

**DRAFT: WRITTEN FINDINGS OF THE
WASHINGTON STATE NOXIOUS WEED CONTROL BOARD**

Scientific Name: *Carduus cinereus* M.Bieb.

Synonyms: *Carduus pycnocephalus* L. subsp. *cinereus* (M.Bieb.) P.H.Davis; *Carduus arabicus* Jacq. subsp. *cinereus* (M.Bieb.) Kazmi

Common Name: Turkish thistle, Spanish thistle

Family: Asteraceae

Legal Status: being considered for listing on the monitor list or the state noxious weed list

Description and Variation:

Turkish thistle's description is adapted from Gaskin et al. (2019) unless otherwise cited. Refer to Gaskin et al. (2019) for Turkish thistle's full botanical description as well as the genetic research that determined these plants to be this new species in North America.

Overall habit:

Turkish thistle is an annual thistle with winged stems that can grow up to 4 feet tall. Its basal leaves are up to 4 inches long, and stem leaves reduce in size moving up the stem. Flower heads are compressed, non-spherical, and single or in loose clusters. Each purplish flower head is typically on a short hairy stem or may be stemless.



Images: left, Turkish thistle plants can flower when they are as small as 3 inches or can grow up to 4 feet tall depending on growing conditions (right image), images by Mark Porter, Oregon Department of Agriculture.

Stems:

Turkish thistle stems can vary greatly in size depending on habitat conditions, growing from 3 to 48 inches tall, (7.7 to 120 cm) (Porter 2020, Gaskin et al. 2019). Stems are unbranched to openly branched, and loosely covered with soft woolly hairs (tomentose). The stems are winged, with teeth of wings to 0.2 inches (5 mm) long and wing spines to 0.4 inches (10 mm) long.



Images: examples of Turkish thistle's winged stems, showing woolly hairs and the teeth and spines on the wings, images by Mark Porter, Oregon Department of Agriculture.

Leaves:

Turkish thistle plants have basal leaves and stem leaves.

- The basal leaves taper to winged petioles and are up to 4 inches (10 cm) long. The leaf blade margins are pinnately lobed with 2 to 5 lobes. The undersides of the leaves are tomentose while the upper surfaces are loosely tomentose.
- The stem leaves are sessile, without petioles, and reduce in size going up the stems toward the tips.



Images: Turkish thistle leaf with yellow arrow pointing to the woolly underside of the leaf (left) and sparsely woolly upper leaf surface (right), images by Mark Porter, Oregon Department of Agriculture.



Images: left, Turkish thistle pinnately lobed basal leaf example; center, single flower head on tomentose stem, left and center image by Mark Porter, Oregon Department of Agriculture; right, three flower heads with each having a stem (peduncle), image by Joel Price, Oregon Department of Agriculture.

Flowers:

The flower heads of Turkish thistle are non-spherical, somewhat compressed, and narrow towards the flowers (Porter 2020, Gaskin et al. 2019). Occurring singly or in loose groups of 2 to 5, flower heads are borne at branch ends and distal axils. A key identifying trait is that the flower heads are often on short stems (pedunculate) or they may also be sessile. These flower head stems are 0 to 1.2 inches (0 to 3 cm) long, do not have wings or are sparsely winged, and are tomentose (covered in soft woolly hairs).

The involucre (collection/whorl of bracts subtending the flower heads) are cylindric to ellipsoid, 0.47 to 0.79 inches long by 0.28 to 0.79 inches in diameter (12-20 mm long by 7-20 mm in diameter). The florets (individual flowers in flowerheads) are purplish and 0.47 to 0.60 inches (12 to 15 mm) long.



Images: Turkish thistle plant with winged stems, open branching and flower heads in bloom, image by Mark Porter, Oregon Department of Agriculture

Fruit:

The cypsela, a dry, single-seeded fruit, is golden brown to brown in color, 0.16 to 0.24 inches (4 to 6 mm) long, and finely-nerved. It has a bristly pappus, 0.4 to 0.8 inches (10 to 20 mm) long.

Similar species:

Gaskin et al. (2019) provides an updated key of the introduced *Carduus* species in North America. Of the five other species, four are listed as noxious weeds in Washington State: Class A noxious weed Italian thistle (*Carduus pycnocephalus*), Class A noxious weed slenderflower thistle (*Carduus tenuiflorus*), Class B noxious weed plumeless thistle (*Carduus acanthoides*), and Class B noxious weed musk thistle (*Carduus nutans*). Slenderflower, Italian, and Turkish thistles all have more slender, compressed, non-spherical flower heads, while plumeless and musk thistle have more rounded, hemispherical flower heads.

