

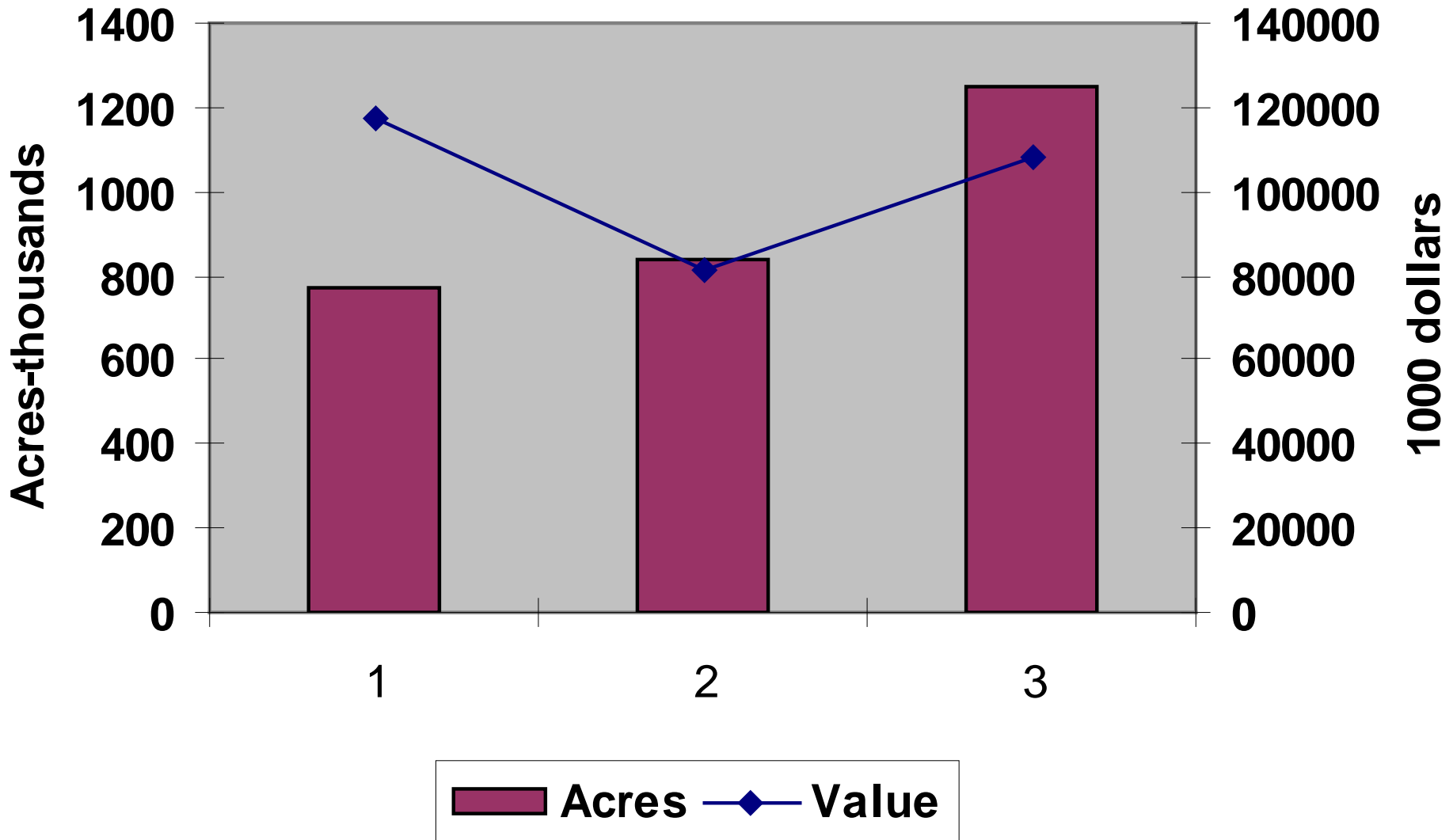


Pest Management of the Insect Pests on Canola



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Canola Production in ND



Canola Insect Pests

Major Pests:

Crucifer Flea Beetle

Occasional Pests:

Cutworms

Bertha Armyworm

Diamondback Moth

Minor Pests:

Grasshoppers

Blister Beetles

Aphids

Lygus bug



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

NDSU Ext. Service

Striped Flea Beetle
Phyllotreta striolata



Flea Beetle Life Cycle

Overwintering
Adults

Adults Emerge & Feed

Pupae

Larvae

Adults Feed
and Lay Eggs!

