

# 2009 SUNFLOWER INSECT PEST PROBLEMS AND INSECTICIDE UPDATE



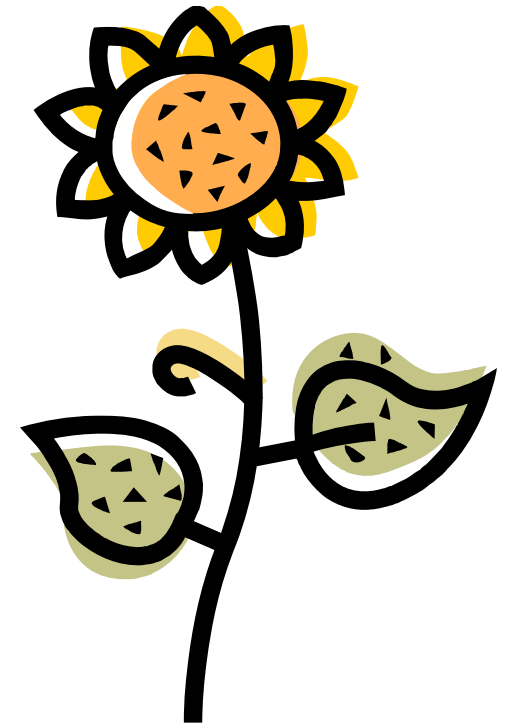
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Fargo, ND

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# Topics

- 2009 Regional Sunflower Insect Trapping Network
- 2009 National Sunflower Survey
  - ▣ Insects
- 2009 Sunflower Insecticide Trial
  - ▣ Head-infesting insects
    - Banded sunflower moth
    - Red sunflower seed weevil



# Banded Sunflower Moth

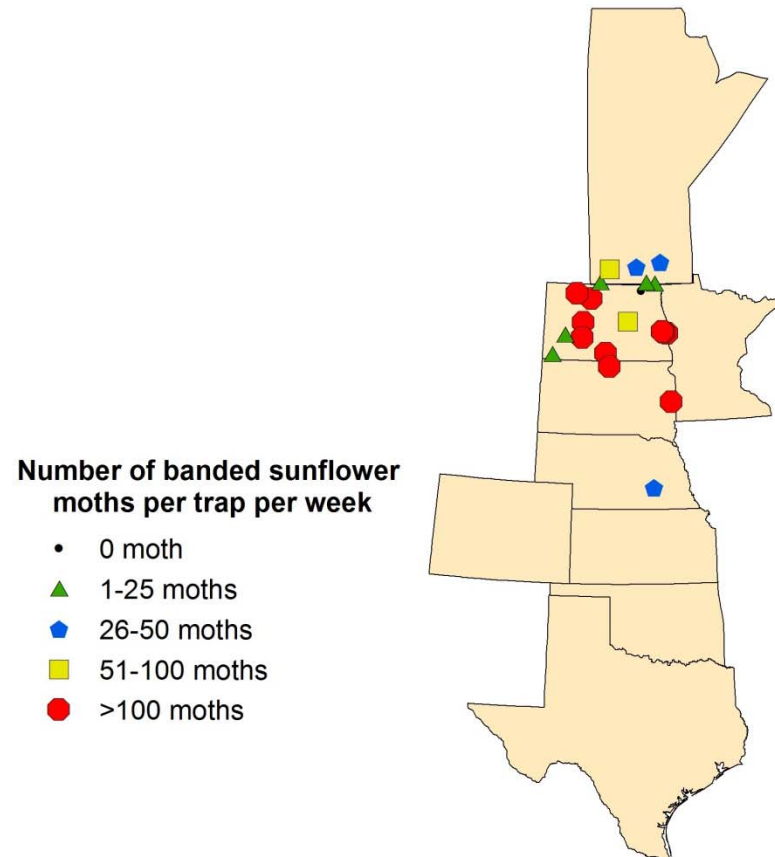
39 trap sites in 8 states and 1 province  
Maps were posted on NSA website



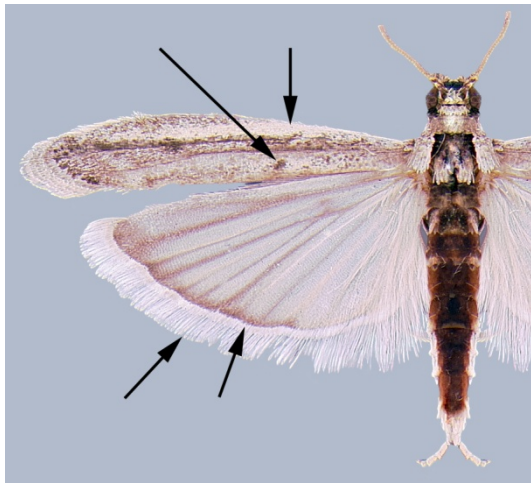
## 2009 Banded Sunflower Moth Trapping Network

*Cochylis hospes* Walsingham

July 24 - July 27, 2009



# Sunflower Moth

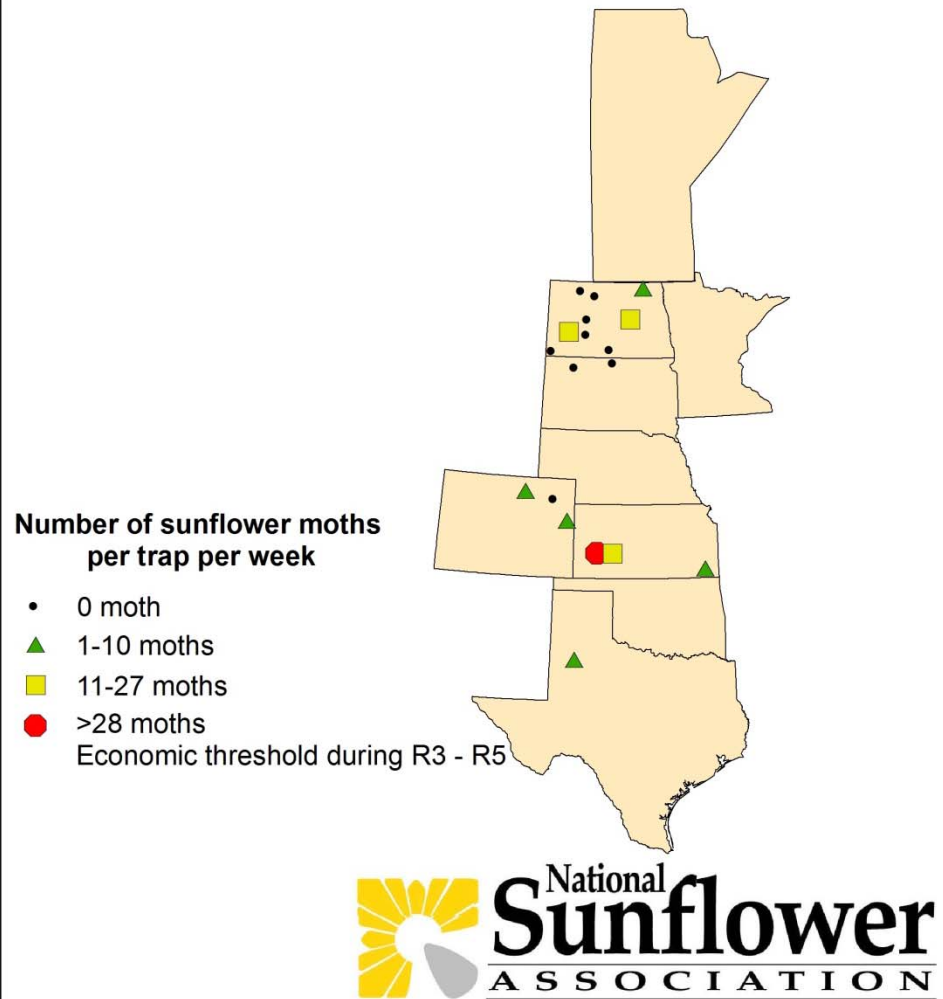


Thanks to Tina for making maps!

## 2009 Sunflower Moth Trapping Network

*Homoeosoma electellum* Hulst

August 7 - August 10, 2009





# Sunflower Insect Pests in Survey

Sunflower  
midge



Sunflower  
longhorned  
beetle



Sunflower seed  
Maggot (2007)



Sunflower  
bud moth (2008)



Sunflower  
moth



Banded  
sunflower moth



Lygus  
bug



Red sunflower  
seed weevil



# Sunflower Midge

*Contarinia schulzi* Gagné



Necrotic tissue under bracts caused by larval feeding; loss of ray flowers



Heavily damaged heads: gnarled & cupped with few seeds produced

# Sunflower Midge Damage Rating

- Bracken 1991
  - 0 - no damage
  - 1 - light bract damage
  - 2 - bract damage & cupping
  - 3 - heavy bract
  - 4 - extreme cupping to hole
  - 5 - head closed





