

California Pest Rating Proposal for

Jacobaea vulgaris Gaertn., tansy ragwort

Family: Asteraceae tribe Senecioneae

Current Pest Rating: B

Proposed Pest Rating: B

Synonym: *Senecio jacobaea* L.



Photo credit: E. Coombs, Oregon Dept. of Agriculture, Bugwood.org

Comment Period: 09/22/2022 through 11/06/2022

Initiating Event:

Senecio jacobaea (= *Jacobaea vulgaris*) has been previously assigned a B-rating by the California Department of Food and Agriculture (CDFA), Plant Health and Pest Prevention Services. The species is designated as a noxious weed as defined by the California Food and Agricultural Code (FAC) Section 5004 and is listed in Title 3, California Code of Regulations (CCR), Section 4500. A pest rating proposal is required to evaluate its current rating and status in the state of California.

History & Status

General Description

Jacobaea vulgaris (with *Senecio jacobaea* as a synonym) is the scientific name currently accepted for the tansy ragwort in the USDA GRIN database (2022) based upon the current understanding of the phylogenetic relationships in the tribe Senecioneae from both morphological and DNA sequence data (see Pelsner et al., 2007; Nordenstam et al., 2009).

Tansy ragwort is a biennial or short-lived perennial herb reaching up to 1 meter, growing from a taproot or taprooted branched caudex and producing one to 10 or more, often purplish-tinged, flowering stems (Barkley, 2006; Trock, 2012). The basal and lower cauline leaves are deeply 1 to 3 times pinnately lobed and approximately 4-30 cm long and sparsely hairy. The plant initially produces basal rosette leaves, which often wither before flowering. The inflorescence is a dense, compound corymb (Harper and Wood, 1957). Each flower head is subtended by approximately 13 black-tipped phyllaries and bears approximately 13 yellow ray florets at the periphery of the head and 60-70 smaller yellow disk florets towards the center. The one-seeded cylindrical fruits are brownish and approximately 1-2 mm in length. The fruits tend to be dimorphic within the flowering heads: those from the disk flowers are narrower and hairy along the longitudinal ribs, whereas those from the ray flowers are thicker and hairless on the body of the fruit (Bain, 1991). The pappus atop the fruits consists of thin, minutely barbed, whitish bristles, and is easily shed from the fruits.

Worldwide Distribution

Jacobaea vulgaris is native to most of Europe, North Africa (Morocco, Tunisia), and western Asia (Plants of the World Online, 2022; USDA/GRIN, 2022). It is reported to be naturalized in Australia (New South Wales, South Australia, Tasmania, Victoria, Western Australia), New Zealand, and North America (United States and Canada). It has also been reported from South Africa and Argentina (Harper and Wood, 1957), but may be extirpated in those countries (CABI, 2022). In the United States, it has been reported from the states of Alaska, California, Oregon, Washington, Idaho, Montana, Wyoming, Michigan, Illinois, Indiana, Pennsylvania, New Jersey, New York, Massachusetts, and Maine, and in Canada from the provinces of British Columbia, Manitoba, Ontario, Quebec, New Brunswick, Newfoundland, Nova Scotia, and Prince Edward Island (Bain, 1991; Plants of the World Online, 2022; USDA PLANTS database, 2022). There are a small number of additional occurrences shown for the states of Utah, Colorado, Minnesota, North Carolina, and Wisconsin, and the provinces of Alberta and Saskatchewan by EDDMapS (2022) that may represent recent introductions.

Official Control:

Senecio jacobaea (= *Jacobaea vulgaris*) is listed on CCR Section 4500 as a noxious weed defined by California FAC Section 5004. The Department is mandated by California FAC, Division 1, Chapter 3, Section 403 to prevent the introduction and spread of noxious weeds. The species is listed as a noxious weed subject to containment, control, or eradication measures in the states of Arizona, Colorado, Connecticut, Idaho, Massachusetts, Montana, Oregon, and Washington (NPB, 2022; USDA PLANTS database, 2022). The species is listed as a harmful organism subject to phytosanitary exclusion by the countries of Chile, China, Colombia, India, and New Zealand (USDA PCIT database, 2022).

