

CAPS Datasheets provide pest-specific information to support planning and completing early detection surveys.

Onopordum acaulon

Scientific Name

Onopordum acaulon

Synonym(s):

Onopordum pyrenaicum DC.

O. uniflorum Cav.

O. acaule

Common Name

Stemless thistle, white thistle, flat thistle, horse thistle, stemless Onopordum

Type of Pest

Weed

Taxonomic Position

Class: Magnoliopsida, **Order:** Asterales, **Family:** Asteraceae



Figure 1. Stemless thistle habit (A) and flowering heads (B). (These images are © State of Victoria, Department of Primary Industries. Victorian Resources Online www.dpi.vic.gov.au/vro. Reproduced with permission. Photos by Mark Imhof.)

Pest Recognition

Leaves: This plant has no stems (Agriculture Victoria, 2022), but a large rosette develops that may spread to cover an area up to 23.6 in or more in diameter. The numerous whitish-green leaves are densely covered in woolly hairs. They are deeply divided with numerous spiny, waxy lobes (DPIRD, 2020).

Flowers: Flowers have spherical heads 1.57 to 2.36 inches in diameter. Each head contains white or purple florets and is surrounded by sharp spines. Several flower heads are formed as a cluster at the center of the rosette, close to the ground (Fig. 1). The flower heads have no stalks (DPIRD, 2020).

Seeds: The achenes (hard, dry fruits, often casually referred to as “seeds”) are gray or brown in color and about 0.16 in long. They are four-sided with a ridged seed coat and a pappus (parachute) of pale barbed hairs (Fig. 2). Seeds may remain dormant for several years. They begin to germinate in autumn but may continue to do so through spring (DPIRD, 2020). The pappus is cream-colored, 0.79 to 1.18 in long, deciduous in a ring, and often missing, leaving a brown to white apical collar measuring 0.05 to 0.07 in at its widest. Seeds have an elaiosome at the base (Scher et al., 2022), which is typical of the genus *Onopordum* and of several other thistles and knapweeds (Meyer, 2017). The elaiosome is eaten by ants and encourages seed dispersal (Meyer, 2017).



Figure 2 . (A) Hard, dry fruits (achenes) without the “parachute” of hairs that allow wind dispersal. (B) Achene with detached pappus. Hairs of pappus have been broken and were originally longer. (Photos by Deena Walters).

Easily Mistaken Species

This species may be confused with two similar thistle species (FNA, 2022), *O. acanthium* and *O. illyricum*, during the seedling and rosette stages. *Onopordum acaulon* has less lobed and broader rosette leaves than the other two species. The mature flowering plant can be easily identified as it is stemless, prostrate, and wreath-like in appearance (Dellow and Holtkamp, 2005).

Biology and Ecology

This species is a non-woody plant that lies close to the ground. It completes its life cycle in one to two years (Parsons and Cuthbertson, 2001).

Germination occurs mainly after autumn rains (Parsons and Cuthbertson, 2001). In winter, the plant is found as a small rosette with a diameter of only 1 to 2 inches. The plant rapidly grows when spring comes and can reach up to 23.6 inches in diameter at maturity (DPIRD, 2020; Parsons and Cuthbertson, 2001). In Australia, flowering occurs in spring before the plant dies. Seedlings that germinate in winter and spring typically

die off during early summer without producing seed (DPIRD, 2020), though some may survive and produce seed their second summer (Parsons and Cuthbertson, 2001). Therefore, this species can be a biennial if conditions are favorable (DPIRD, 2020; Parsons and Cuthbertson, 2001).

This species can produce eight flower heads per plant. Each flower head can produce 150 seeds, resulting in about 1,200 seeds per plant (Agriculture Victoria, 2022). This species reproduces only by seed (Parsons and Cuthbertson, 2001). The seeds are dispersed by wind and water and possibly externally by animals (Agriculture Victoria, 2022; Parsons and Cuthbertson, 2001).

Seeds can survive for several years in the soil. Cut plants may re-sprout from root fragments and may produce multiple crowns (Agriculture Victoria, 2022).

Habitats

Onopordum acaulon is a weed of pastures, arable and cultivated lands, roadsides, channel banks, fallow ground, wastelands, and irrigated vegetable crops in Australia (Agriculture Victoria, 2022; Auld and Medd, 1987; Briese, 1990; Julien, 2006; Lanea, 1979; Parsons and Cuthbertson, 2001). It can tolerate a wide range of precipitation levels (DPIRD, 2020). Although it prefers warm-temperate areas with sandy soil and less than 18 in of annual precipitation (Auld and Medd, 1987), it has also been found in cooler regions of Australia with up to 31 in of annual precipitation (Briese et al., 1990).

