

**WRITTEN FINDINGS OF THE
WASHINGTON STATE NOXIOUS WEED CONTROL BOARD
Updated 2015**

Scientific Name:	<i>Tanacetum vulgare</i> L.
Synonyms:	<i>Chrysanthemum vulgare</i> (L.) Bernh., <i>Tanacetum boreale</i> Fisch. ex DC., <i>Tanacetum vulgare</i> L. var. <i>crispum</i> DC.
Common Name:	Common tansy, golden-buttons, tansy, bitter buttons, ginger plant, scented fern, garden tansy
Family:	Asteraceae
Legal Status:	Class C noxious weed in 1988



Images: left, *Tanacetum vulgare* in bloom, image by Stevens County Noxious Weed Control Board; right, infestation of blooming *T. vulgare*, image by Steve Dewey, Utah State University, Bugwood.org

Description and Variation:

Overall habit:

Tanacetum vulgare is a rhizomatous, perennial plant that generally grows up to 5 feet tall. Leaves are fern-like and alternately arranged along the stems. Flowers are in yellow, button-like flowerheads that are arranged in flat-topped clusters at stem tips.

Roots:

Tanacetum vulgare have rhizomes that are thick, branched and extensive (DiTomaso et al. 2013, Zhu et al. 2011). New shoots result from buds on the rhizomes and grow close to the parent plant, creating an expanding stand of stems (DiTomaso et al. 2013, Jacobs 2008). Rhizomes from *T. vulgare* growing in Gallatin County Montana ranged between 1/2 to 3/4 inches (5 to 19 mm) in diameter (Jacobs 2008).

Stems:

Tanacetum vulgare grows one to many ridged stems, which are typically 15.75 inches to 4.9 feet (40 to 150 cm) tall (Watson 2006). Stems are hairless to sparsely hairy and branch near the top (Watson 2006). Stems can become somewhat woody (Panke and Renz 2013).

Leaves:



Image: *Tanacetum vulgare* leaf from middle of mature stem, image by WSNWCB.

Leaves at the base of stems soon die back (senesce) as the plants grow during the season (Watson 2006). Stem leaves are alternately arranged and are either sessile (attached directly to the stem) or have short petioles (Zhu et al. 2011, Watson 2006).

Leaf blades are oblong or oval to elliptic in overall shape, 1.6 to 7.9 inches (4 to 20 cm) long by 0.8 to 3.9 inches (2 to 10 cm) wide (Watson 2006). Leaf blades are pinnately lobed, with 4 to 13 pairs of primary lobes, which are divided into numerous narrow, toothed segments (Watson 2006). They are hairless to sparsely hairy and dotted with flat or sunken glands, emitting a strong, unpleasant (bitter) scent when crushed (DiTomaso et al. 2013, Panke and Renz 2013).

Flowers:

Tanacetum vulgare flowerheads are in compact, somewhat flat-topped clusters (corymbiform arrays) and are a helpful identification trait (DiTomaso et al. 2013, Watson 2006). Flowerhead clusters range in number from 20 to 200 (Watson 2006). Each yellow, button-like flowerhead is comprised of only disk flowers and lack ray flowers (which can look like petals). Disk flowers can number up to 100 for each flowerhead and are all perfect except for the outermost (~20) that are pistillate (lack stamens) (Dorn 1977 and Great Plains Flora Association 1986 in Gucker 2009, Jacobs 2008, Watson 2006). The disk flower's petals are 0.08 to 0.12 inches (2 to 3 mm) long (Watson 2006). Involucre are 0.2 to 0.4 inches (5 to 10 mm) in diameter (Watson 2006). The involucre bracts are arranged so they overlap like roof tiles (imbricate), with papery margins and tips.



Images: left, *Tanacetum vulgare* flowerheads prior to opening; center, open flowers; right, flowers after blooming; all images WSNWCB.

