New Agricultural Pests

• Small grains
  – *Sipha maydis*
  – Wheat stem sawfly
  – Orange wheat blossom midge
  – Wheat flea beetles
• Brown marmorated stink bug
• Spotted wing drosophila/ African fig fly

*Sipha maydis*  
(Passerini 1860)

• Exotic small grain aphid
• Argentina
  – 2002
• Albuquerque
  – October 2014
• Fruita CO
  – Feb 2015

*Sipha elegans*

*Sipha maydis*

• Native and widespread in eastern Europe, Asian former USSR, NW India, Israel, Lebanon, Morocco, South Africa
• Wide host range
  – Agropyron, Avena, Bromus, Dactylis, Elymus, Hordeum, Poa, Trisetum, Zea
  – Feeds on corn in north Africa

*Sipha maydis*

• ID should be relatively simple
• Black with white hairs
• Sclerotized dorsum
*Sipha maydis* Damage

- Found on young leaves in autumn
- Feeding at base of leaf
- Feeds up to flag leaf
- Chlorosis, reduced growth, grain yield and quality losses.

Management in Argentina has relied on insecticides

A wheat breeding program has identified genetic sources of resistance

There is no cross resistance from RWA or greenbug resistance genes

*Alternate Host Plants*

According to the Argentina Literature
- *Agropyron* - Wheatgrass
- *Agrostis* - Bentgrass
- *Avena* - Oats
- *Bromus* - Brome
- *Dactylus* - Orchardgrass
- *Elymus* - Wildrye
- *Hordeum* - Barley
- *Poa* - Bluegrass
- *Zea* - Corn

*Where do you look for it?*

- Site – S-facing
- Off color
- Lemon yellow
- Black aphids
- Dead aphids
- Mixed with RWA, BCO?

*Sipha maydis* feeding damage

- Chlorosis at feeding site
- Feeds in leaf collar area on mature plants
- Damage to flag leaf leads to yield loss
- Reported vector of Barley Yellow Dwarf Virus
Management

- We know very little about this aphid
- Scout your fields
- Protect the flag leaf
- Beware of virus transmission
- RWA insecticides??
- Fall populations

Orange Wheat Blossom Midge

- European & Asian native but long established in North America
- Low numbers most years, but occasional devastating outbreaks
- MT, ND, MN, Alberta, Manitoba Saskatchewan
- Spring wheat primarily, but present in late maturing winter wheat
- Also in rye and triticale, but rare in barley

OBWM Damage

- Larvae feed on developing kernels within head
- Exude enzymes that break down cell walls
- Damage ranges from slight to complete
- In high numbers, losses can be 100%

Life History

- One generation per year
- Larvae overwinter in top 2-4" of soil
- Cocoon is present
- Pupate outside cocoon in springtime
- May go into diapause for 5 to 10+ years
- Adults emerge ~ 2 weeks after pupation
- Timing dependent on soil temperatures & moisture

- Adult emergence over 6-8 week period
- Warm, calm evenings needed for egg laying
- Eggs laid on florets, singly or in groups of 3-5
- Each female lays up to 80 eggs
- Eggs hatch in 4-7 days
- Larvae feed on developing kernels for 2-3 weeks
Monitoring for OBWM

- Be aware of lookalikes
- Yellow blossom wheat midge
- Pheromone traps
- Visual searches, sweep nets
- Evening searches are best
- Late maturing spots, tillers

Management

- Planting dates
- Crop rotation
- Resistant varieties
- Insecticides
  - Timing at 70% heading
  - Not effective on older larvae protected by floret
  - Most effective at dusk

Wheat Flea Beetle

*Chaetocnema subconvexa*

- An unknown insect
- Range appears to be limited to Routt and Moffat Counties??
- More abundant in spring wheat, but present in winter wheat
- Adults are foliar feeders which do minimal damage
- Larvae feed on developing tillers
- Damage potential is unknown

- Adults are shiny black
- About 2 mm long
- Jump like fleas
- Can be abundant in field
- Adult feeding limited to "scratches" on leaves
- Overwintering is in pupal or adult stage

Flea beetle larvae feed at the base of the plant and tunnel inside newly formed secondary and tertiary tillers.

There is usually only one damaged tiller per plant

It is possible that wheat plants compensate for the loss of a late forming tiller by diverting those growth resources to earlier formed heads

Flea beetle larvae are creamy white with small dark spots. They have a distinct dark head capsule and sclerotized legs

Fully grown larvae are about 5 mm (a little less than ¼") long

Larvae are present during tiller formation/jointing growth stage (Feekes 5-10; Zadoks 30-45)
Larvae tunnel within a newly developing rolled up leaf

A plant must be dissected to determine if it is infested

Early stage infestations are difficult to diagnose

The egg stage is unknown

---

**WHEAT STEM SAWFLY**

Terri Randolph

---

**Wheat Stem Sawfly**

*Cephus cinctus*

- Small native sawfly
- Evolved on grasses
- Moved to wheat

---

**HISTORY**

1872 - first described on grasses in Colorado
1895 - found infesting spring wheat in Canada
1980 - damaging winter wheat crops in Montana
2010 – found infesting wheat in NE Colorado