Pest Importance

Although this plant is not considered a weed in its native range (Parsons and Cuthbertson, 2001), it is invasive in its introduced range in Australia. The carrying capacity of pastures can be lowered by dense infestations of *O. acaulon* because livestock rarely eat the plant except when it wilts (Parsons and Cuthbertson, 2001). If livestock do eat it, it can cause stomach ailments and liver and kidney damage (DPIRD, 2020). *Onopordum acaulon* can spread over large areas and shade out other plants (native ground covers and grasses) with its large, flat leaves (Agriculture Victoria, 2022; DPIRD, 2020). It is not known how this plant affects soil nutrients and subsequent crops in the infested areas (Parsons and Cuthbertson, 2001).

This species is spiny throughout most of the year and can interfere with recreational activities. The spines may cause minor injuries (Agriculture Victoria, 2022).

Because of the impact that this weed has caused in Australia, the biological control program that was already in place for two congeners (*O. illyricum* and *O. acanthium*) in Western Australia was extended to include *O. acaulon* (Julien, 2006; Swirepik and Woodburn, 2002). In Australia, *O. acaulon* is a declared pest, which means that all reasonable measures must be taken to control its impact and spread (DPIRD, 2020; Minehan, 1996). Trade goods exported to New Zealand must have phytosanitary certificates declaring the goods to be free of this pest (USDA PCIT, 2019). In the United States, it is also regulated as a Federal Noxious Weed (7 CFR §360, 2018).

Known Distribution

This species is native to:

Africa: Algeria, Morocco, and Tunisia and **Europe:** France and Spain (GRIN Taxonomy, 2022)

This species has been introduced and is established in the following countries:

Australia (GRIN Taxonomy, 2022).

It has also been reported from the United Kingdom (Adams, 2009), but this has not been confirmed.

Pathway

This species can be dispersed easily by wind, as the seeds have a large feathery pappus. In Australia, seeds of this species have been dispersed over 656 feet by wind (Agriculture Victoria, 2022).

Spread may also occur to a lesser extent as an agricultural contaminant of hay, silage, chaff, and commercial seed; on vehicles and animals; and through water (Agriculture Victoria, 2022; HEAR, 2007; Parsons and Cuthbertson, 2001).

This species may have been introduced into Australia as an ornamental (Parsons and Cuthbertson, 2001).

This species is a weed and may potentially enter the United States through any number of pathways as a hitchhiker on commodities or conveyances. Because it is a Federal Noxious Weed, a permit is required for importation and interstate movement (7 CFR §360, 2018).

Potential Distribution within the United States

The Weed Risk Assessment conducted for *O. acaulon* indicates that the species is most likely to establish in the southwestern states and along the West Coast. Suitable climates may also be found in the southeastern states (PPQ, 2022).

Survey and Key Diagnostics

Approved Methods for Pest Surveillance*:

For the current approved methods and guidance for survey and identification, see Approved Methods for Pest Surveillance (AMPS) pest page on the CAPS Resource and Collaboration website, at <https://caps.ceris.purdue.edu/approved-methods>.

References

7 CFR §360. 2018. U.S. Code of Federal Regulations, Title 7, PART 360—Noxious Weed Regulations

Adams, J. 2009. Vegetation-Climature Interaction: How Plants Make the Global Environment. Springer, Berlin, Heidelberg.

