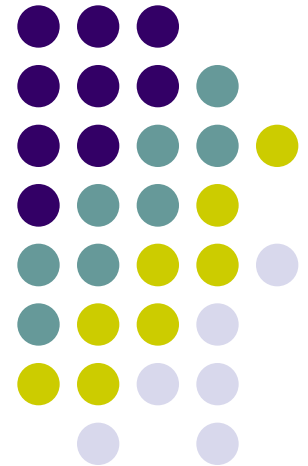


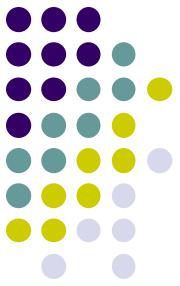
# Insect Management in Cole Crops and Crucifer Greens

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Rick Weinzierl, University of Illinois

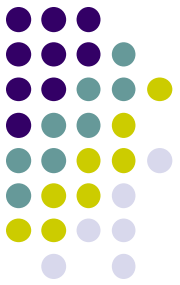


# Cole crops ... Who are the key players?



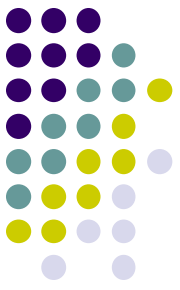
Because of its coating of wax, some growers call the cabbage aphid the "gray aphid." Freshly molted individuals lack the gray wax.





# Cabbage Insects

- Root maggots
- Crucifer flea beetles
- Cabbage aphid, turnip aphid
- “Leps”
  - Diamondback moth, imported cabbage worm, and cabbage looper
- Onion thrips

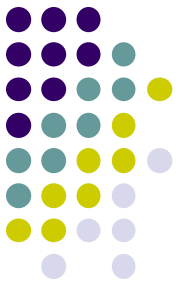


# Cabbage maggot control

- Most necessary where planting / transplanting into cool, wet soils and where organic matter is high
- Lorsban, diazinon, Capture LFR
  - Transplant or seed-furrow drenches
  - Some resistance problems noted for diazinon

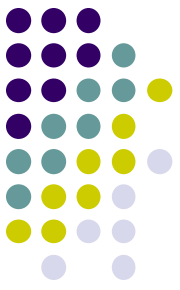


Degree-day model uses a starting date of [March 1]. At base 43 F, peak emergence of the first three generations is at 300, 1475, and 2650 degree-days.



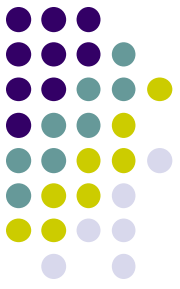
# Flea beetles





# Flea beetle control

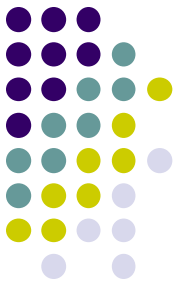
- Threshold? Where numbers are high enough that feeding stresses seedlings and slows growth or damage to foliage of greens prevents marketing
- Greatest populations occur in weedy fields and on smooth, glossy-leafed varieties
- Cultural: Intercrop with tomatoes; till in crop residues immediately after harvest
- Effective insecticides: All the pyrethroids, Actara, Provado, or Sevin; kryocide / cryolite for organic growers



# Cabbage Aphid



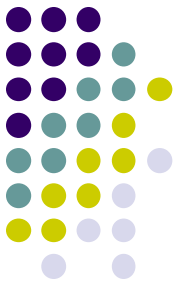
Cabbage aphid damage on cabbage  
[ Picture by C. Eastman ]



# Cabbage aphid control

- Thresholds:
  - Treat any infestations in seedbeds
  - Infestations in broccoli and cauliflower can reach 100 per plant before heading; keep to <5 per plant after heading
  - Treat cabbage if >20 percent of plants are infested (at all)
- Rogue out infested plants if practical
- Insecticides: (treat only if thresholds are met; let natural enemies do their jobs)
  - Actara, Admire, Assail, Fulfill, Movento, and Provado are specific aphicides
  - M-Pede for organic growers
  - Diazinon, Dimethoate, Endosulfan, Orthene





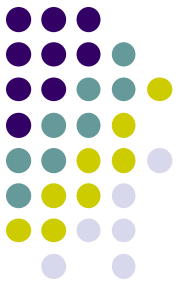
# Imported Cabbage Worm





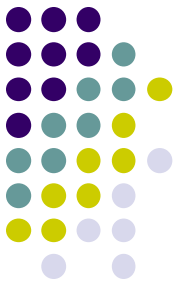
# Imported Cabbage Worm

- Overwinter as pupae in a chrysalis; adults are active early in the season – day-flying white butterflies
- Larvae are velvety-green, about 1 inch long when fully grown
- 4-5 week generation time; 4 or 5 generations per year in much of the Midwest
- The easiest of the three major Leps to kill with insecticides ... Bt is very effective



