Pest Management of the Insect Pests on Canola

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Crop Protection Specialist
Canola Production in ND

- **Acres-thousands**
  - 0
  - 200
  - 400
  - 600
  - 800
  - 1000
  - 1200
  - 1400

- **Value (1000 dollars)**
  - 0
  - 20000
  - 40000
  - 60000
  - 80000
  - 100000
  - 120000
  - 140000

- **Years**
  - 1
  - 2
  - 3
Canola Insect Pests

Major Pests:
- Crucifer Flea Beetle

Occasional Pests:
- Cutworms
- Bertha Armyworm
- Diamondback Moth

Minor Pests:
- Grasshoppers
- Blister Beetles
- Aphids
- Lygus bug

NDSU Ext. Service
Cutworms - Early Season Pest

- **Dingy cutworm** - early May
- **Red backed cutworm** - early June
- **Economic Threshold** = 3-4 per sq. yard (Canada)
- Impossible to control if feeding below ground
Eight Species of Flea Beetle Attack Canola

- Crucifer Flea Beetle
  *Phyllotreta cruciferae*
- Striped Flea Beetle
  *Phyllotreta striolata*

NDSU Ext. Service
Flea Beetle Life Cycle

- Overwintering Adults
- Adults Emerge & Feed
- Pupae
- Larvae
- Adults Feed and Lay Eggs!
- Overwintering Adults Emerge
- Overwintering Adults

NDSU Ext. Service
Flea Beetle Hosts

- Canola
- Mustard
- Rapeseed
- Brussel sprouts
- Broccoli
- Cauliflower
- Other plants in Crucifer Family

NDSU Ext. Service
Emergence & Feeding Behavior

- Emerge at 68°F
- More active feeding
- Readily distribute in fields
- Move around to find fields

- Not actively feeding
- Move slowly into fields
- “Edge” effect
Feeding Damage: Three Types

- Spring foliar damage most significant
  - Overwintering adults feed on young plants
- Root damage from larval feeding
  - Estimated Yield Loss = 5%
- Mid-Summer feeding new generation of adults
  - Damage seed pods causing seed shattering, pod drying, and disease development
  - Usually concentrated on younger pods
Flea Beetle injury appears as pits in the leaves. Severe injury results in desiccation of the cotyledons.

Typical flea beetle injury appears as holes in leaves and drying of leaves.
Impact on plants includes
stand reduction, delayed maturity, and
uneven maturity
Impact on plants includes stand reduction, delayed maturity, and uneven maturity
• **Flea Beetle Monitoring**
  – Field Scouting
  – Sticky Traps

• **Economic Threshold**
  – 25% of plant’s surface damaged
• Assessment at harvest may help with next year’s seed treatment decision
• Large numbers in August translate into large overwintering populations
1998-2001 Flea Beetle Trap Catches at NCREC, Minot, ND

Average trap catch

NDSU Ext. Service
2001 Flea Beetle Populations across North Dakota

Average trap catch


Minot  Langdon  Carrington

NDSU Ext. Service
Canola Insecticides
Seed Treatments
Insecticide + Fungicide(s)

- **Gustafson**
  - Gaucho (400 g ai per 100 kg)
  - Gaucho Platinum (800 g ai per 100 kg)

- **Syngenta**
  - Helix (200 g ai per 100 kg)
  - Helix Xtra (400 g ai per 100 kg)
Other Canola Insecticides
Foliar Sprays

- *Bifenthrin* – Capture 2 EC
- *6,3 Ethyl-methyl parathion*
- *Methyl parathion 8EC*

**Section 18 during 1998-99**
- *Lamba cyhalothrin* - Warrior
Pros of Seed Trmt vs. Foliar

• Seed Treatment
  – Effective under most flea beetle pressures
  – Monitoring less frequent
  – Protection against soil and seed-borne diseases

• Foliar Application
  – Effective if properly timed and applied
  – Usually lower costs at low rates ($3.90/A)
  – Tank mix with round-up herbicides
  – Spray only part of field
Cons of Seed Trmt vs. Foliar

• **Seed Treatment**
  – Pre-season treatment decision?
  – Can be more expensive (> $4.00/A)
  – Flea beetle must still ingest chemical by feeding on plant

