



Biological Control of Leafy Spurge

Fact Sheet 2015

LOCATION: FIRST STREET PASTURE

START DATE: JUNE 2015

STATUS: IN PROGRESS

The economic management of leafy spurge using biological control agents

Project Leads: Bev Dunlop, Range Management Biologist, Agriculture and Agri-Food Canada, beverly.dunlop@agr.gc.ca; and Mae Elsinger, Rangeland and Forage Specialist, Agriculture and Agri-Food Canada, mae.elsinger@agr.gc.ca

Background

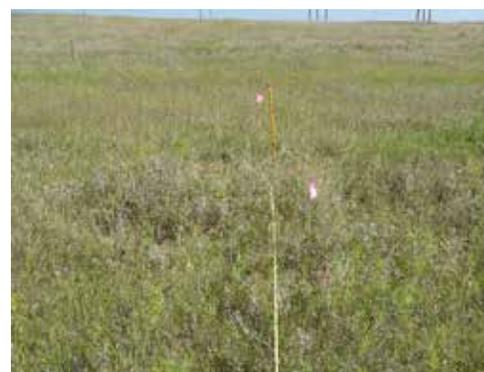
The overall objective of this project is to investigate a low-input, low-management solution for invasive species management, specifically leafy spurge. There are a number of recognized multi-species grazing, feeding, chemical and mechanical options that yield very productive and quick results. However, for larger and/or more extensively managed landscapes, like Crown land leases, community pastures, grazing co-ops, and remote private or rented pastures, a low-input solution is more likely to be adopted and sustained than the more intensive solutions that are being promoted elsewhere. One option is the use of biocontrol agents (special insects) that stifle the performance of leafy spurge in a pasture.

Objectives

- ü To characterize existing leafy spurge and biocontrol populations and their impacts;
- ü To demonstrate how grazing affects the size and efficacy of leafy spurge flea beetle populations;
- ü To demonstrate realistic timelines and expected results for leafy spurge biocontrol; and
- ü To demonstrate how to track biocontrol agent populations, their efficacy, and their migration to aid in invasive weed treatment decisions

Project Design and Methods

In June of 2015, four permanent monitoring plots were established in fields D and H – two in grazed and two in ungrazed enclosures. Background leafy spurge performance and leafy spurge flea beetle populations were sampled with stem counts, height measurements, and sweeping. In July of 2015, each plot was “boosted” with 2000 black



Leafy spurge in Field H of the First Street pasture.



Black leafy spurge flea beetle, *Aphthona czwalinae*.

Photo accessed July 15, 2016:

<https://www.ag.ndsu.edu/cpr/entomology/get-ready-to-collect-leafy-spurge-flea-beetles-5-31-12>



Flowering leafy spurge at the First Street Pasture.



Brown Leafy spurge flea beetle (*Aphthona flava*).
 Photo accessed July 15, 2016:
<https://www.ag.ndsu.edu/publications/crops/leafy-spurge-control-using-flea-beetles-aphthona-spp>

beetles and 500 brown beetles, harvested from Besant, in western Saskatchewan. The permanent sampling pattern in each plot is a 10 m x 10 m cross, permanently marked with steel pegs and an aluminum tag. In all study years, the leafy spurge and leafy spurge beetle populations will be monitored using the sampling techniques described above. Additionally, further sweeping and gall counts of various biocontrol species, and forage and leafy spurge sampling, will occur throughout the pasture to evaluate the presence of biocontrol species and the impact of spurge on forage production.

Initial Results

As 2015 is the year of site establishment and beetle release, only the background populations of leafy spurge and leafy spurge flea beetles at our permanent plots can be reported. Counts of spurge stems in the plots averaged 35 stems/m², with only 20% to 33% of the stems being flowering stems. This indicates a significant degree of pressure from existing multiple biocontrol agents throughout the pasture. Before boosting the beetle count at our plots with beetles imported from Saskatchewan, we found abundant background brown beetle populations at all four plots, and small numbers of black beetles near two plots.

Although we did not collect data to quantify the populations of biocontrol agents throughout First Street Pasture, brown and black leafy spurge beetles, hawk moth larvae, gall midges, and leaf tier moths were observed. Such agents would impact the spurge by mining the plants' roots, eating leaves, and producing galls or nests that would restrict top growth from producing flowers. Leaf tier moth evidence was the most obvious throughout the pasture – clusters of leaves glued together at the tips of spurge stems – and appeared to have at least two periods of this activity: one early in spring and one in late summer.

Key Messages

1. Various leafy spurge biological control agents exist at First Street Pasture.
2. Users of biological control agents are unlikely to achieve eradication of the spurge, but there is the potential to reduce the stifling of forage. It will take numerous years to see pasture-wide effects from biological control agents; users will be required to assist in the migration of biocontrol agents through sweeping and relocating them throughout their pasture.
3. Herbicide application is expected to be incompatible with use of biocontrol agents, as it removes their food source for a significant period of time.

Description (from June 26, 2015)	Value
Average Leafy Spurge stem count (stems/m ²)	35
Flowering leafy spurge (%)	20 – 30
Characterization of Black leafy spurge beetle population	Low
Characterization of Brown leafy spurge beetle population	Moderate
Characterization of Leafy spurge Hawkmoths population	Low
Characterization of Leafy spurge tier moths population	Abundant

Manitoba Beef & Forage Initiatives Inc.

220-530 Century Street, Winnipeg, MB, R3H 0Y4
www.mbf.ca

Collaborator:

Jane Thornton, Forage and Pasture Specialist, Manitoba Agriculture