# Sunflower Midge Damaged Heads



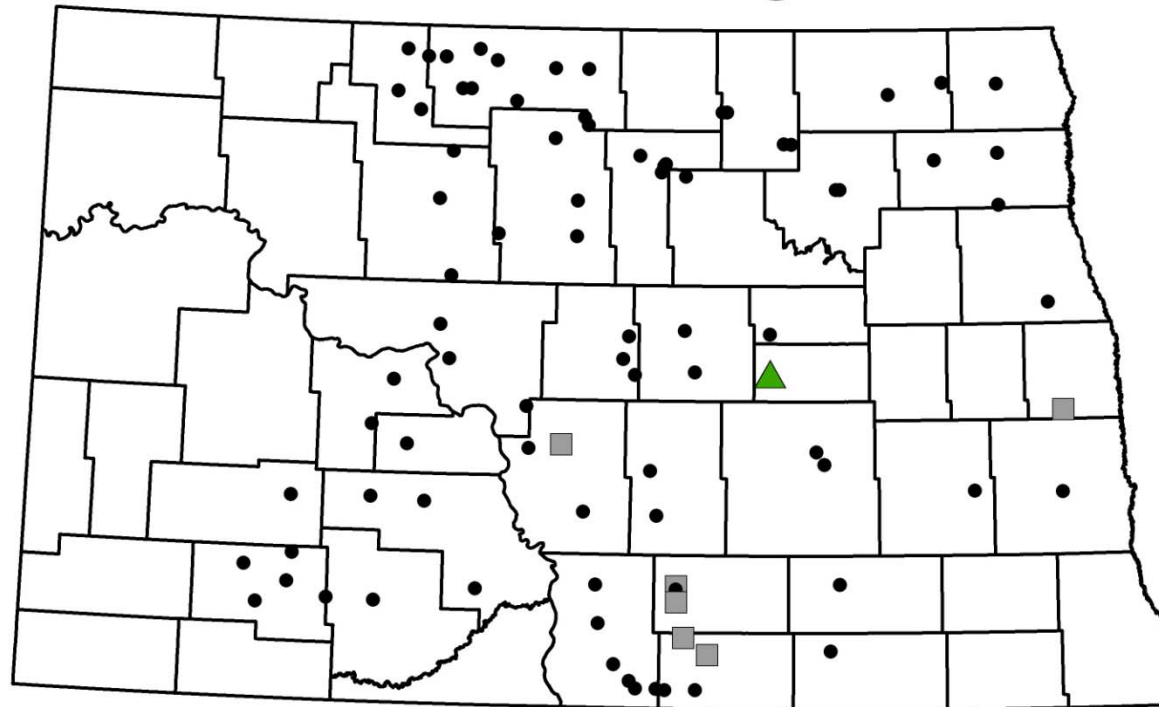


# 2009 Sunflower Survey

## *Sunflower Midge*



North Dakota



### Damage Rating (Bracken)

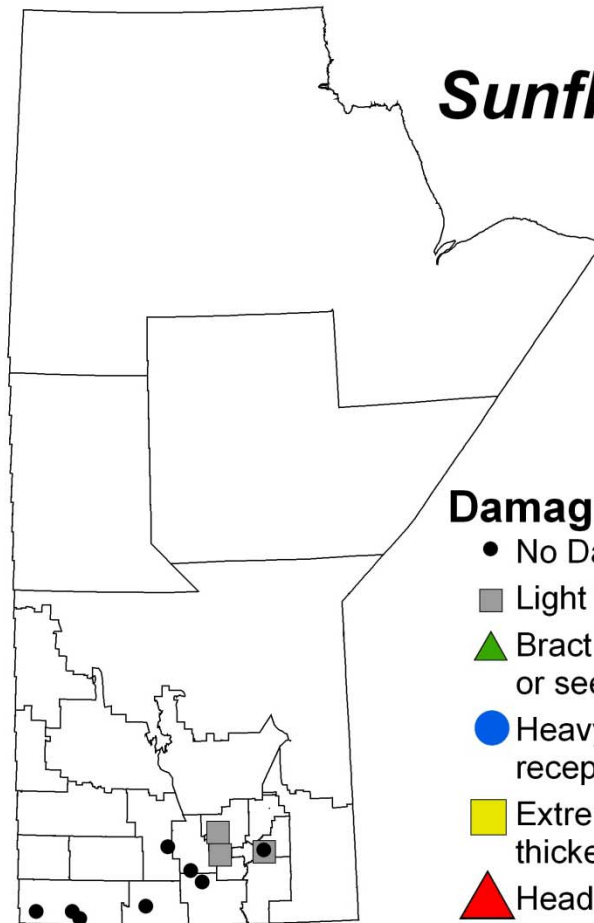
- No Damage
- Light bract damage, may be creased
- ▲ Bract damage, some cupping, start of central hole or seedless area
- Heavy bract damage, central hole or seedless area, receptacle thickening
- Extreme cupping to hole or seedless area, receptacle thickening >1/2 diameter
- ▲ Head Closed



# 2009 Sunflower Survey



Manitoba



## Damage Rating (Bracken)

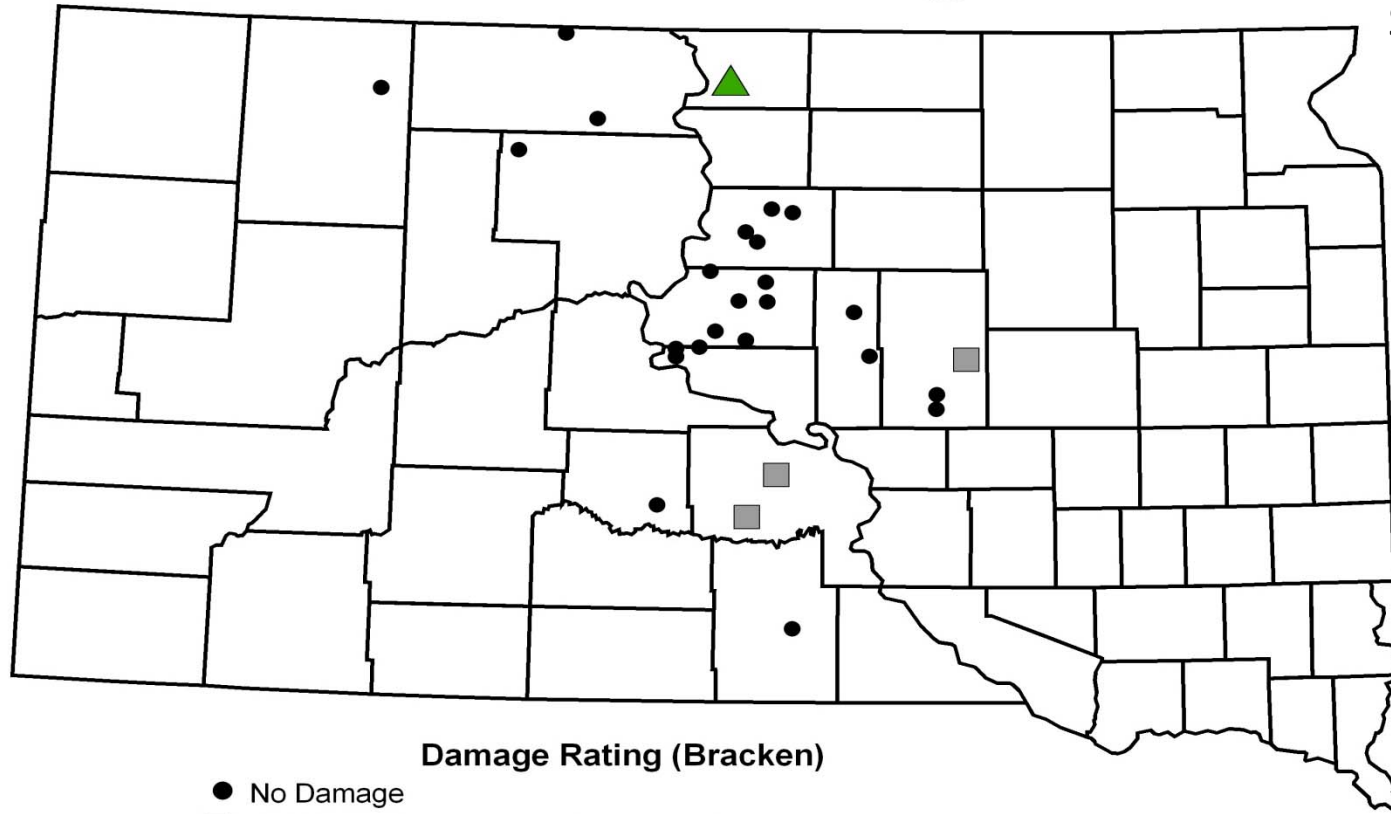
- No Damage
- Light bract damage, may be creased
- ▲ Bract damage, some cupping, start of central hole or seedless area
- Heavy bract damage, central hole or seedless area, receptacle thickening
- Extreme cupping to hole or seedless area, receptacle thickening >1/2" diameter
- ▲ Head closed

# 2009 Sunflower Survey

## *Sunflower Midge*



South Dakota



### Damage Rating (Bracken)

- No Damage
- Light bract damage, may be creased
- ▲ Bract damage, some cupping start of central hole or seedless area
- Heavy bract damage, central hole or seedless area, receptacle thickening
- Extreme cupping to hole or seedless area, receptacle thickening >1/2 head diameter
- ▲ Head closed

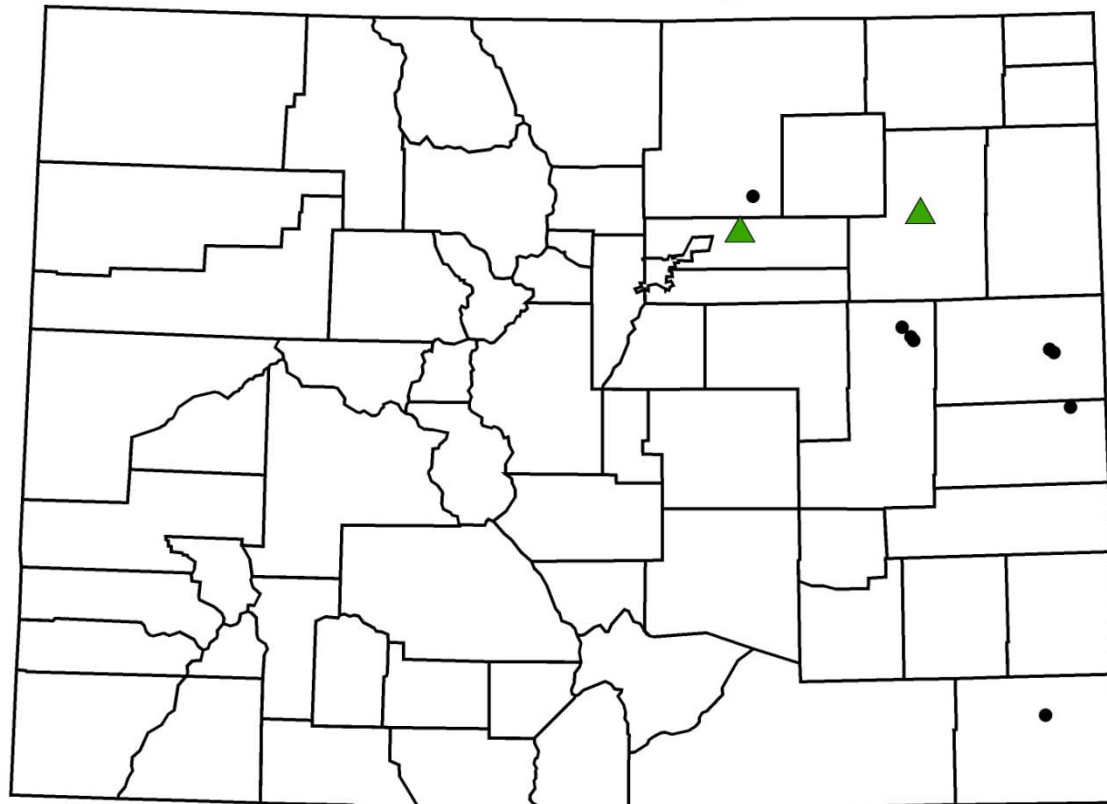


# 2009 Sunflower Survey

## *Sunflower Midge*



Colorado



● No Damage

■ Light bract damage, may be creased

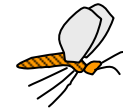
▲ Bract damage, some cupping start of central hole or seedless area

● Heavy bract damage, central hole or seedless area, receptacle thickening

■ Extreme cupping to hole or seedless area, receptacle thickening >1/2 head diameter

▲ Head closed

# Sunflower midge - IPM



Impossible to scout for due to small size and short emergence period and multiple emergence windows depending on weather



Chemical control not effective even when properly timed and multiple applications



Cultural control

- Delayed planting date = less damage in 2009
- Multiple (Stagger) planting dates



Host Plant Resistance – most promising IPM tool



# Sunflower Seed Maggot Injury

- **Seed sterility**
- **Tunneling through ovaries (seeds)**
- **No webbing (webbing indicates banded sunflower moth or sunflower moth)**



