

UNDERSTANDING AND MANAGING SECONDARY BELOW GROUND INSECT PESTS IN CORN

Bryan Jensen
IPM Program/Dept. of Entomology
UW Extension

Secondary below ground insects pests on corn

- Seedcorn maggots
- Wireworms
- True White grubs

Why?

- **Damage often unnoticed**
- **Life cycle/habits are cryptic**
 - ✓ Often misunderstood
 - ✓ Often unfairly blamed
 - ✓ Damage blamed on something else
- **No rescue treatments**
 - ✓ Often treated prophylactically
 - ✓ Field histories can help the decision making process for WG and WW

Topics

- **Identification**
- **Life cycle**
- **Damage symptoms**
 - **Above**
 - **Below**
- **Management**

Seedcorn Maggot

- **Adult : Fly**
- **Immature: white, legless, cigar-shaped maggot**
- **Life Cycle**
 - **OW as pupae in soil**
 - **Multiple generations in WI**
 - **First generation: damage to timely planted crops**
 - **Second generation: damage to late planted crops**



Seedcorn Maggot

Life Cycle (continued)

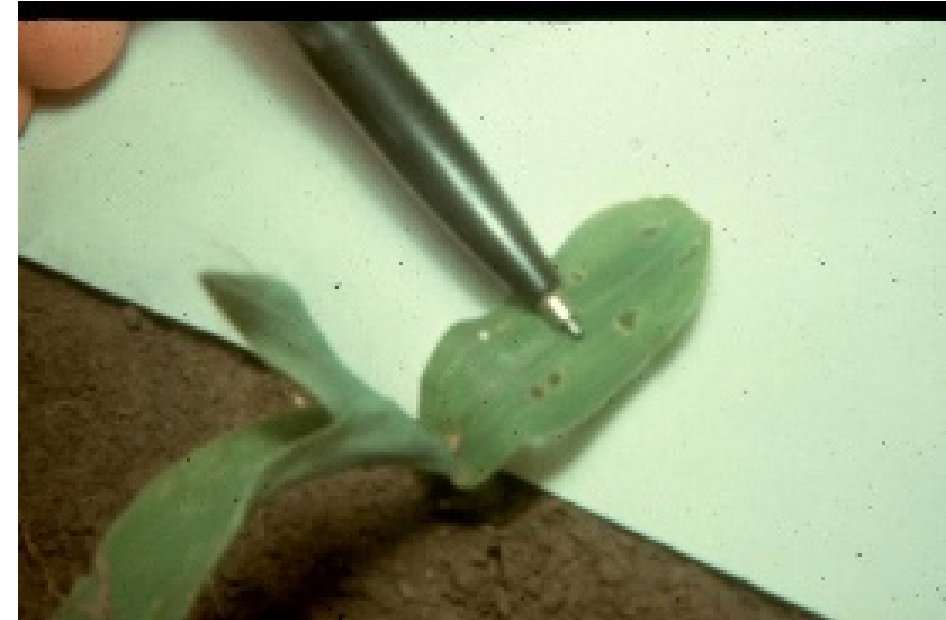
- Adults mate w/in 2-3 days
- Oviposition preference:
 - Soils with decaying OM
 - Application of livestock manure
 - Plow-down of weeds/cover crops
 - Freshly tilled soil
- Eggs hatch 2-3 days



Seedcorn maggot

Damage

- Soybeans more sensitive than corn
- Larvae feed on seed
- All feeding is below ground
- Cool/wet weather increases damage potential
- Above ground symptoms
 - Poor plant stand
 - Uniform distribution w/in field
 - Holes in oldest leaves (usually cotyledon) of corn



Seedcorn maggot

Damage symptomology maybe confused with

- Seedling diseases
- Wireworms
- “bad” seed

Seedcorn Maggot Troubleshooting

- ✓ Was seed planted?
- ✓ SCM maggots present?? Or Not
 - Sound seed
 - Decaying seed
 - Saprophytic maggots (non pest) look similar
- ✓ Range of symptoms
 - Skips in row
 - Cotyledons w/ holes
 - Newly emerging leaves are undamaged

Seedcorn Maggot Troubleshooting

- ✓ Is damage randomly distributed w/in field
- ✓ Was field planted during an adult peak
- ✓ Was field planted into green/livestock manure
- ✓ Do other fields w/ similar history and planting dates have damage?
- ✓ Were seed treatments/soil insecticides used?

