



Scouting for Insect Pests

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Agriculture and
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INSECT PEST MANAGEMENT

Outline

- Insect pests of potatoes
- Monitoring Techniques
- Control Options

Colorado potato beetle (*Leptinotarsa decemlineata* (Say))



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Overwintered adults emerge in the spring and begin feeding and laying eggs



The eggs hatch and pass through 4 larval instars



Fourth instar when ready will drop to the ground and pupate



Emerge as adults in mid to late August and begin feeding on mature plants before moving to the hedgerow to overwinter



Colorado potato beetle

(Leptinotarsa decemlineata (Say))

- Overwinters as an adult in the hedgerows around fields
 - Adults may be present before potatoes emerge
 - Defoliation can reduce yield
 - Four larval instars.
 - Fourth instar causes the most damage
 - Pupate in the soil mid to late July
 - Summer adults appear early to mid August
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Colorado potato beetle

(Leptinotarsa decemlineata (Say.))

- Adults usually walk or fly to the fields
 - Infestation starts from the perimeters
 - Sample entire plants, adults can be anywhere
 - Egg masses on the underside of leaves
 - Young larvae on lower parts of plant; older larvae are higher up
 - Resistance to insecticides is a major concern
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Colorado potato beetle (*Leptinotarsa decemlineata* (Say.))

- Sample 30 – 50 plants
- Count spring adults, eggs, small larvae, large larvae and summer adults
- Calculate means for each of the above except eggs
- Calculate the economic threshold using average numbers
- $CPBE = Sp\ ad \times 1 + Sm\ L \times 0.125 + Lg\ L \times 0.333 + Sum\ ad \times 0.625$
- Economic threshold 1.5 - 2 CPBE

Aphids

Potato Aphid



- First species to colonize
- Poor vector of PVYo and PLRV

Buckthorn Aphid



- Colonizes mid-July
- Vectors PVYo

Foxglove Aphid



- Colonizes mid-summer
- Vector PVYo

Green Peach Aphid



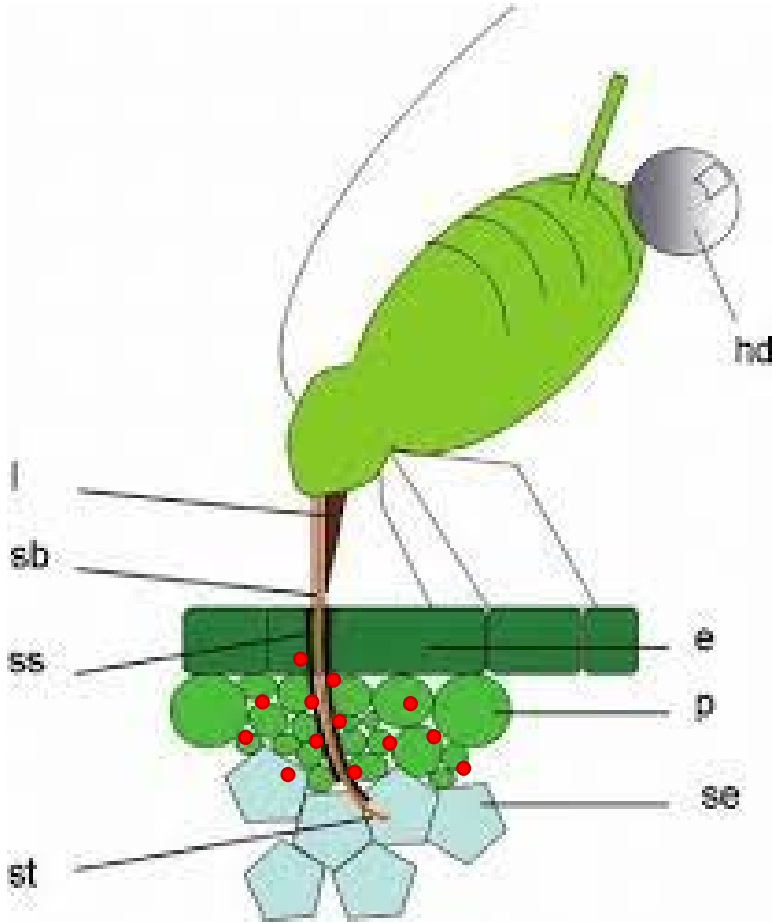
- Late July or early August
- Vectors PVYo and PLRV

Aphids

Two virus transmission methods

1. Non- Persistent transmission e.g.PVY

PVY particles are quickly acquired and are stylet-borne. aphids are capable of transmitting the virus for only a short period of time after acquisition, usually just a few minutes or hours