Fruit:

Each disk flower can produce one fruit, a cypsela which is similar to an achene. The cypsela is 0.04 to 0.08 inches (1 to 2 mm) long, 4 to 5 angled or ribbed, dotted with glands and has a very short pappus (0.2 to 0.4mm) (Watson 2006). *Tanacetum vulgare* can produce more than 2,000 seeds per plant (DiTomaso et al. 2013).

Similar species:

At the Washington State Noxious Weed Control Board questions come in each summer about yellowing flower weeds that people need help identifying or call tansy. Typically they have either common tansy (*Tanacetum vulgare*), tansy ragwort (*Senecio jacobaea*) or common St. Johnswort (*Hypericum perforatum*); all three are noxious weeds. These noxious weeds overlap in their bloom time and can be confused with each other. By looking at certain flower and leaf traits though, the three can be easily distinguished from each other. See the table below for specific information.



Image: Flower comparison of common St. Johnswort (lower left) with five-petaled flowers, common tansy (upper center) with button-like flowers, and tansy ragwort (right) with yellow daisy-like flowers.

Species	Habit and stems	Leaves	Flowers
<i>Tanacetum vulgare</i> , common tansy, Class C noxious weed	Perennial up to 5 feet tall, upright leafy stems; mainly hairless or sparsely hairy	Alternate on stems; fern-like in appearance, divided with 4 to 10 pairs of primary lobes, and further divided into numerous toothed segments; to about 8 inches long	Yellow, button-like flowerheads, no ray flowers (no 'petals')
<i>Senecio jacobaea</i> , tansy ragwort, Class B noxious weed	Primarily a biennial, forms a rosette the first year; second year grows upright stems up to ~4 feet	Alternate on stems; divided and lobed, can have a ruffled appearance; to about 8 inches long	Yellow flowerhead daisy-like in appearance, with disk and ray flowers; on average, there are 13 'petals' (ray flowers)
<i>Hypericum perforatum</i> , common St. Johnswort, Class C noxious weed	Perennial, stems up to 2.5 feet; stems smooth, somewhat two-edged, woody at the base	Opposite on stems; 1-2 inches long; narrow and simple with smooth margins and tiny purplish-black dots (glands)	Flowers have five yellow petals with tiny black dots (glands) on the margins;

Tanacetum bipinnatum (camphor tansy) is a native *Tanacetum* species in Washington, Oregon and California that grows in sand dunes along the coast, other sandy sites, calcareous soils, and coastal scrub habitats (Jacobs 2008, Watson 2006). *Tanacetum bipinnatum*'s leaves are pinnately dissected but have a less jagged appearance (more rounded tips of the lobes and teeth) than *T. vulgare* and it also only grows up to 2 feet (60 cm) while *T. vulgare* grows up to 5 feet (Jacobs 2008). The Washington Natural Heritage Program, which tracks rare and listed species in the state, includes *T. bipinnatum* on its list of vascular plants it tracks. The species is currently unranked for the state as its conservation status has not been ranked, and also lists it in the group of 'potential concern but needs more field work to assign another rank' (WANHP 2014).

Habitat:

Like many other weedy species, *Tanacetum vulgare* exhibits a high degree of environmental adaptability. *Tanacetum vulgare*'s successful growth in a wide range of habitats, including stressful conditions, may be attributed to the essential oils present in plant parts (Stevović et al. 2009).

Tanacetum vulgare grows on disturbed sites including abandoned plantings, gardens, roadsides and railroad tracks, fence rows, pastures, forest clearings and ditch banks (LeCain and Sheley 2014, DiTomaso et al. 2013, Birdsall et al. 2011, and Watson 2006). Plants are also found in meadows and riparian areas, thriving especially in soil that is moist, for at least part of the year, and open sites (DiTomaso et al. 2013 and Jacobs 2008).

