

INSECT MANAGEMENT IN WHEAT

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Common plant parts injured by insects

- **Head**
 - Direct feeding on grain
 - Prevention of grain filling
- **Stem**
 - Clipping
 - Boring/lodging
 - Reduced stand
- **Leaves**
 - Disease transmission
- **Roots**
 - Reduced stand

Key insect pest groups in wheat

- Aphids
- Cutworms
- Armyworms
- Flies
- Grasshoppers/locusts
- Mites

Aphids

- Russian wheat aphid
 - Damage
 - Leaf curling
 - Plant stunting
- There are thresholds for chemical control



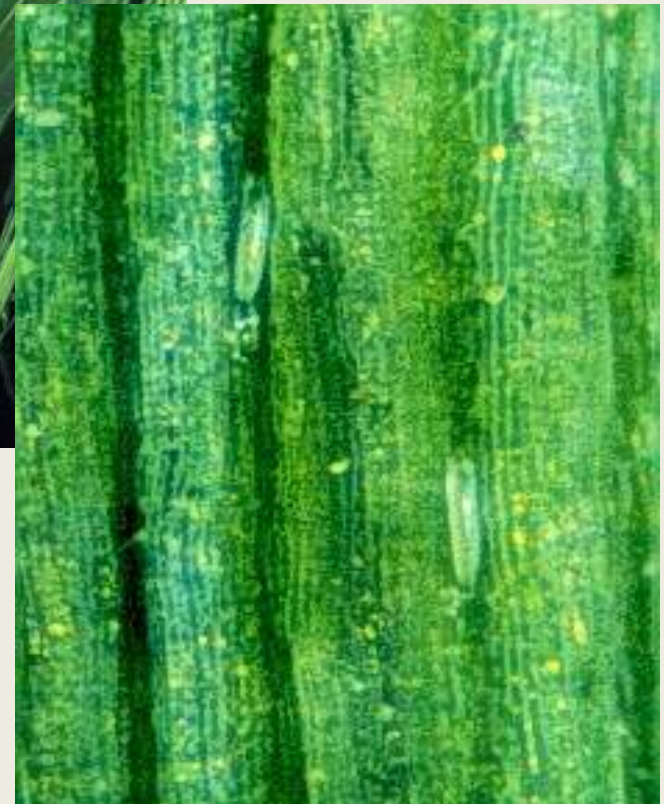
Aphids

- Other cereal aphids
 - English grain aphids
 - Greenbug
 - Bird-cherry-oat aphid
- All are vectors for Barley Yellow Dwarf (BYDV)



Wheat curl mite

- Vectors for viruses such as wheat streak mosaic virus (WSMV)
- Often associated with volunteer wheat and early planting
- A number of resistant wheat lines have originated from Afghanistan



Cutworms

- Lay eggs in the fall or otherwise overwinter as larvae
- Some feed during warmer winter days
- Active in the Spring and can cause reduced stands
- Susceptible to very cold soil temperatures



Wheat head armyworm

- Larvae feed on developing kernels
- Infestations greater near field edges
- Sampling best with a sweep net
- Difficult to control due to pre-harvest interval



Hessian fly

- Larvae suck on plant sap causing stunting
- Adults deposit eggs on seedling wheat
- Larvae and pupae can be found within leaf sheaths at the crown or joints of the plants
- Adults are short-lived, so planting date is changed to minimize available host plants



Hessian fly

- Survival dependant on environment
 - Susceptible to dry conditions
 - Susceptible to cool, rainy weather
 - Negatively impacted by tillage



Wheat stem sawfly

- Damage
 - Larvae feed within the stem
 - Cut stems and cause lodging
- More abundant in no-till wheat
- Only good control is through resistant varieties



