

# Washington Invasive Ranking System

Washington Natural Heritage Program

## *Jacobaea vulgaris* (Tansy Ragwort)

Assessed by

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14 October 2024 (WIRS Version 1.5)

Ecological Impact Rank: **Moderate** (60)

Confidence: **Low** (25)

Management Difficulty Rank: Moderate (67)

Confidence: Moderate (40)

Biological Characteristics of Invasiveness: High (77)

Confidence: High (71)

Concern Related to Distribution and Abundance: High (87)

Confidence: High (90)



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### Ranking Notes

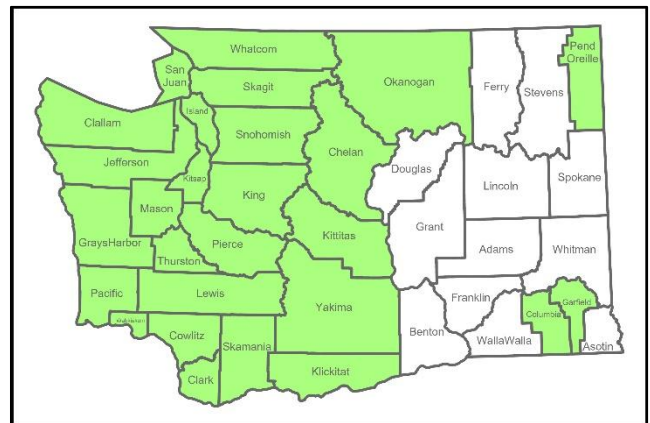
None

### Legal Listings

[Washington State Weed Board](#): Class B, Washington State quarantine list.

[Washington Invasive Species Council](#): No

### Section 1: Distribution and Abundance



**Figure 1.** Distribution of counties where *Jacobaea vulgaris* has been documented in Washington State (CPNWH, 2023; EDDMapS, 2023; iNaturalist Contributors, 2023).

### Q1: Current Range Size in Washington

Rating: High

Confidence: High

*Jacobaea vulgaris* is found in 69% of counties in Washington State (CPNWH, 2023; EDDMapS, 2023; iNaturalist Contributors, 2023).

Source: Herbarium records and other observations

## Q2: Current Trend in Total Range

Rating: Moderate

Confidence: High

In Washington, *Jacobaea vulgaris* is most abundant west of the Cascades, but has been documented in most counties outside of the Columbia Plateau (EDDMapS, 2023). In the past 20 years, this species appears to have expanded into the Olympic Peninsula and the western Cascades, but does not appear to be expanding east of the Cascades (CPNWH, 2023; iNaturalist Contributors, 2023).

Source: Herbarium records and other observations, Model predictions.

## Q3: Proportion of Potential Range Currently Unoccupied

Rating: Low

Confidence: High

According to model predictions, *Jacobaea vulgaris* may expand somewhat further in eastern Washington, but may not gain a foothold in the Columbia Plateau (EDDMapS, 2023). However, the vast majority of herbarium records are from west of the Cascades, as are all herbarium and iNaturalist records documented in the past 20 years (CPNWH, 2023; iNaturalist Contributors, 2023). This species survives best in cool, wet climates; hot, dry summers reduce seedling survival and establishment (Richardson, 2004), likely limiting its range in eastern Washington.

Source: Informal publication, Herbarium records and other observations, Model predictions

## Q4: Local Range Expansion or Change in Abundance

Rating: High

Confidence: High

Over the last 20 years, *Jacobaea vulgaris* abundance and local range appears to have increased rapidly west of the Cascades, particularly in the Puget Trough ecoregion (CPNWH, 2023; iNaturalist Contributors, 2023).

Source: Herbarium records and other observations

## Q5: Diversity of Ecosystems Invaded

Ecosystem types: Forest & Woodland, Grassland & Shrubland, Emergent Open Wetland, Forested Wetland

Rating: High

Confidence: Moderate

In its introduced range, *Jacobaea vulgaris* is mainly known from disturbed mesic sites in cool and wet climates. In the Pacific Northwest, it is abundant in prairie and oak habitats, and frequently found in old fields, pastures, roadsides, forest clearings, the edges of riparian areas and wetlands, and other open disturbed areas. This species prefers well-drained loamy or sandy soils and frequently occurs with *Cirsium arvense*, *Hypericum perforatum* and *Linaria vulgaris* (Richardson, 2004; Jacobs, 2009).