Geographic Distribution:

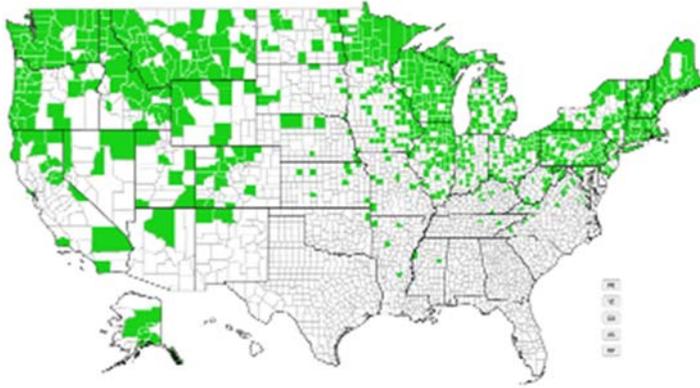
Introduced horticulturally and for medicinal purposes, *Tanacetum vulgare* was brought to North America in herbal gardens, being noted as flourishing in New England gardens as early as 1663 (Durant 1976 in Mitich 1992). From its continual introduction, plants were noted as being naturalized throughout the northeast United States in 1785 (Haughton 1978 in Mitich 1992). *Tanacetum vulgare* was first documented in Montana in 1931 and was widespread in California by 1952 (LeCain and Sheley 2014).

Tanacetum vulgare is native to parts of Asia and Europe and is also considered a weed in parts of its native range (Gassmann et al. 2006 and Rebele 2000 in Kleine and Muller 2013). According to the USDA GRIN database, (USDA ARS 2015), *Tanacetum vulgare* is specifically native to:

- Europe: Denmark, Faroe Islands, Finland, Iceland, Norway, Sweden, United Kingdom, Austria, Belgium, Czech Republic, Germany, Hungary, Netherlands, Poland, Slovakia, Switzerland, Belarus, Latvia, Lithuania, Moldova, Ukraine, Albania, Bosnia and Herzegovina; Bulgaria, Croatia, Greece, Italy, Macedonia, Montenegro, Romania, Serbia, Slovenia, France, Spain
- Asia: Turkey, Armenia, Georgia, Russian Federation, Kazakhstan, Kyrgyzstan, Mongolia, China, Japan, Korea

USDA GRIN database (USDA ARS 2015) lists *Tanacetum vulgare* naturalized in:

- New Zealand
- Europe: Ireland, Portugal
- Canada: Northwest Territory, New Brunswick, Newfoundland, Nova Scotia, Ontario, Prince Edward Island, Quebec, Alberta, British Columbia, Manitoba, Saskatchewan
- United States: Connecticut, Indiana, Maine, Massachusetts, Michigan, New Hampshire, New Jersey, New York, Ohio, Pennsylvania, Rhode Island, Vermont, West Virginia, Illinois, Iowa, Kansas, Minnesota, Missouri, Nebraska, North Dakota, Oklahoma, South Dakota, Wisconsin, Colorado, Idaho, Montana, Oregon, Washington, Wyoming, Arkansas, Georgia, Kentucky, Louisiana, Maryland, North Carolina, Tennessee, Virginia, New Mexico, California, Nevada, Utah
- South America: Brazil, Peru, Argentina, Chile, Uruguay



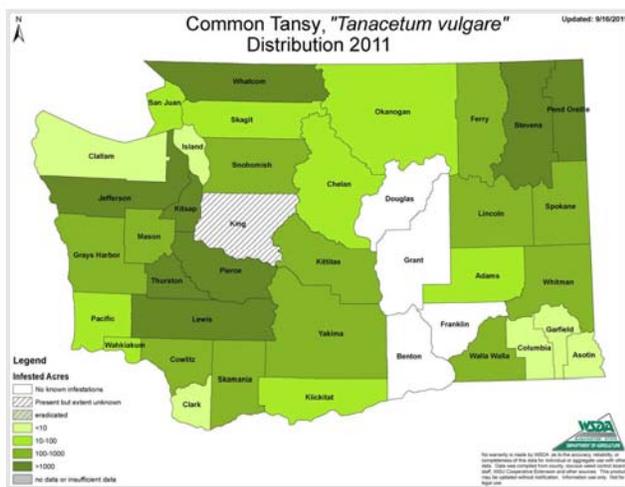
Map: County presence/absence data of *Tanacetum vulgare* in the United States in 2015, map by EDDMapS 2015.

