



# Insect Pests and Beneficial Insects in Wheat



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# The Greenbug

- **The greenbug is a bright green aphid with a dark green stripe down its back**
- **As the aphid feeds with sucking mouthparts a phytotoxin is introduced into the plant causing leaf tissues surrounding the site to die**
- **Some hard winter wheat varieties from the southern Great Plains have resistance**
- **Host plant resistance from greenbug is derived from durum wheat**
- **Estimated losses up to 250 million**
- **Transmission of Barley Yellow Dwarf Virus (BYDV)**



# Russian wheat aphid

- Originally from central Asia, also in Africa, central Europe and South America
- First found in Texas in 1986
- In 3 years spread North and West
- Highly infested lands average less than 50% attainable yield if not controlled and early infestations can lead to complete crop failure
- Losses of more than 1 billion since introduction
- No transmission of BYDV



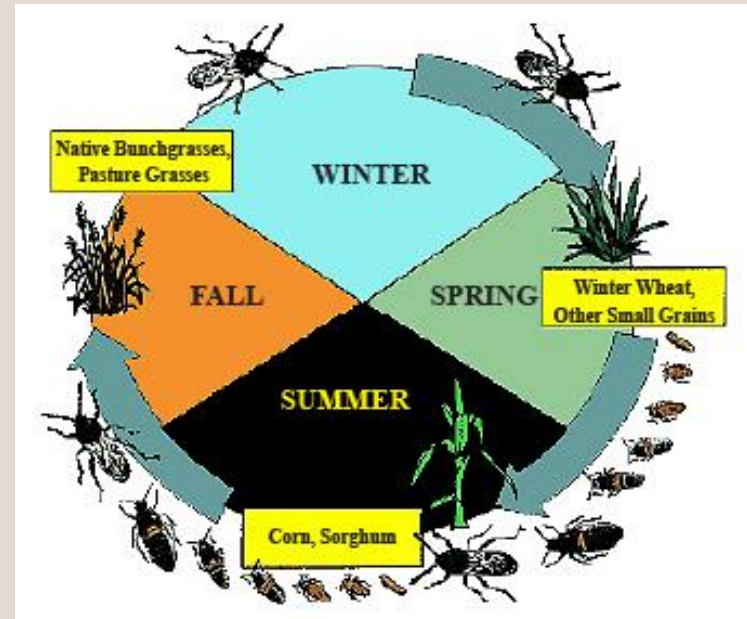
# Other Aphids

- **Bird Cherry Oat aphid is of major economic significance in Canada, southeastern Europe and Scandinavia**
- **English grain is major pest in eastern and central Europe**
- **Aphids fly or are blown onto winter wheat and over summer feed on grasses**
- **Overwinter as eggs, can overwinter as larvae and adults in mild winters below the soil surface**
- **Newly hatched aphids are wingless females, which reproduce parthenogenically. Multiple generations produced on winter host**
- **All three transmit BYDV**



# Chinch bug

- Greatest problem in dry years.
- Chinch bugs are most attracted to the poorest, thinnest stands of wheat
- More of a problem in central and southeastern U.S.
- Overwinter as adults in native grass pastures, prairies and CRP
- Parasitic fungus in wetter climates usually controls this pest
- Substitute another crop for winter wheat: Broad-leaved substitutes are safest, such as alfalfa, soybeans, or sunflowers
- Transmission of BYDV



# Stink Bugs

- **Adult stink bugs feed on stem tissue or developing kernels**
- **Saliva from this insect is toxic to the plant, and a single feeding puncture can kill a stem**
- **Feeding on kernels during the milk dough stage will destroy the kernel, while feeding during later development stages will badly shrivel the grain**
- **Feeding on the developing head may cause partial or total sterility**
- **In the spring they migrate to cereal hosts, mate, and lay eggs at various places on the plant. These hatch into nymphs that feed on the plant**
- **Mild winters and low rainfall seem to favor outbreaks of the insects**
- **Stink bugs over-winter as adults**



# Cereal leaf beetle

- Most of the pest insects within this family are beetles that infest grain, other than the cereal leaf beetle
- Originating in Europe.
- First reported in Michigan in early 1960's.
- Host plants include barley, oats, wheat, corn, sorghum.
- Established from NC to WA
- Beetles overwinter near woodlands or where protection from wind.
- Beetles fly into field into spring and feed then lay eggs 10 days later. Eggs hatch 2-3 weeks and then larvae feed on leaves. The larvae body are yellow but usually covered with dark, slimy fecal material.
- The level of infestation can be estimated by counting number eggs or larvae within area.





- **Successful biological control agents can be used for control.**
- **Parasitoids (order: hymenoptera) will feed on eggs and larvae and are responsible for the significant decline.**

# Wireworms & False Wireworms

- Can cause significant loss of wheat, and feed on seed, seed germ, and roots of newly emerged seedlings. They often hollow out seed as it begins to germinate. Destroy seedlings by feeding on roots and subterranean portions of stem.
- Lifecycle: 1-7 years
- Larvae move up and down in soil profile as soil temperature and moisture changes. Pupate in the soil and emerge in late summer, early fall.
  
- False wireworms emerge in early summer and lay eggs in soil.
- Life cycle: 1-2 years and overlap.
- Typically cause damage when wheat is planted in dry seedbeds. Larvae move below frostline where they remain inactive until spring. Wireworms are attracted to the release of carbon dioxide by germinating seed
- Monitoring traps should be placed 2 weeks before planting.
- Insecticide seed treatments are most reliable defense against wireworm damage.