Adult



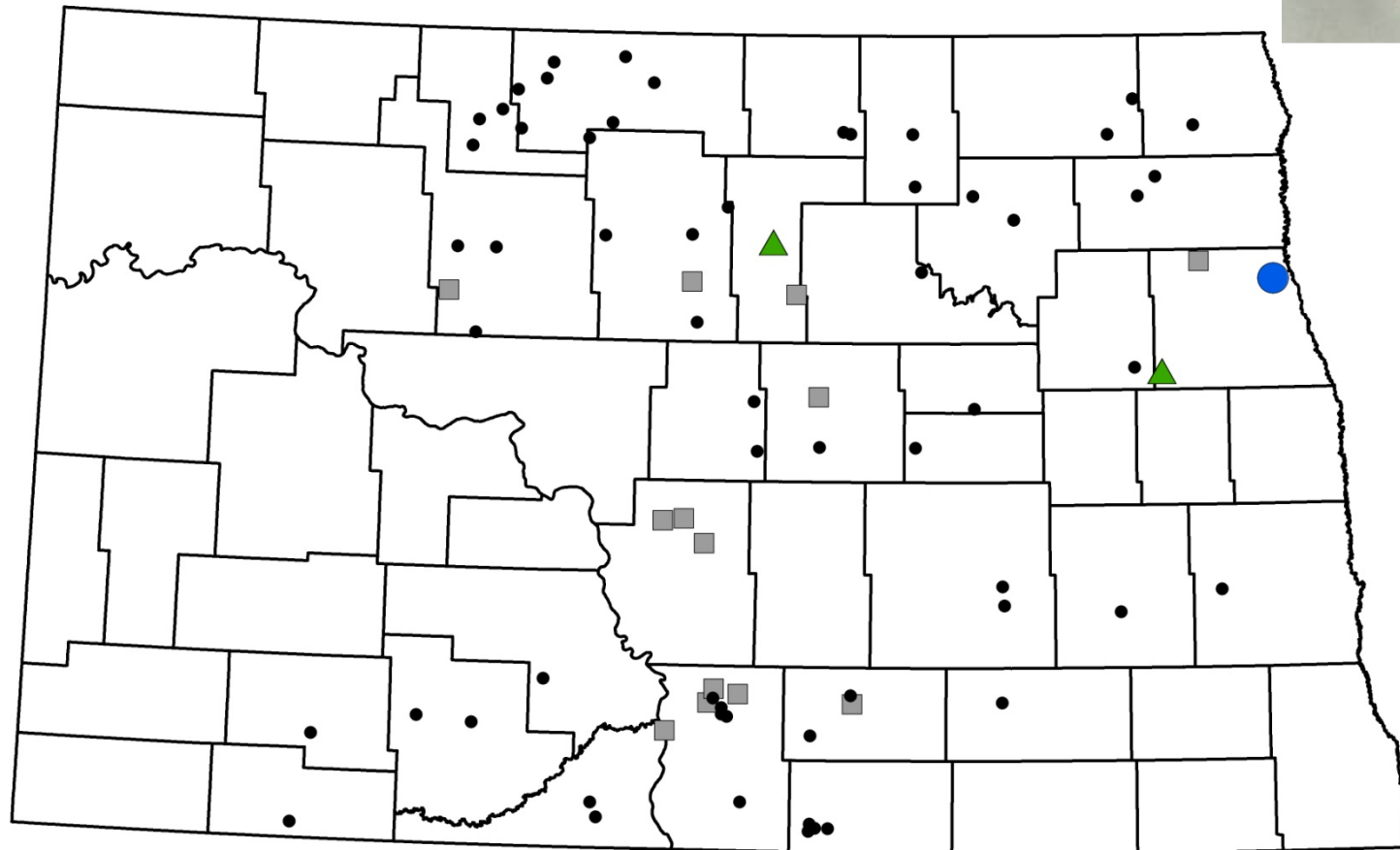
Larvae





# 2008 Sunflower Survey

## Sunflower Seed Maggot



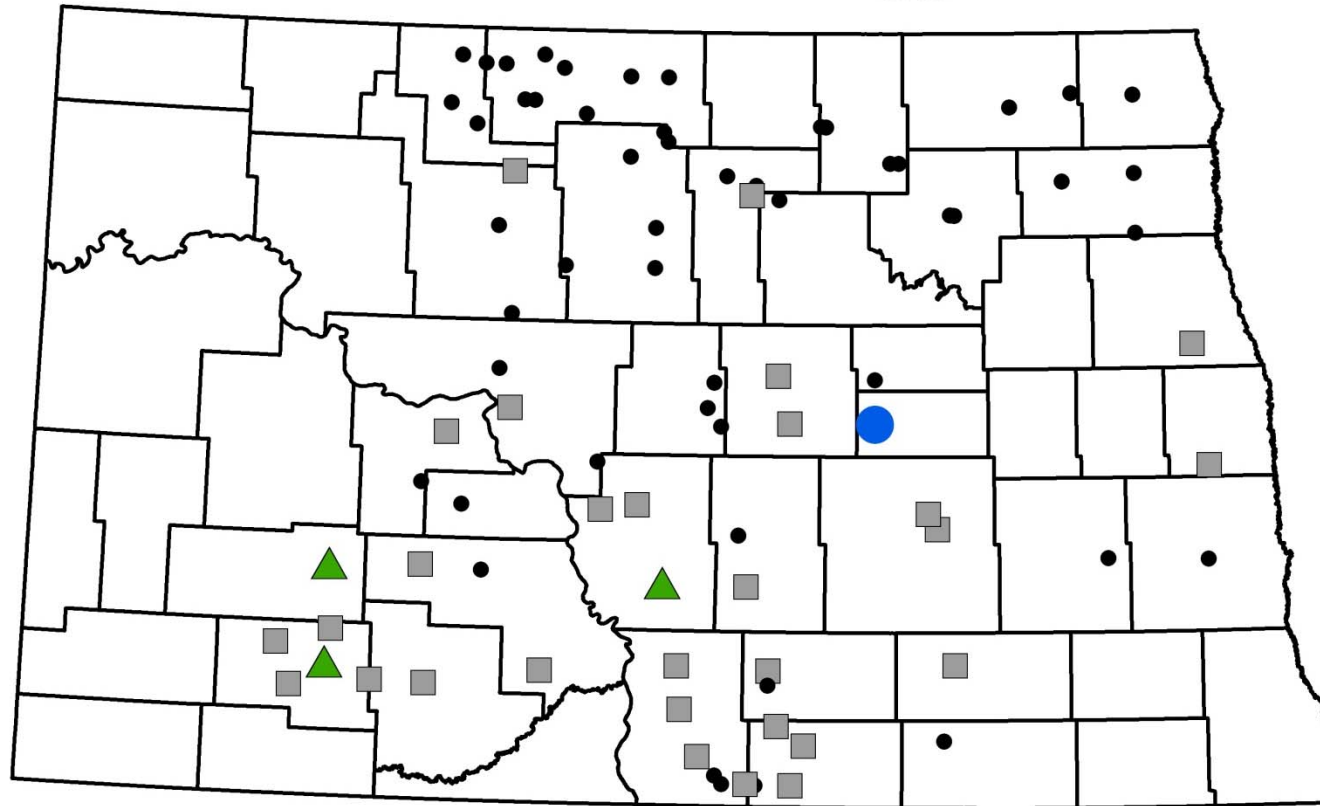
Percent Heads with Damage

- 0
- 1-10
- ▲ 11-25
- 26-50
- 51-75
- ▲ 76-100



# 2009 Sunflower Survey

## *Sunflower Seed Maggot*

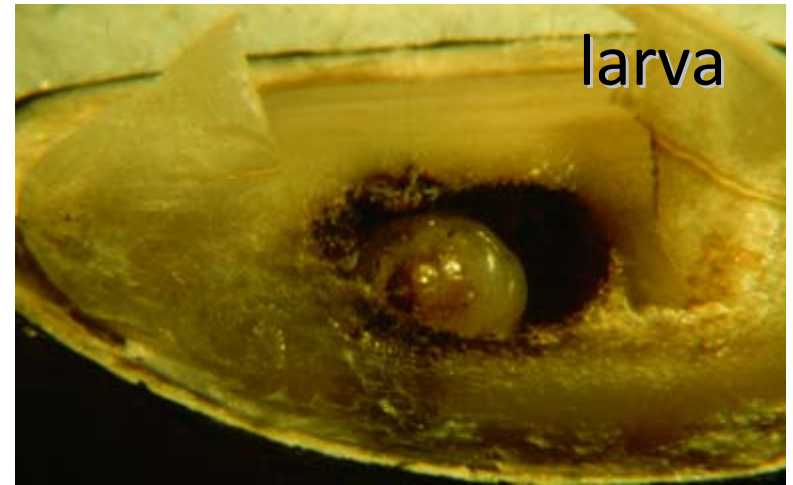


Percent Heads with Damage

- 0    ■ 1-10    ▲ 11-25    ● 26-50    ■ 51-75    ▲ 76-100



# Red Sunflower Seed Weevil



Drop into soil to overwinter

- Females require pollen to mature eggs
- Oviposit during flowering
- Heads with 50% flowering preferred
- Eggs laid inside seed
- Larvae in outer seed rows
- Kernel 1/3 consumed



Exit holes



# Lygus Plant Bugs

## Adults

- Small, cryptically colored insects
- Distinctive yellow triangle or “V”
- Pale green to reddish-brown