Jacobaea vulgaris is listed as a restricted noxious weed seed in California and is subject to stringent tolerances in agricultural seed shipments into and within California. The species is listed as a prohibited

noxious weed seed by the states of Arizona, Idaho, Montana, Oregon, and Washington (USDA/AMS, 2022), and as a primary noxious weed seed (Class 2) in the Canadian Weed Seed Order (2016).

Tansy ragwort has been the target of biological control efforts in the United States since 1959 with the California release of the cinnabar moth, *Tyria jacobaeae* L. (Lepidoptera: Arctiidae), followed by the release of the ragwort seed fly, *Botanophila seneciella* Meade (Diptera: Anthomyiidae) in California in 1966 (Jacobs and Sing, 2009). These two insects, plus the tansy ragwort flea beetle, *Longitarsus jacobaeae*, are biological control agents permitted for use in California (Pitcairn et al., 2014).

California Distribution:

Jacobaea vulgaris has been reported from vouchered collections in the Consortium of California Herbaria database (2022) from Del Norte, Humboldt, Siskiyou, Glenn, Mendocino, Lake, Sonoma, Marin, Nevada, Amador, San Francisco, San Mateo, Santa Cruz, and Monterey counties in northern and central California, with the earliest recorded collection from 1912 in Mendocino County. The CalFlora database (2022) contains over 400 records for the species from California, including the following reports per county: Amador (3), Del Norte (177), Glenn (1), Humboldt (71), Inyo (1), Lake (3), Marin (2), Mendocino (107), San Benito (1), San Francisco (1), San Mateo (1), Santa Clara (1), Santa Cruz (2), Shasta (1), Siskiyou (4), Sonoma (4), Tehama (1), Trinity (18), and Tulare (3), some of which may represent transient introductions.

California Interceptions:

Between 2006-2021 there were 8 interceptions of *Jacobaea vulgaris* (*Senecio jacobaea*) in shipments or vehicles from Oregon into northern California. One of the interceptions was of seedlings found in a commercial shipment of nursery stock into Santa Clara County, California. The remaining interceptions were from private vehicles intercepted at the Hornbrook, Redwood Highway, or Smith River Border Inspection Stations, one of which was in association with grass hay in a truck bed (CDFA PDR database, 2022).

Consequences of Introduction

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

In its native environment, *Jacobaea vulgaris* occurs in sand dune, woodland, and grassland communities (Harper and Wood, 1957). It grows best in moist areas with cool, wet, cloudy weather, on lighter, well-drained loamy or sandy soils (Jacobs and Sing, 2009). According to Wardle (1987), the species is not tolerant of drought or salinity.

In North America, tansy ragwort is found at elevations between 0–1500 meters above sea level in pastures, rangelands, forest clearings, roadsides, and waste grounds, most commonly in heavily grazed pasturelands and disturbed or open habitats in areas with cool damp summers (Barkley, 2006; Wardle, 1987). In Australia, the species primarily occurs in areas of high rainfall (Everist, 1974), and in California it has been found most frequently in the northwestern counties of the state (CCH, 2022; CalFlora, 2022)

- 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: Score is High (3)

Jacobaea vulgaris 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 High (3)

Jacobaea vulgaris reproduces by seed and can also grow vegetatively from root fragments or from overwintering basal stems (Harper and Wood, 1957). Root and stem fragments can be moved in and between infested fields (Jacobs and Sing, 2009). Local seed dispersal is primarily via wind and to a lesser degree, water (Wardle, 1987). Jacobs and Sing (2009) state that most seed of the species is dispersed between two to 14 meters of the parent plant. Seeds can also be moved longer distances in soil, on clothing or vehicles, and by birds or other animals (Bain, 1991).