Source: Informal publication, Professional expertise

## Section 2: Biological Characteristics

### Q6: Aggressive Mode of Reproduction

Rating: Yes

Confidence: High

*Jacobaea vulgaris* is a winter annual to short-lived perennial. Many plants are monocarpic, but this species can also grow as a true perennial, flowering and producing seed in multiple years. While *J. vulgaris* can reproduce from root fragments, it is most likely to reproduce from seed. One plant can produce between 5,000–200,000 seeds in four to six weeks, with an average viability of 80%. Populations can spread rapidly in disturbed areas without control efforts. One population in Montana grew to cover 150 square miles between 1993 and 1997 (Richardson, 2004; Jacobs, 2009).

Source: Informal publication

### Q7: Innate Potential for Long-Distance Dispersal

Rating: Yes

Confidence: Moderate



*Jacobaea vulgaris*’ ray flowers shed their pappus, but disc flowers maintain the pappus, allowing for wind dispersal. Seeds are usually dispersed only a few meters from the parent plant but can be dispersed up to several kilometers by wind under the right conditions. Seeds are also occasionally dispersed by animals and water (Richardson, 2004; Jacobs, 2009).

Source: Informal publication

#### **Q8: Potential to be Spread by Human Activities**

Rating: Yes

Confidence: Moderate

In its introduced range, *Jacobaea vulgaris* is usually found in areas of human disturbance such as roadsides, old fields, and developments. Mowing can disperse this species’ seeds more than double the distance of natural dispersal. Seeds can also be spread via other agricultural equipment, tires and clothes, livestock manure, contaminated weed and straw, and by firefighting activities (Richardson, 2004; Jacobs, 2009).

Source: Informal publication, Professional expertise

#### **Q9: Allelopathy**

Rating: Yes

Confidence: Moderate

*Jacobaea vulgaris* produces alkaloids that may be allelopathic and some studies have shown that this species can inhibit seed germination in several other plant species (Richardson, 2004; Jacobs, 2009). However, other studies found a positive effect of *J. vulgaris* presence on growth and survival of heterospecific plant species (at least in *J. vulgaris*’ native range) (Van De Voorde et al., 2012).

Source: Published research, Informal publication

#### **Q10: Competitive for Limiting Abiotic Factors**

Rating: Yes

Confidence: Moderate

*Jacobaea vulgaris* can crowd out other species in disturbed areas, but this species generally does not invade intact plant communities (Richardson, 2004).

Several studies have compared the competitive ability of plants from introduced populations of *J. vulgaris* to plants from *J. vulgaris*’ native range. These studies have found that plants from the introduced range are more competitive than their counterparts from their native range. This is likely due to release from specialist predators, allowing plants to allocate more resources (such as nitrogen) to growth and reproduction instead of defense (Lin et al., 2019). Adult plants are strongly competitive against other plant species, but seedlings are not (Wardle, 1987).

*Jacobaea vulgaris* is a winter annual, biennial, or short-lived perennial. This species is generally monocarpic and overwinters as a seed or rosette (Jacobs, 2009).

Source: Published research, Informal publication

#### **Q11: Growth Form**

Rating: No

Confidence: Moderate

In restored Willamette Prairie habitats, *Jacobaea vulgaris* can occur as scattered individuals or small clumps. This species can form large, dense stands in unrestored old fields in the same habitat. This species’ rosettes have large leaves that lay flat to the ground, shading out neighboring plants. The death of adult plants provides openings for new *J. vulgaris* seedlings to establish (Richardson, 2004; Jacobs, 2009). However, *J. vulgaris* does not appear to exclude other species long term.