## Immatures (nymphs)

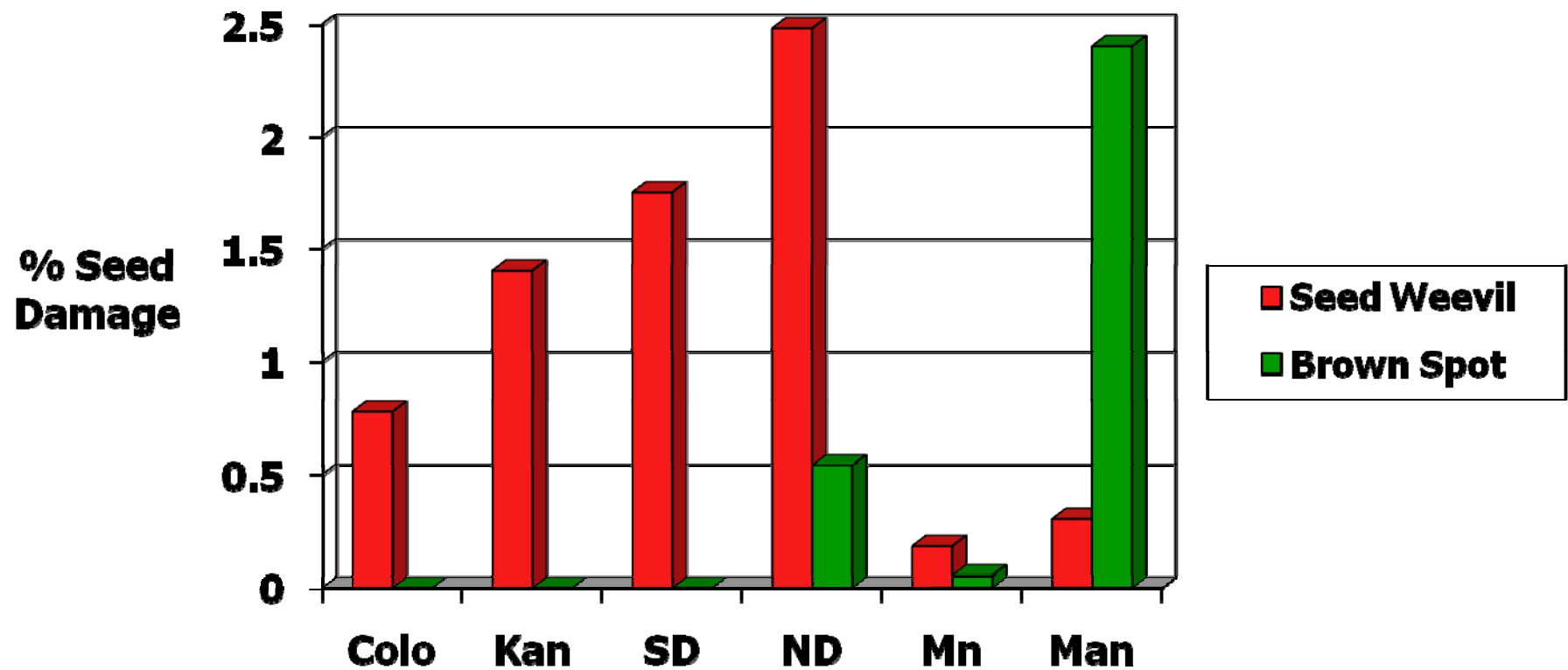
- Look like aphids



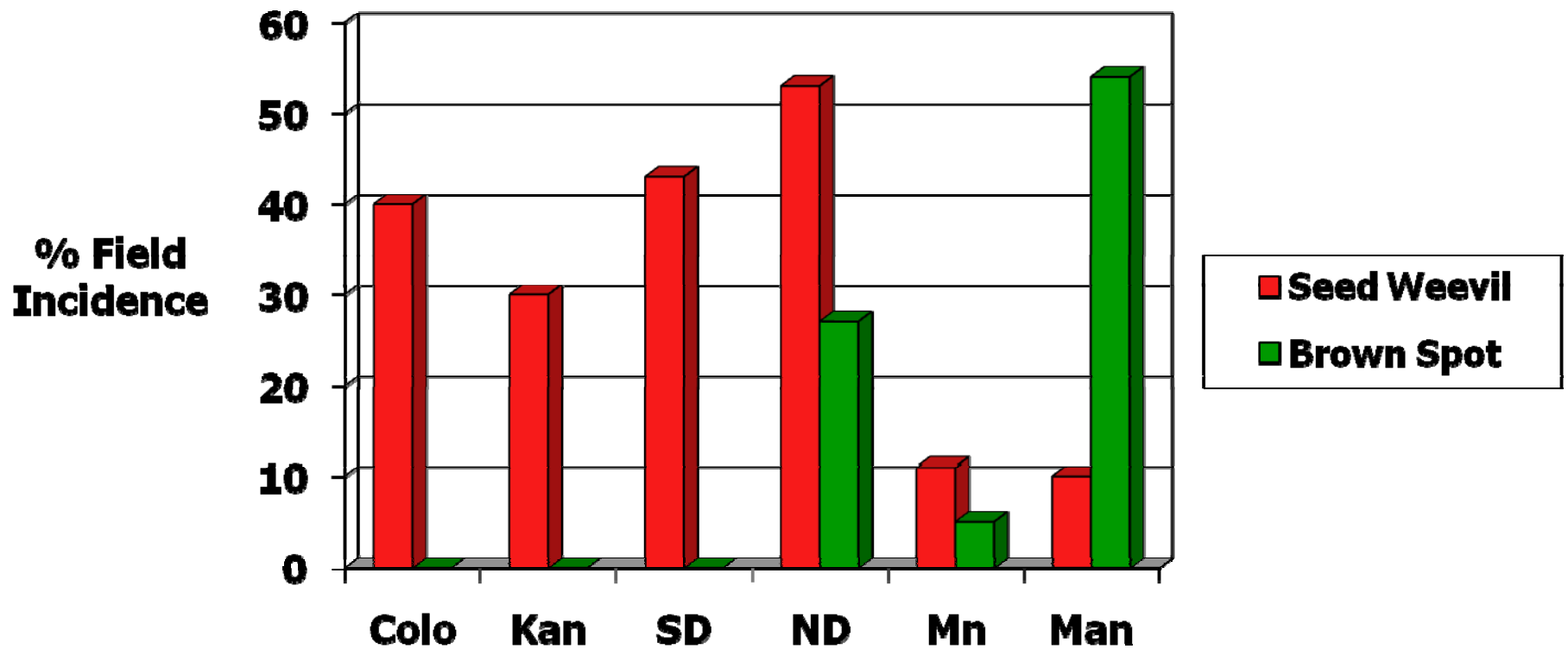
Brown spot  
on  
confection  
kernels



# Insect Seed Damage-2009



# Insect Seed Damage Incidence-2009

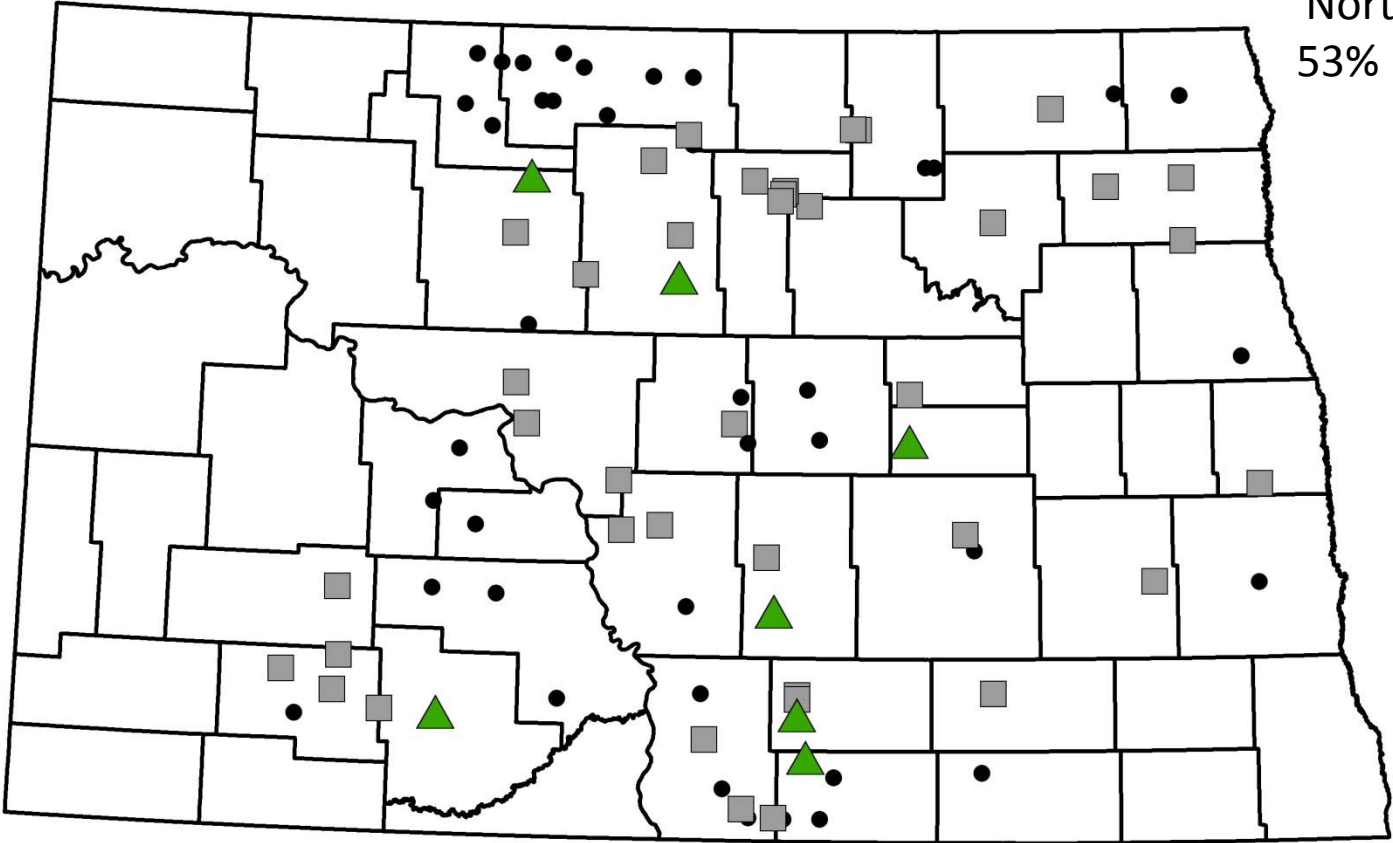


# 2009 Sunflower Survey

## Red Sunflower Seed Weevil



North Dakota  
53% Incidence



Percent Insect Damage to Seeds

- 0
- 1-10
- ▲ 11-25
- 26-50
- 51-75
- ▲ 76-100



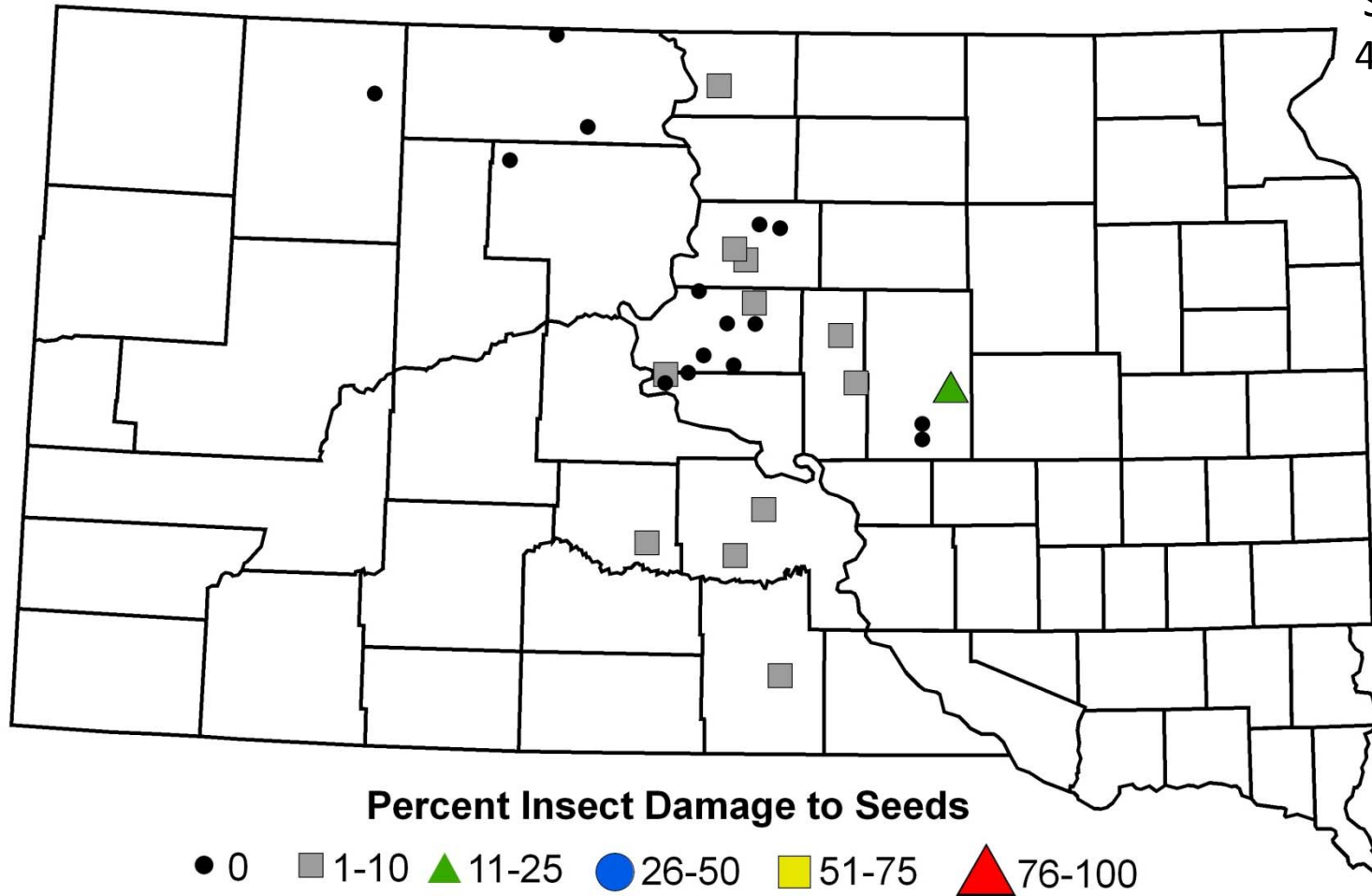


# 2009 Sunflower Survey

## Red Sunflower Seed Weevil



South Dakota  
43% Incidence

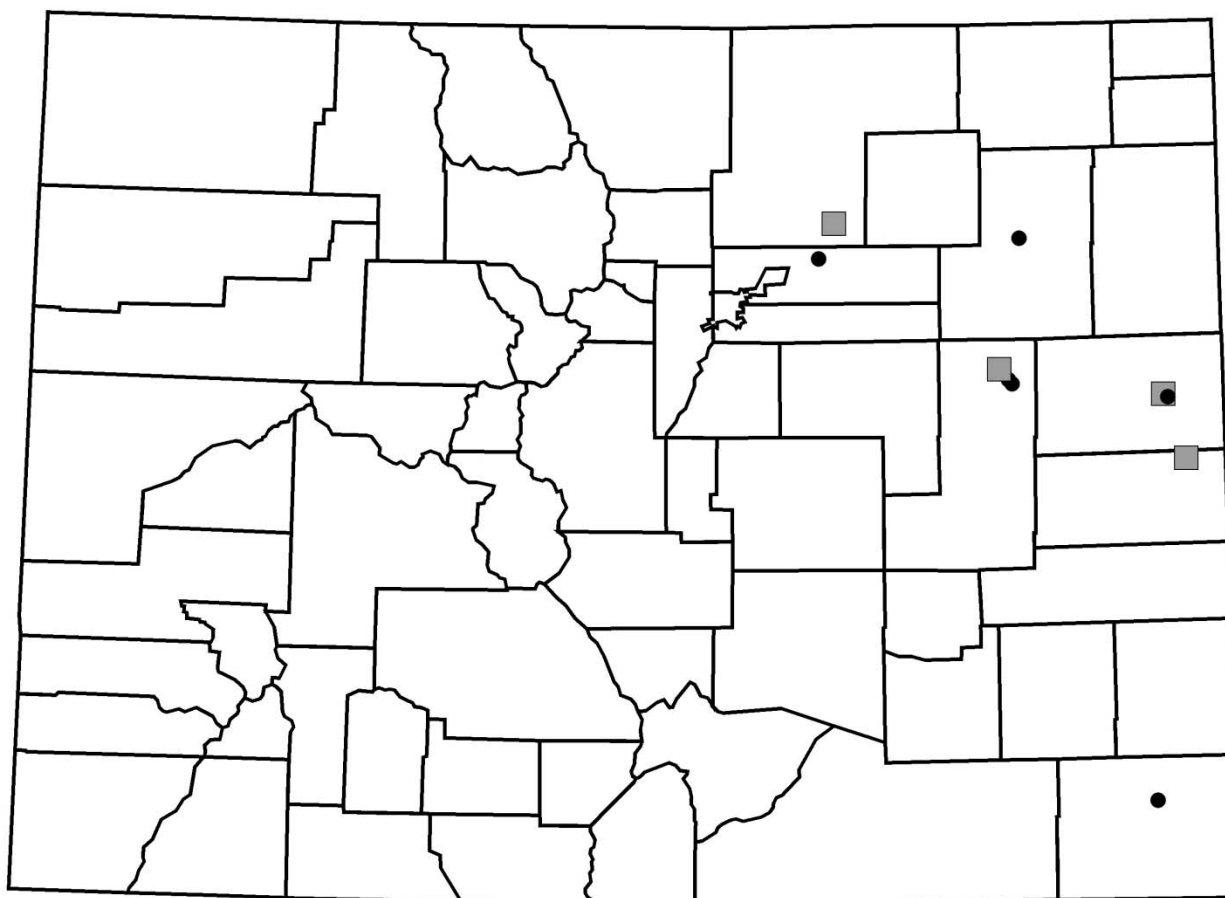


# 2009 Sunflower Survey

## *Red Sunflower Seed Weevil*



Colorado  