Of these species, Italian thistle is the most similar in appearance to Turkish thistle. The key included in Gaskin et al. (2019) separates the two species by

- Turkish thistle flower heads are typically on short stems and loosely clustered, with the bracts (phyllaries) of the flower heads having scarious (thin, dry, and membranous in texture) margins.
- Italian thistle in contrast has flower heads that are sessile (no stem) and are tightly clustered together, with the bracts (phyllaries) of the flower heads lacking scarious (thin, dry, and membranous in texture) margins.

Italian thistle is only documented from one location in Washington State, in Clallam County, but is known from a number of locations in Oregon and Idaho. Originally, certain thistle collections in northeast Oregon and western Idaho were also thought to be Italian thistle. Their identification was questioned due to morphological differences they exhibited from other Italian thistle collections and led to Gaskin et al. (2019) conducting a genetic study of these species. Due to the differences found in DNA sequences and morphology between Italian thistle (*Carduus pycnocephalus* subsp. *pycnocephalus*) and the plants in question, Gaskin et al. (2019) identified these plants as Turkish thistle, *Carduus cinereus*. Due to the similarities of the two species, there may be more Turkish thistle near to where it has already been found that was misidentified as Italian thistle (Porter pers. comm. 2020)



Images: left, Turkish thistle (*Carduus cinereus*) flower heads that are on short stems with woolly hairs, image by Joel Price, Oregon Department of Agriculture; right, Italian thistle, Italian thistle (*Carduus pycnocephalus*), flower heads are tightly clustered together and attach directly to the main stem (are sessile), image by John M. Randall, The Nature Conservancy, Bugwood.org.

Habitat:

Turkish thistle plants have been found growing on canyon grasslands, which include scattered shrubs and trees, and are often dominated by native bunchgrasses. Turkish thistle grows on dry rocky talus slopes on southern aspects as well as sites with deeper soils in more mesic sites (Porter 2020, Gaskin et al. 2019). Plants also grow along ephemeral streams, following their edges downhill (Porter pers. comm. 2020).

Geographic Distribution:

Turkish thistle, *Carduus cinereus*, is native to the eastern Mediterranean and the Irano-Turanian region – from much of Turkey east to the Himalayan Mountains (Porter 2020, Gaskin et al. 2019). In the United State, Turkish thistle is documented in northeastern Oregon and the adjacent area in Idaho (Gaskin et al. 2019). Porter

(2020) notes that the climate conditions of its native range are similar to many of the climate conditions found where the plants have been documented in Oregon and Idaho.

History:

It is not known how Turkish thistle was introduced into Oregon and Idaho (Gaskin et al. 2019). Turkish thistle was documented in North America in 2007 but was misidentified as Italian thistle until its identification was questioned in 2014 (Oregon Department of Agriculture, n.d.). As previously noted, genetic work and botanical study resulted in the determination of the plants as Turkish thistle in 2019 (Gaskin et al. 2019, Oregon Department of Agriculture n.d.). Recent survey work in Oregon and Idaho discovered additional plants near the areas of known populations (Porter pers. comm. 2020).

Listings:

Turkish thistle is listed as an A Rated noxious weed in Oregon. Idaho added Turkish thistle as a noxious weed on September 8, 2020. It was added to Idaho's noxious weed list as a temporary order for 15 months and placed on Idaho's Statewide Emergency Detection Rapid Response (EDRR) Weed list (Idaho State Department of Agriculture 2020).

Nearby to Washington:

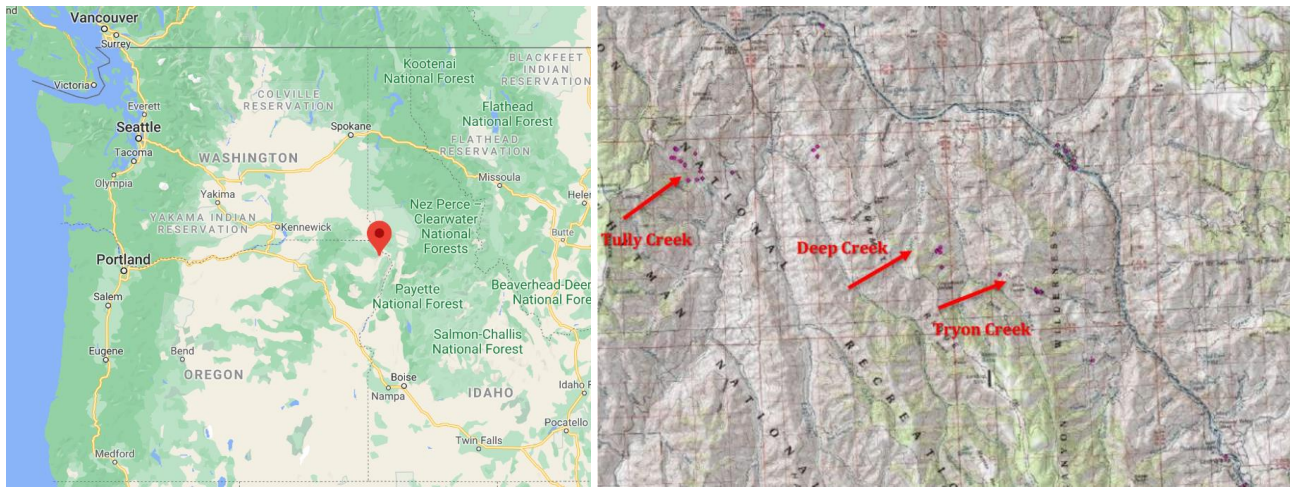
Idaho

Turkish thistle was found by Idaho State Department of Agriculture staff in the Pittsburg Landing area of Hells Canyon, Idaho County, Idaho (Idaho State Department of Agriculture 2020). This site is a developed recreational area on the Snake River and Turkish thistle was found within 100 feet of the main road (Porter 2020). New locations of Turkish thistle have been found in Idaho in 2020 near to the Pittsburg Landing area, along the Snake River. Survey work is continuing in the area (Porter pers. comm. 2020).

Oregon

Turkish thistle plants have mostly been found in the rugged back country of the Hells Canyon National Recreation area in Wallowa County. Porter (2020) reports that there are three main sites of Turkish thistle in this area: Tulley Creek (approximately 440 gross acres), Deep Creek (approximately 50 gross acres) and Tryon Creek (approximately 12 gross acres). There are also a few smaller satellite populations, under 5 gross acres in size, that are known to exist (Porter 2020). The Tulley Creek site has cattle grazing in the area and is in immediate proximity to a cattle driveway, so seeds are likely being moved from the area (Porter 2020). Additional plants were also found on the Oregon side of the Snake River in during a 2020 survey (Porter pers. comm. 2020).

No other populations are known of Turkish thistle in the United States at this time. Porter (pers. comm. 2020) noted that with the recent research available from Gaskin et al. (2019) and education of land managers and botanists, additional sites of Turkish thistle may be found, or previously identified Italian thistle sites may be determined to be Turkish thistle.



Maps, left, Map of Washington, Oregon and part of Idaho with a red marker indicating where Tulley Creek is located, map from Google maps 2020; right, map of the three main Turkish thistle sites in northeastern Oregon, plant sites indicated with purple dots, blue line is the Snake River, map from Oregon Weed Risk Assessment of Turkish thistle (Porter 2020).

Washington:

As of 2020, Turkish thistle has not been documented in Washington State. County noxious weed board coordinators were surveyed in September of 2020, and of the 32 counties responding, none reported knowing of any Turkish thistle plants in their counties. One area in which Turkish thistle could have a higher probability of being found would be in similar habitats in the southeast corner of the state, given the locations of the Oregon and Idaho populations.

Growth and Development:

Limited information is known about Turkish thistle, as this is a new find in the United States (Porter 2020). It is an annual with a short growing season that can flower at a very small size, as small as 3 inches, as well as grow up to 4 feet tall (Porter 2020). Plants were estimated to be rosettes in early to mid-April of 2020 and were observed to be in full bloom in mid-May 2020 when control treatments were taking place (Porter pers. comm. 2020). Younger plants can appear to look more like Italian thistle as the flower heads are less pedunculate, more sessile, and appear to develop the stems (peduncles) as the plants age (Porter pers. comm. 2020). Plant stems quickly decay after they dieback making the plant difficult to detect in the landscape unless the plant is actively growing (Porter 2020).

Reproduction:

Turkish thistle reproduces by seed, but its seed viability is unknown (Porter 2020). DiTomaso et al. (2013) note that our *Carduus* species seeds typically do not persist in the soil seed seedbank for more than a few years, but musk thistle has been found to have seeds viable in the soil up to 18 years (James et al. 1998 in Porter 2020). Turkish thistle is presumed to not be able to spread vegetatively (Porter 2020).

At one of the remote Hells Canyon sites being treated annually for at least five years, three plants were treated in 2020, and it is thought there haven't been any seeds produced recently at this location due to these treatments (Porter pers. comm. 2020).