Overwintering
Adults Emerge

Overwintering Adults

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Winter

Spring

Summer

Fall

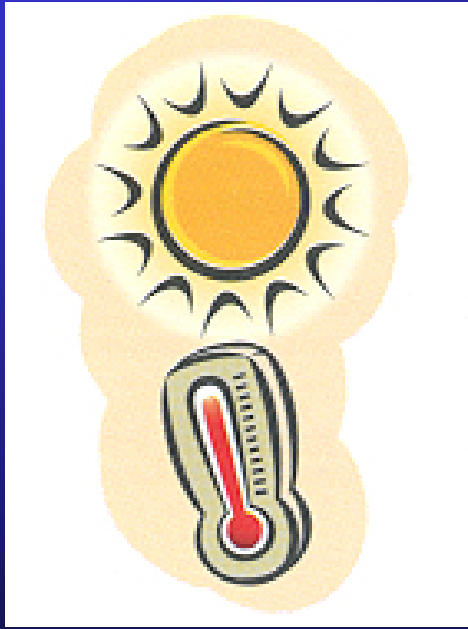
Winter

Flea Beetle Hosts

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

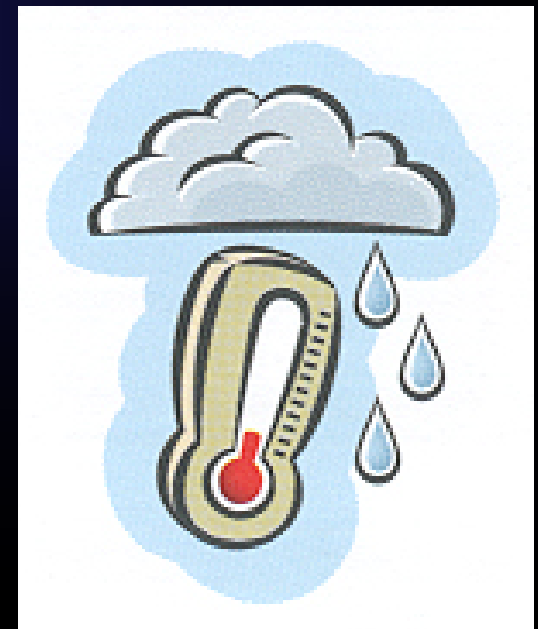


Emergence & Feeding Behavior



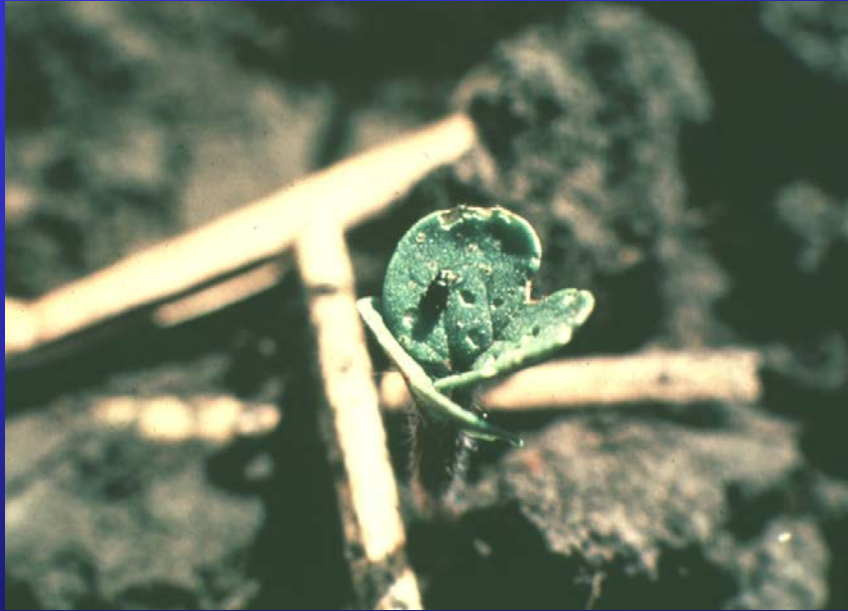
- Emerge at 68°F
- More active feeding
- Readily distribute in fields
- Move around to find fields

