2009 SUNFLOWER INSECT PEST PROBLEMS AND INSECTICIDE UPDATE

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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
Sunflower Moth

Thanks to Tina for making maps!
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*

- **Eggs**: Necrotic tissue under bracts caused by larval feeding; loss of ray flowers.
- **Larvae**: Heavily damaged heads: gnarled & cupped with few seeds produced.
- **Infested bud**: 
- **Adult**: 

![Eggs](image1)
![Larvae](image2)
![Infested bud](image3)
![Adult](image4)
![Necrotic tissue](image5)

*Sunflower Midge* is a significant pest for sunflower production, causing damage to the plants and reducing yield. The larvae feed on the developing seed heads, leading to a loss of ray flowers and eventual damage to the seeds. Controlling this insect is crucial for maintaining the quality and quantity of sunflower production.
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

Heavily damaged heads: attacked at early bud stage with no seeds
2009 Sunflower Survey
Sunflower Midge

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

North Dakota
2009 Sunflower Survey

Sunflower Midge

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

Manitoba
2009 Sunflower Survey

Sunflower Midge

Damage Rating (Bracken)

- Black: No Damage
- Gray: Light bract damage, may be creased
- Green triangle: Bract damage, some cupping start of central hole or seedless area
- Blue circle: Heavy bract damage, central hole or seedless area, receptacle thickening
- Yellow: Extreme cupping to hole or seedless area, receptacle thickening >1/2 head diameter
- Red triangle: Head closed

South Dakota
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)
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

- 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

Drop into soil to overwinter

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

% Seed Damage

Colo  Kan  SD  ND  Mn  Man

Seed Weevil  Brown Spot
Insect Seed Damage Incidence-2009

% Field Incidence

- Colo
- Kan
- SD
- ND
- Mn
- Man

Seed Weevil
Brown Spot
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

Percent Insect Damage to Seeds

- • 0
- □ 1-10
- ▲ 11-25
- ○ 26-50
- ▼ 51-75
- △ 76-100
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

Lygus Bug Injury to Confection Sunflowers

Percent Brown Spot on Seed

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

Manitoba
54% Incidence
2009 Sunflower Survey

Lygus bug Injury to Confection Sunflowers

North Dakota
27% Incidence

Percent Brown Spot on Seed

- 0
- 1-5
- 6-25
- 26-50
- 51-75
- 76-100
Banded Sunflower Moth

Adult

Larvae

Damaged seeds

Exit holes
Sunflower Moth

- 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

% Seed Damage

- Colo
- Kan
- SD
- ND
- Mn
- Man

Banded Moth
SF Moth
Moth Damage Incidence in 2009 Sunflower Survey

% incidence of moth damage

Colo  Kan  SD  ND  Mn  Man

Banded Moth
SF Moth
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

Banded Sunflower Moth

Percent Insect Damage to Seeds
- 0
- 1-10
- 11-25
- 26-50
- 51-75
- 76-100

Manitoba 45% Incidence
2009 Sunflower Survey

Banded Sunflower Moth

Percent Insect Damage to Seeds

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

North Dakota
35% Incidence
2009 Sunflower Survey

Banded Sunflower Moth

South Dakota 25% Incidence

Percent Insect Damage to Seeds

- 0
- 1-10
- 11-25
- 26-50
- 51-75
- 76-100
2009 Sunflower Survey

Banded Sunflower Moth

Minnesota
22% Incidence

Percent Insect Damage to Seed

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

National Sunflower Association
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 CO₂ 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

Treatment

BSM Damage  RSSW Damage  Yield