

Integrated Pest Management

Flea beetles



Clallam/Jefferson/Kitsap County
WASHINGTON STATE UNIVERSITY
Regional Small Farms

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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



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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



University of Maryland Extension <https://extension.umd.edu/resource/row-covers>

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



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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

- 3rd 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

Beauveria 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.



Surendra Dara, University of California ANR



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