Source: Informal publication, Professional expertise

#### **Q12: Germination Requirements**

Rating: No

Confidence: High

*Jacobaea vulgaris* seeds require light to germinate. Cover from other plants may prevent germination. Seedling survival is greatly reduced in areas with tall vegetation or dense turf and increases in grazed or cleared areas. Seedling establishment increases with available open ground (Jacobs, 2009; Van De Voorde et al., 2012).



Source: Published research, Informal publication

**Q13: Invasiveness of Other Plants in Genus**

Rating: Yes

Confidence: High

*Jacobaea aquatica* is an increaser species in its native habitat in Central Europe (Krieger et al., 2023).

Source: Published research

**Q14: Shade Tolerance**

Rating: Moderate

Confidence: Moderate

*Jacobaea vulgaris* is generally found in open, disturbed areas, and requires light to germinate seeds and establish seedlings (Richardson, 2004; Jacobs, 2009). However, at least in its native range, open habitat can also increase vulnerability to drought and the chances of discovery by specialist herbivores like *Tyria jacobaeae*. In these instances, partially shaded areas can become refugia from drought and herbivory for some populations of this species (Van Der Meijden et al., 1992), at least in Europe.

Source: Published Research, Informal Publication, Professional expertise

**Q15: Disturbance Tolerance**

Rating: Yes

Confidence: High

In the Pacific Northwest, *Jacobaea vulgaris* is usually found in open, disturbed areas such as old fields, roadsides or the edges of disturbed wetlands. Fire can kill seeds and encourage plant species that are competitive with *J. vulgaris* in grasslands but creates habitat conducive to *J. vulgaris* invasion in forests (Jacobs, 2009). This species has a persistent seed bank and can reproduce from root fragments, enabling populations to increase after disturbances like grazing, mowing, and tilling (Richardson, 2004; Jacobs, 2009). In its native and invasive range, *J. vulgaris* colonizes disturbed areas and disappears from stable communities, suggesting that it relies on disturbance to maintain populations (Van Der

Meijden et al., 1992; Jacobs, 2009; Van De Voorde et al., 2012).

Source: Published research, Informal publication, Professional Expertise

**Q16: Propagule Persistence**

Rating: >10 years

Confidence: Moderate

*Jacobaea vulgaris* seeds are not innately dormant. However, frost, drought, and burial can all induce dormancy, and seeds can remain viable for 6–20 years (Richardson, 2004; Jacobs, 2009).

Source: Informal Publication

**Q17: Palatability**

Rating: Yes, plant is unpalatable

Confidence: High

Due to high alkaloid contents, *Jacobaea vulgaris* is toxic to most mammals (sheep are an exception) (Richardson, 2004; Jacobs, 2009). This species has caused serious poisonings of livestock in the Pacific Northwest and may also be poisonous to deer (Richardson, 2004; Jacobs, 2009). The alkaloids present in the nectar and pollen of this plant also make bitter, off-color honey (Jacobs, 2009). The presence of *J. vulgaris* reduces forage values in the pastures where it occurs (Jacobs, 2009). *Jacobaea vulgaris* plants in the introduced range can produce up to 90% more alkaloids than plants in the native range (Lin et al., 2019). While these alkaloids are effective in discouraging generalist herbivores, plants from the invasive range have less defense against specialist herbivores than plants growing in their native range, even after the introduction of those specialists as biocontrols (Lin et al., 2019).

Source: Published research, Informal publication

**Section 3: Ecological Impact**

**Q18: Impact on Ecosystem Abiotic Processes**

Abiotic Processes: Geomorphology, Light availability



Rating: Low

Confidence: Low

*Jacobaea vulgaris* rosettes have large leaves that lay flat to the ground, excluding other species by blocking light. When adult plants die, they leave bare openings in the vegetation. In Oregon, studies found that *J. vulgaris* seedlings established best in the openings left by senesced adult plants, allowing populations to persist in plant communities after initial establishment (Wardle, 1987).

In California, has been shown to increase erosion rates (Richardson, 2004).

Source: Published research

### **Q19: Impact on Ecosystem Structure**

Rating: Low

Confidence: Low

*Jacobaea vulgaris* can reduce biomass of microbes in the soil (Richardson, 2004). Given the ability of rosettes to shade out neighboring plants, the presence of this species may reduce overall vegetation cover where it occurs.