Listings:

Tanacetum vulgare is listed as a noxious weed or on a regulated list in Washington, Colorado, Montana, Wyoming, and Minnesota (USDA ARS 2015, Minnesota Department of Agriculture 2015).

Washington:

The earliest herbarium record of *Tanacetum vulgare* in Washington is from Whitman County, collected in 1930 (WTU 25862) (WTU 2015). The specimen label notes that it is common and is growing on waste ground near Pullman. Other early collections in Washington include ones from a roadside collection in Clallam County in 1931 (WTU 21485), from Vashon Island in King County in 1932 (WTU 306371), and from Skamania County in 1933 (WTU 28847). Collections and reports have documented *T. vulgare* growing in most counties in Washington, with large infestations in eastern and western Washington (WSDA 2011).



Maps: left, county level distribution data of *Tanacetum vulgare* in 2011, map by Washington State Department of Agriculture; right, herbarium records (orange dots) of *T. vulgare* in Washington, Oregon, Idaho and part of Montana and Canada, map by Consortium of Pacific Northwest Herbaria 2015.

Growth and Development:

New growth begins in the spring. Stems grow near the parent plant from spreading rhizomes, creating an expanding infestation (DiTomaso et al. 2013). The dense roots can occupy the upper two feet of soil (LeCain and Sheley 2014). Stems grow clusters of flowerheads during midsummer (LeCain and Sheley 2014) Flowers bloom during the summer to fall, generally from July to October (Watson 2006).

A variety of insects pollinate *T. vulgare* flowers including flies, butterflies, moths and honeybees (LeCain and Sheley 2014).

Jacobs (2008) recorded the growth of *T. vulgare* in Montana with leaf expansion occurring in mid-May, stems grew to 3 or more feet by mid-June, flower bud formation began in June, late flower bud state in late June, and flowers blooming in August up through October and early November along roadsides. In Montana, stem densities averaged 100 per meter squared (Jacobs 2008).



Image: left, *Tanacetum vulgare* seedling, image by Joseph M. DiTomaso, U of California-Davis, Bugwood.org; center, spring stem and leaf growth, Steve Dewey, Utah State University, Bugwood.org; right, stems and old inflorescences in the winter, image by Joseph M. DiTomaso, U of California-Davis, Bugwood.org

Reproduction:

Tanacetum vulgare spreads by seed and also vegetatively by rhizomes and rhizome fragments (DiTomaso et al. 2013). It is not known how long seeds survive in the seedbank (DiTomaso et al. 2013, Gucker 2009). Seeds can germinate without cold stratification but have higher germination rates having undergone cold stratification (Gucker 2009). In seeding trials, *T. vulgare* established best on open sites with low amounts of groundcover and no litter while plants did not establish where there were high amounts of competition and litter (White 1997 in Gucker 2009). Estimates of seeds produced per plant widely range from 2,000 seeds and higher. In a study in Montana, developed seeds were tallied for each plant and averaged 2,533 and were also tallied and averaged per square meter at 198,625 (Jacobs 2008).

Genetic testing indicates that the spread of *T. vulgare* over large areas is by seed rather than by rhizomatous spread (Clasen et al. 2011). *Tanacetum vulgare* can form large clonal patches by its spreading rhizomes and has the ability to produce a large quantity of seed, enabling it to have a high invasive potential (Clasen et al. 2011). *Tanacetum vulgare* is an outcrossing species and can have a high level of genetic diversity, which is distributed within all populations in genetic sampling carried out in one study (Clasen et al. 2011).

Seeds can be spread in a number of methods including on water, by animals, by people, in baled hay, and in soil (Gucker 2009). Rhizome fragments can be spread by equipment and in soil (Jacobs 2008).