- Not actively feeding
- Move slowly into fields
- “Edge” effect



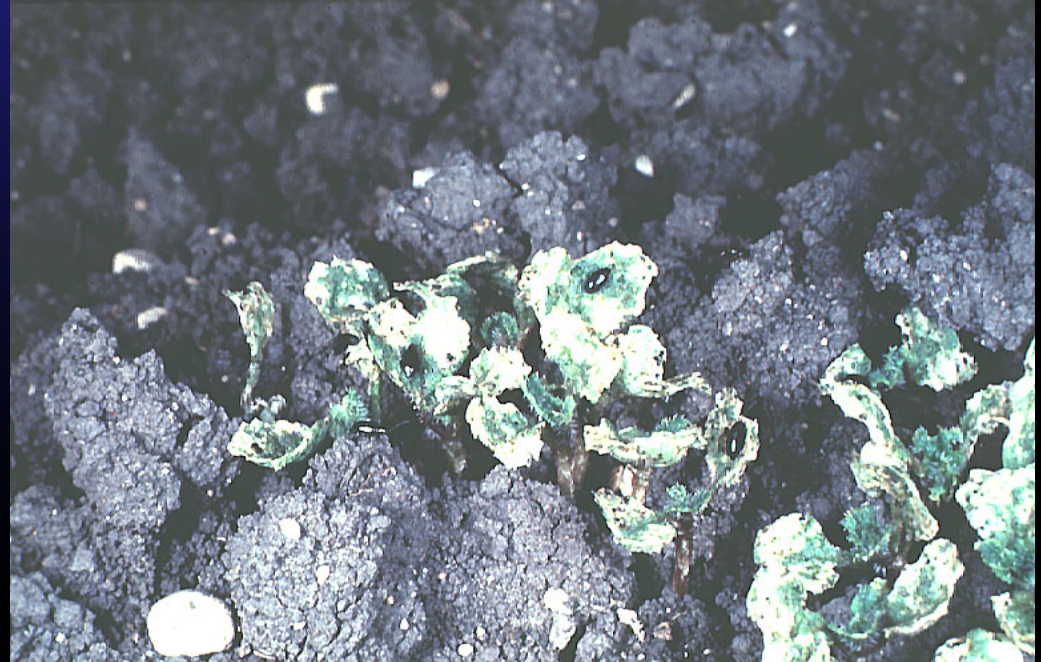
Feeding Damage: Three Types

- **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

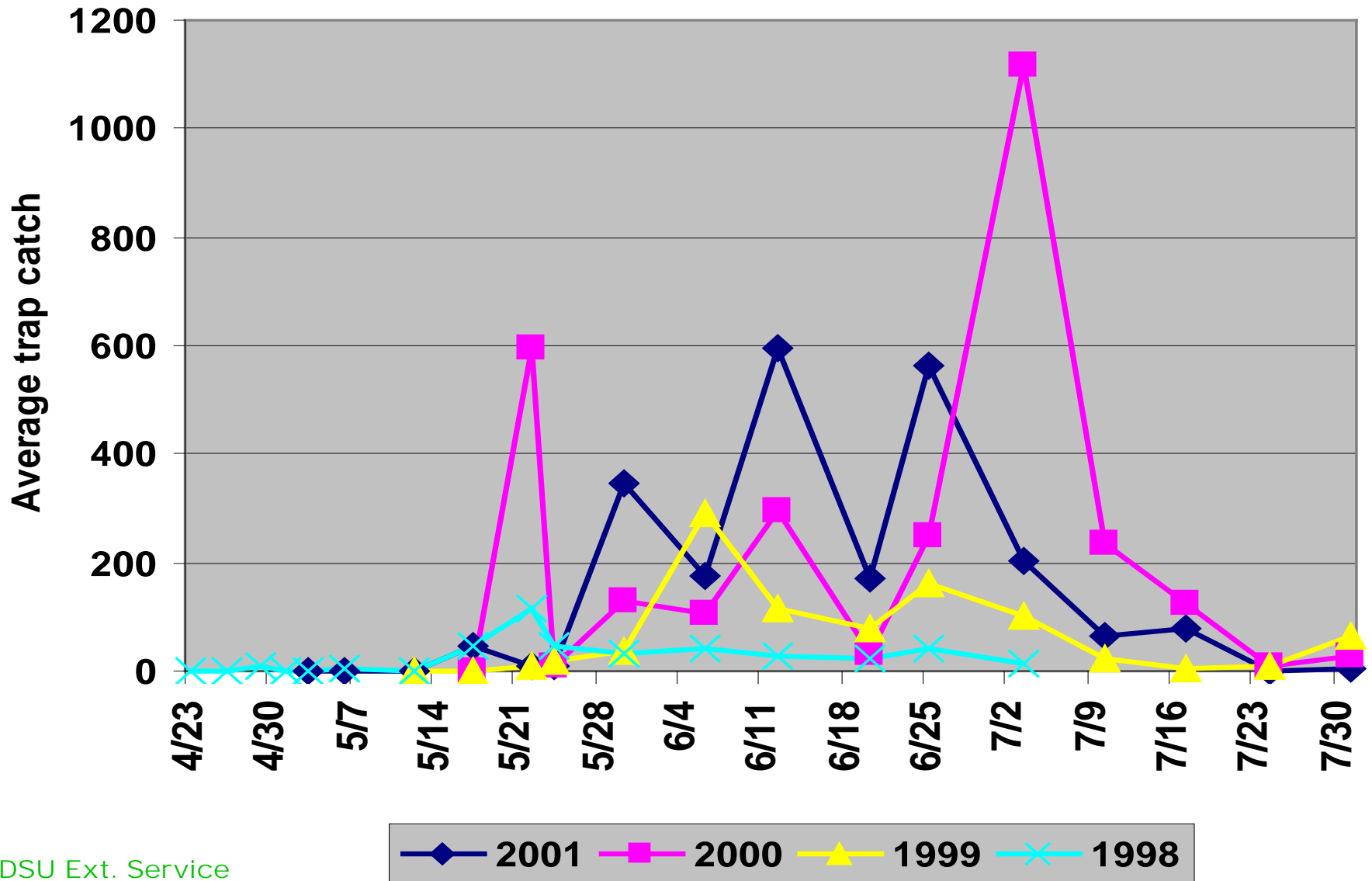
Flea Beetle Populations



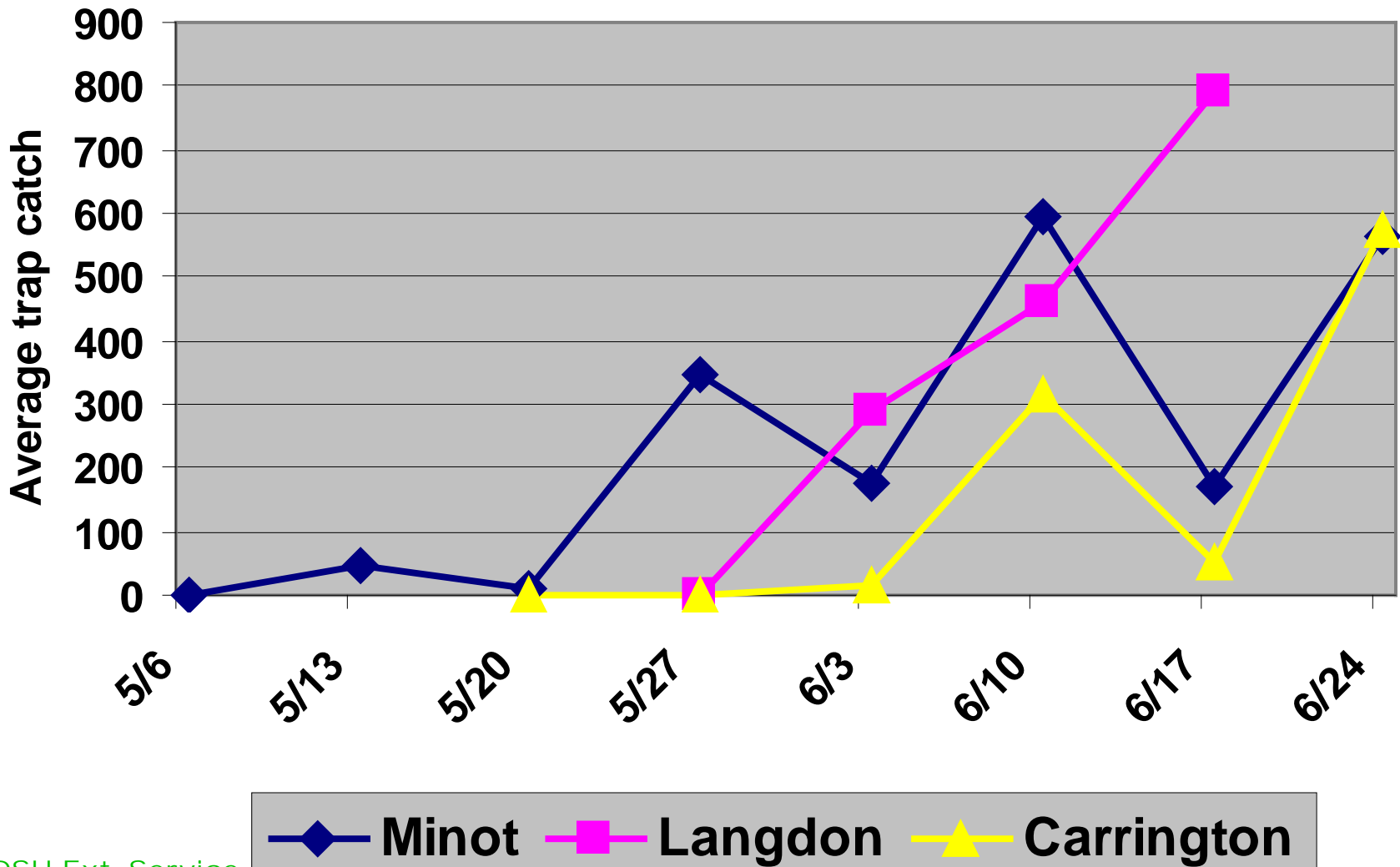
- Assessment at harvest may help with next year's seed treatment decision
- Large numbers in August translate into large overwintering populations



1998-2001 Flea Beetle Trap Catches at NCREC, Minot, ND



2001 Flea Beetle Populations across North Dakota



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 \$\$

<u>Treatment / Rate</u>	<u>Type</u>	<u>Cost \$/A</u>
Gaucho	Seed	\$4.25-7.80
Helix	Seed	\$4.60-7.20
Aventis	Seed	Not available
Warrior 0.96 oz/A	Foliar	\$2.50
Warrior 1.28 oz/A	Foliar	\$3.30
Capture 1.3 oz/A	Foliar	\$3.90
Capture 2.1 oz/A	Foliar	\$6.30
Asana 3.9 oz/A	Foliar	\$3.50
Asana 7.8 oz/A	Foliar	\$7.02

