# **Integrated Pest Management**

### Flea beetles



Presented by:

Laurel Moulton, WSU Regional Small Farms IPM Specialist

Jen Clark, Roots Farm

Laura Llewellyn, Chimalow Produce



## 3 common species of flea beetles

- Crucifer flea beetle (Phyllotreta Cruciferae)
  - brassicas

- Tuber flea beetle (Epitrix tuberis)
  - potatoes

- Western flea beetle (Epitrix subcrinata)
  - all solanaceous plants
- Others: Tobacco flea beetle, etc.





## Flea beetle life cycle

- Adults emerge in the spring
  - May June, 59-68°F
- Feed on weeds until desirable crops become available
- Lay eggs at base of host plants
- Larvae feed on plant roots
- Adults feed on foliage
- Adults overwinter in field edges in plant debris

#### Crucifer flea beetles:

- 1 generation
- Warmer weather = more generations
- Tuber flea beetle
  - 2-3 generations (6-week life cycle)
- Western potato flea beetle:
  - 2-3 generations

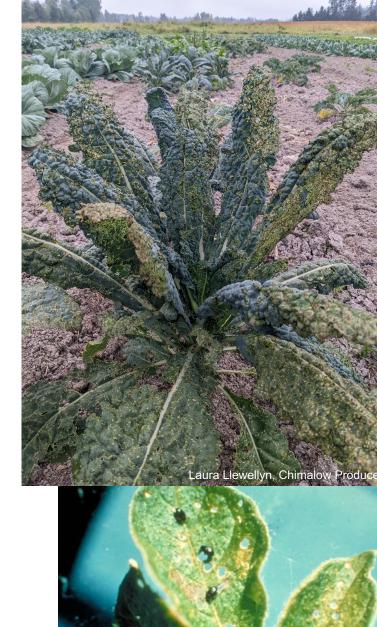


### Above ground damage

- Adult flea beetles feed on foliage, stems
- Shothole or pitting pattern
  - Leaf damage often not damaging on solanaceous crops
  - · Leaf damage is a problem on crucifers
- Desiccation





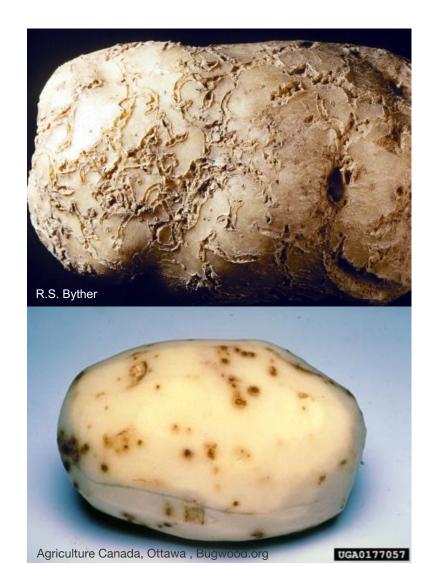






## **Tuber and root damage**

- Tuber flea beetle larvae create shallow tunneling damage on potatoes
  - Identical to symphylan damage
- Secondary rot limits storage
- All flea beetle larvae feed on roots. Plants may be stunted by heavy feeding





## **IPM: Monitoring**

- Heavy infestations can kill seedlings or newly transplanted starts in 24 hours.
  - Monitor cotyledons and young leaves for damage
- Focus on edges of field to see if beetles are migrating into the field
  - Consider border treatments
- Sweep net thresholds for potato damage
  - 10 beetles per 50 sweeps
  - 2 beetles per 25 sweeps along edges of young potatoes





## IPM: Cultural management

- Planting schedule
  - Plant/harvest potatoes earlier
  - Plant brassicas in mid-late July to reduce areas where overwintered flea beetles can feed/reproduce
- Manage host weeds and crop residue to reduce food and overwintering sites
- Rotating crops alone is not helpful

- Trap crops
  - Diverse quick growing brassicas.
    Spray or till in.
- Companion planting or living mulches
  - Bunching onions, dill and marigolds
- Organic mulch: barley straw mulch and "large leaf mulch" showed moderate improvement in management (OSU study)



## IPM: Physical management



#### Row cover

- Use in combination with crop rotation
- Secure the edges very well



### **Biocontrol: Natural enemies**

#### **Native predators and parasitoids**

- Many generalist predators feed on flea beetles
  - Lacewing
  - Big eyed bug
  - Damsel bugs
- Parasitoid wasp
- Create habitat
  - Alyssum
  - Carrot family plants
  - Chamomile
  - Marigold
  - Clover





### **Biocontrol: Nematodes**

#### **Entomopathogenic nematodes**

- Microscopic soil-dwelling parasitic worms
- Parasitize juvenile insect life stages, killing them in the process
- Not to be confused with plant parasitic nematodes

#### **Keys to success**

- Match correct species with target pest
- Order no more than 3-4 days before needed.
- Correct soil moisture, temperature and sunlight during application
- Apply with compatible pesticides



### **Biocontrol: Nematodes**

#### **Species to try**

- Steinernematidae
  - *S. carpocapsae* can decrease damage to potatoes
- Heterorhabditidae
  - · H. bacteriaphora



#### How they work

- 3<sup>rd</sup> juvenile stage is the infective, free-living stage
- Ambush and cruising strategies
- If hosts are present the population will perpetuate through the growing season
- Unknown if they overwinter



## Pesticides: Biological

#### Beauvaria bassina

- Fungus that naturally occurs in many soils.
- Causes white muscadine disease
  - Reduces flea beetle populations
- Used as a foliar spray for adults
- Strains GHA and ATTCC 74040
- Apply in the evening. Sunlight can kill spores.





### **Pesticides: Chemical**

- Pyrethrins
- Spinosad
- Kaolin clay

Be careful with broad spectrum insecticides



### Resources

- PNW Insect Management Handbook
- Extension publications:
  - PNW 640, Organic Management of Flea Beetles
  - FS 089E, How to Install Floating Row Cover
  - PNW 544, Using Entomopathogenic Nematodes for Crop Insect Pest Control
  - PNW 550 Encouraging Beneficial Insects in Your Garden
  - USDA publication, Plants for Pollinators in Oregon