SCM Management

1. Avoid till/plant
2. Avoid green manures
3. Avoid livestock manure application
4. Plant between adult flight periods
 - ✓ 380 and 1080 DD, base 39⁰F
 - WI Pest Bulletin (base 40)
 - <http://uspest.org/cgi-bin/usmapmaker.pl>
 - Interactive
 - Back calculate for adult peak flights
5. Soil Applied Insecticides
6. Seed Treatments

Wireworm

➤ ID

- Adult: click beetle
- Larvae:
 - Hard-shelled
 - Copper colored
 - 3 sets of jointed legs
- Millipedes (look-a-like)



[Frank Pears, Colorado State University, Bugwood.org](http://Bugwood.org)

Millipedes

“wireworm look-a-like”



- hard-shelled
- Grayish-black
- Legs: fringe of “hairs” entire length of body
- Found in wet areas with high OM
- Non pest (?)
 - Opportunistic feeding

Wireworms

➤ Life Cycle

- Overwinter as adults and larvae
- 1 year as adult
- Adults usually oviposit in weedy areas
- Multiple years (2-6) as immature
 - Species dependent
 - Overlapping generations

Wireworm



Damage to corn

- Adults: none
- Larval
 - Feed on corn seed
 - Increased potential in cold/wet weather
 - Burrow into corn stalk always below ground
 - Above growing point—holes in emerging leaves
 - Below growing point- “dead-heart”, “wilted whorl”
 - Year 2,3 + , may have significantly more damage than year 1
 - Clumped distribution
- Damage possible to Soybean, Small Grains

Wireworm

- **Management**
 - No rescue treatment
 - Scout/verify damage
 - ✓ Develop field history
 - Preventive treatments
 - ✓ Soil applied Insecticides
 - ✓ Seed treatments

Wireworm bait stations

- **Labor intensive**
 - Best (?) suited for high value crops
 - Several/field
 - Place 3 weeks prior to planting
 - Dig hole 4 inches wide by 9 inches deep
 - ½ cup of untreated corn/wheat seed
 - Cover w/ plastic
 - 1/trap indicates need for treatment

True White Grubs

ID

- Several species
- Adult
 - May/June beetles
 - 1 inch long
 - Dark brown - black
- Larvae
 - ¼- 1 ¼ inch long
 - White/cream color
 - C-shaped
 - Tan head



True White Grubs

Life Cycle

- Overlapping generations
- Year 1
 - Adults feed on a variety of trees (aspen, willows, oak)
 - Females lay eggs mid/late summer
 - (usually) in association w/ weeds
 - Eggs hatch
 - Little damage to corn
 - Larvae move down in the soil profile

True White Grubs

Life Cycle

- **Year 2**
 - Move back up w/in soil profile
 - feed on corn roots
- **Year 3**
 - Feeding obvious
 - larvae feed on corn roots
 - Can burrow into plant
 - Pupate

True White Grubs

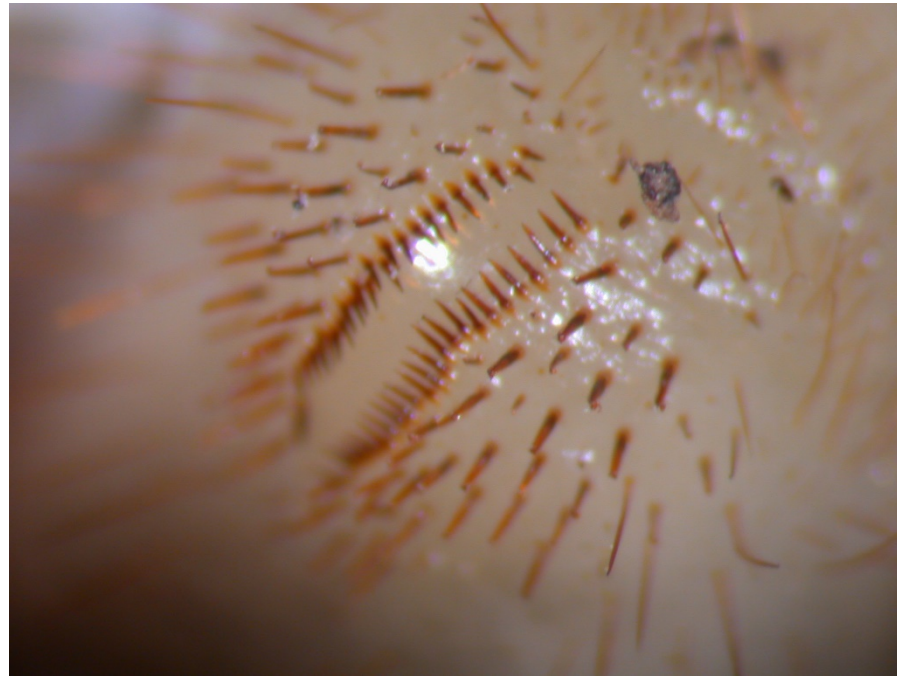
Above ground damage symptoms

- Larvae usually present
- Stunted plants
- Discolored plants
- Mimic:
 - nutrient deficiency symptoms
 - Herbicide injury
 - Seedling corn diseases
 - Etc.
- Burrow into plant
 - Always below ground
 - “dead-heart” plants
- Lodged corn



Annual vs. True White Grubs

- Annual vs. 3 year life cycle



True White Grub Management

- ✓ No Rescue Treatment
- ✓ Scouting
 - Build a field history
- ✓ Preventive treatments
 - Soil applied insecticides
 - Seed treatments

Questions ?