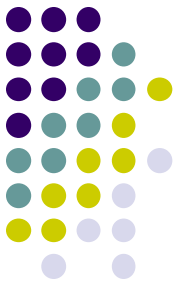
# Diamondback Moth





# Diamondback Moth

- Overwinters as an adult in protected areas; larvae and pupae are brought in on transplants (and their insecticide resistance spectrum comes from the region of their origin)
- Larvae are light green, 3/8-inch long when fully grown
- 3- to 4-week generation time; 4 to 6 generations per year (the first often on mustard family weeds)
- Lots of insecticide resistance problems around the world



# Cabbage Looper





# Cabbage Looper

- Little successful overwintering in the Midwest (adults in protected areas?); adults migrate in from the south on weather systems
- Larvae 1 ½ inch long when fully grown; only 3 pairs of abdominal prolegs – so a “looper”
- 4 to 6 week generation time; 3 or 4 generations per year in most of Midwest
- Large larvae are difficult to control and not very susceptible to Bt; pyrethroids work best where “cleanup” is necessary

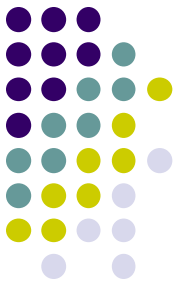
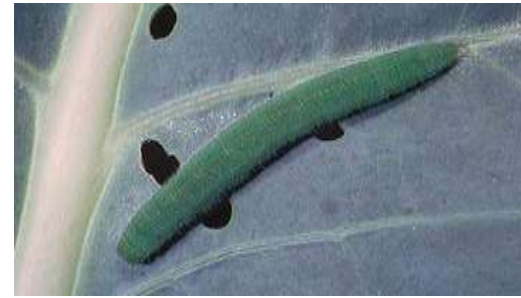
# Thresholds for “Leps”



- Broccoli and cauliflower
  - Seedbed = 10%
  - Transplant-head = 50%
  - Head to harvest = 10%
- Cabbage
  - Seedbed = 10%
  - Transplant – cup = 30%
  - Cup – head = 20%
  - Maturing head = 10%

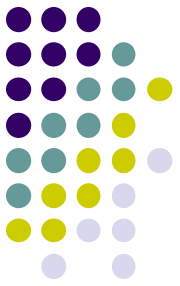
Percentages refer to the portion of plants with any live larvae of CL, DBM, or ICW. Check 5-10 plants in each of 5-10 areas in each field, once or twice weekly. On greens, use the thresholds for heading-to-harvest for cole crops or treat if infestations threaten marketability.

# “Lep” control



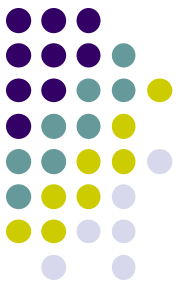
- Use BT products early
- Proclaim, Avaunt, Larvin, Entrust, Intrepid, Coragen, Radiant, and Rimon are also alternatives ... see labels
- Pyrethroids (Ammo, Brigade, Warrior, Danitol, Asana, Pounce, Ambush, and Mustang Max:
  - Best choices for medium and large loopers and for late “cleanup” in general
  - Do not rely on them for the whole season
- Resistance in DBM to: pyrethroids, BT, and more ...use rotations to slow resistance development and kill DBM larvae that are resistant to BT or pyrethroids





# Onion Thrips

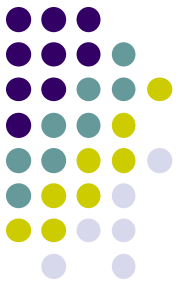




# Onion thrips control (in cabbage)

- Pay extra attention as thrips move to cabbage from maturing wheat
- Use resistant varieties if practical
- Control must be best for kraut cabbage
- Treat as heads begin to form
- Registered insecticides include Actara, Assail, Baythroid, Brigade, Entrust, Radiant, Mustang Max, and Warrior

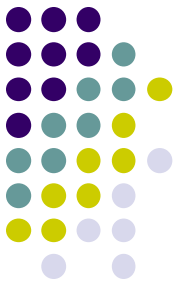




# Annual Guides

- **Midwest Vegetable Production Guide**
  - Production and pest management information
  - Updated annually
  - Especially useful for listings of insecticides, fungicides, and herbicides

To order, contact Information Technology and Communications Services at the University of Illinois ... 1-800-345-6087 or <https://webstore.aces.uiuc.edu/shopsite/>



# Resources

- Illinois Fruit and Vegetable News
  - 20 issues per year
  - \$20.00 by mail
  - Free via the web ... subscribe for email notifications
- Midwest Vegetable Production Guide
  - <http://web.extension.illinois.edu/state/publications.html>
  - <http://www.btny.purdue.edu/Pubs/ID/id-56/>