40% Incidence



Percent Insect Damage to Seeds

● 0   ■ 1-10   ▲ 11-25   ● 26-50   ■ 51-75   ▲ 76-100

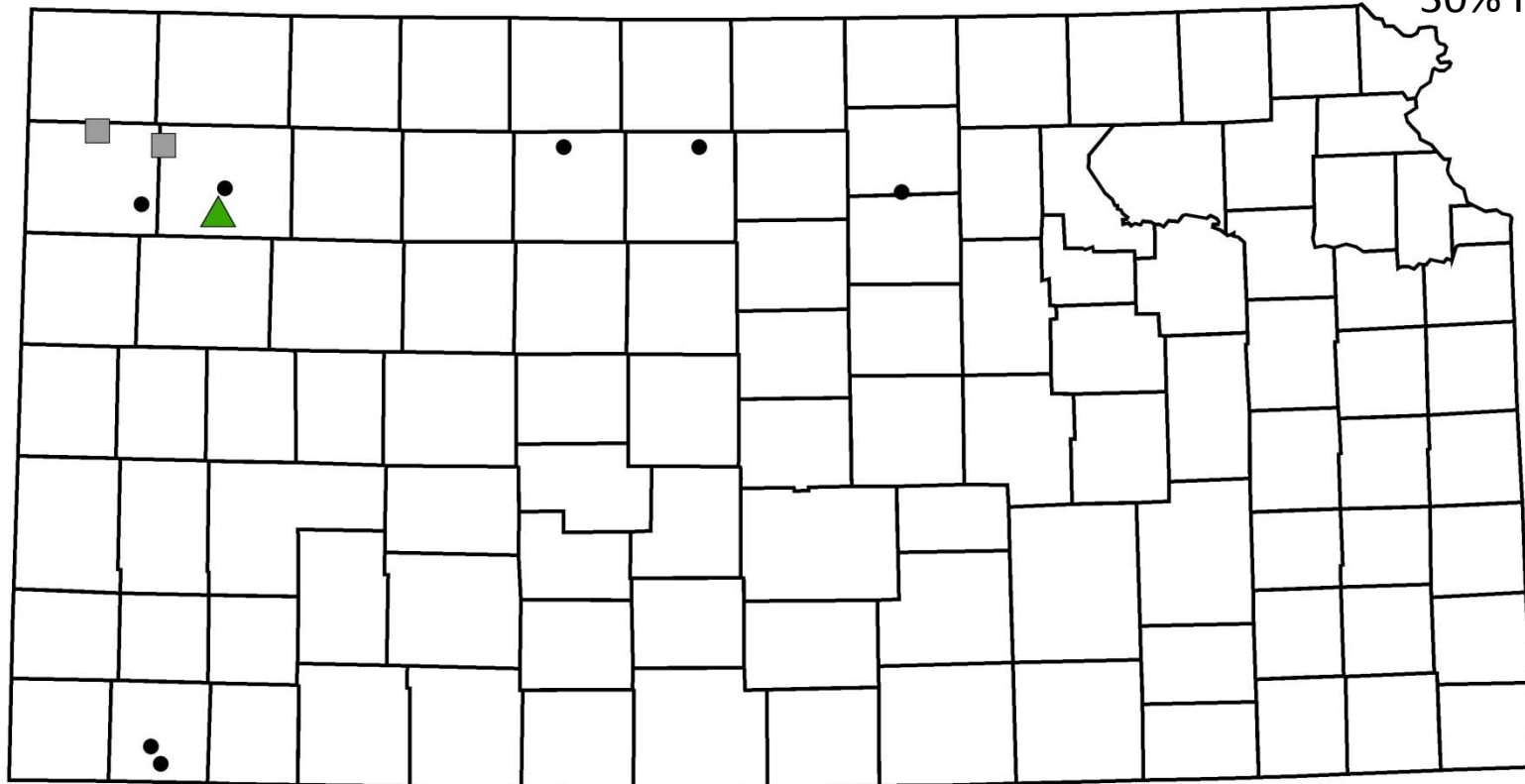


# 2009 Sunflower Survey



## *Red Sunflower Seed Weevil*

Kansas  
30% Incidence



Percent Insect Damage to Seed

- 0
- 1-10
- ▲ 11-25
- 26-50
- 51-75
- ▲ 76-100

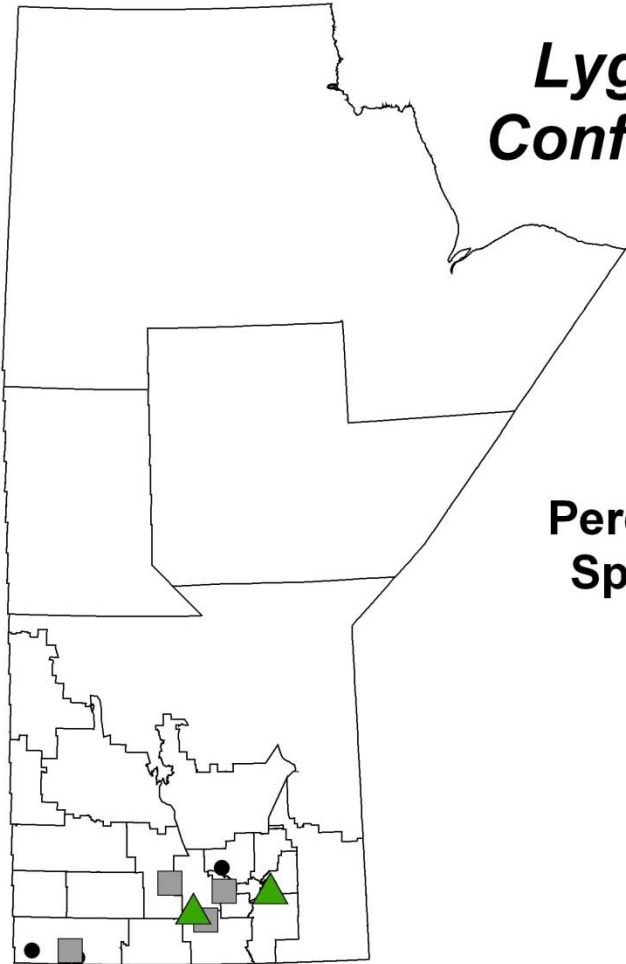


# 2009 Sunflower Survey



Manitoba  
54% Incidence

## *Lygus Bug Injury to Confection Sunflowers*



### Percent Brown Spot on Seed

- 0
- 1-5
- ▲ 6-25
- 26-50
- 51-75
- ▲ 75-100

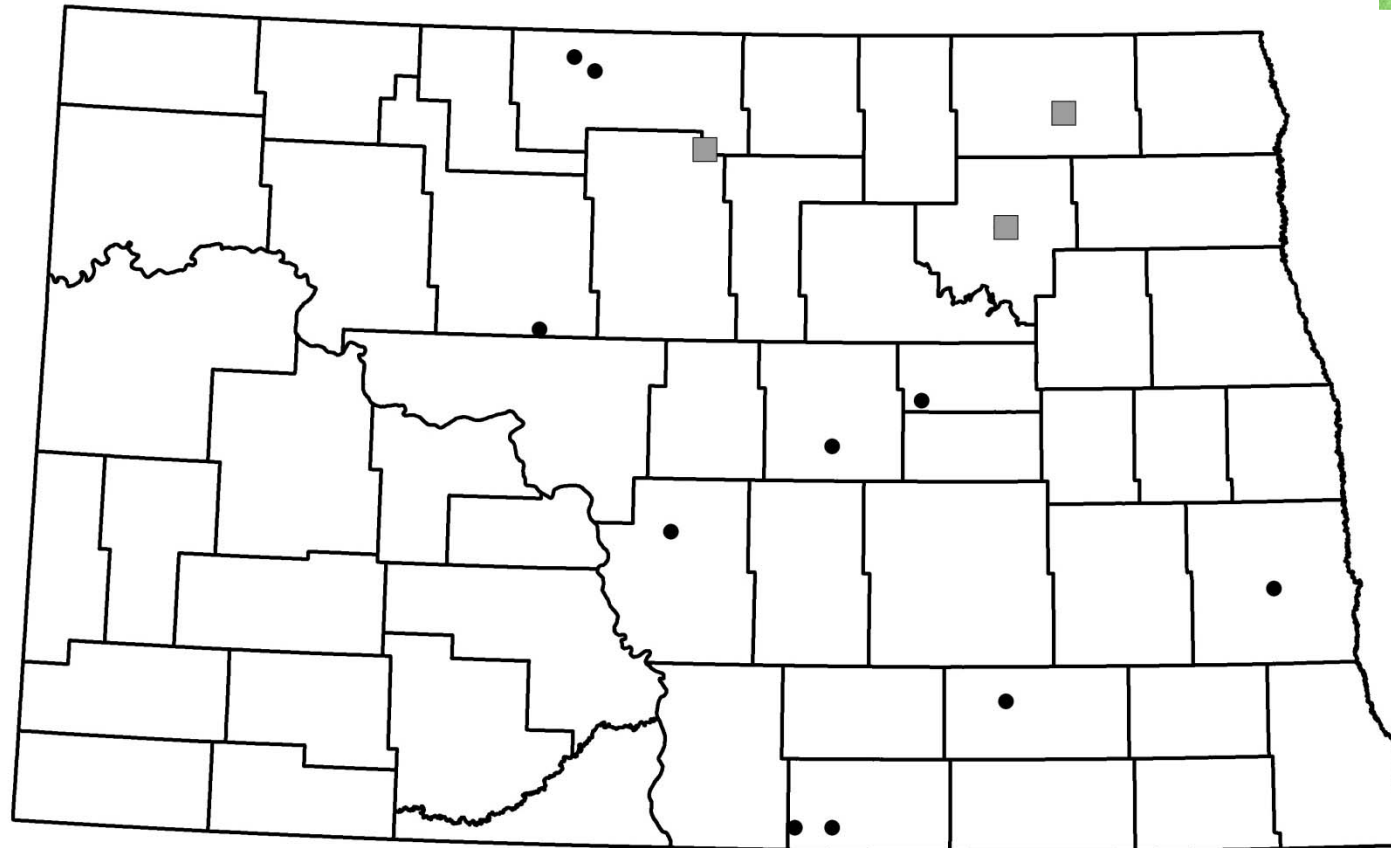


# 2009 Sunflower Survey

## *Lygus bug Injury to Confection Sunflowers*



North Dakota  
