Grasshoppers, cutworms and flea beetles: Forecasts for 2020, monitoring and management strategies

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Top Insect Concerns From 2019

- Flea beetles in canola
- Cutworms
- Grasshoppers
- Diamondback moth in canola
- Bertha armyworm in canola
- Armyworms
- Thistle caterpillar
Flea Beetles on Canola: Situation from 2019

• Most canola seed with neonicotinoid seed treatment.
• Some canola growers delayed seeding to reduce risk from flea beetles.
• Many fields received additional insecticide applications.
• Some reseeding due to flea beetles.
• Additional stresses on canola seedlings in some areas, such as frost, cool and dry weather, soil blasting and cutworms.
Forecasting Flea Beetle Levels the Following Season?

**Figure 3. Flea Beetle Life Cycle.**

- **June** (Overwintering Adults Emerge & Feed)
- **July** (Eggs)
- **August** (Larvae Feed on Canola Roots)
- **September** (Adults Emerge & Feed)
- **October** (Pupae)
- **November** (Overwintering Adults)

August

June
How to Minimize Injury from Flea Beetle?

- Seeding Practices
- Tillage Practices
Seeding Dates and Flea Beetle Injury

1) MB: Earlier seeded tests suffered more damage by flea beetles.


2) ND: Early seeding increased injury by flea beetles.


3) AB: Early seeding reduced damage by flea beetles in southern Alberta, but increased damage in central and northern Alberta.

Seeding Depth and Rate for Minimizing Flea Beetle Injury to Canola

- Seed as shallow as available moisture will allow

- Increasing seeding rate
Reduced Tillage and Flea Beetles

• Direct seeding provides a micro-climate which is less ideal.
  – Flea beetles prefer environments exposed to bright sunlight and relatively warm.

• Greater damage to canola grown with conventional tillage compared with a zero tillage regime.
Cutworms: Situation from 2019

• A concern in many crops in 2019.
• Insecticides used, and some reseeding.
• Some reports of multiple insecticide applications.
Forecasting Cutworms?

• Predicting cutworm outbreaks based on adult counts generally does not work.

• Timely scout individual fields to minimize damage.
Live Cutworms After Spraying

- During moulting, cutworms are inactive and remain several centimetres below the soil surface.
- Research from Alberta found 20-50% of the population of pale western cutworms in some fields were in a pre-moult or recent post-moult stage and were not feeding.
- Laboratory studies have shown the moulting period comprised approximately 33% of the entire larvae life stage.
- A moulting cutworm will not have food in its gut.

Can some plants compensate for cutworm feeding?

• Removal of some canola plants resulted in remaining plants producing more pods (which increased from 20-90 to as many as 600), and in some instances more seeds per pod and increased seed weight.

• “The loss of only some flax plants at larval densities lower than 16 larvae per 0.5m2 results in a small but significant increase in per plant yield”.
Grasshoppers:
Situation from 2019

- Population increasing over past few years.
- Control along field edges and whole fields.
- Later-season edge effects noted in some crops (canola, soybeans, etc.).
- Affected pasture regrowth in some areas.
Annual Grasshopper Survey

- Conducted in Manitoba since 1931.
- Current survey based on counts in August.
- Also factor in weather, current population trends, and natural enemies.
Grasshoppers (Orthoptera)

In Canada there are:

129 species of short-horned grasshoppers (Acrididae)
44 species of katydids (Tettigoniidae)
7 species of pygmy grasshoppers (Tetrigidae)

4 species of short-horned grasshoppers are potential pests in Manitoba.
Grasshopper counts in the higher risk categories, and dominant grasshopper species for each agricultural region.

<table>
<thead>
<tr>
<th>Region</th>
<th>Total Counts</th>
<th>Very Severe</th>
<th>Severe</th>
<th>Moderate</th>
<th>Dominant Species</th>
</tr>
</thead>
<tbody>
<tr>
<td>Southwest</td>
<td>30</td>
<td>0</td>
<td>6</td>
<td>2</td>
<td>Twostriped</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>(25 sites)</td>
</tr>
<tr>
<td>Central</td>
<td>46</td>
<td>1</td>
<td>1</td>
<td>4</td>
<td>Twostriped</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>(36 sites)</td>
</tr>
<tr>
<td>Eastern</td>
<td>13</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>Twostriped</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>(15 sites)</td>
</tr>
<tr>
<td>Interlake</td>
<td>17</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>Twostriped</td>
</tr>
</tbody>
</table>

Average Density of August DTH

- 0 – 2.0 (Very Light)
- 2.1 – 4.9 (Light)
- 5.0 – 9.9 (Moderate)
- 10.0 – 19.9 (Severe)
- 20.0+ (Very Severe)
Manitoba Grasshopper forecast maps from 2016 - 2020
• Rainy September and early October + early October snowfall. = less grasshoppers?