• **Foliar Application**
  – Judicious monitoring (daily)
  – Require immediate action
  – If airplane needed, lose economic benefits
## $\$\$\$\$\$$ Economics $\$$\$\$\$\$\

<table>
<thead>
<tr>
<th>Treatment / Rate</th>
<th>Type</th>
<th>Cost $/A</th>
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<tbody>
<tr>
<td>Gaucho</td>
<td>Seed</td>
<td>$4.25-7.80</td>
</tr>
<tr>
<td>Helix</td>
<td>Seed</td>
<td>$4.60-7.20</td>
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<tr>
<td>Aventis</td>
<td>Seed</td>
<td>Not available</td>
</tr>
<tr>
<td>Warrior 0.96 oz/A</td>
<td>Foliar</td>
<td>$2.50</td>
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<tr>
<td>Warrior 1.28 oz/A</td>
<td>Foliar</td>
<td>$3.30</td>
</tr>
<tr>
<td>Capture 1.3 oz/A</td>
<td>Foliar</td>
<td>$3.90</td>
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<tr>
<td>Capture 2.1 oz/A</td>
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<tr>
<td>Asana 3.9 oz/A</td>
<td>Foliar</td>
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</tr>
<tr>
<td>Asana 7.8 oz/A</td>
<td>Foliar</td>
<td>$7.02</td>
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</table>

[http://www.ag.ndsu.nodak.edu/minot/pest/pn.htm](http://www.ag.ndsu.nodak.edu/minot/pest/pn.htm)
Do I use a seed treatment?

- Large numbers in August at harvest translate into large overwintering populations
- Do you have time to scout daily and spray foliar insecticide?
- Remember, flea beetles move quickly and in large numbers if conditions are right!
Biological Control

• **Predator**
  – Lacewing (Chrysopa carnea)
  – Big-eyed bugs (Geocoris bullatus)
  – Two-lined collops (Collops vittatus)
  – Crickets (Gryllus pennsylvanicus)

• **Parasites**
  – Braconid wasp (Microoctonus vittate)

• **Flea beetles populations emerge in large numbers during a relatively short time and tend to overwhelm the predators and parasites.**
Biocontrol of Crucifer Flea Beetle
Dr. Denise Olson

- *Beauveria bassiana*
- Common soilborne fungus
- Conidium adhere to host cuticle
- Penetrate cuticle
- 1999 Field success = <10% infection

NDSU Ext. Service
Best Pest Management Strategies for Canola

1. Plant Early
   canola seed can germinate at 38°F

2. Plant good quality seed
   Especially if you do NOT plan to use a seed treatment. Early vigorous growth can withstand more flea beetle injury.

3. Dormant No-Till systems
   Usually have fewer flea beetles

4. Seed Treatment
   Use seed treatment if flea beetle populations were very high last season.
5. Weather affects plant growth.

*Hot and Dry* - risk of stand loss highest, grows slow

*Cool and Wet* - plants tolerate higher levels of feeding, grows faster

6. Weather, especially temperature, affect flea beetle emergence and feeding activity.

*Cool Spring* - injury could be confined to field margins, limited feeding

*Warm Spring* - injury throughout field, feeding frenzy!
7. Monitoring = always a good idea!

Watch fields closely during cotyledon to 4-leaf stage - check three times weekly or more often.

Sample for beetles during warm, sunny part of day.
Monitoring Network
Canola Insect Pests

http://www.ag.ndsu.nodak.edu/minot/pest/pn.htm

Crucifer Flea Beetle
Bertha Armyworm
Diamondback Moth
Canola Insect Trapping Network

29 trap sites in 15 counties

http://www.ag.ndsu.nodak.edu/minot/pest/pn.htm

Bertha armyworm
1998 = 54 moths/site
1999 = 42 moths/site
2000 = 47 moths/site
2001 = 173 moths/site

Diamondback moth
1998 = 223 moths/site
1999 = 126 moths/site
2000 = 272 moths/site
2001 = 617 moths/site
Bertha Armyworm

Outbreaks occurred in the north central counties during the 1996 and 1997 seasons
Pheromone traps can alert crop managers to potential problems

... 1500 moths/ six weeks

Bertha armyworm monitoring can begin with moth activity in mid-June
## Canadian Trapping Guidelines
### Bertha Armyworm

<table>
<thead>
<tr>
<th>Cumulative Trap Numbers</th>
<th>Larval Infestation Risk Level</th>
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<tbody>
<tr>
<td><strong>From</strong></td>
<td><strong>To</strong></td>
</tr>
<tr>
<td>0</td>
<td>300</td>
</tr>
<tr>
<td>300</td>
<td>900</td>
</tr>
<tr>
<td>900</td>
<td>1200</td>
</tr>
<tr>
<td>1200</td>
<td>1500+</td>
</tr>
</tbody>
</table>

Larvae have two color phases.

