Insects Associated with Seedling Injuries

- Cutworms
- Flea beetles
- Root maggots
Flea Beetles
Shothole injuries typical of adult flea beetles
Crucifer flea beetle, Western black flea beetle – Cabbage family plants, primarily
Seedling injuries by flea beetles on crucifers

Indirect injuries by flea beetles on leaves
Direct injuries to leaf parts that are marketed (e.g., mustard leaves, cabbage greens)
Feeding damage extending to stalks and flowering structures
Potato flea beetle, Tuber flea beetle

Nightshade family plants – potato, tomato, etc.
Tobacco flea beetle

Eggplant and *Nicotiana* are common hosts
Palestriped Flea Beetle – Wide host range (beans, sunflower, lettuce, corn, potato, etc.)
Apple Flea Beetle – Adults feed on a wide range of plants
Larvae of most flea beetles feed on plant roots and cause little injury.
Tuber flea beetle injury to potato
Larvae of most flea beetles feed on plant roots and cause little injury.

Apple flea beetle is a notable local exception.
Apple flea beetle larvae develop on leaves of evening primrose (*Oenothera* spp.)
Flea Beetle Injuries

• Seedling injuries
  – Death/Stand Loss
  – Retarded Growth

• Defoliation of established plants

• Esthetic damage to leafy vegetables, ornamentals
Seedling damage by crucifer flea beetles

Tomato seedling killed by potato flea beetles
A broccoli plant that is outgrowing the damage by flea beetles
Cabbage Flea Beetle Lesson Learned #1

Cabbage flea beetles can disperse over very long distance
Crop rotation does not work
Flea Beetle Control

- **Seedling Injury**
  - Provide conditions for rapid plant establishment
  - Row covers
  - Trap/diversionary crops
  - Insecticides
Cabbage Flea Beetle Lesson Learned

Conditions that favor rapid seedling growth, including transplanting, may be needed to establish adequate stand.
Seedling stages are highly vulnerable to flea beetles
Once established, plants can often outgrow moderate flea beetle infestations.
Plants can tolerate minor injuries
<table>
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<th>Percent Defoliation</th>
<th>Treatment date after transplanting</th>
<th>Avg. Head Weight (grams)</th>
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<td>426 a</td>
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<tr>
<td>25%</td>
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<tr>
<td>Untreated Check</td>
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<td>410 a</td>
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Floating Row Covers

Can exclude insects that migrate into crops from outside areas
Cabbage Flea Beetle Lesson Learned

Daikon or radish can be used as a diversionary trap crop for these insects
CULTURAL CONTROL
TILLAGE
SANITATION
CROP ROTATION
MIXED CROPPING
STRIP HARVESTING
TIME OF PLANTING & HARVESTING
TRAP CROPS
Flea Beetle Control

- Provide conditions for rapid plant establishment
- Row covers
- Trap/diversionary crops
- Insecticides
Flea Beetle Insecticides

- Carbaryl/Sevin
- Permethrin (many formulations)
- Spinosad (Bull’s-Eye, etc.)*
- Diatomaceous Earth*

* Spinosad and diatomaceous earth are somewhat less effective in CSU trials. However, some formulations of both products are allowed in organic food production.

Recommendations for flea beetle control are found in CSU Extension Fact Sheet 5.592