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California Pest Rating Proposal for

Alliaria petiolata (M. Bieb.) Cavara & Grande, garlic mustard, hedge-garlic

Family: Brassicaceae

Pest Rating: A

Synonyms: *Alliaria officinalis* Andr. ex M. Bieb., *Erysimum alliaria* L., *Sisymbrium alliaria* (L.) Scop.

Comment Period: 12/03/2021 through 01/17/2022

Initiating Event:

Alliaria petiolata has been newly discovered in San Bernardino County in 2020 during a plant inventory in San Bernardino National Forest, with official samples submitted to the CDFA Plant Pest Diagnostics Branch in 2021 for identification and rating. A pest rating proposal is required to evaluate the current rating and status of the species in California.

History & Status:**Background:**

Alliaria petiolata is a biennial herb with stems simple or branched above, commonly 30-90 cm in height and sometimes reaching 1.3 m (Al-Shehbaz, 2010; Ball, 1964). The plant is glabrous or pubescent with simple hairs, and the foliage is strongly garlic-scented when crushed. The basal rosette leaves are long petiolate, with the blade kidney-shaped to triangular-ovate with cordate base and scalloped margin. The stem leaves are short-stalked and generally triangular-ovate in shape, with the leaf blade up to 15 by 15 cm in size. The leaf is cordate to truncate at base, the margin toothed, and the apex pointed. The inflorescence is a multi-flowered raceme, with stiffly spreading to ascending pedicels approximately 0.5-1.5 cm in length and similar in width to the fruits. The flowers have four narrow white petals approximately 4-8 mm in length. The fruit is a narrow, elongate, multi-seeded silique, approximately 2-8 cm long by 1.2-2.5 mm wide, quadrangular to subcircular in cross-section, and typically somewhat narrowed between the seeds (torulose). The fruit valves have a prominent midvein and distinct lateral veins. The seeds are dark brown to blackish, longitudinally ridged, narrowly oblong, approximately 2-4 mm long by 0.7-2 mm wide.

Worldwide Distribution: *Alliaria petiolata* is a plant of open or disturbed habitats and shaded woodlands, considered to be native in Europe, western to central Asia, the Indian subcontinent, and north Africa (Morocco, Tunisia), and naturalized in North America (U.S., Canada) and southern South America (Patagonian Argentina) (Al-Shehbaz, 2010; Ball, 1964; USDA/GRIN, 2021).

The species has been reported from Oregon, Washington, Idaho, Utah, Colorado, North Dakota, Nebraska, Kansas, Oklahoma, and all states of the midwestern and eastern U.S. from Minnesota through Arkansas east to Georgia through Maine. It is not currently reported from the southern tier of states from Arizona through Florida. In Canada, the species has been collected in the provinces of British Columbia, Ontario, Quebec, New Brunswick, and Nova Scotia (Al-Shehbaz, 2010; USDA/NRCS PLANTS database, 2021).

Official Control: *Alliaria petiolata* is listed as a noxious weed by the states of Alabama, Minnesota, Maine, Oregon, Utah, Vermont, and Washington, and as a prohibited invasive species in Iowa, Indiana, Ohio, Connecticut, Massachusetts, New Hampshire, and New York (NPB, 2021; USDA/NRCS, 2021).

Alliaria petiolata is listed by the state of Utah as a prohibited noxious weed seed (USDA/AMS, 2021).

California Distribution: The species has been collected in 2020 and 2021 from a small population in San Bernardino National Forest in San Bernardino County (CDFA PDR database). There has also been an iNaturalist photographic report of the species from an urban setting in Napa in Napa County in 2017 (CalFlora, 2021), but the species has not been subsequently found in the area for a voucher specimen to be collected. The species may have been observed in an urban setting in the San Francisco Bay region in Cupertino in Santa Clara County in 2010, but no vouchers were collected from the area to confirm the record and the plant appears not to be currently present in the area (CalFlora, 2021; Consortium of California Herbaria, 2021).

California Interceptions: No interceptions at border inspection stations have been recorded in the CDFA PDR database (2021).

Consequences of Introduction

1) Climate/Host Interaction: Score is **Medium (2)**

In its introduced range in the United States, *Alliaria petiolata* occurs in open or wooded habitats including fields, roadsides, railroad tracks, streambanks, floodplains, shaded woodlands, and bluffs (Al-Shehbaz, 2010).

- 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: Score is **High (3)**

Alliaria petiolata can occur wherever general ecological conditions exist that are conducive to its survival.

- 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: Score is **Medium (2)**

Alliaria petiolata reproduces only by seed, commonly producing 10-20 seeds per fruit, and under favorable conditions can produce over 1000 seeds per plant (Cavers et al., 1979). The seeds produced in summer exhibit strong dormancy and frequently do not germinate in the first year after release, thus forming a seed bank which gradually germinates over several years. The seeds do not have specific adaptations for dispersal, but may be spread from the area of the parent population by human or animal activity, by water, or in soil.

Evaluate the natural and artificial dispersal potential of the pest.

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

4) **Economic Impact:** Score is **Medium (2)**

Alliaria petiolata can form dense stands in well-fertilized soils on agricultural lands in the eastern United States and Canada, although it is less clear how well adapted it will be in the strongly seasonally dry environments of California. The species can be eaten as a nutritious vegetable green, but has been reported to give a disagreeable taste to cows' milk (Cavers et al., 1979). In Europe, the species is reported to be a host for several viruses that can attack vegetable or floricultural crop plants, including *Alliaria* mosaic virus, cucumber mosaic virus, and turnip mosaic virus (Cavers et al., 1979). The species is also reported have allelopathic effects detrimental to other plant species.

- 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 A, D:

- 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:** Score is **High (3)**

Alliaria petiolata can form dense stands in shaded or semishaded woodland or riverside environments if enough water is available to the plants, potentially changing the makeup of environmental communities. It is reported to exclude other species by allelopathic effects. It can also occur in more limited numbers in drier open habitats.

- 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 A, D, E:

- 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**
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Consequences of introduction to California for *Alliaria petiolata*: **Medium (12)**

Low = 5-8 points

Medium = 9-12 points

High = 13-15 points

1) Post Entry Distribution and Survey Information: Score is Not established (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) Final Score: Medium 12 (12-0=12)

Uncertainty: Since the species is newly reported for California it is unclear how well adapted it will be to the climatic regimes of the state, but given the diversity of habitats in California it represents a significant threat of establishment in both natural and disturbed areas.

Conclusion and Rating Justification: *Alliaria petiolata* is a serious environmental weed in many states of the United States, and has been recently documented from a single population in California. An "A"-rating is recommended.

References:

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***Comment Period: 12/03/2021 through 01/17/2022**

***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 permits[@]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: A