# White Grubs

- **Sporadic pests of wheat**
- **Cause damage to roots of plants as they tunnel through soil.**
- **Delayed planting is one way to avoid grubs after feeding has occurred.**
- **Two-year crop rotations with less preferred legume or broadleaf can reduce infestations.**
- **Also, tillage can reduce populations.**
- **Planting directly into reclaimed rangeland should be avoided.**



# Cutworms

- **Five species of cutworms feed on wheat: The armyworm, the fall armyworm, the army cutworm, the pale western cutworm and the wheat head armyworm**
- **Annually migrate from southern states.**
- **Arrival of moths can be detected using pheromone traps or light traps in the spring**
- **Reproduces from August to early September**
- **Have four distinct raised black spots on top of eighth abdominal segment.**
- **Greenish to cream colored with longitudinal white and brown lines down each side of body.**
- **Adults lay eggs in soil in the fall, with each female producing greater than 1000 eggs**
- **The larvae feed on the roots, shoots and tillers in fall and spring.**
- **Overwinters as pupa in the soil.**
- **They cause stunting and thinning of wheat during tillering and jointing stage.**
- **There are many natural biological controls against armyworm that often prevent them from causing economic losses, including parasitoids, diseases and predators**

Fall Armyworm



Armyworm



Pale Western Cutworm



Wheat Head Armyworm



# Grasshoppers

- Grasshoppers are omnivorous
- Damage is usually caused by clipped heads when grasshoppers enter mature wheat crop.
- Damage usually localized along field margins.
- Complete defoliation can occur.
- Grasshoppers molt 5-6 times before maturity.
- Many overwinter as egg stage in the soil
- Eggs are subject to damage by tillage and predatory insects. Management is based on population density. Economic damage will occur when grasshopper density is 10-18 per m<sup>2</sup>.
- Monitor the edge of fields where infestations will arise.



# Hessian Fly

- Major insect pest around the world in spring wheat.
- Accidentally introduced over 200 years ago.
- Adult Hessian flies are small dark gray to black midges.
- They do not feed and die a few days after emergence. Emerged adult females release pheromone to attract males for mating.
- Females lay 200-300 eggs on upper surface of leaves. Adults emerge in spring or fall.
- Produces multiple generations per year. One cycle every 35 days!
- Only one to two generations per year in Northern Oregon and Washington.



# Hessian Fly

- Pupa overwinter. Produces multiple generations per year. One cycle every 35 days!
- All damage to plant caused by larvae. The larvae feed on the stem beneath the leaf sheaths. Pupae are often called flaxseeds.
- In severe infestations primary tillers may die.
- Feeding is believed to be accomplished by specialized mandibles, which secrete substances that inhibit growth and cell wall permeability to allow larvae to suck juices from plant.
- Greatest injury to winter wheat when seeded early or spring wheat seeded late.
- Manage through resistant wheat cultivars, modification of planting date, crop rotation and destruction of volunteer crop.



# Wheat Stem Maggot

- Indigenous to North America.
- Host: Wheat, rye, barley, oats, bluegrass, millet, timothy, and a range of other native and introduced grass species
- Insect of minor importance
- Cause injury by larval feeding within the stem, killing the upper part of stem and heads
- Wheat stem maggot larvae overwinter in the lower parts of the stems
- Cultural practices like crop rotation and stubble cultivation help to prevent the buildup of populations



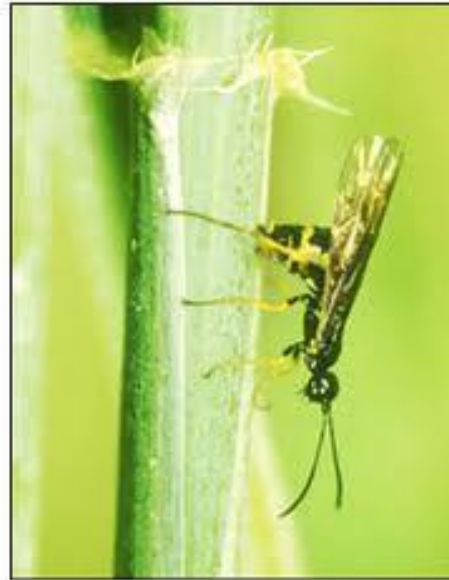
# Thrips

- Barley thrips most common but also grain thrips and flower thrips.
- Native to Europe and Asia
- Introduced in the 1923
- Adult females overwinter in wild grasses or soil
- Feeding produces light-colored streaks on leaves
- Feeding may reduce size of developing kernels
- Monitor when flag leaf becomes visible.
- Economic thresholds of 5-8 thrips per plant. Favored by hot dry weather.



# Wheat stem sawfly

- Of significant importance in North Dakota, Montana and Canadian Provinces (Alberta, Saskatchewan, Manitoba)
- Most costly and serious insect pest of Montana wheat production
- Losses due to this insect to be more than \$250 million per year at current wheat prices
- It was first reported and described from a sample collected in Colorado in 1872
- The wheat stem sawfly can develop on most cultivated cereals and large-stemmed grass
- Larvae girdle the interior of stem walls at plant senescence causing lodging
- Usually one egg deposited per event



Wheat stem sawfly ovipositing.



# Beneficials

- Ladybird beetles, lacewings, syrphid flies, parasitic wasps, damsel bugs, pirate bugs, rove beetles, ground beetles, praying mantids