<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**

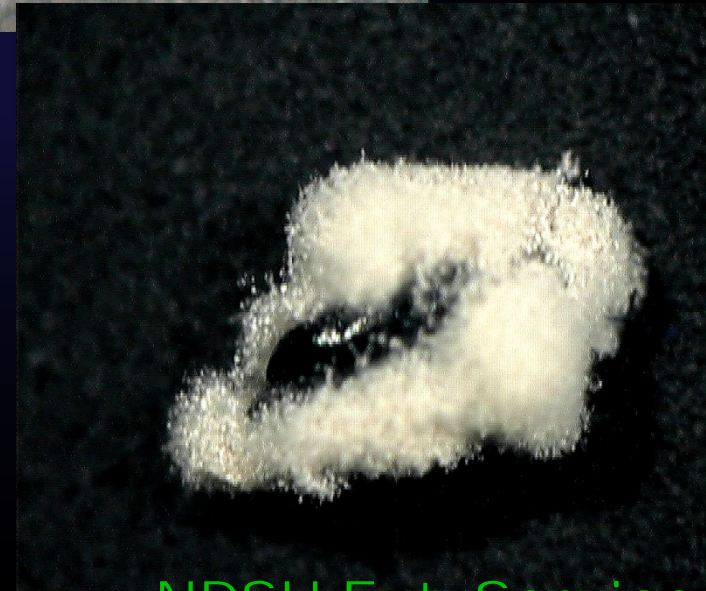
- Braconid wasp (*Microctonus vittate*)

- **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



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.

Best Pest Management Strategies for Canola (continued)

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!

Best Pest Management Strategies for Canola (continued)

7. Monitoring = always 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





**Bertha armyworm
monitoring can
begin with moth
activity in mid-June**

**Pheromone traps
can alert crop
managers to
potential problems**

... 1500 moths/ six weeks



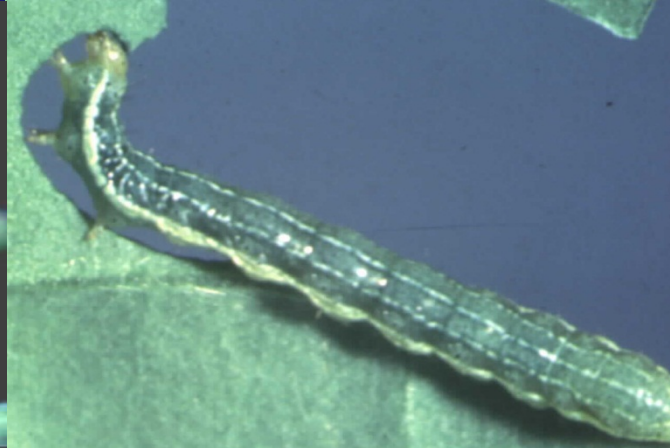
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Canadian Trapping Guidelines Bertha Armyworm

Cumulative Trap Numbers		Larval Infestation Risk Level
From	To	
0	300	LOW
300	900	UNCERTAIN
900	1200	MODERATE
1200	1500+	HIGH

