



Figure 1: *Solanum marginatum* (white-margined nightshade). Photo by Leif & Anita Sridvall

California Pest Rating Profile for
***Solanum marginatum* L. f.: white-margined nightshade**
Pest Rating: B

Comment Period: CLOSED

Initiating Event:

Solanum marginatum (white-margined nightshade) is included on the CDFA noxious weed list (Cal. Code Regs., tit. 3, § 4500), but it has not been reviewed under the current pest rating system. A pest rating proposal is required to evaluate the current rating and status of white-margined nightshade in the state of California.

History & Status:

Background: White-margined nightshade is a perennial shrub that grows to five meters in height. The leaves measure up to 25 cm long and 18 cm wide, are densely covered in white stellate hairs, and are armed on both the upper and lower surfaces with prickles that measure up to 1.5 cm long. Flowers are white, and fruits, which measure up to 6 cm across, are yellow when mature (PIER, 2011). This plant appears to prefer disturbed areas and can be found in woodland/forest, pastures, grassland, and rocky outcrops (Breitwieser et al., 2010; Jepson Flora Project, 2019; PIER, 2011). It can form dense thickets.

Worldwide Distribution: White-margined nightshade is native to northeastern Africa (Ethiopia and Eritrea). It was introduced to Europe in the 18th century and has been cultivated as an ornamental there (Roth, 1986). It has also been introduced to other localities, including Australia, New Zealand, North America (including Mexico and the United States, where it is apparently limited to California [USDA, 2019]), and South America (Breitwieser et al., 2010; PIER, 2011; Standley, 1920).

Official Control: White-margined nightshade is on the CDFA noxious weed list. It is a declared weed in Tasmania.

California Distribution: White-margined nightshade has been reported from nine counties in California (Alameda, Contra Costa, Los Angeles, Marin, Monterey, San Diego, San Francisco, Santa Barbara, and Santa Cruz [Calflora, 2019; CCH, 2019]).

California Interceptions: White-margined nightshade has not been intercepted in California.

The risk white-margined nightshade would pose to California is evaluated below.

Consequences of Introduction:

- 1) Climate/Host Interaction:** White-margined nightshade has been reported from nine counties in California. Although the oldest of the reports as a naturalized plant date to the 1920s, all reported localities are in coastal counties. This species may spread to a wider portion of the state, but it may not be able to establish at higher elevations or in the northernmost areas. Therefore, white-margined nightshade 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.
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- 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:** White-margined nightshade plants are self-fertile and can produce hundreds of fruits per plant, with each fruit containing approximately 1,000 seeds (Dulberger et al., 1981). The fruits have characteristics that may protect them against attack by insects, and they may be able to be dispersed by floating on water (Chiarini and Barboza, 2007). This plant can also reproduce vegetatively via root fragments. White-margined nightshade 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:** Infestations of white-margined nightshade could increase crop production costs. In addition, this plant is apparently toxic to animals, and it has spines, which are injurious to livestock and could impede access to water by livestock (State of Victoria, 2019). The presence of this noxious weed could lead to the loss of markets because of the risk of transporting fruit or seeds with agricultural products. This plant is a host of tomato spotted wilt virus and potato cyst nematode, so it could serve as a reservoir of such diseases that could then be transferred to nearby crops (State of Victoria, 2019). White-margined nightshade receives a **High (3)** in this category.

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

Economic Impact: B, C, E, F, G

- 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: White-margined nightshade forms dense patches and can displace native plant species (State of Victoria, 2019). It could threaten many native plant species in California. For example, in coastal dunes (where it is known to thrive in Australia), it could outcompete the Federally Threatened Morro manzanita (*Arctostaphylos morroensis* Wies. & Schreib.) and soft leaved Indian paintbrush (*Castilleja mollis* Pennell) (Calflora, 2019). This, in turn, could impact threatened or endangered species that depend on habitats like coastal dunes. The presence of this plant could trigger treatments in areas such as parks and grazing land, and it is likely to invade gardens and ornamental plantings. Therefore, it receives a **High (3)** in this category.

Environmental Impact: A, B, C, D, 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:

- 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 white-margined nightshade: 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 been reported from nine counties that span much of coastal California. It is likely that this plant could expand to a greater proportion of the state. It receives a **Medium (-2)** in this category.

Score: -2

- 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).
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-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 (12)*

Uncertainty:

Most of the records of this plant in California are old, and the current distribution in the state is poorly known.

Conclusion and Rating Justification:

This plant has the potential to have significant economic and environmental impacts in California. It is already established in the state, although it probably has not reached its full potential distribution here. A “B” rating is justified.

References:

Australian Government. Weeds in Australia. *Solanum marginatum*. Accessed: August 26, 2019

http://www.environment.gov.au/cgi-bin/biodiversity/invasive/weeds/weeddetails.pl?taxon_id=4844

Breitwieser, I., Brownsey, P.J., Heenan, P.B., Nelson, W.A., and A.D. Wilton, eds. 2010. Flora of New Zealand Online. Accessed: August 26, 2019

<http://www.nzflora.info/factsheet/Weed/Solanum-marginatum.html>

Calflora. 2019. Information on California plants for education, research and conservation, with data contributed by public and private institutions and individuals. Accessed August 28, 2019:

https://www.calflora.org/cgi-bin/species_query.cgi?where-calrecnum=7657

California Department of Food and Agriculture (CDFA). 2019. Encycloweedia. Accessed: August 28, 2019

https://www.cdfa.ca.gov/plant/ipc/encycloweedia/encycloweedia_hp.html#

Chiarini, F. and Barboza, G. 2007. Anatomical study of different fruit types in Argentine species of *Solanum* subgen. *Leptostemonum*. *Anales del Jardín Botánico de Madrid*. 64: 165-175

Consortium of California Herbaria (CCH). 2019. Data provided by the participants of the CCH. Regents of the University of California 2019. Accessed August 28, 2019:

<http://ucjeps.berkeley.edu/consortium/>

Dulberger, R., Levy, A., and Palevitch, D. 1981. Andromonoecy in *Solanum marginatum*. *Botanical Gazette*. 142: 259-266.

Jepson Flora Project (eds.) 2019, Jepson eFlora. Accessed August 26, 2019:

http://ucjeps.berkeley.edu/eflora/eflora_display.php?tid=44876

Pacific Island Ecosystems at Risk (PIER). 2011. Accessed: August 28, 2019

http://www.hear.org/pier/species/solanum_marginatum.htm

Roth, L. 1986. Worldwide distribution of the wild plant *Solanum marginatum* and its cultivation in Ecuador. In (W.G. D'Arcy, ed.) *Solanaceae, Biology and Systematics*. Columbia University Press. 603 pp.

Standley, P.C. 1920. Trees and shrubs of Mexico. U.S. Government Printing Office. 1721 pp.

State of Victoria. 2019. Agriculture Victoria. Victorian Resources Online. White-edged nightshade (*Solanum marginatum*). Accessed August 28, 2019:

http://vro.agriculture.vic.gov.au/dpi/vro/vrosite.nsf/pages/weeds_white-edged-nightshade

Tasmanian Government. 2019. Department of Primary Industries, Parks, Water and Environment. Invasive Species: Weeds. Accessed August 28, 2019:

<https://dpiwpe.tas.gov.au/invasive-species/weeds/weeds-index/declared-weeds-index/white-edged-nightshade>

United States Department of Agriculture (USDA). 2019. Natural Resources Conservation Service. Plants Database. *Solanum marginatum* L. f. purple African nightshade. Accessed August 28, 2019:

<https://plants.sc.egov.usda.gov/core/profile?symbol=SOMA>

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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).

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: B