Vectors of seed spread for Turkish thistle are wind, water and animals (Porter 2020). Seeds may also be inadvertently spread in soil and mud moved by any recreational users in these areas. For example, visitors to the Pittsburg Landing recreational site in Idaho along the Snake River may inadvertently come in contact with and spread seeds due to Turkish thistle's close proximity to a main road (Porter 2020). Seed heads have also been found to have fallen off the plant before they are mature, but it is unknown what role this plays in the plant's reproduction (Porter 2020).

Porter (2020) does note that fire has been more prevalent - more frequent and more intense - in the Hells Canyon area, and this removes competition and makes conditions more favorable for the expansion of weeds, possibly including Turkish thistle.

Economic and Ecological Importance:

Detrimental:

Turkish thistle is documented as spreading on its own in Oregon, competing with and crowding out native vegetation and desirable forage plants (Porter 2020). It has been noted to spread readily and be competitive in native rangelands in NE Oregon (Porter 2020). Other *Carduus* species are known to be weedy and invade rangelands, meadows, pastures, and fields in Washington and the Pacific Northwest.

Turkish thistle plants, notably populations found in the rugged terrain of Hells Canyon, provide a significant challenge to land managers due to the time and resources needed to reach the plants and treat them (Porter 2020). If adequate resources are not available to treat these populations, plants will likely spread, reaching recreational areas and nearby agricultural lands (Porter 2020).

Hybridization is able to occur within the *Carduus* genus. Plumeless and musk thistle are able to hybridize, but it is unknown if Turkish thistle may be able to hybridize with other *Carduus* species (Porter 2020, DiTomaso et al. 2013).

Beneficial:

Turkish thistle may be used by native pollinators in early to mid-summer for pollen and nectar, but there is no research on this possible usage of the species (Porter 2020).

In Turkish thistle's native range, caterpillars of the painted lady butterfly (*Vannessa cardui*) feed on the plants, but it is not expected this would act as a control for the Turkish thistle plants in Oregon (Porter 2020).

Control:

It is expected that control methods used on the other non-native *Carduus* species should be effective to manage and control Turkish thistle, *Carduus cinereus* (Porter 2020). Turkish thistle's short growing season and its current distribution in hard to access locations makes it challenging to time control methods when they are most effective.

When possible, carry out control methods when pollinators are not active on plants. Also, make sure to clean shoes, clothing, and equipment when leaving infestations to prevent spreading seeds to new locations.

Many of the control methods from DiTomaso et al. (2013) for *Carduus* species can be used for Turkish thistle. This information can be found online here:

https://wric.ucdavis.edu/information/natural%20areas/wr_C/Carduus_acanthoides-nutans-pycnocephalus-tenuiflorus.pdf

Below are additional considerations from Porter (2020) to keep in mind when controlling Turkish thistle.

Mechanical Control and Grazing:

Repeatedly mowing plants over the growing season when they are bolting and almost flowering can provide control, but timing this repeated treatment can be difficult depending on how easily the plants can be accessed. Since Turkish thistle appears to have a short growing season, control methods that need to be specifically timed need to be carefully planned for hard to reach populations.

While grazing of Turkish thistle plants may be possible in some settings, due to the presence of at-risk species, it is not recommended for Oregon populations (Porter 2020).

Biological Control:

Oregon Department of Agriculture found that seed-feeding weevils released on the plants have shown little to no establishment or damage, so this is not a recommended control method for Turkish thistle (Oregon Department of Agriculture, n.d.).

Chemical Control:

Weed Control in Natural Areas in the Western United States (DiTomaso et al. 2013) provides helpful herbicide recommendations and advice. Oregon has found Turkish thistle to be susceptible to herbicides containing aminopyralid and picloram (Porter 2020). Remember to carefully read and follow the herbicide label. In general, use herbicide control in combination with other control methods to reduce usage when possible. When using herbicide, treat plants when pollinators are not present or are the least active. For questions about specific herbicide use, please contact your county noxious weed control board.

Monitor plants to make sure all have been controlled, and follow up with additional control methods where plants are still living. Plant native and other non-invasive species to provide competition and help prevent reinfestation of this and other invasive species.

References:

DiTomaso, J.M., G.B. Kyser, et al. 2013. Weed Control in Natural Areas in the Western United States. Weed Research and Information Center, University of California. 544 pp.

Gaskin, J. F., E. Coombs, D. G. Kelch, D. J. Keil, M. Porter, and A. Susanna. 2019. *CARDUUS CINEREUS* (ASTERACEAE) – NEW TO NORTH AMERICA. *Madroño*, Vol. 66 (4): 142-147.

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