



WHAT IS BIOCONTROL

Biocontrol is the suppression of pest populations using living organisms. The release program started as a collaboration between Agriculture & Agri-Food Canada and several Agricultural Fieldmen in 2001. The AISC took over in 2016 and continues to use host-specific insects for invasive plant control in Alberta.



Dalmatian toadflax, *Linaria dalmatica*

DALMATIAN TOADFLAX

Dalmatian toadflax (*Linaria dalmatica*) is classified as a noxious weed in Alberta. This perennial plant flowers from May to August with yellow, snapdragon-type blooms. It reproduces through creeping roots and up to 500,000 seeds per plant which can remain viable in the soil for up to 10 years. It produces compounds that are toxic to livestock.

TOADFLAX WEEVIL

The AISC uses *Mecinus janthiniformis* stem weevils as biocontrol agents for Dalmatian toadflax populations. Adult weevils feed on toadflax leaves suppressing plant growth. Weevils are small (up to 5mm) and can lay up to 45 eggs within toadflax stems. Eggs will hatch and larvae will burrow in the stems where they overwinter and emerge as adults in the early spring the following year.

HOW TO PREPARE

Here's how you can prepare for your biocontrol release:

- **Get your orders in!**
 - Orders are 'first come, first serve'; please contact AISC as soon as possible.
- **Locate ideal site for release:**
 - Toadflax patch size (at least 20m x 50m).
 - Full sun, avoid tree canopy.
 - Choose south to west facing slopes or bases of them.
 - Separate from herbicide treatments (at least 10m).
 - Avoid areas that receive cold air drainage or allow cold air to pond as weevils cannot endure freezing.
 - Coarse to fine, well-drained soils.



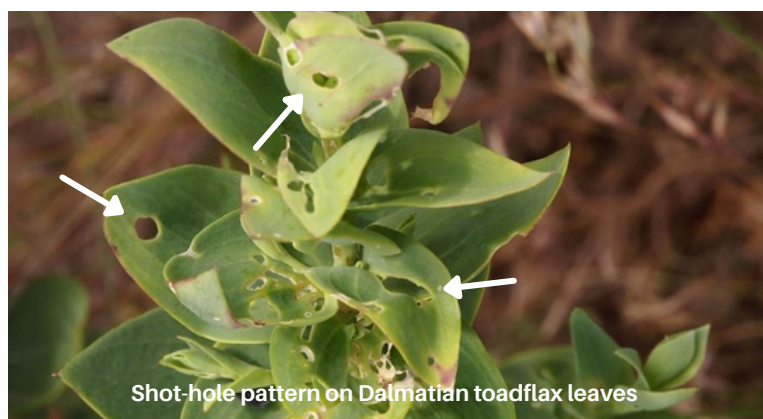
Dalmatian toadflax stem weevil, *Mecinus janthiniformis*, larvae (top) and adult (bottom)



MOVING WEEVILS

Once you have an established population of toadflax weevils on your property, you can move them to nearby infestations of Dalmatian toadflax. Adult weevils can fly and spread to nearby infestations by themselves. Please note, not all biocontrol releases will result in established populations.

Here are some tips to help you start collecting and releasing your toadflax weevils:



Shot-hole pattern on Dalmatian toadflax leaves

When can you move the weevils?

Moving and collecting weevils is most efficient when populations of weevils are high and a site is well established (usually 2-3 years after a release). Collect adults as they emerge in spring (mid May to early June). An established site will exhibit shot-hole patterns on the leaves, tops of the plant will turn yellow, wilt and desiccate from feeding, and/or weevils will be visible on the plants.

Remember, good collection sites will only remain this way for a few years!

How do you move the weevils?

- **Gather equipment.**
 - GPS, vented containers, and ice packs.
- **Monitor the site for weevil activity.**
 - Yellowing tops of toadflax plants, shot-hole patterns on upper leaves, and oviposition marks on the stems.
 - Visible weevils on toadflax stems, leaves and flower buds.
- **Once weevils have emerged, collect!**
 - Weather must be hot and sunny for collection.
 - Gently tap stems and catch falling weevils in vented containers. Avoid damaging agents by pulling them off plants.
 - Keep weevils cool by storing them in a cooler with ice packs (nothing below 4°C).



Dalmatian toadflax stem weevils feeding on a toadflax plant



CONTINUED..

- **Release the weevils!**

- Weather is no issue for releasing, release in rain or shine!
- Choose areas with no tree canopy, south-facing slopes, and away from cold drainage areas (see site requirements under 'How to prepare').
- Scatter weevils on the ground below toadflax plants.

That's all! The weevils will get to work on your Dalmatian toadflax infestation and you should see changes within 2-4 years!



5/19/2008



6/4/2020



A biocontrol release site in Hungry Valley, Southern California.

Need help or have any questions?

Feel free to contact the AISC! We offer additional biocontrol agents for several invasive plants found in Alberta, please visit our website at abinvasives.ca to learn more!

Contact us:

587-999-0954
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