Tanacetum vulgare rhizomatous growth rate has been measured at up to 1.3 feet (0.4 meters) over a 2-year period, and there was also found to be a 14-fold increase in the stems growing in bare soil (Alec McClay pers. comm. in Clasen et al. 2011). Rhizomes from a study in Gallatin County Montana were studied and found to have an average age of 5.4 years with the longevity depending a lot on site conditions (Jacobs 2008). In the study, moist sites had rhizomes that lived on average for 3 to 4 years and drier sites rhizomes tended to live longer, some up to 10 years old (Jacobs 2008).

Economic Importance:

Detrimental:

A number of sources note how *Tanacetum vulgare* grows in thick, expanding stands that crowd out native and other desirable plants, but there is little published information on its invasive ecology (Jacobs 2008). The large body of scientific literature that is available on *Tanacetum vulgare* focuses primarily on the plant's chemical make-up and how it has, and can be, used medicinally. The high genetic diversity of *T. vulgare* helps it to be a successful invader, providing variation on which novel selection can act (Bossdorf et al. 2005 and Davis 2009 in Wolf et al. 2012). *Tanacetum vulgare* also has high diversity of chemotypes that can vary depending on population, habitat, and time of year, and can be beneficial for invasion as it may impede the adaptation potential of biological control agents (Jacobs 2008, Wolf et al. 2011 in Wolf et al. 2012). Several distinct chemotypes of *T. vulgare* are recognized (Mitich 1992).

Tanacetum vulgare infestations are reported to lower the production of forage for livestock and wildlife (DiTomaso et al. 2013). Plants can quickly spread after soil disturbance and overgrazing (DiTomaso et al. 2013).

Toxicity

Tanacetum vulgare can be toxic if ingested in large enough quantities, and toxic properties are also cumulative, so long-term consumption can cause toxic effects (Plants for a Future n.d., LeCain and Sheley 2014). Consuming too much of the plant can cause neurointoxication, cardiac and respiratory depression, gastritis, convulsions, and death in people (Kingsbury 1964 in Mitich 1992, and Millspaugh 1974 in Burrows and Tyrl 2013). There are cases of fatal overdoses of *T. vulgare* tea and oil (Burrows and Tyrl 2013). Thujone, a chemical within the plant's volatile oil, can cause these symptoms including skin irritation (DiTomaso et al. 2013). Acute and chronic toxicity occur when doses of *T. vulgare* are 9 g/kg b.w. and greater (Lahiou et al. 2008 in Burrows and Tyrl 2013). *Tanacetum vulgare* is typically avoided by grazers due to its unpalatability so livestock poisonings are not common.

It has been noted that dairy cows that graze on *Tanacetum vulgare* may produce unpleasant-tasting milk (Hilty 2009 in Gucker 2009).

Beneficial:

Tanacetum vulgare has been used for a variety of purposes including medicinal. Historically, it was used in funeral wraps to discourage worms, used to treat intestinal worms, used for fevers and digestive problems, and for many other purposes (Mitich 1992). Additional medicinal uses of *T. vulgare* include use as a antispasmodic, antihelminthic, carminative, stimulant to abdominal viscera, a tonic, emmenagogue, antidiabetic, diuretic, and antihypertensive (Stevović et al. 2009). Recent research on *T. vulgare* has focused on additional medicinal information, repellent properties, preservative properties and on the essential oils in the plant that vary with season and between plants, resulting in distinct chemotypes being recognized (Mitich 1992).

Zhu et al. (2011) report that the entire plant is used as an insecticide, though it has been found to not be as effective as commercial preparations containing diethyltoluamide (Mitich 1992). The essential oils distilled from the flowerheads of *T. vulgare* have a repellent effect (between 64 to 72%) on the common tick, *Ixodes ricinus* (Pålsson et al. 2008).

Control:

When working with *Tanacetum vulgare*, it is important to wear gloves to avoid contact dermatitis from the foliage (DiTomaso et al. 2013). Since *T. vulgare* does best when it grows in open areas without litter and plant competition, it is important to plant and seed competitive native and non-invasive plants to provide competition to *T. vulgare* as part of a management plan.