Feed on leaves, then on pods for six weeks.
Armyworm Damage (cont)

After leaf drop, larvae feed on other green tissue . . . The pods.

Infested fields can take on a whitish cast because of green tissue loss.
Bertha Armyworm Treatment Decisions

• Monitor fields two weeks after peak trap catch . . . About mid July

• Detect larvae in early instars, when their size is about 1/2 inch in length;

• Economic Threshold

  2-3 armyworm per square foot

If pod damage is occurring, treatment should be considered.
Pheromone Traps for Monitoring Diamondback Moth

> determine first occurrence

> identify population peaks and size

> gauge magnitude of subsequent larval population

> 100 moth per trap week

> E.T. = 20 larvae / sq. foot at pod stage
Diamondback moth has the potential to be a problem --- MIGRATORY!

- primarily a foliage feeder
- later feed on buds, flowers, pods
- moths and larvae impacted by weather
Moth Populations

1st flight

2nd flight

3rd flight

1999

Date

# of Moths

Diamondback Moths

Bertha Armyworms
Diamondback Moth Treatment Decisions

• The second generation is present during blooming and early pod development

• Economic Thresholds
  • Flowering – 10-15 larvae per sq. foot or 1-2 per plant
  • Pod stage – 20-30 larvae per sq. foot or 2-3 per plant

• Biological control factors (fungal diseases, parasitic wasps) often keep populations below economic levels
Aster Yellows

- A phytoplasma
- Transmitted only by the six-spotted leaf hopper
  - Blown up from the south each summer
- Causes purpling of leaves, bladdering of pods and pod abortion
- May cause premature seed germination in healthy looking the pods
- Statewide Incidence (Lamey)
  - 1.8% in 2001
  - 4.5% in 2000
Aster Yellows

Bladdering of pods in infected plant
Nuttall Blister Beetles were found in canola fields in July in 2001.

SPOT TREAT!

Beetles feed in groups

Attracted to flowering plants

No threshold is established
Green peach aphids

Migrate up from south

Weather favored the buildup of aphids

NO treatment threshold in canola

Populations usually reduced by predators and fungal infections
Aphid Monitoring Network

University of Minnesota – Dr. Radcliffe

http://ipmworld.umn.edu/alert.htm

- Suction traps and pan traps
- Movements of aphids
- Early identification of aphid carrying viruses
- Early warning system for growers
Lygus Bug

• Small, cryptically colored insects
• Piercing-sucking mouthparts
• Damage: buds and flowers to fall, fruit to abort, seeds to shrivel
• Decrease seed weight
• Pod development
**Lytgus Bug IPM**

- **Economic Thresholds**
  - 15 lygus/10 sweeps up to end of petal fall
  - 20 lygus/10 sweeps within 4 to 5 days after last petal fall

- **Capture (2.1 - 2.6 oz/A)**
  - Cleared for plant bugs in canola

- **Avoid spraying blooming canola during active bee pollination.**
New Insect in Canola in ND

- Migrates up from n. Mexico, does not overwinter in ND
- Feeds on thistles, sunflowers, composites
- A few Isolated canola fields had to be treated in 2001
Grasshoppers pose a threat to all crops.

Populations in North Dakota began to decline in number during 1998 due to environmental factors.

E.T. = >8-12 per sq. yd.

(Canada)
New Canola Insect Pest

Cabbage Seedpod Weevil

*Ceutorhynchus obstrictus*

- Major pest in NW US, Alberta, Saskatchewan
- **Damage**
  - Adult Spring – buds “BUD BLASTING”, pollen
  - Larval Damage – seeds, exit holes (source of fungal disease entry)
  - Adult new generation – seeds within green pods
- **Reduce yields by 15-30%**

![Adult](image1.png)

![Larvae](image2.png)

![Seed Damage](image3.png)