Tansy ragwort can produce tens of thousands of seeds per plant under favorable conditions, and plants that have been grazed or otherwise damaged can respond by producing increased numbers of stems and flower heads (Bain, 1991). Seed viability is generally high, commonly reaching 80 to 90 percent (Bain, 1991). Seeds can remain viable after eight years of dormancy in soil, with a predicted dormancy period of up to 20 years (Wardle, 1987).

Disturbance, mowing, or grazing during the growing season can stimulate vegetative growth of *Jacobaea vulgaris*. Over 20 flowering stems have been observed growing after cutting from a single crown. The stems persist after the original crown decays, leaving fully established new plants (Wardle, 1987).

- 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: Score is High (3)

Pyrrolizidine alkaloids present both in growing plants of tansy ragwort and in dry plant material of the species are highly toxic to cattle, horses, and goats, although cattle and horses generally avoid eating the living plant because of its bitter taste and are thus more likely to ingest the plant in contaminated grass hay (Harper and Wood, 1957; Fuller and McClintock, 1986). The alkaloids can cause irreversible liver damage (Winston et al., 2016) and may lead to reduced weight gain, the production of milk (in cows) with reduced butterfat content, and sudden death in apparently healthy animals (Jacobs and Sing, 2009). Sheep show a higher level of tolerance for the toxins in the plant (DiTomaso and Keyser, 2013). The alkaloids in tansy ragwort pollen can also taint honey, making it bitter, off-color, and unmarketable (Fuller and McClintock, 1986; Jacobs and Sing, 2009).

In 2019, the revenue generated from cattle production in California was \$3.1 billion, from milk and cream production was \$7.3 billion, and from honey production was over \$25 million (CDFA, Agricultural Statistics Review, 2019-2020). In 2019, organic pasture and rangeland accounted for

647,288 acres throughout California, with the top ten pasture and rangeland producing counties being Tehama, Modoc, Humboldt, Merced, Siskiyou, San Luis Obispo, Sonoma, Marin, and both Mendocino and Stanislaus (CDFA, 2020).

Shipments, including agricultural seed, that are found infested with tansy ragwort and shipped to or within California or to another state where the species is regulated are subject to rejection, treatment, reconditioning, or destruction, typically at the owner's expense.

- 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:

- 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)

The flattened rosettes of tansy ragwort can displace native plant species by covering other plants and suppressing their growth. Jacobs and Sing (2009) and Wardle (1987) suggest that the alkaloids in tansy ragwort rosettes may have an allelopathic effect on other plants. The plant is however mostly found in overgrazed pastureland and open habitats.

According to Jacobs and Sing (2009), tansy ragwort is toxic to deer.

- 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:

- 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 *Jacobaea vulgaris*: **High (14)**

Low = 5-8 points

Medium = 9-12 points

High = 13-15 points

6) Post Entry Distribution and Survey Information: Score is Medium (-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).

-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 (14-2=12)

Conclusion and Rating Justification:

Tansy ragwort is a noxious weed species that has been found in cool moist climate areas of northern California for many decades and has been significantly reduced in population size by concerted efforts at biocontrol. Due to the high reproductive output of the species and its toxic effects on livestock from contaminated pasturage or hay, the species has a high potential for economic damage to agriculture. A B-rating is recommended to encourage continued control efforts to limit its harmful effects on agriculture and the environment of the state.

Uncertainty:

It is unclear to what degree that the plant may be able to establish on a long-term basis in eastern areas of the state where climatic differences such as colder winters may negatively impact the Cinnabar moth and other biocontrol agents.

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Responsible Party: Robert Price, Primary State Botanist; California Department of Food and Agriculture; Seed Laboratory and Herbarium; 3294 Meadowview Road, Sacramento, CA 95832; (916) 738-6700; permits@cdfa.ca.gov.

***Comment Period: 09/22/2022 through 11/06/2022**

***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](mailto: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.

Proposed Pest Rating: [B]
