

Dalmatian toadflax

Linaria dalmatica L.

Synonyms: None

Other common names: None

Family: Scrophulariaceae

Description

Dalmatian toadflax is a perennial with a stout woody rootstalk. Stems are glabrous, erect, and often branched, up to 3 feet tall. Leaves are alternate, $\frac{3}{4}$ to 1 inch wide, lanceolate to ovate, acute or long-tapered, and clasping the stem. They are often appearing opposite. The stem and leaves are smooth and bluish green. Flowers are born in long terminal inflorescences and are 2-lipped, $\frac{3}{4}$ to $1\frac{1}{2}$ inches long with a long spur; the lower lip closing throat is densely hairy and white to orange colored. Fruit is a 2-celled capsule with numerous small seeds (Royer and Dickinson 1999, Wetherwax 1993, Whitson et al. 2000)



Yellow toadflax (*Linaria vulgaris* P. Mill.) can be distinguished from Dalmatian toadflax by much narrower leaves, $\frac{1}{4}$ inch wide and 1 to 4 inches long, and smaller yellow flowers with an orange throat (Royer and Dickinson 1999, Wetherwax 1993).

Ecological Impact

Impact on community composition, structure, and interactions: Dalmatian toadflax may outcompete and displace native species (Zouhar 2003). This plant is considered unpalatable for grazing animals. Bumble bees and halictid bees are the two most important pollinators for Dalmatian toadflax (Carpenter and

Murray 1998). This species may form hybrids (Vujnovic and Wein 1977).

Impact on ecosystem process: Dalmatian toadflax may lead to establishment and dominance of other invasive species in community (Zouhar 2003).

Biology and Invasive Potential

Reproductive potential: Dalmatian toadflax reproduces by both seeds and by vegetative buds on roots. New infestations usually originate from seed. The plant can produce up to 500,000 seeds annually (Carpenter and Murray 1998). New plants can be produced when vegetative buds sprout from lateral roots that are found in the upper 2 to 12 inches of soil (Alex 1962). Vegetative reproduction is possible from root fragments as short as $\frac{1}{2}$ inch (Zouhar 2003).

Role of disturbance in establishment: Dalmatian toadflax is readily established on disturbed sites (Carpenter and Murray 1998). Soil disturbance that removes perennial plants may increase toadflax seedling survival and encourage a severe infestation (Grieshop and Nowierski 2002, Robocker 1970).

Potential for long-distance dispersal: Most of the seeds fall within short distances of the parent plant. When seeds fall onto crusted snow, they can be blown by wind across the surface of the snow (Zouhar 2003). Dalmatian toadflax may also be dispersed by cattle, deer, and other browsing animals (Robocker 1970, Vujnovic and Wein 1997).

Potential to be spread by human activity: Dalmatian toadflax was probably introduced to North America as an ornamental, and it is still used as a garden plant in many areas (Alex 1962, Vujnovic and Wein 1997).

Germination requirements: Most of the seeds germinate in spring, but some can germinate in the fall. Seed are small and germinate if they are not buried deeper than $\frac{1}{4}$ inch in soil (Robocker 1970).

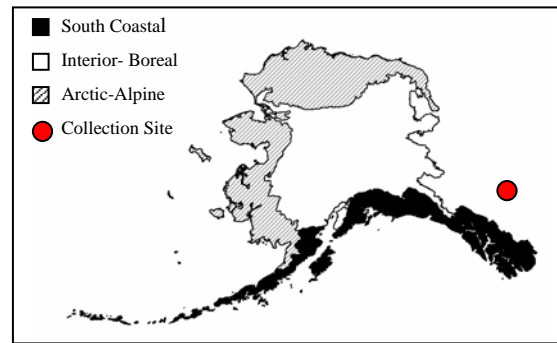
Growth requirements: Dalmatian toadflax is adapted to a wide variety of soil types and moisture conditions. It can be found in open, sunny places on well-drained, coarse-textured soils with pH ranging from 6.5 to 8.5 (Vujnovic and Wein 1997).

Congeneric weeds: *Linaria vulgaris* P. Mill., *L. genistifolia* (L.) P. Mill. (USDA 2002).

Listing: Linaria dalmatica is declared a noxious weed in 9 American states and 3 Canadian provinces (Invader Database System 2003).

Distribution and abundance

Native and current distribution: Dalmatian toadflax is native of southeastern Europe and southwestern Asia. The present world distribution includes most of Europe and Asia, and it has been introduced to Japan, Australia, New Zealand, South Africa, South and North America. It occurs throughout the continental U.S. and in almost in every Canadian province (Alex 1962, Royer and Dickinson 1999, Saner et al. 1995, USDA 2002). The range of Dalmatian toadflax in North America is from about 33° N to about 56° N and it is most common in western North America (Alex 1962, Carpenter and Murray 1998). It has not been reported in Alaska. This species was found in southeast Yukon Territory, Canada (B. Bennett – pers. com.). Dalmatian toadflax is most commonly found on roadsides, waste areas, clearcuts, overgrazed pastures and rangeland, and in plant communities that are open or disturbed (Beck 2001, Carpenter and Murray 1998).



Management

Successful control can be obtained by pulling or herbicide applications. Five insect species have been approved by the USDA for release as biological control agents. Since the seeds can remain dormant for up to ten years and the plant also spreads through vegetative propagation, control measures must be repeated every year for at least ten years to completely remove a stand (Beck 2001, Carpenter and Murray 1998).

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Last Updated May 18, 2005