Mechanical Control:

Small infestations and individual plants can be hand-pulled or hand-dug out of the soil. It is important to try to remove the roots as fragments left in the soil may resprout (DiTomaso et al. 2013). The size of the infestation that can be hand-pulled depends on how much time is available to thoroughly remove plants and monitor and control the area for resprouts.

Mowing alone will not kill established *Tanacetum vulgare* plants as they can readily regrow (DiTomaso et al. 2013). If mowing is the only option, mow plants before they bloom, but when plants have flower buds, as this may reduce seed production (DiTomaso et al. 2013). When mowing *T. vulgare*, limit damage to desirable plants by setting the mower blades high (LeCain and Sheley 2014). Repeat mowing if plants produce more flower buds (Panke and Renz 2013). Repeated mowing over time may reduce populations when there are competitive plants present (Jacobs 2008). Do not mow *T. vulgare* if it is already in flower or in seed as this could aid spreading seed (Panke and Renz 2013). Mowing can also be used to prep a site before an herbicide treatment (DiTomaso et al. 2013).

Tilling can control *Tanacetum vulgare* in cropland that is in rotation though follow up control work may be needed for resprouting rhizomes and for seedlings (Jacobs 2008). Tilling also has the potential to spread rhizome fragments, so make sure to clean equipment before moving it to another location.

Cultural Control:

Prescribed fire is not reported to kill *Tanacetum vulgare* as plants have been found to quickly resprout from root buds (DiTomaso et al. 2013).

As already noted, planting and promoting competitive non-invasive or native plants can help slow the spread of *T. vulgare* (DiTomaso et al. 2013).

Biocontrol Control:

There are no approved classical biological control agents for *Tanacetum vulgare*, though research is in progress.

Some animals may be poisoned from grazing *Tanacetum vulgare*, but sheep and goats are reported to be able to tolerate grazing the plants, though they may avoid it due to its bitter taste (Panke and Renz 2013). Grazing may knock plants back but will not kill them. Animals used to graze *T. vulgare* will need to be quarantined in a holding facility for 14 days to allow time for its seeds to pass through their digestive system (LeCain and Sheley 2014, Panke and Renz 2013). A study in Montana using sheep to graze *T. vulgare* reported no toxic effects to the sheep, but considering the reproductive failures it can cause, they recommended removing sheep from grazing infestations four weeks prior to breeding and during gestation (LeCain and Sheley 2014, Jacobs 2008).

Herbicide Control:

A number of herbicides can be used to control *Tanacetum vulgare*. In general, use herbicide control in combination with other control methods to reduce usage. Treat plants when pollinators are not present or are the least active.

Please refer to The Pacific Northwest Weed Management Handbook for information on timing, herbicides and herbicide rates to use for *T. vulgare* control. <http://pnwhandbooks.org/weed/other-items/control-problem-weeds/tansy-common-tanacetum-vulgare>. A number of herbicides are listed including metsulfuron, dicamba, and chlorsulfuron. Glyphosate and 2,4-D can also be used and should be applied to rapidly growing plants before bloom (DiTomaso et al. 2013). Herbicides Perspective (aminocyclopyrachlor + chlorsulfuron), Streamline (aminocyclopyrachlor + metsulfuron), and Milestone (aminopyralid) also can provide good control of *T. vulgare* (Dr. Tim Miller, WSU Extension, pers.comm.). Make sure to carefully read and follow all

instructions on herbicide labels. Contact your county noxious weed control board for further information about *T. vulgare* herbicide use and control.

References:

Birdsall, J. L., W. McCaughey, and J. B. Runyon. 2012. Roads impact the distribution of noxious weeds more than restoration treatments in a lodgepole pine forest in Montana, U.S.A. *Restoration Ecology*, Vol. 20: 517-523.

Burrows, G. E. and R. J. Tyrl. 2013. *Toxic Plants of North America*. Second Edition. Wiley-Blackwell. 1383 pp.

Clasen, B. M., N. G. Moss, M. A. Chandler, and A. G. Smith. 2011. A preliminary genetic structure study of the non-native weed, common tansy (*Tanacetum vulgare*). *Canadian Journal of Plant Science*. 91: 717-723.

