

## California Pest Rating Proposal for

*Striga* Lour.: witchweed, Family

Orobanchaceae

Pest Rating: A

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Comment Period: **CLOSED**

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### Initiating Event:

A member of this genus is included on the CDFA noxious weed list and a rating proposal for the genus is needed in keeping with Federal and international listing of the entire genus.

### History & Status:

**Background:** The witchweed genus, *Striga*, with an estimated 34 to 40 species worldwide (Mabberley, 2009; USDA ARS GRIN database), is currently placed in the family Orobanchaceae, but was formerly placed in a broadly circumscribed family Scrophulariaceae. Witchweed species are annual to perennial obligate root parasites predominantly using grass species as hosts, but some, such as *S. gesnerioides*, attack only dicotyledonous flowering plants (Mohamed et al., 2001). After an underground seedling phase on the root system of the host, the emergent inflorescences of the plant bear chlorophyllous leaves. The leaves are entire to toothed, opposite to subopposite, and sometimes may also be alternate on the upper portion of the stem. The flowers are salverform and showy, with corollas red, white, orange, yellow, or purple. The narrow tube portion of the corolla has a characteristic medial or apical bend. The terminal portion of the corolla is broadly two-lipped, with one lip two-lobed and the other three-lobed. Fruits are many-seeded capsules with loculicidal dehiscence. Seeds are numerous per plant, dustlike, 0.2-0.6 by 0.1-0.3 mm, with reticulate and spirally ridged ornamentation.

**Worldwide Distribution:** Witchweed species are native to Africa and tropical to warm temperate areas of Asia, northern Australia and Papua New Guinea, with the majority of species occurring in Africa, where 28 species were recognized in the monograph of Mohamed et al. (2001). Two species have been introduced into the southeastern United States (*S. asiatica* in the Carolinas and *S. gesnerioides* in Florida; Musselman and Parker, 1981; USDA PLANTS database). These two species and *S. hermonthica* are well known pests of agricultural crop species, but they are not the only species in the genus that can attack economically important plants.

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**Official Control:** All members of the genus are listed as Federal noxious weeds and are subject to quarantine by the United States (USDA APHIS, Federal Noxious Weed List). Since the introduction of *S. asiatica* into North and South Carolina in 1955, this species has been subject to longterm federal and state control, with the affected area in the Carolinas reduced by ca. 99% (USDA APHIS, 2011). *Striga asiatica* is listed as an A-rated noxious weed by California. Members of the genus are listed as noxious weeds by the states of Alabama, Arizona, Arkansas, Hawaii, Massachusetts, Minnesota, North Carolina and Vermont, and as a plant pest in South Carolina (USDA PLANTS database). The species *Striga asiatica* has been listed as a noxious weed seed by California, North Carolina, and South Carolina, and the entire genus is listed as a noxious weed seed by Arizona and Hawaii and as a Federal noxious weed seed with zero tolerance for introductions into the United States. Approximately 30 other countries including Australia, Argentina, Brazil, Canada, Chile, China, Korea, Mexico, New Zealand, and the Russian Federation also list the entire genus as harmful weeds subject to exclusion (USDA PCIT database).

**California Distribution:** The genus *Striga* is not known to have been introduced into California (Consortium of California Herbaria; USDA PLANTS).

**California Interceptions:** There are no documented introductions to California (Consortium of California Herbaria; CDFA PDR database).

The risk witchweed species would pose to California is evaluated below.

## Consequences of Introduction:

- 1) Climate/Host Interaction:** 1) Climate/Host Interaction: Most of the geographic range occupied by witchweed species is tropical to subtropical in climate. Several species, including those attacking economically important grain crops, also occur in warm temperate zone habitats in the Republic of South Africa, which has climate zones comparable to portions of California. Therefore, witchweed receives a **Medium (2)** in this category.

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

**Score: 2**

- 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 witchweed attacks a wide range of species of the grass family and certain species also attack plants in the morning-glory, euphorbia, legume, and nightshade families.

Evaluate the host range of the pest.

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**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:** Seeds of witchweed species are produced in large numbers per plant (up to 200,000 or more) and can be dispersed by wind, water, farm equipment, and vehicles, and they can be carried long distances as a contaminant of seeds and hay. The seeds are known to remain viable in the soil for up to 20 years. Witchweed receives a **High (3)** in this category.

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:** Witchweed species attack a wide variety of grass species, including economically important species such as maize, sorghum, rice, sugarcane, and tef. The species *S. gesnerioides* also attacks cowpea and tobacco crops. High percentages of crop loss may occur following *Striga* infestation. Witchweed receives a **High (3)** in this category.

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

**Economic Impact:**

- 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.**
- 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: 3**

- 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:** Witchweed species are invasive in both agricultural and natural settings, and may cause significant population decline, especially in C4 grass species. Therefore, it receives a **High (3)** in this category.

**Environmental Impact:**

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- 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:**

- 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 witchweed: High (14)**

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:** This plant has not been reported from California. It receives a score of **not established (-0)** in this category.

**Score: -0**

**-Not established (0) Pest never detected in California or known only from incursions.**

-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 = High (14)*

**Uncertainty:**

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The range of suitable habitats for the genus in California could vary significantly depending on the actual species involved.

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

Witchweed species have not been reported from California and are subject to stringent Federal control measures. Because of the economic importance of several of the known host species of staple grains and other grass crops, a rating of “A” is justified.

### **References:**

California Department of Food and Agriculture. Pest and Damage Record database (PDR). Accessed August 20, 2019:

<https://pdr.cdfa.ca.gov/PDR/pdrmainmenu.aspx>

Consortium of California Herbaria. Accessed August 20, 2019:

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Mabberley, D. J. 2008. Mabberley’s Plant-Book. 3<sup>rd</sup> edition. Cambridge University Press.

Mohamed, K. I., L. J. Musselman, & C. R. Riches. 2001. The genus *Striga* (Scrophulariaceae) in Africa. Ann. Missouri Bot. Gard. 88: 60-103.

Musselman, L. J., & C. Parker. 1981. Studies on indigo witchweed, the American strain of *Striga gesnerioides* (Scrophulariaceae). Weed Science 29: 594-596.

USDA APHIS Plant Protection and Quarantine Factsheet. 2011. Witchweed: a parasitic pest.

[https://www.aphis.usda.gov/publications/plant\\_health/2011/witchweed\\_parasitic\\_pest.pdf](https://www.aphis.usda.gov/publications/plant_health/2011/witchweed_parasitic_pest.pdf)

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Information Network (GRIN). Accessed August 20, 2019. [https://npgsweb.ars-](https://npgsweb.ars-grin.gov/gringlobal/taxon/taxonomysimple.aspx)

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<https://plants.sc.egov.usda.gov>

### **Responsible Party:**

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**\*Comment Period: CLOSED**

### **\*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.
- ❖ 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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## Pest Rating: A

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