27% Incidence

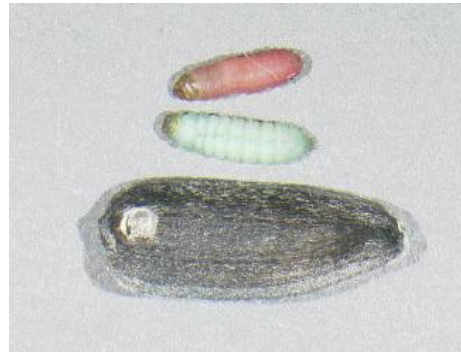


Percent Brown Spot on Seed



# Banded Sunflower Moth

Adult



Larvae



Damaged seeds



Exit holes



# Sunflower Moth



Adult



Larvae

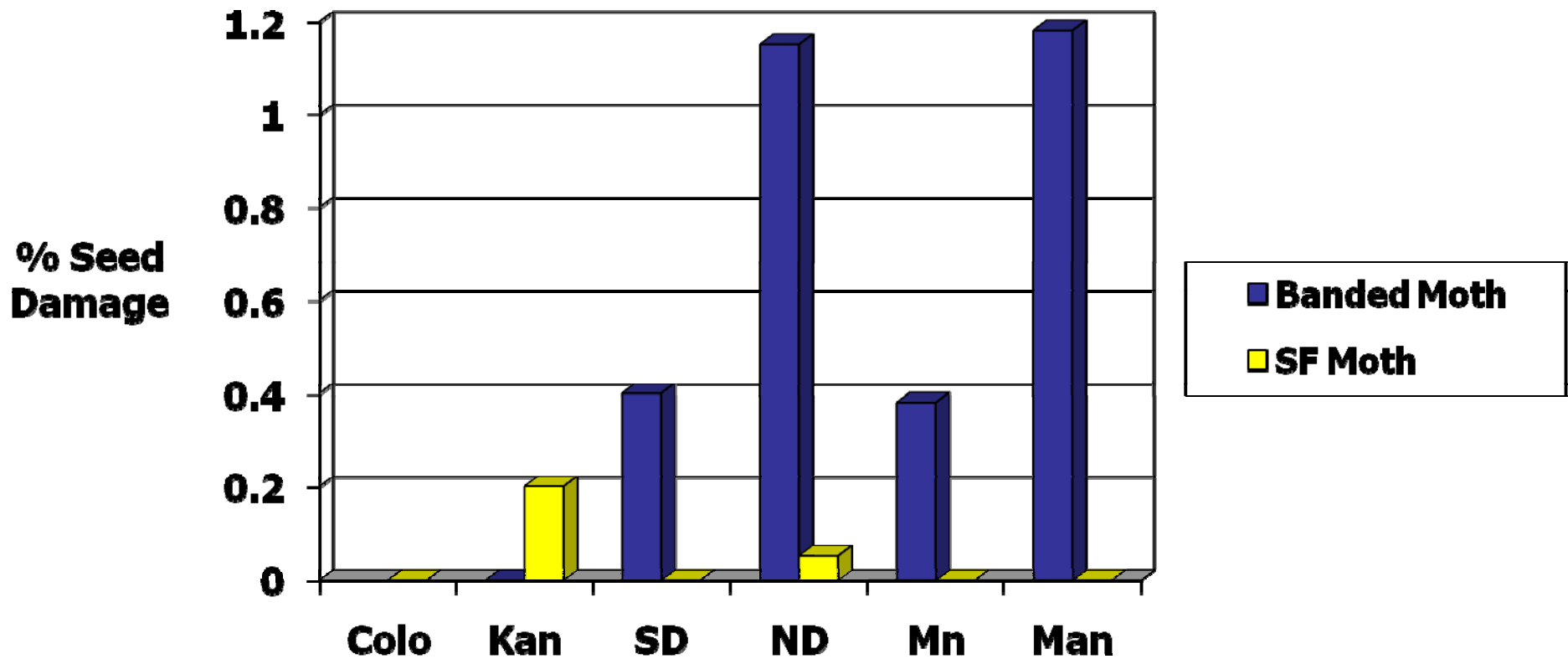


- Adults attracted to blooming heads
- Eggs deposited on heads & hatch in 4-5 days
- Larvae feed on pollen, disk flowers, & mature seeds
- Mature larvae move to soil & spin cocoons to overwinter

Overwinter in Texas  
adults migrate to central & northern Plains on southerly winds

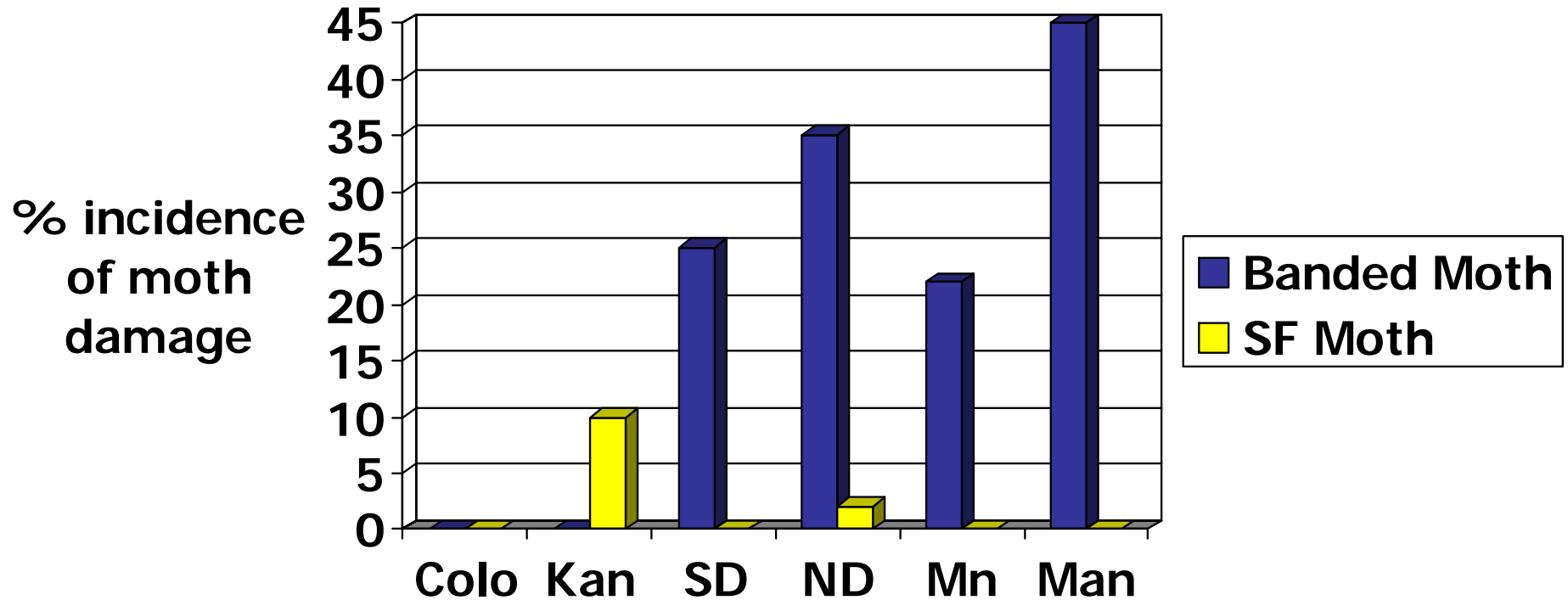
**Webbing & frass may occur in areas on head & Rhizopus head rot is often associated with infestations**