---

**DISTRIBUTION**

---

**Colorado Distribution in Wheat**
LIFE CYCLE

Univoltine

- Adults emerge late spring / early summer
- Females lay eggs within the stem of the host
- Larvae move to base of plant and create an overwintering chamber
- Larvae pupate mid-late spring
- Larvae feed throughout stems until plant maturity

HOST PLANTS

- *Triticum* spp. (wheats)
- *Hordeum* spp. (barleys)
- *Secale cereale* (rye)
- *Agropyron* spp. (wheat grasses)
- *Bromus* spp. (brome grasses)
- *Elymus* spp. (rye grasses)

Preferred hosts are those with large diameter stems

PLANT DAMAGE

- Loss in head weight
- Lodged stems due to larval girdling

Estimated losses up to 80% due to lodging

MONITORING

- Sweep net sampling for adults (Late Jointing – Late Heading)
- Dissect stems to determine % infested tillers

Commercial pheromones are available

MANAGEMENT

Cultural Control

- Tillage
  - Summer/fall
  - Spring
- Trap crops
  - Oats
  - Solid-stem Wheat
- Block planting rather than planting in strips

Chemical Control

Larval and adult control have been found to be ineffective and/or cost prohibitive under dryland conditions.
FUTURE DIRECTIONS?

• Improved IPM
• Biological control
• Host plant resistance
  – Improved solid stem?
  – Non-preference?
  – Antibiosis?

QUESTIONS?

Invasive Drosophilids (Vinegar Flies)
Spotted Wing Drosophila
African Fig Fly

Fruit Flies (Tephritidae)          Vinegar Flies (Drosophilidae)

generally house fly size
nearly always with patterned wings
many species of economic importance
western cherry fruit fly
apple maggot

much smaller
nearly never with patterned wings
almost never of economic importance
nuisance fruit flies

Spread of SWD within US
What crops are at risk from SWD?

- Cane fruits
- Strawberries
- Cherries
- Grapes
- Blueberries
- Peaches
- Apples

Damage

“pin pricks” left by ovipositor

Identification

- Eggs
- Larvae
- Pupae

Identification

- Eggs
- Larvae
- Pupae

https://www.youtube.com/watch?feature=player_embedded&v=LsNja6BkzFY
African Fig Fly
Zaprionus indianus (Gupta)

- Possible threat to grapes
- Drosophilid fly
- Tropical origin
- Has spread quickly across US
- Often found in association with SWD
- Not known if a primary pest
- Often present in grape pomace

Stink Bugs: Pentatomidae

- True Bugs:
  - Piercing/sucking mouthparts
  - scutellum
- Distinctive shape
  - rough five-sided ovoid
  - narrow head
- Many produce disagreeable odor
- Mostly above-ground plant feeders
- Many native genera/species
  - Very broad host range

Stink Bug Damage

- Piercing & sucking mouthparts
  - pierce epidermis
  - suck cell contents
- Damage can be catastrophic
  - depending on
    - abundance
    - growth stage when feeding occurs
    - market / use for product

The Trouble with Stink Bugs

- Very mobile
- Travel in “gangs”
- Wide host range
- Damage appears after bugs are long-gone

Brown Marmorated Stink Bug
Halyomorpha halys (Stål)

- Native to China, Japan, Korea, Taiwan
- Agricultural pest in those areas
- Introduced into Eastern US in early/mid 1990's
- Population exploded in 2010
- A nuisance home invader
- Notorious hitchhiker
  - Introduction into CO has already occurred
- Adult & immature can be present simultaneously
Adult and Nymphal Feeding on Corn
August 3

Photos courtesy of Clarissa Mathews, Shepherd Univ. and Ames Herbert, VA Tech.

Adult and Nymphal Feeding on Tomato
Early to Mid-August

Photos courtesy of Clarissa Mathews, Shepherd Univ. and Ames Herbert, VA Tech.

Adult and Nymphal Feeding on Pepper
Early to Mid-August

Photos courtesy of Ames Herbert, VA Tech.

Ornamentals and Nursery Crops
Mid-August

Photo courtesy of Kim Hoelmer

Late-Season Feeding in Grape
Early September

Photos courtesy of Doug Pfeiffer

Photo courtesy of Dean Polk
Stink Bugs and Wine

• Bug feeding can abort fruit formation
• Bugs in grape harvest can affect flavor
• Five bugs per lug could be detected by smell
  – crushed cilantro, piney, skunky, citrusy

“At low levels, these aromas do not make the resulting wine unusable, but they may reduce a wine’s varietal character sufficiently that the wine would have to be used in a blend rather than bottled as a varietal wine.”

* Dr. Joe Fiola, MD Viticulturist, via Wines & Vines, October 4, 2010

Late-Season Feeding on Stone Fruit
September 5

BMSB Injury to Apple
Late August-Early September

• Injury severe and deep in flesh rendering fruit unacceptable for fresh market.
• 37 million dollars lost in mid-Atlantic apples in 2010 to BMSB feeding injury.
• Questions of premature drop?

Managing BMSB

• Learn to identify stink bugs!!!
• Watch for them in all outdoor settings
• If many brown stink bugs are present in a vineyard/orchard/field/garden/anywhere
  – GET THEM IDENTIFIED

BMSB Identification

Euschistus servus
Chlorochroa ligata
Conchuela