Consortium of Pacific Northwest Herbaria. *Tanacetum vulgare*. <http://pnwherbaria.org/index.php>

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.

EDDMapS. 2015. Early Detection and Distribution Mapping System. The University of Georgia-Center for Invasive Species and Ecosystem Health. Available online at <http://www.eddmaps.org/>; last accessed January 26, 2015.

Gucker, C. L. 2009. *Tanacetum vulgare*. In: *Fire Effects Information System*, [Online]. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory : <http://www.fs.fed.us/database/feis/> . accessed 2015, February 17.

Jacobs, J. 2008. *Ecology and Management of Common Tansy (Tanacetum vulgare L.)*. Invasive Species Technical Note No. MT-18. United States Department of Agriculture Natural Resources Conservation Service.

Kleine, S. and C. Müller. 2013. Differences in shoot and root terpenoid profiles and plant responses to fertilization in *Tanacetum vulgare*. *Phytochemistry* 96: 123-131.

LeCain, R. and R. Sheley. 2014. *Common tansy (Tanacetum vulgare)*. MT199911AG Revised 1/14. Montana State University Extension. 114SA.

Minnesota Department of Agriculture. 2015. 2015 Noxious Weed List. Accessed online at: <http://www.mda.state.mn.us/plants/pestmanagement/weedcontrol/~media/Files/plants/weeds/noxiousweeds2015.pdf>

Mitich, L. W. 1992. Tansy. *Weed Technology*. Vol. 6 (1) 242-244.

Pålsson, K., T. G. T. Jaenson, P. Bäckström, and A. Borg-Karlson. 2008. Tick repellent substances in the essential oil of *Tanacetum vulgare*. *Journal of Medical Entomology*. Vol. 45 (1): 88-93.

Panke, B. and M. Renz. 2013. *Management of invasive plants in Wisconsin: Common tansy (A3924-32)*. University of Wisconsin-Extension, Cooperative Extension.

Plants for a future. 2015. *Tanacetum vulgare*. <http://pfaf.org/user/Plant.aspx?LatinName=tanacetum+vulgare>

Stevović, S., V. S. Mikovilović, and D. Čalić-Dragosavac. 2009. Environmental adaptability of tansy (*Tanacetum vulgare* L.). African Journal of Biotechnology. Vol. 8 (22) 6290-6294.

Watson, L. E. 2006. *Tanacetum*. In: Flora of North America Editorial Committee, ed. 1993+. Flora of North America North of Mexico. http://www.efloras.org/florataxon.aspx?flora_id=1&taxon_id=132267. Accessed 1.19.2015.

Wolf, V. C., A. Gassmann, B. M. Clasen, A. G. Smith, and C. Müller. 2012. Genetic and chemical variation of *Tanacetum vulgare* in plants of native and invasive origin. Biological Control. Vol. 61: 240-245.

WSDA. 2011. Common tansy, *Tanacetum vulgare* distribution 2011. Map. <http://agr.wa.gov/PlantsInsects/Weeds?WeedMapLists/> Accessed 19 January 2015.

WTU. 2015. University of Washington Burke Herbarium. *Tanacetum vulgare*. <http://www.burkemuseum.org/herbarium>. Accessed on January 26, 2015.

USDA, ARS, National Genetic Resources Program. Germplasm Resources Information Network-(GRIN) Online Database. National Germplasm Resources Laboratory, Beltsville, Maryland. URL <http://www.ars-grin.gov/cgi-bin/npgs/html/taxon.pl?80037> (19 January 2015).

Washington Natural Heritage Program (WANHP). 2014. List of Vascular Plants Tracked by the Washington Natural Heritage Program. Accessed January, 2015. <http://www1.dnr.wa.gov/nhp/refdesk/lists/plantrnk.html>

Zhu, S., C. J. Humphries, and M. G. Gilbert. 2011. *Tanacetum*, in Flora of China. Vol. 20-21. http://www.efloras.org/browse.aspx?flora_id=2&start_taxon_id=132267. Accessed 1.19.2015.