# Insect Seed Damage by Moths-2009





# Moth Damage Incidence in 2009 Sunflower Survey



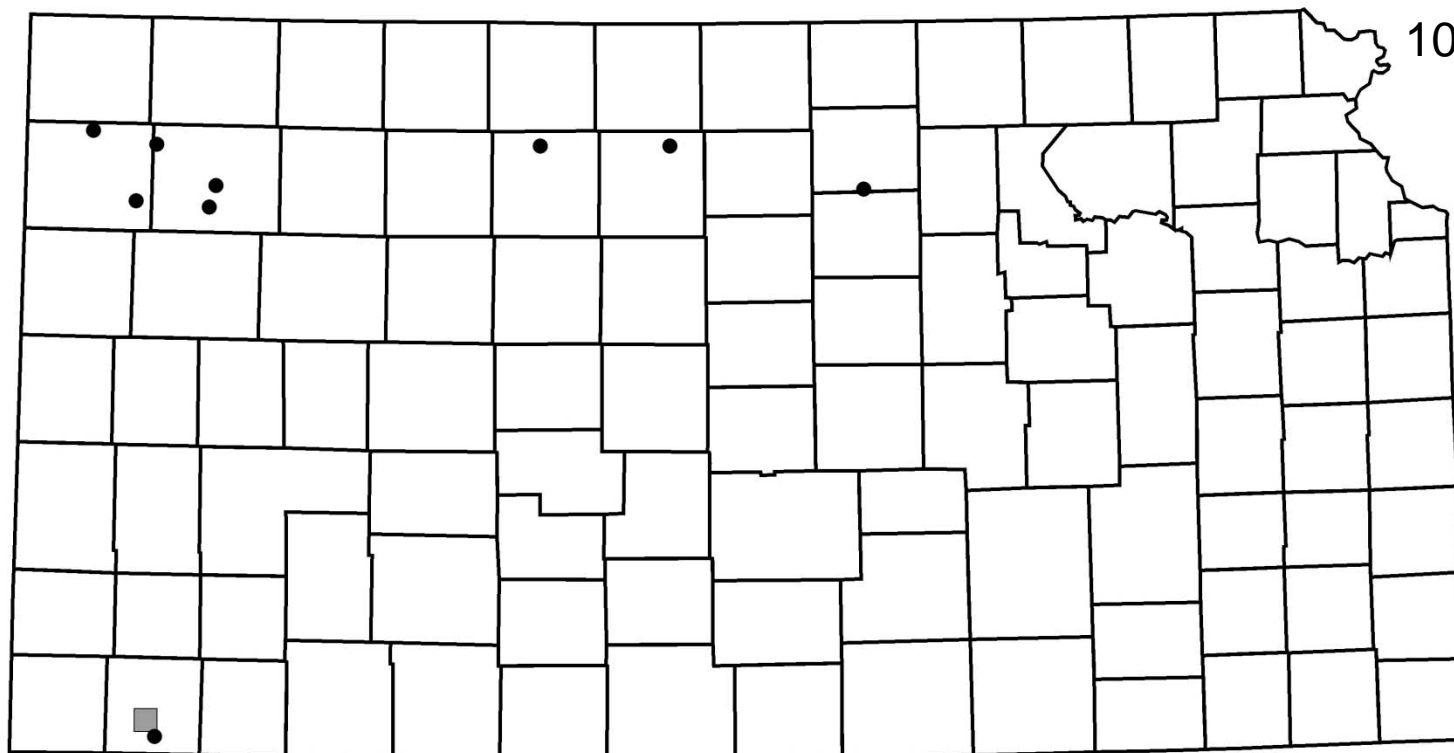
# 2009 Sunflower Survey



## *Sunflower Moth*

Kansas

10% Incidence



### Percent Insect Damage to Seed

- 0
- 1-10
- ▲ 11-25
- 26-50
- 51-75
- ▲ 76-100

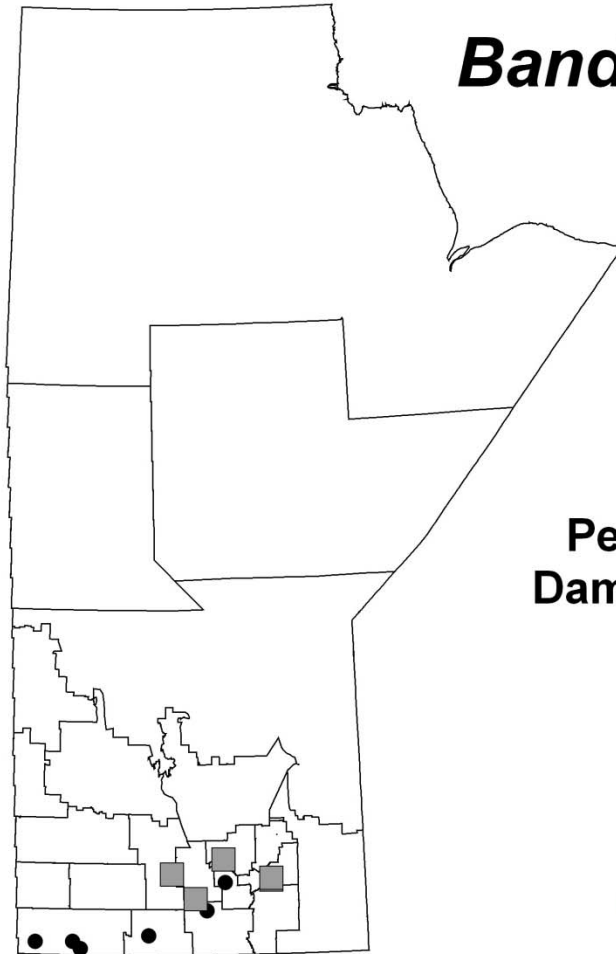


# 2009 Sunflower Survey



Manitoba  
45% Incidence

## *Banded Sunflower Moth*



### Percent Insect Damage to Seeds

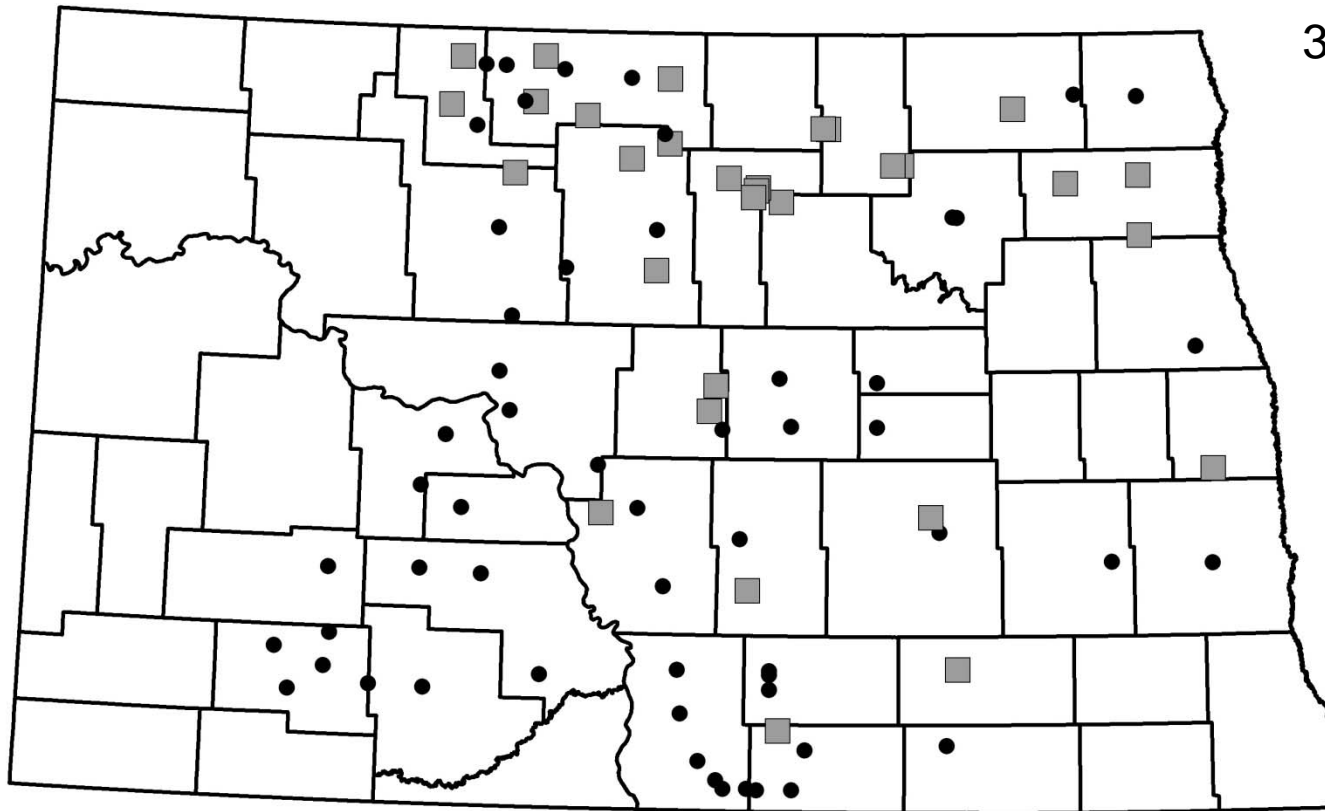
- 0
- 1-10
- ▲ 11-25
- 26-50
- 51-75
- ▲ 76-100

