

# Biocontrols for Dalmatian Toadflax

*Mecinus janthinus*, the stem-boring weevil, attacks Yellow and Dalmatian Toadflax.

Adults of the stem-boring weevil, *Mecinus janthinus*, eat the leaves of Dalmatian Toadflax after they emerge from tunnels inside the stalks of old plants each May. When there are sufficient numbers of the weevil, **adult feeding** will prevent the noxious weed from **flowering** and going to **seed**.

But the real damage is done by the *Mecinus Janthinus* larvae. The larvae mine out a **tunnel** inside the stems of Dalmatian Toadflax, causing **premature wilting** and death of the plant.

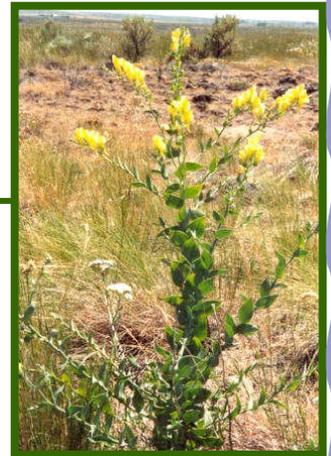
Females drill holes into the sides of stems, placing **one egg** in each hole. Over a season, a **female** will lay **80 to 120 eggs**.

Once the **eggs hatch** some **six to seven days** later, the **larvae** continue to eat the inside of the plant for the rest of the year.

Over 100 larvae may develop in one toadflax stem.

*Mecinus Janthinus* has been a **successful biocontrol agent** in Lincoln County for the past few years. A mountainside of thick Dalmatian Toadflax north of Porcupine Bay was **80 percent controlled** after releasing **4,800 MJs** over a **two-year period** of time. A field of thick toadflax north of Reardan was controlled by **1,000 MJs** over a **four-year period** of time. The insects had spread out for about a **half-mile** from the original release point. There are many other local success stories.

With **50 percent cost-share** available for CRP lands, landowners should consider MJs as part of their **noxious weed control plan** for Dalmatian Toadflax.



Dalmatian Toadflax in bloom



Dalmatian Toadflax blooms

## Biology of Dalmatian Toadflax

- **Scientific Name:** *Linaria dalmatica*
- **Origin:** Mediterranean region, imported as an **ornamental**, a "wild yellow snapdragon."
- A perennial forb, 2- to 4-feet tall, with deep roots.
- Heart-shaped, waxy leaves that clasp the stems.
- Reproduces by seed and **underground root stalks** that can grow out 10 feet laterally each year, giving rise to new shoots and plant colonies.
- Fruits are a **two-cell capsule** that each contain **hundreds of tiny seeds**, the size of **pepper flakes**.
- Flowers can produce over **500,000 seeds** per plant.

## Mechanical, Cultural & Chemical Controls

- **Pulling toadflax by hand** can be effective for **small infestations**, if **sandy or moist soils**, and if done for **5 or 6 years**.
- **Early-season cultivation**, every 7 to 10 days, **four or five times** a season, for **2 years**. **Irregular tilling** may spread infestations since small root pieces can produce new shoots.
- **Mowing is not recommended** since it does not affect root reserves or buried seeds.
- **Overgrazing by cattle** in the **spring** will increase toadflax spread. **Timing of grazing** is important in maintaining desirable plants.
- **Spraying herbicides** like: Telar, Escort, Milestone + 2,4-D, or Tordon + 2,4-D are effective, if applied early (by **May or June**.) with an **MSO** or **silicone surfactant**.
- The use of an **MSO** or **silicone surfactant** is **essential** to penetrate the waxy leaf surface.
- A **fall spray in October** of any green **re-growth** is **very beneficial** in limiting plant growth the following season.



Mecinus Janthinus on a thumb



Adult Mecinus Janthinus



Larva inside toadflax stem



Mecinus Janthinus, up close



Weevils crawl up toadflax

## How Effective Is *Mecinus Janthinus*?

- Larvae **tunnel** inside the stems throughout most of the year.
- Adults feed on leaves, stems and flowers, and this causes significant damage, especially with a **high density of insects**.
- The **damage and desiccation** caused by weevils is **enhanced by drought stress**.
- The weevils **weaken and stress** the weed, allowing **native vegetation** to **better compete and thrive**.

Lincoln County Noxious Weed Control Board  
405 Ross Street  
Davenport, WA 99122

# Biology of *Mecinus Janthinus*



Mecinus Janthinus crawls on toadflax



Larva tunnels out the inside of the stem



Adults emerge from stem tunnels as a pupa continues to mature on the left.



Healthy plant on left, and holes in leaves on right indicating MJ's are working



Hole in stem where female placed egg



**Before and 3 years after MJ bugs released:** Dalmatian Toadflax is mostly gone, now replaced by native plants.

- **Common Name:** Toadflax stem weevil.
- **Origin:** Croatia, Italy and Slovenia.
- **Generations:** One per year.
- **Description:** A small cylindrical-shaped weevil, .12- to .18-inches long, with a pronounced snout. The head, thorax and appendages are black, except for the tarsi which are brownish. The wing covers are blue with parallel sides. The front femur of the male is strongly toothed, while that of the female is smooth.
- **Eggs:** A single, white, oval egg is laid in a cavity that the female chews in flowering stems. A stem may receive many eggs. The female seals the oviposition site with chewed-up plant material. The female lays an average of 1.15 eggs a day from late-May to mid-July, for a total of 80 to 120 eggs per season. Eggs hatch in six to seven days. Eggs are also laid in fine stems, but development of the larvae is only completed in stems over 0.9 mm. Prostrate stems of non-flowering toadflax are not favored.
- **Larvae:** Complete development takes 23 to 34 days at a daytime temperature of 75 degrees F and 65 degrees at night. The

larva mines 1 to 3 cm of stem for a maximum of 7.5 cm. Over 100 larvae may develop inside one stem. Larval activity causes the stem to wilt. Larval survival is poor in the prostrate stems of non-flowering plants.

- **Pupa:** Pupae are formed in the stem after 30 to 40 days. The pupa is 3.0 to 4.5 mm long. It is initially white but gradually turns black.
- **Over-Wintering:** The pupa develops into an adult which remains in the pupal cell until temperatures warm up in mid-May. Then the adult chews a hole and emerges out the stalk of the old plant. There may be a heavy mortality of weevils in very cold winters, but enough will survive to infest most stems the following spring.
- **Adults:** Adults feed on the leaves and stems, and this reduces the general vigor of the plant. Adults prefer Dalmatian Toadflax over Yellow Toadflax. Weevils from Yellow Toadflax are smaller, but egg production is not affected. The weevils do not feed on any other plants.

## A Lincoln County Success Story

- Landowners in Lincoln County have made a major investment in purchasing MJ's to control Dalmatian Toadflax.
- *Mecinus Janthinus* weevils migrated to Stevens County, Wash., from British Columbia, Canada, in 2000, and were first released in Lincoln County in 2002.
- From 2002 to 2006, more than 54,450

*Mecinus Janthinus* have been released in Lincoln County., with 34,450 MJ's released in 2006 alone.

- Communities where landowners have released MJ's include Cayuse Cove, Porcupine Bay, Mill Canyon, Spring Canyon, Long Lake, Lincoln, Jacubiak and Townsend Estates.



External MJ bug damage on plant



Dalmatian Toadflax totally out of control



Mecinus Janthinus tunnels out