



Figure 1: Virginia buttonweed (*Diodia virginiana*) Photo: Robert H. Mohlenbrock, USDA, SCS, 1989.

## California Pest Rating Proposal for

*Diodia virginiana* L.: Virginia buttonweed

Current Pest Rating: B

Proposed Pest Rating: C

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Comment Period: **10/02/2019 through 11/16/2019**

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### Initiating Event:

This plant has been included on the CDFA noxious weed list [3 CCR § 4500] as a B-rated plant pest. However, Virginia buttonweed has not been reviewed under the current pest rating system. A pest rating proposal is required to evaluate the current rating and status of Virginia buttonweed in the state of California.

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## History & Status:

**Background:** Virginia buttonweed is native to the eastern and southern United States, Mexico, and Cuba (Govaerts, 2019). It has spread to and become naturalized in parts of the central United States. The exact boundaries of its native distribution are not known. Therefore, in portions of its range it may be adventive or native. It is found mostly in areas with wet, poorly-drained soils such as margins of ponds. It is often a nuisance plant when it invades lawns or other turf. It is a prostrate to semi-upright perennial that roots readily at the nodes and tolerates close mowing. It spreads both vegetatively and sexually, with self-fertilized flowers sometimes forming underground along the base of rooted stems. The leaves are opposite and lance-shaped, producing small, white, four-lobed flowers. The fruits are elliptical-shaped and consist of two indehiscent, one-seeded segments. In California, it has only been reported on lawns in one neighborhood in Shasta County, and this past population was eradicated (CCH, 2019; Calflora, 2019).

**Worldwide Distribution:** Virginia buttonweed is native to the eastern and southern United States, from Connecticut to Florida and west to Kansas and Texas. (NRCS, 2019). It is also native to Cuba and northeastern Mexico. It has naturalized in Japan, Korea, and Taiwan (Govaerts, 2019). It can be weedy or invasive (Uva et al., 1997).

**Official Control:** Virginia buttonweed has not been under official control beyond its rating as a restricted noxious weed seed by California, although there is much advice available on managing it as a lawn weed (McCurdy, 2016; Breeden and Brosnan, 2015).

**California Distribution:** In 2003, Virginia buttonweed was recorded in Redding, Shasta County. It was recorded in a single residential neighborhood on irrigated lawns and there have been no further locations recorded (CCH, 2019).

**California Interceptions:** There are five records in the PDR database of California interceptions of very small numbers of seeds of Virginia buttonweed in plant debris found at the Needles Border Inspection Station in vehicles arriving from the southeastern United States. The source of the Redding infestation is unknown.

The risk Virginia buttonweed would pose to California is evaluated below.

## Consequences of Introduction:

- 1) Climate/Host Interaction:** Risk is **Low (1)**. Virginia buttonweed is found in wet soil, such as irrigated turf, pond margins, and wet meadows. California has an overall dryer climate than that characterizing the native range of this plant. California does have lawns and turf which would provide areas to establish. However, this species primarily proliferates through underground rhizomes. Seeds could be
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introduced in poorly-cleaned lawn seed and rhizome fragments could be introduced in turf from another state.

Evaluate if the pest would have suitable hosts and climate to establish in California.

**Score: 1**

- **Low (1) Not likely to establish in California; or likely to establish in very limited areas.**
- Medium (2) may be able to establish in a larger but limited part of California.
- High (3) likely to establish a widespread distribution in California.

**2) Known Pest Host Range:** Risk is **High (3)** as weeds do not require any one host, but grow wherever ecological conditions are favorable.

Evaluate the host range of the pest.

**Score: 3**

- Low (1) has a very limited host range.
- Medium (2) has a moderate host range.
- **High (3) has a wide host range.**

**3) Pest Dispersal Potential:** Virginia buttonweed receives a **High (3)** in this category. Virginia buttonweed has high reproduction potential. It can reproduce through seeds, roots, and stem fragments and its flowers self-pollinate. This makes it difficult to eliminate once it has become established; postemergence herbicides combined with cultural controls are recommended.

Evaluate the natural and artificial dispersal potential of the pest.

**Score: 3**

- Low (1) does not have high reproductive or dispersal potential.
- Medium (2) has either high reproductive or dispersal potential.
- **High (3) has both high reproduction and dispersal potential.**

**4) Economic Impact:** Virginia button receives a **Medium (2)** for Economic Impact. Virginia buttonweed can affect lawns and growers of sod, requiring multiple applications of herbicides to control. In 2014, the most recent year with data, California had 13,881 acres of sod in production. The value of sales was estimated at over \$140 million (USDA, 2015). If Virginia buttonweed were to establish in areas with sod production, it could have a detrimental effect on the industry.

Evaluate the economic impact of the pest to California using the criteria below.

