

# Dalmatian Toadflax Spp

*Linaria dalmatica* / *Linaria genistifolia*



<b>FAMILY</b>	Plantaginaceae- plantains	<b>ORIGIN</b>	Mediterranean
<b>LIFE CYCLE</b>	Short-lived perennial	<b>OTHER NAMES</b>	Broad-leaf toadflax, Balkan toadflax, Wild snapdragon

## QUICK FACTS

- Dalmatian toadflax originates from the Mediterranean, was introduced to North America in 1874 as an **ornamental plant**, and now thrives in the U.S. and Canada, particularly in semiarid climates and disturbed areas.
- It reproduces prolifically via **seeds** and **creeping root buds**, displacing native plants, reducing forage diversity, and harming rangelands and crops. Its extensive root system makes it difficult to eradicate once established.
- Prevention through strong native ground cover and re-vegetation is key. Manual removal, targeted grazing, and combined strategies are effective, but eradication requires **persistence over several years**.

This tenacious invader, with its bright yellow flowers and silvery-green leaves, may look like it wandered off the set of a children's fairy tale, but don't let its charm fool you. Brought to the United States in the late 19th century as an easy-to-grow ornamental, it quickly escaped to become the agricultural nightmare we know today. Unfortunately, this weed is still sold on the market today, as many are fooled by its unique and numerous flowers, which last all summer.

## What does it look like?

Toadflaxes are perennial, creeping, woody plants with very similar attributes. In the United States, three toadflax species are listed as noxious: Dalmatian toadflax is divided into broadleaf (*L. dalmatica*) and narrowleaf (*L. genistifolia*) varieties. There is also yellow toadflax (*Linaria vulgaris*), which is similar to the Dalmatian toadflaxes but can be distinguished by smaller, whiter flowers and globe-shaped fruit. Yellow toadflax is also a bit shorter (1.5-3 feet), while Dalmatian toadflax is usually taller (3+ feet). Dalmatian toadflax tends to have thick, heart-shaped, waxy leaves, while yellow toadflax leaves are linear and soft. It is possible for Dalmatian toadflax to hybridize with yellow toadflax. Dalmatian toadflax mainly propagates via seed germination with success rates of about 75%, while yellow toadflax spreads by creeping roots, with only a 10% germination rate.



Eric Coombs, Oregon Department of Agriculture, Bugwood.org



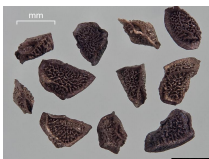
Steve Dewey, Utah State University, Bugwood.org



Bonnie Million, Bureau of Land Management, Bugwood.org



Bonnie Million, Bureau of Land Management, Bugwood.org



D. Walters and C. Southwick, USDA, Bugwood.org

**Plant:** Dalmatian toadflax grows up to 5 feet tall with a rough, woody base and mostly dies back in winter (with the exception of prostrate stems) while the roots remain alive underground. New stems emerge from both seed and shoots in April through May. The plant's form is narrow and upright, with multiple stems growing from a single base (up to 25 stems in its first year).

**Roots:** There are extensive roots. The vertical roots are rough and large, somewhat branching, and extend down 6 feet or more. The lateral roots branch off from the vertical roots and can extend 10 feet or more and remain close to the soil surface. Buds that develop on the lateral roots quickly produce new shoots.

**Leaves:** The heart-shaped (cordate) leaves are alternate, with a dense, waxy-rubbery feel, and have a pale blue-green color. Leaf shapes can be broad or lanceolate (*L. genistifolia* leaves are narrower). The margins are smooth, and leaf bases clasp the upper part of the stem.

**Flowers:** The flowers are snapdragon-like and bright yellow-tinged with orange. They are 1 to 1.5 inches long, with two lips and a long spur. Flowers, buds, and seed pods can be present simultaneously. Flowers start as clusters at the tip of the stem and become more spaced out further down. The plants have a long flowering period, usually from May to late August.

**Seeds:** Mature plants can produce up to 500,000 seeds, which remain viable in the soil for up to 10 years. The black, sharply angled seeds begin to appear in late June or early July and may continue until early October. Each seed capsule (fruit) contains a highly variable number of seeds, ranging from 10 to 40.

# Impact and Management

## Economic

This weed will establish itself as a monoculture through aggressive seed production and vegetative growth. Aside from big game, it can reduce available forage for domestic livestock and, in rare cases, cause harm to cattle. The growth rate of grasses may be up to 2.5 times lower in areas densely infested with Dalmatian toadflax. Occasionally, the weed has been known to affect production in alfalfa fields and pine plantations. Dalmatian toadflax primarily affects wild rangelands and habitats, while yellow toadflax tends to be a greater threat to agricultural lands.

## Ecosystem Health

Dalmatian toadflax displaces native plants once established, leading to a significant loss of floral and faunal biodiversity. This can significantly impact game forage availability, particularly in winter months, and even alter migratory habits. While deer, sheep, some birds, and rodents may use Dalmatian toadflax as a food source, it is generally not considered good forage as most animals tend to avoid it. Native grass species seem to be most negatively affected by Dalmatian toadflax. When high groundcover-producing sod grass and bunchgrass are displaced, there is usually an increase in erosion.

## Erosion

Dalmatian toadflax significantly increases the risk of soil erosion by outcompeting and displacing native bunchgrasses and ground cover. These native plants play a crucial role in stabilizing soil with their extensive root systems, which help bind the soil and reduce runoff. When yellow toadflax takes over, it replaces these stabilizing plants with its shallow, less effective root structure, leaving the soil more vulnerable to wind and water erosion. In areas where there is already little to no vegetation, or in areas of primary succession such as mines, it is possible that toadflax species may help stabilize the soil until more favorable plant communities take over.

Dalmatian toadflax has difficulty settling in areas with well-established grass and forb communities. Promoting native plant development and healthy cover crops is the best first step to preventing the weed from gaining a foothold. Once Dalmatian toadflax has become a fully established monoculture, many management strategies used in conjunction may be necessary to fully eradicate the plant.

One of the most successful management strategies is the successful re-vegetation of desirable plants. Competition from these plants will quickly crowd out potential invasions. While grazing typically increases the risk of infestation, targeted sheep and goat grazing may be beneficial for small patches or hard-to-reach areas.

## DO's

- Identify the plant when it is young; young shoots are weak and die easily
- Be wary that this plant is currently on the market and could pop up anywhere!
- Out-compete the plant with well-established crops and native plant communities.

## DON'Ts

- Overgraze or frequently till fields and pastures, as this can allow the weed to gain a foothold.
- Mow, burn, or graze as these methods leave behind root fragments, furthering its spread
- Let the plant become established; management becomes more difficult with time, especially after its first year.



For more information on managing Dalmatian toadflax, please visit [www.nmweeds.org](http://www.nmweeds.org)