- Agriculture Victoria. 2022. Stemless thistle. Victoria Department of Jobs, Precincts and Regions. <https://agriculture.vic.gov.au/biosecurity/weeds/weeds-information/stemless-thistle>.
- Auld, B. A., and R. W. Medd. 1987. Weeds: An illustrated botanical guide to the weeds of Australia. Inkata Press, Melbourne. 255 pp.
- Briese, D. T. 1990. A new biological control programme against thistles of the genus *Onopordum* in Australia. Pages 155-163 in Proceedings of the VII International Symposium on Biological Control of Weeds. CSIRO Publications, Rome, Italy.
- Briese, D. T., D. Lane, B. H. Hyde-Wyatt, J. Crocker, and R. G. Diver. 1990. Distribution of thistles of the genus *Onopordum* in Australia [weeds of pasture]. Plant Protection Quarterly (Australia) 5:23-27.
- Dellow, J., and R. Holtkamp. 2005. Scotch, Illyrian and stemless thistles (*Onopordum* spp.) (No. P7.6.55). New South Wales Department of Primary Industries, Orange, Australia. 6 pp.
- DPIRD. 2020. Stemless thistle: Declared pest. Western Australia Department of Primary Industries and Regional Development, Agriculture and Food, Perth, Australia. Last accessed 11/8/2022, <https://www.agric.wa.gov.au/declared-plants/stemless-thistle-declared-pest>.
- FNA. 2022. Flora of North America. eFloras. http://www.efloras.org/florataxon.aspx?flora_id=1&taxon_id=122941.
- GRIN Taxonomy. 2022. Germplasm Resources Information Network (GRIN Taxonomy, Online Database). United States Department of Agriculture, Agricultural Research Service, National Plant Germplasm System (National Germplasm Resources Laboratory, Beltsville, Maryland). <https://npgsweb.ars-grin.gov/gringlobal/taxon/taxonomydetail?id=25669>.
- HEAR. 2007. *Onopordum acaulon* (Asteraceae). Global Compendium of Weeds. Hawaiian Ecosystems at Risk (HEAR) http://www.hear.org/gcw/species/onopordum_acaulon/.
- Julien, M. H. 2006. Biological control of rangeland weeds in Australia. The Rangeland Journal 28(1):47-54.
- Lanea, D. 1979. The significance of noxious weeds on roadsides in agricultural areas of Victoria, Australia. Weed Research 19(3):151-156.
- Meyer, D. J. L. 2017. Identification Guide for Some Common and Noxious Thistle and Knapweed Fruits (Asteraceae, tribe Cardueae). California Department of Food and Agriculture, Plant Pest Diagnostic Center, Sacramento, CA. 13 pp.
- Minehan, D. 1996. Practical problems with existing thistle control: where is more research needed? Plant Protection Quarterly 11(SUP2):279-280.
- Parsons, W. T., and E. G. Cuthbertson. 2001. Noxious Weeds of Australia (Second). CSIRO Publishing, Collingwood, Australia. 698 pp.
- PPQ. 2022. Weed risk assessment for *Onopordum acaulon* L. (Asteraceae) - Stemless thistle. (Version 2). United States Department of Agriculture, Animal and Plant Health Inspection Service, Plant Protection and Quarantine (PPQ), Raleigh, NC. 17 pp.
- Scher, J. L., D. S. Walters, and A. J. Redford. 2022. Federal Noxious Weed Disseminules of the United States. United States Department of Agriculture,

California Department of Food and Agriculture.
<http://idtools.org/id/fnw/factsheet.php?name=14651>.

Swirepik, A. E., and T. L. Woodburn. 2002. A new biological control project against stemless thistle (*Onopordum acaulon*) in Western Australia. 13th Australian Weeds Conference, Perth, Australia. September 8-13, 2002.

USDA PCIT. 2019. Phytosanitary Certificate Issuance and Tracking System (PCIT). United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS). <https://pcit.aphis.usda.gov/pcit/faces/signIn.jsf>.

USDA-APHIS-PPQ-ST staff developed this datasheet. Cite this document as:

PPQ. 2022. Cooperative Agricultural Pest Survey (CAPS) Pest Datasheet for *Onopordum acaulon* (Asteraceae): Stemless thistle. United States Department of Agriculture, Animal and Plant Health Inspection Service, Plant Protection and Quarantine (PPQ), Raleigh, NC.

Versions

2011: Datasheet completed (Version 1)

January 2023 (Version 2)

- Updated website citation information
- Copied material into new CAPS template with changes as follows
- **Symptoms/Signs** section removed
- **Pathogens Vectored** section removed
- **Habitat** section added
- Added report from the United Kingdom to the **Known Distribution** section
- Added information about the Agricultural Commodity Import Requirements Database to the **Pathway** section
- Replaced outdated information in the **Potential Distribution with the United States** section with information from the WRA map.
- Replaced **Survey** section with **Survey and Key Diagnostics** section.
- **Identification** section removed
- **Easily Confused Pests** section removed

Reviewer(s)

Scott Blackwood USDA APHIS PPQ Weeds Cross Functional Working Group
Sherrie Emerine NCSU CIPM

Tony Koop USDA APHIS PPQ Weeds Cross Functional Working Group
Anne LeBrun USDA APHIS PPQ Weeds Cross Functional Working Group
Alec Ormsby USDA APHIS PPQ Weeds Cross Functional Working Group
Indira Singh USDA APHIS PPQ Weeds Cross Functional Working Group