geranium (Geranium maculatum).

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

Answer / Justification:

Though some gardeners describe G. sanguineum as invasive and weedy, it is not included on invasive species lists.

Reference(s):

- [Anonymous] .

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

Answer / Justification:

Though some gardeners describe G. sanguineum as invasive and weedy, it is not included on invasive species lists.

Reference(s):

- [Anonymous] .

5. Are other species of the same genus (or closely related genera) invasive in a similar climate?

- 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:

Many species of Geranium show weedy tendencies. Though G. molle and G. pusillum are widely naturalized, they are not included on invasive species lists in the Eastern United States, perhaps because they do not have significant economic or environmental impacts. However, G. sibiricum is described as invasive in the Bukovinian Cis-Carpathians in the Ukraine and G. nepalense is on Suffolk County, NY's list of moderately invasive species; both are climate matches for Illinois. Analyzing all of the citations for Geranium in the Global Compendium of Weeds is beyond the scope of this evaluation, but there may be other invasive Geranium species in matching climates in Europe and Asia.

Reference(s):

- Suffolk County (2011). Suffolk County's Management List of Invasive Species.
- Tokaryuk, ALLA. I., Chorney ILLYA. I., Korzhan KSENIA. V., Budzhak VASYL. V., Velychko M.. V., Protopopova V.. V., et al. (2012). The participation of invasive plants in the synanthropic plant communities in the Bukovinian Cis-Carpathian (Ukraine). Thaiszia–Journal of Botany. 22, 243–254.
- NatureGate (2017). Dove's Foot Cranesbill, Geranium molle.
- Randall, R. Peter (2017). A Global Compendium of Weeds. Third Edition..

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:

Distribution of G. sanguineum in central and SW Europe, the western United States, and Australia do not match the climate of Illinois. The origin of var. striatum is in Great Britain, which is not a climate match.

Reference(s):

- GBIF Secretariat (2016). GBIF Backbone Taxonomy: Geranium sanguineum L..

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

Answer / Justification:

Geraniums can form dense mats. "Species such as G. sanguineum make exceptional ground covers because they fill in quickly and smother competitors."

Reference(s):

- Hawke, R. (2004). Hardy Geraniums for Northern Gardens. Chicago Botanic Garden Plant Evaluation Notes.

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

Answer / Justification:

There is no evidence for changing fire regimes.

Reference(s):

- [Anonymous] .

9. Is the plant a health risk to humans or animals/fish? Has the species been noted as impacting grazing systems?

- 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 health risks to humans or animals, but G. sanguineum is cited as a weed of pastures.

Reference(s):

- Randall, R. Peter (2017). A Global Compendium of Weeds. Third Edition..

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:

G. sanguineum var. striatum is unlikely to produce impenetrable thickets due to its low-growing habit.

Reference(s):

- [Anonymous] .

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:

"In nature, plant propagation occurs both by seeds and vegetatively by rhizome sprouts (suckers)."

Reference(s):

- Dalton, A. (2012). No One to Blame but Myself - Geranium sanguineum and Ajuga genevensis.
- Lis-Balchin, M. (2003). Geranium and Pelargonium: History of Nomenclature, Usage and Cultivation.

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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:

Small pieces of the roots can form new plants, but it's unclear if this happens frequently in the wild.

Reference(s):

- Dalton, A. (2012). No One to Blame but Myself - Geranium sanguineum and Ajuga genevensis.

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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.

Reference(s):

- Hibberd, D., & Hibberd F. (1988). Growing Hardy Geraniums from Seed. The Seed Raising Journal from Thompson & Morgan. 2(4),

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

- 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:

"After the flowers are fertilised, the petals fall and the base of the style rapidly lengthens and thickens to form a structure known as the rostrum, the 'cranesbill'. At the base of the rostrum are five fruit segments (mericarps) each containing one seed."

Reference(s):

- Hibberd, D., & Hibberd F. (1988). Growing Hardy Geraniums from Seed. The Seed Raising Journal from Thompson & Morgan. 2(4),

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

Answer / Justification:

"Geraniums are easy to grow from seed and no special methods are involved. Seed may be sown in autumn or spring, with the main flush of germination expected in late spring."

Reference(s):

- Hibberd, D., & Hibberd F. (1988). Growing Hardy Geraniums from Seed. The Seed Raising Journal from Thompson & Morgan. 2(4),

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

Answer / Justification:

"Most species flower a year after germination, but some, including G. pratense, take two years."

Reference(s):

- Hibberd, D., & Hibberd F. (1988). Growing Hardy Geraniums from Seed. The Seed Raising Journal from Thompson & Morgan. 2(4),

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

Answer / Justification:

Flowers early May-early July with sporadic or repeat bloom into August and September

Reference(s):

- Hawke, R. (2004). Hardy Geraniums for Northern Gardens. Chicago Botanic Garden Plant Evaluation Notes.

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

Answer / Justification:

Evidence is lacking for dispersal by animals.

Reference(s):

- [Anonymous] .

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

Answer / Justification:

Seeds are primarily dispersed by an explosive release. There is no evidence of long distance dispersal by wind or water.

Reference(s):

- [Anonymous] .

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

Answer / Justification:

Evidence is lacking for accidental dispersal by humans.

Reference(s):

- [Anonymous] .

Total PRE Score

PRE Score: 10 -- Accept (low risk of invasiveness)
Confidence: 61 / 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:

- Richard Hawke September 18, 2017

This evaluation has a total of 1 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.