• Our pest species of grasshoppers all overwinter in the egg stage, which is quite resilient to excess moisture.
A warm extended fall will result in:

- 1) a larger number of grasshopper eggs being laid
- 2) greater embryo development within the eggs
Winter Weather and Grasshoppers

- Soil temperatures of **-15°C** required to cause substantial winter mortality.
  - Don’t usually occur because snow cover insulates.
  - Eggs usually laid where snowfall accumulates.

A warm and dry **spring** and **summer**

- Favors early and rapid grasshopper development.

- Grasshoppers will become adults and start laying eggs for the following year sooner.
Effect of spring rains

• “Impact of mid-May rain on grasshoppers will be negligible.”
  – Each egg has a nearly waterproof shell.

• “Plenty of rain between late May and mid-June will slow down the pest species of grasshoppers, and can kill a significant proportion”.

Predators of Grasshopper Eggs

- Bee fly larvae
- Blister beetles
- Ground beetles
- Field Crickets

- Consider management techniques that minimize harm to predators and parasites.
Grasshoppers killed by a fungus
Fire as a Management Tool for Grasshoppers?

- Species of grasshoppers laying egg pods deeper, such as migratory grasshopper, not significantly affected.
  - Branson et al. Ecological Entomology. 2007: 128-134
Grasshopper Management

• Some control around the edges of field in June or early-July may be needed in years of high risk.
“Normally will result in 80 to 95 percent control, which is approximately 5 to 15 percent lower mortality than with a standard (high rate, blanket coverage) treatment.”

Cooperative Extension Service University of Wyoming College of Agriculture.
Reduced Area and Agent Treatments
Tests on Wyoming Rangeland Infestations (18-56 grasshoppers/m²)

<table>
<thead>
<tr>
<th>Insecticide</th>
<th>% Crop treated</th>
<th>Rate (g/ha)</th>
<th>% Control</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carbaryl</td>
<td>100</td>
<td>560</td>
<td>94</td>
</tr>
<tr>
<td>Carbaryl</td>
<td>50</td>
<td>280</td>
<td>81</td>
</tr>
<tr>
<td>Malathion</td>
<td>100</td>
<td>683</td>
<td>90</td>
</tr>
<tr>
<td>Malathion</td>
<td>80</td>
<td>342</td>
<td>91</td>
</tr>
<tr>
<td>Fipronil</td>
<td>100</td>
<td>4</td>
<td>98</td>
</tr>
<tr>
<td>Fipronil</td>
<td>33</td>
<td>4</td>
<td>92</td>
</tr>
</tbody>
</table>

Benefit:Cost Ratios: Fipronil RAAT > Carbaryl RAAT > Malathion RAAT > Malathion 100% > Fipronil 100% > Carbaryl 100%.

Reduced Area and Agent Treatments

- Depends on movement of grasshoppers from treated to untreated swaths.
- Conservation of biological control agents.

Brochure by University of Wyoming

Factsheets, Forecasts and Insect Pest Summaries


Insects

The links below will provide information on identification and monitoring of potentially damaging and beneficial insects in crops grown in Manitoba. You’ll also find information on various types of control methods.

Field Scouting Guide

Beneficial Insects

- Beneficial Insects: Predators and Parasitoids factsheet
- Beneficial Insects: Predators and Parasitoids Poster
- Fear on Canola
- Protecting and Supporting Pollinators
- Greenhouse Tomato Pollination with Bombus Impatiens

Field Crop Insects

Generalists (feed on many crops)

- Cutworms in Field Crops
- Grasshoppers
- Lygus Bug
- Thistle Caterpillar
- Wireworms

Canola

- Bertha Armyworm
- Cabbage Maggot
- Diamondback Moth
- Flea Beetles on Canola & Mustard
- Red Turpia Beetle

Cereal Crops and Grain Corn

Manitoba
Summary

- Flea beetles and cutworms potential early-season issues.

- Grasshopper levels have been increasing.

- Weather and natural enemies can affect grasshopper population.
Discussion and Questions?

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