**Economic Impact: A, B**

- A. The pest could lower crop yield.**
  - B. The pest could lower crop value (includes increasing crop production costs).**
  - C. The pest could trigger the loss of markets (includes quarantines).
  - D. The pest could negatively change normal cultural practices.
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- E. The pest can vector, or is vectored, by another pestiferous organism.
- F. The organism is injurious or poisonous to agriculturally important animals.
- G. The organism can interfere with the delivery or supply of water for agricultural uses.

**Economic Impact Score: 2**

- Low (1) causes 0 or 1 of these impacts.
- **Medium (2) causes 2 of these impacts.**
- High (3) causes 3 or more of these impacts.

**5) Environmental Impact:** As Virginia buttonweed favors an environment not widespread in California it is unlikely to have significant environmental impacts. It could impact cultural practices as it favors lawns, leading to more weeding and pesticide to remove.

**Environmental Impact: E**

- A. The pest could have a significant environmental impact such as lowering biodiversity, disrupting natural communities, or changing ecosystem processes.
- B. The pest could directly affect threatened or endangered species.
- C. The pest could impact threatened or endangered species by disrupting critical habitats.
- D. The pest could trigger additional official or private treatment programs.
- E. **The pest significantly impacts cultural practices, home/urban gardening or ornamental plantings.**

**Environmental Impact Score: 2**

- Low (1) causes none of the above to occur.
- **Medium (2) causes one of the above to occur.**
- High (3) causes two or more of the above to occur.

**Consequences of Introduction to California for Virginia buttonweed: Medium (11)**

Add up the total score and include it here.

- Low = 5-8 points
- Medium = 9-12 points**
- High = 13-15 points

**6) Post Entry Distribution and Survey Information:** : Virginia buttonweed has a localized distribution in California and there are limited areas it can to spread due to the dry climate. It receives a **Low (-1)** in this category.

**Score: -1**

- Not established (0) Pest never detected in California or known only from incursions.
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**-Low (-1) Pest has a localized distribution in California or is established in one suitable climate/host area (region).**

-Medium (-2) Pest is widespread in California but not fully established in the endangered area, or pest established in two contiguous suitable climate/host areas.

-High (-3) Pest has fully established in the endangered area, or pest is reported in more than two contiguous or non-contiguous suitable climate/host areas.

**7) The final score is the consequences of introduction score minus the post entry distribution and survey information score:**

**Final Score:** *Score of Consequences of Introduction – Score of Post Entry Distribution and Survey Information = Medium (10)*

### **Uncertainty:**

Virginia buttonweed has no record of establishing in California or an environment with California-like conditions. However, detection surveys for this species have not been done and it is possible this plant is more widespread in irrigated lawns and turf.

### **Conclusion and Rating Justification:**

Virginia buttonweed is present in California in limited areas and is unlikely to spread, however if it was brought into the state with no oversight it could impact lawns, turf, and sod. A “C” rating is justified.

### **References:**

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**Author:**

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Rachel Avila, Environmental Scientist; California Department of Food and Agriculture; 2800 Gateway Oaks, Suite 200, Sacramento, CA 95833; Tel. (916) 403-6813; [plant.health\[@\]cdfa.ca.gov](mailto:plant.health[@]cdfa.ca.gov)

### Responsible Party:

Robert Price, Primary State Botanist; California Department of Food & Agriculture; Seed Laboratory and Herbarium; 3294 Meadowview Road, Sacramento, CA 95832; Tel. (916) 738-6700; [plant.health\[@\]cdfa.ca.gov](mailto:plant.health[@]cdfa.ca.gov)

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**\*Comment Period: 10/02/2019 through 11/16/2019**

### \*NOTE:

You must be registered and logged in to post a comment. If you have registered and have not received the registration confirmation, please contact us at [plant.health\[@\]cdfa.ca.gov](mailto:plant.health[@]cdfa.ca.gov).

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### Comment Format:

- ❖ Comments should refer to the appropriate California Pest Rating Proposal Form subsection(s) being commented on, as shown below.

#### Example Comment:

Consequences of Introduction: 1. Climate/Host Interaction: [Your comment that relates to “Climate/Host Interaction” here.]

- ❖ Posted comments will not be able to be viewed immediately.
- ❖ Comments may not be posted if they:

Contain inappropriate language which is not germane to the pest rating proposal;

Contains defamatory, false, inaccurate, abusive, obscene, pornographic, sexually oriented, threatening, racially offensive, discriminatory or illegal material;

Violates agency regulations prohibiting sexual harassment or other forms of discrimination;

Violates agency regulations prohibiting workplace violence, including threats.

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- ❖ Comments may be edited prior to posting to ensure they are entirely germane.
  - ❖ Posted comments shall be those which have been approved in content and posted to the website to be viewed, not just submitted.
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**Proposed Pest Rating: C**

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