# 2009 Sunflower Survey

## *Banded Sunflower Moth*



North Dakota  
35% Incidence



Percent Insect Damage to Seeds



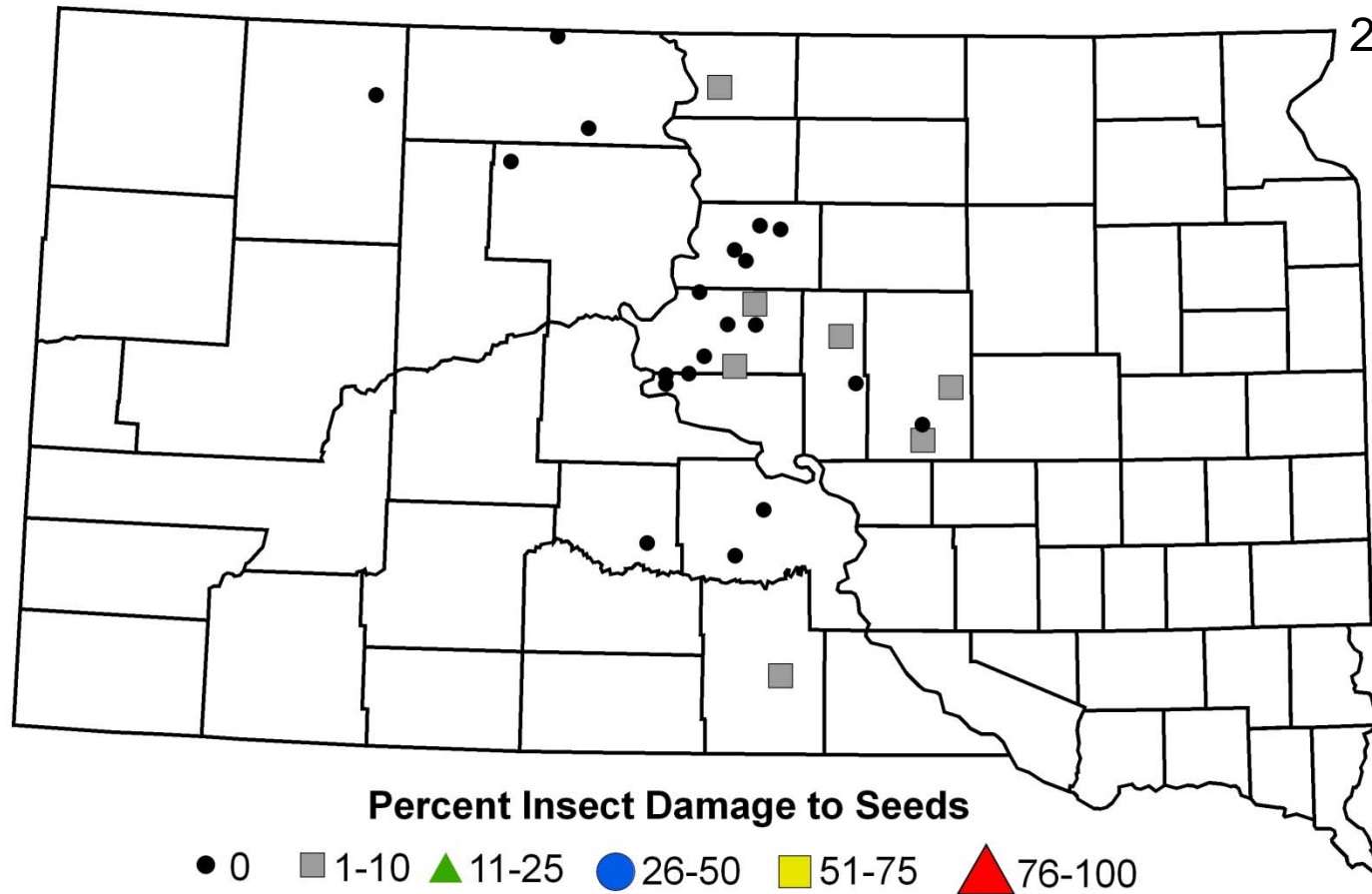


# 2009 Sunflower Survey

## *Banded Sunflower Moth*



South Dakota  
25% Incidence

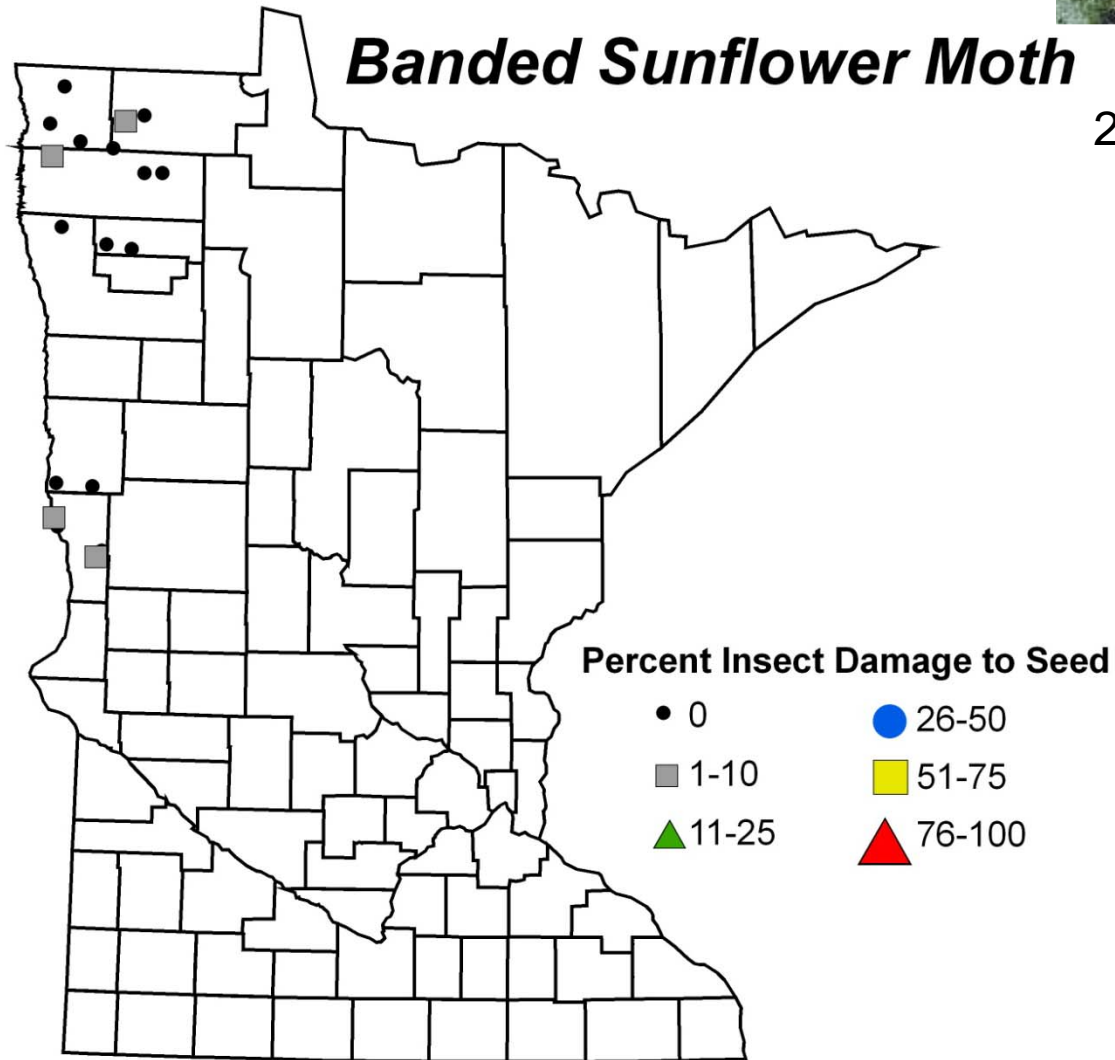


# 2009 Sunflower Survey



## *Banded Sunflower Moth*

Minnesota  
22% Incidence



# 2009 Insecticide Efficacy Study

- Planted May 30
- Dekalb DKF29-30 NS/DM Oilseed
- Conducted at NDSU Research Farm near Prosper
- RCBD with 4 replications
- 4-row plots (30" row spacing), 10' x 30'
- 10' alleys around each plot
- Insecticides applied on 10 August, stage R5.1
- Applied with CO<sub>2</sub> sprayer and offset tractor-mounted boom using T-Jet 80015 nozzles at 40 psi and a volume of 20 GPA



# Methods



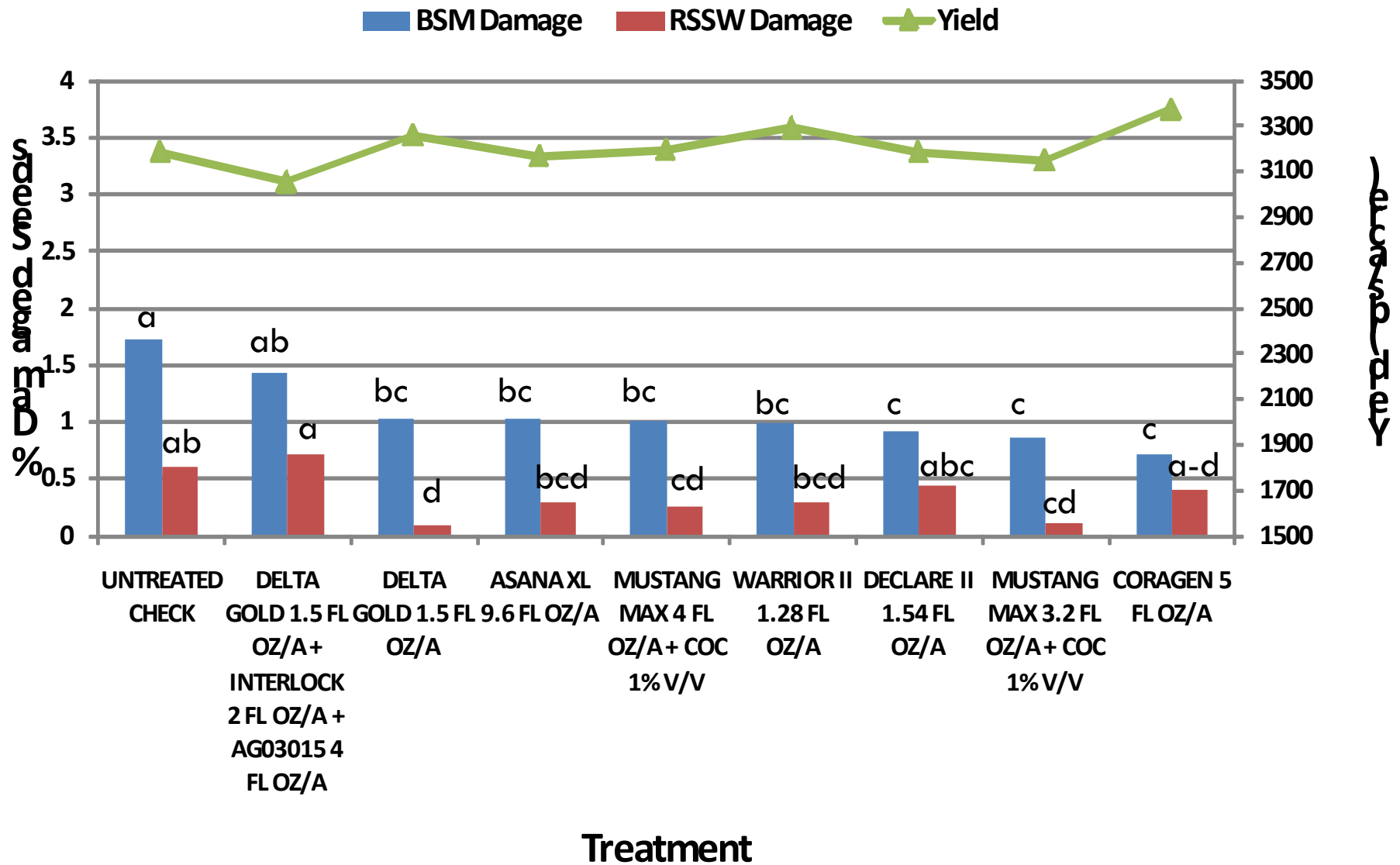
- 10 heads harvested from center two rows of each plot
  - ▣ Diameter and seed weight recorded for each head
  - ▣ 200 seed subsample evaluated for BSM and RSSW seed damage
- Plots harvested using plot combine on 2 December
- Seed weights from each head added to harvest data to obtain total plot weights

# Treatments

- Untreated Check
- Pyrethroids (IRAC Group 3A, sodium channel modulators)
  - ▣ Asana XL @ 9.6 fl oz/a
  - ▣ Delta Gold @ 1.5 fl oz/a
  - ▣ Delta Gold @ 1.5 fl oz/a + Interlock @ 2 fl oz/a + AG03015 @ 4 fl oz/a
  - ▣ Mustang Max @ 3.2 fl oz/a + COC @ 1% v:v
  - ▣ Mustang Max @ 4 fl oz/a + COC @ 1% v:v
  - ▣ Warrior II @ 1.28 fl oz/a
  - ▣ Declare II @ 1.54 fl oz/a
- Diamides (IRAC Group 28, ryanodine receptor modulators)
  - ▣ Coragen @ 5 fl oz/a



# Percent BSM Damage, Percent RSSW Damage, and Yield for Sunflower Insecticide Treatments at Prosper, ND 2009



# Sunflower Insect Team



Thank You