Locusts

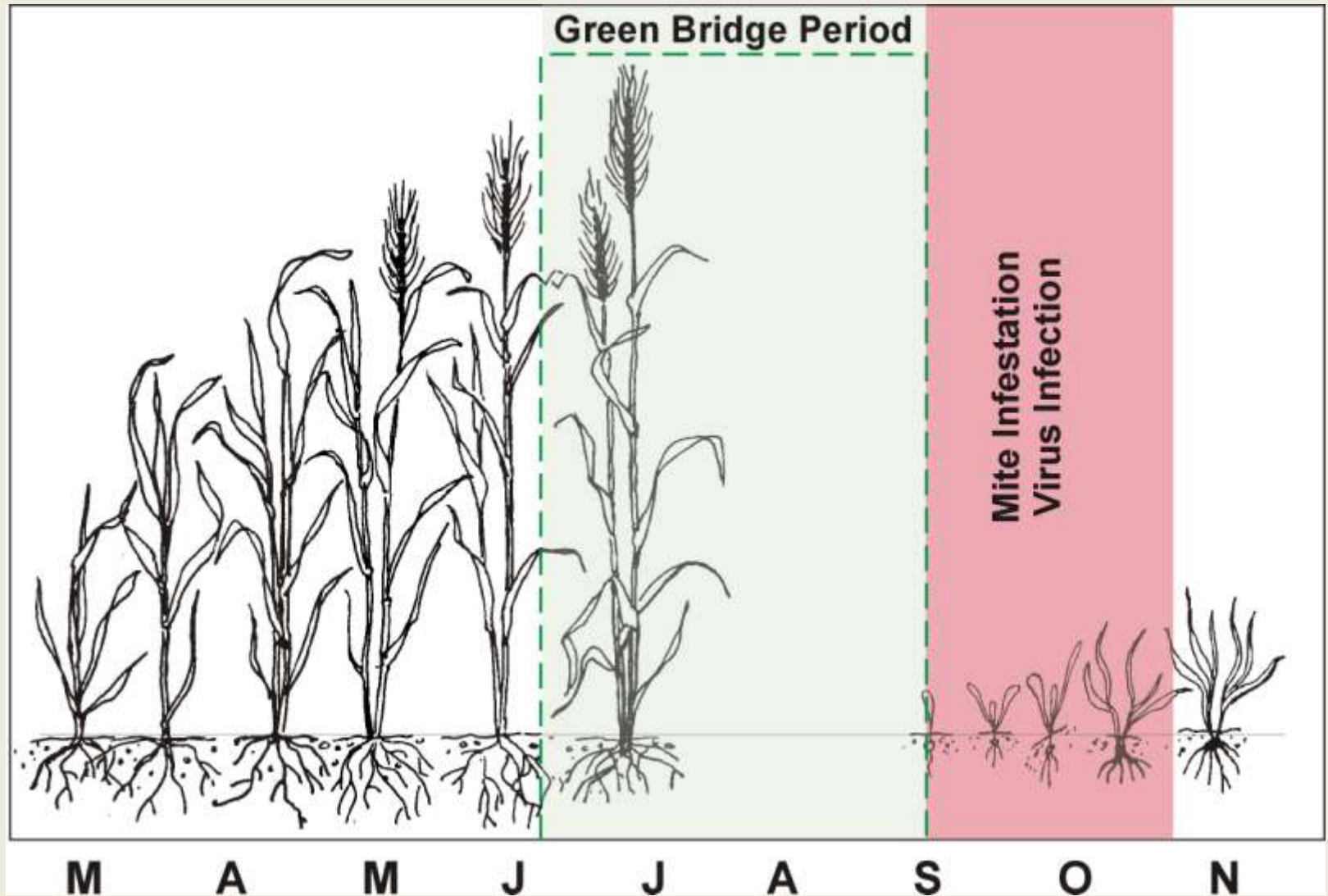
- Much like grasshoppers here, they are often brought on by weather
- Dessert rains in the Sahara can result in large swarms of the desert locust
- >300,000 acres of crop land were impacted in 2008



Population Characteristics

- Density
- Dispersion
- Natality
- Mortality
- Age distribution
- Growth form

Seasonal wheat growth and the green bridge



Economic Injury Level

$$EIL = \frac{C}{V \cdot I \cdot D \cdot K}$$



Economic Threshold

Russian Wheat Aphid

- Pre-heading threshold calculation
 - (% infested tillers)

– Threshold =
$$\frac{\text{Control cost} * 200}{\text{Market value} * \text{Exp. yield}}$$



Russian Wheat Aphid Management

Treatment Thresholds (% infested tillers)

Control cost per acre	Market value per acre	
	\$100	
\$5	10%	
\$10	20%	

Russian Wheat Aphid Management

Treatment Thresholds (% infested tillers)

Control cost per acre	Market value per acre	
	\$100	\$200
\$5	10%	5%
\$10	20%	10%

Russian Wheat Aphid Management

Treatment Thresholds (% infested tillers)

Control cost per acre	Market value per acre	
	\$100	\$400
\$5	10%	2.5%
\$10	20%	5%

Universal management tactics

- **Chemical control**
 - May not be the cheapest option
 - Use if the insect isn't well concealed
 - If they can be applied being mindful of PHI
 - www.cdms.net
 - www.greenbook.net
- **Cultural control**
 - Alteration of planting dates
 - E.g., fly-free dates
 - Plant late to evade aphids and mites
 - Crop rotation
 - Control volunteer wheat!
 - Tillage
 - Resistant varieties?