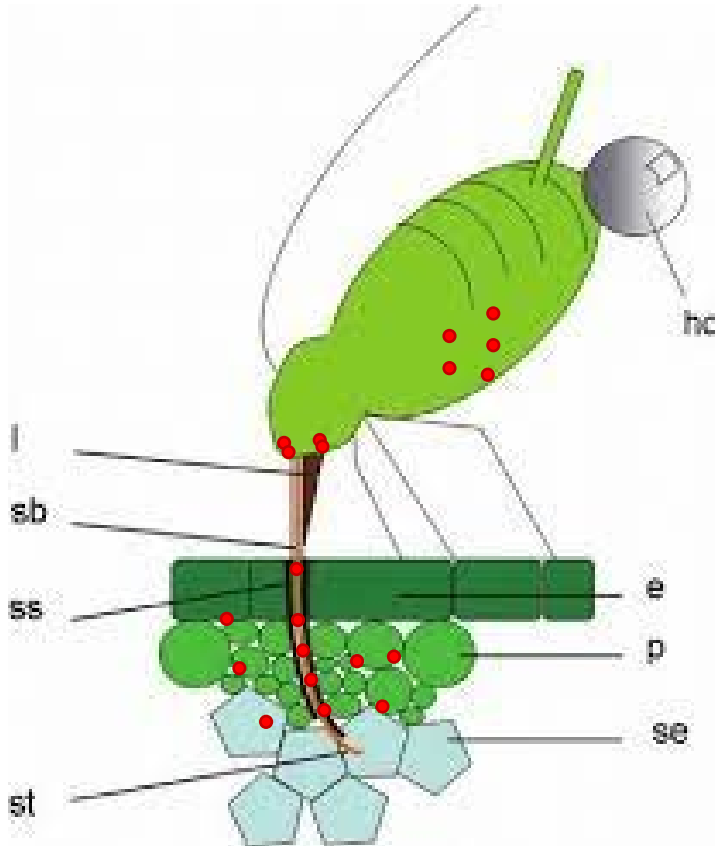


Aphids

Two virus transmission methods

2. Persistent and Circulative transmission – PLRV

when aphids acquire a persistent virus, there is a period of latency between acquisition and the aphid being able to transmit the virus to a new plant. Once infected the aphids remain infectious for the rest of their lives and can transmit the virus each time they feed on another plant



Green Peach Aphid is a good vector of PLRV

Impact of Aphids on Yield

- Aphids reduce yield through feeding damage
- Primary concern is their potential to transmit PVY and PLRV
- Concern for seed potatoes grown near table and processing fields

Scouting and trapping

- Check the top, middle and lower leaves of a plant
- Yellow pan traps
 - Early detection of green peach aphid



Potato Flea Beetle (*Epitrix cucumeris* (Harris))

- Overwinters as an adult
- Leaves have a shot hole appearance
- Defoliation can be yield limiting
- Larvae feed on root hairs but damage is not economical
- Summer adults appear after mid August



Scouting for flea beetle damage



Count number of shot holes on fourth terminal leaf
(counting down from the apex of the plant)

Damage Low = 0-5%, Medium = 5-10% and high = > 10%
leaf area eaten

European corn borer *Ostrinia nubilalis* (Hubn.) Adults



European corn borer (*Ostrinia nubilalis* (Hubn.))

- Overwinters as a mature larvae in potato stalks
- Adults appear early to mid July
- Egg masses seen about the mid to end of July
- Larvae and damage seen end of July into August



European corn borer *Ostrinia nubilalis* (Hubn.)

Egg Mass



European corn borer *Ostrinia nubilalis* (Hubn.)

Damage to potato stalk

Stem with larva and entry hole



European corn borer *Ostrinia nubilalis* (Hubn.) Overwintering



European corn borer *Ostrinia nubilalis* (Hubn.)

- In general damage looks worse than it is
- Damage to stalk weakens plant
 - wounds are entry points for disease organisms
- - wind will break the stalks
- - damage to stalks interrupts the flow of nutrients and water
- Damage to late maturing varieties can be more severe



European corn borer *Ostrinia nubilalis* (Hubn.)

- Adults can be sampled with pheromone baited traps
- Sample bottom 2/3 of plant, stalks and underside of leaves for egg masses
- Threshold is 2 egg masses per plant 10 plants
- Sample at least 4 different areas in the field



Wireworms

- Larvae are found in the soil
- They live for five years as larvae
- Feed on the roots and potato tubers
- Monitor populations before planting potatoes
- Bait trapping in April or mid September
- Threshold is 1-2 larvae per bait



Control Measures for Wireworms

Monitor larval population
using bait traps



Plant brown mustard or
Buckwheat as rotation crops
prior to potatoes



- Chemicals available applied at planting

Leafhoppers

- Found in late August
- Usually not a problem
 - except in hot dry conditions
- Feeding results in hopper burn; initial yellowing at tips and margins of leaflets, eventually leaf margins die and roll inwards
- Damage may cause yield loss



Tarnished plant bug (*Lygus lineolaris* (Beauvois))



Generally, not a major problem except in dry conditions.

Damage results in leaves curling or with holes at the base of leaves.

Biological control agents

Lady beetles



Lady Beetle larva



Lady Beetle Pupa



Ground beetle



Soldier bug adults and nymphs feeding on CPB larvae and eggs



Control Options

- Chemical Control
 - Foliar vs systemic (e.g seed piece treatment)
 - **Other Options!**
- Physical Control (e.g. removal of debris)
- Cultural Control (e.g. crop rotation)
- Biological Control (e.g. predators, parasitoids)
- Resistant Varieties



Thank you for listening

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