Source: Informal publication

### **Q20: Impact on Ecosystem Composition**

Rating: Moderate

Confidence: Moderate

*Jacobaea vulgaris* is capable of displacing native plant species, reducing plant community diversity and the abundance and cover of beneficial plant species within a vegetation community (Jacobs, 2009). It can also displace herbivore pressure to more palatable species (Wardle, 1987). In grasslands and oak woodlands west of the Cascades, this species frequently occurs with other introduced and invasive species such as *Cirsium vulgare*, and a multitude of introduced perennial grasses.

Source: Published research, Informal publication, Professional expertise

### **Q21: Impact on Particular Native Species**

Rating: Low

Confidence: Low

In Oregon, the rare plant *Sidalcea hirtipes* (which is also present in southwestern Washington (WNHP, 2024) showed a 40% increase in seed production after *J. vulgaris* biocontrols were released (Richardson, 2004). However, no information was found on whether this apparent effect on reproduction was a result of direct interaction between the two species, or part of a community wide response to reduction in *J. vulgaris* populations.

*Jacobaea vulgaris* may also have the potential to interfere with pollination of *Senecio* or *Packera* species, but little evidence is available to confirm this. (Richardson, 2004). One of the successful biocontrol agents for *J. vulgaris*, *Tyria jacobaeae* (cinnabar moth), reportedly feeds on native *Senecio* and *Packera* species after exhausting local *J. vulgaris* populations (Jacobs, 2009).

*Jacobaea vulgaris* may have a positive effect as a nectar source for the federally threatened butterfly *Speyeria zerene hippolyta* (Oregon silverspot) (Richardson, 2004), though there was no information on the quality or importance of this species as a nectar plant.

Source: Informal publication

### **Q22: Observed Ability to Invade Undisturbed Ecosystems**

Rating: Low

Confidence: High

Intact plant communities are resistant to invasion by *Jacobaea vulgaris*, but this species can establish in small disturbances (e.g., gopher burrows) and then serve as a vector for increased abundance (Richardson, 2004).

Source: Informal publication

### **Q23: Observed Ability to Invade Naturally Disturbed Ecosystems**

Rating: Yes

Confidence: Low

At a site in Corvallis, Oregon, *Jacobaea vulgaris* was common in restored old fields, but was not frequent in remnant prairie that had not been previously farmed. This species appears to require soil disturbances to establish (Van De Voorde et al., 2012), but grasslands with intact native communities and fire regimes may be resistant to invasion by *J. vulgaris* (Jacobs, 2009). However, this species may be able to invade naturally disturbed communities when the recurring disturbance results in bare soil (e.g., flooding, landslides, high-severity fire).

Source: Published research, Informal publication, Professional expertise

## Section 4: Management Difficulty

### Q24: General Management Difficulty

Rating: Moderate

Confidence: Moderate

Herbicide application before flowering may be the most effective management technique for *Jacobaea vulgaris*. Care is required when using herbicide because application can temporarily make the plant more palatable to livestock. Mowing is not recommended because it does not remove the vegetative portion of the plant and *J. vulgaris* may flower more vigorously after mowing. Tilling is also not recommended unless combined with herbicide use and revegetation with another competitive plant species, because plants can regrow from root fragments and soil disturbance stimulates germination of seeds from the seed bank. Hand pulling can be effective if all of the caudex and roots are removed, but gloves should be used when pulling this species. Several biocontrol agents have been developed for *J. vulgaris*, and in California and Oregon *Tyria jacobaeae* and the fleabeetle *Longitarsus jacobaeae* have both been effective in reducing *J. vulgaris* populations (Richardson, 2004; Jacobs, 2009). *Jacobaea vulgaris* populations in North America are less well defended against specialist herbivores like *T. jacobaeae* or *L.*

*jacobaeae* than plants from this species' native range (Lin et al., 2019).