Source: <http://web2.gov.mb.ca/agriculture/insect/insectcount.php>

Bertha Armyworm - Damage



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

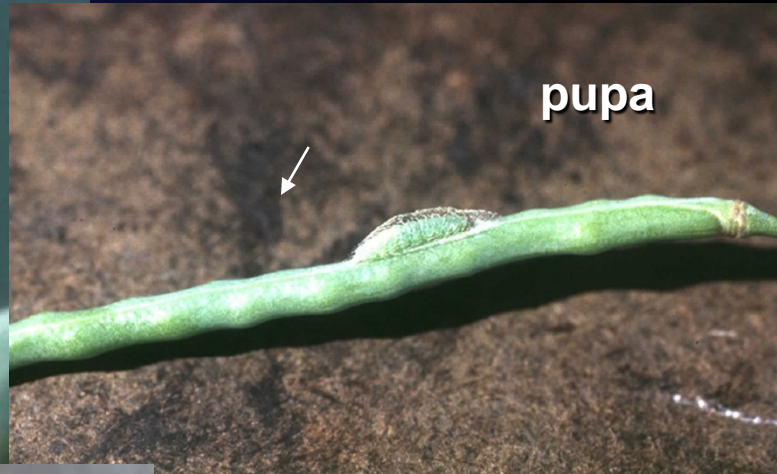
>100 moth per trap week

>E.T. = 20 larvae / sq. foot at pod stage



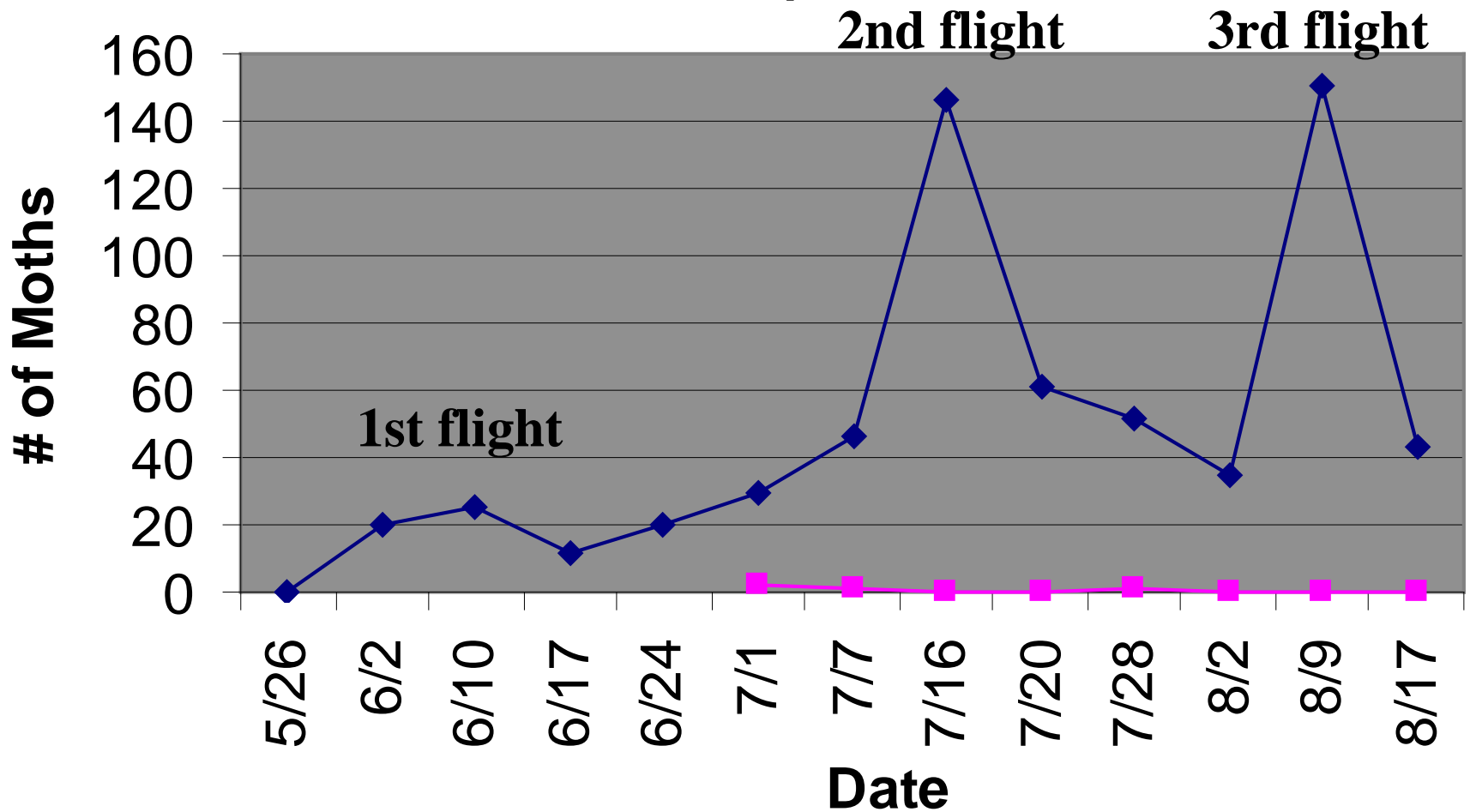
Diamondback moth has the potential to be a problem --- **MIGRATORY !**