Source: Published research, Informal publication

### Q25: Minimum Time Commitment

Rating: High

Confidence: Low

Literature review did not reveal a minimum time commitment for treating *Jacobaea vulgaris*. However, it seems likely that active treatment efforts need to extend long enough to exhaust the seed bank for this species (6-20 years) (Richardson, 2004). To prevent recolonization, ongoing monitoring coupled with native plant community restoration is likely needed.

Source: Informal publication, Professional expertise

### Q26: Impacts of Management on Native Species

Rating: Moderate

Confidence: Low

Broadcast herbicide use could have negative effects on co-occurring forbs and grasses. Biocontrol agents may also spill over on related *Senecio* and *Packera* species (Jacobs, 2009).

Source: Informal publication, Professional expertise

### Q27: Inaccessibility of Invaded Areas

Rating: Low

Confidence: Moderate

*Jacobaea vulgaris* appears to rely primarily on human disturbance to invade plant communities (Jacobs, 2009), suggesting populations are frequently in areas that are accessible for treatment.

Source: Informal publication, Professional expertise

### Q28: Sociopolitical Implications of Management

Rating: Insignificant

Confidence: High

*Jacobaea vulgaris* reduces the value of pasture and rangelands, and is poisonous to livestock



(Richardson, 2004; Jacobs, 2009). Given these effects, objections are likely to be minimal, beyond general objections to herbicide use.

Source: Informal publication, Professional expertise

### Additional Comments

None

### References

- Consortium of Pacific Northwest Herbaria (CPNWH). 2023. Consortium of Pacific Northwest Herbaria Specimen Database. <http://www.pnwherbaria.org/index.php>. Accessed: October 17, 2023.
- EDDMapS. 2023. Early Detection & Distribution Mapping System. The University of Georgia - Center for Invasive Species and Ecosystem Health. <http://www.eddmaps.org>. Accessed: October 15, 2023.
- iNaturalist Community. 2024. Research grade observations from Washington State. <https://www.inaturalist.org/>. Accessed: December 24, 2024.
- iNaturalist Contributors. 2023. iNaturalist Research-grade Observations, Accessed via GBIF.org. <https://doi.org/10.15468/ab3s5x>. Accessed: October 5, 2023.
- Jacobs J.S. 2009. Plant guide for tansy ragwort, *Senecio jacobaea* L. USDA-Natural Resources Conservation Service, State Office, Bozeman, MT 49715.
- Krieger M.-T., L.H. Teixeira, K. Grant, J. Kollmann, and H. Albrecht. 2023. Reconciling the control of the native invasive *Jacobaea aquatica* and ecosystem multifunctionality in wet grasslands. *Basic and Applied Ecology* 68:13–22.
- Lin T., P.G.L. Klinkhamer, T.L. Pons, P.P.J. Mulder, and K. Vrieling. 2019. Evolution of increased photosynthetic capacity and its underlying traits in invasive *Jacobaea vulgaris*. *Frontiers in Plant Science* 10:1016.
- Richardson B. 2004. Plant assessment form: *Senecio jacobaea*. <https://www.cal-ipc.org/plants/paf/senecio-jacobaea-plant-assessment-form/>. Accessed: October 14, 2024.
- Van De Voorde T.F.J., W.H. Van Der Putten, and T.M. Bezemer. 2012. The importance of plant–soil interactions, soil nutrients, and plant life history traits for the temporal dynamics of *Jacobaea vulgaris* in a chronosequence of old-fields. *Oikos* 121(8):1251–1262.
- Van Der Meijden E., P.G.L. Klinkhamer, T.J. De Jong, and C.A.M. Van Wijk. 1992. Meta-population dynamics of biennial plants: how to exploit temporary habitats. *Acta Botanica Neerlandica* 41(3):249–270.
- Wardle D.A. 1987. The ecology of ragwort (*Senecio jacobaea* L.) - A review. *New Zealand Journal of Ecology* 10:67–76.
- Washington Natural Heritage Program (WNHP). 2024. Bristly-stemmed checkermallow - *Sidalcea hirtipes*. Washington Field Guide. <https://fieldguide.mt.gov/wa/?species=sidalcea%20hirtipes>. Accessed: October 14, 2024.