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



1999

Ward, Minot NCREC Moth Populations



◆ 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



adult

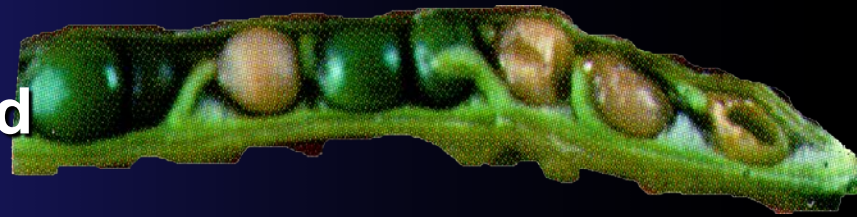


nymph

Lygus 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.**

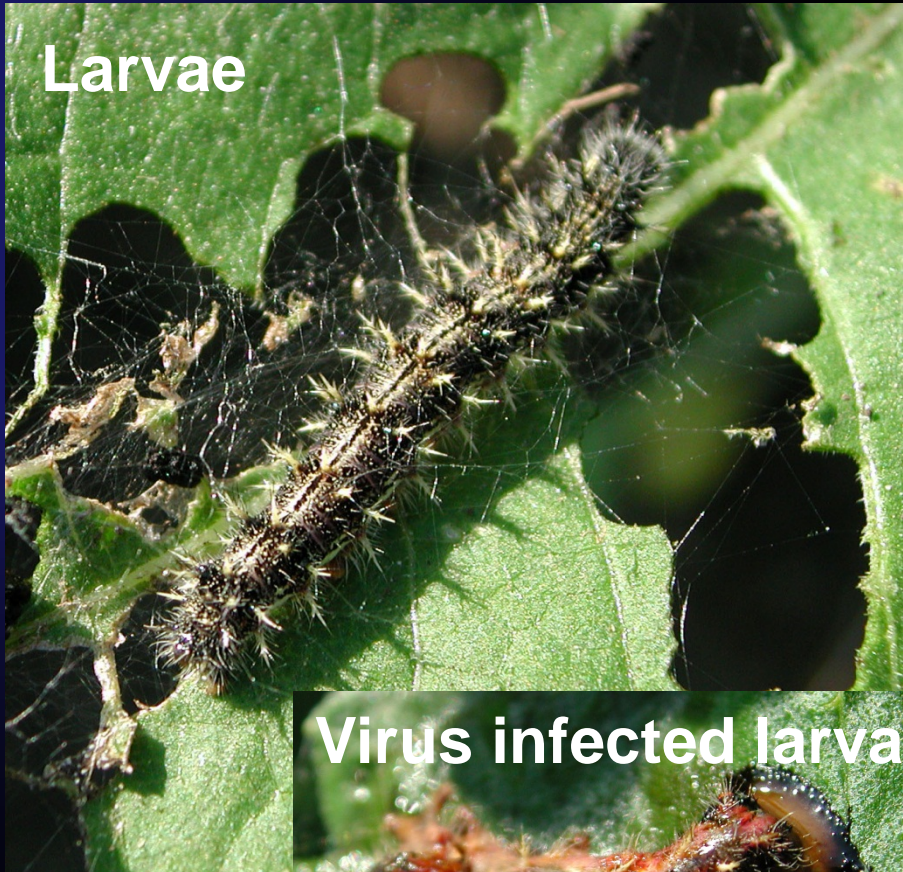
Damaged seeds



Thistle Caterpillar - Painted lady butterfly

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%



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