



Cole Crop IPM Guide for Small Acreage & Backyard Production

PPFS-VG-23

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INTRODUCTION

Cole crops (cabbage, broccoli, cauliflower, kohlrabi, and brussels sprouts) are popular vegetables for both commercial production and backyard gardens. Yields may be impacted by diseases, insect pests, or weeds, so a proactive management approach is needed. Preventative practices are recommended to minimize damage and cost of management. This guide focuses on preventative cultural practices with options of low-input pesticide applications; organic options are also presented. Refer to the *Home Vegetable Gardening in Kentucky* (ID-128) publication for additional information on pesticide spray schedules for small acreages.

IPM PRACTICES

Integrated Pest Management (IPM) utilizes a combination of biological, cultural, physical, and chemical methods to reduce and/or manage diseases and pests. Implementation of multiple IPM practices is often more impactful than any practice used alone.

CULTURAL PRACTICES

Cultural practices should always be considered when planning, planting, and maintaining a field or garden. Some practices keep plants healthy and ensure the lowest risk for disease outbreaks or insect infestations. Other practices eliminate and eradicate sources of disease agents or insects, thereby reducing risk. Combine cultural practices with a preventative spray program or use them alone for a no-spray alternative.

- Choose a well-drained site located in full sun.
- Maintain plant vigor by watering during drought, mulching to regulate soil moisture and temperature, and amending soil nutrients according to soil tests.
- Minimize insect and wildlife damage.
- Increase plant spacing to improve air circulation and promote leaf drying.
- Utilize specific cultural practices listed in the table to eliminate disease-causing pathogens or insects and to reduce risks for infections/infestations.

RESISTANCE

A healthy vegetable garden begins with planning. Disease-resistant cultivars can reduce the need for many fungicide and bactericide applications. Select cultivars that are resistant to the most devastating cole crop diseases in the area. Growers are advised to maintain a record of disease occurrence and select cultivars with resistance. Information about resistant cultivars can be found in *Vegetable Cultivars for Kentucky Gardens* (ID-133) or through supplier catalogs/websites.

WEED MANAGEMENT

Cultural practices such as manual weed removal and mulching are the primary methods for weed management in small acreages. Fields and gardens should be scouted frequently to remove weeds while they are young. Never allow weeds to go to seed. Often, a hoe is sufficient to remove above and below-ground portions of weeds. Vegetable plants should be planted as soon as possible after working the soil to minimize the germination of new weeds. Organic mulches such as compost, straw (not hay), shredded bark, newspaper, or cardboard can be used to limit weed emergence. Lawn clippings should not be used if herbicide treatments were applied prior to mowing. Avoid introducing mulch from sources that may be contaminated with weeds or weed seeds.

Small acreage farmers and gardeners rarely rely on herbicides for weed management. Non-selective contact herbicides, such as glyphosate, may be used according to the label. Herbicide applications should be made with low spray pressure to avoid drift, and precautions should be taken to avoid herbicide contact with vegetable plants. Pre-emergent herbicides may be applied after transplanting or when plants are at least 2 to 3 inches tall but before weeds have emerged. There are few organic herbicides labeled for home gardens. Check labels for information, precautions, and pre-harvest intervals.

USING THE TABLE

The following table focuses on cultural practices as a means for eliminating or reducing risk for diseases and insects of cole crops. Cultural practices should be considered for each plant growth stage and should be utilized regardless of spray programs. Fungicides and insecticides are listed in the right-hand columns with target pathogens or insects. Always read and follow label instructions when using pesticides, including pre-harvest intervals. Organic products (OMRI-approved) are marked with an asterisk (*). Organic fungicides are generally less effective for managing diseases than synthetic products.

Spring-planted Cole Crops

| Time of Year ¹ | Growth Stage | Cultural Practices | | Disease | | Insect | |
|---------------------------|-------------------------------|--|--|-----------------------|---|-----------------------|--|
| | | Target Disease/Insect | Cultural Management | Target Disease | Fungicide/Bactericide Management ² | Target Insect | Insecticide/Miticide Management ^{2,3} |
| March-April | Planting or transplant | -Damping-off (Pythium) -White mold | Utilize new or pasteurized potting mix; Use new or sanitized trays/pots; Plant certified or heat-treated seed; Rotate plants into a different area of the garden; Solarize soil prior to planting; Plant in a well-drained location. | | NONE | | NONE |
| | | -Cutworms -Flea beetles | Prepare soil two or more weeks in advance of planting. | | | | |
| May-June | Vegetative growth and harvest | -Alternaria Leaf -Spot bacterial soft rot -Black leg -Black rot -Cercospora leaf spot -Pythium root & crown rot | Use wide spacing for air circulation; Avoid overhead watering; Improve drainage; Remove diseased plants and debris (do not compost); Sanitize tools. | -Alternaria leaf spot | chlorothalonil | -Aphids | insecticidal soap* or neem* |
| | | | | -Cercospora leaf spot | | -Diamondback moth | Bt* or pyrethroid or spinosad* |
| | | | | -Bacterial soft rot | copper* | -Imported cabbageworm | |
| | | -Aphids -Diamondback moth -Flea beetles -Imported cabbageworm | Protect plants from insect feeding with row covers; Scout for insects. | -Black rot | copper* | -Flea beetles | pyrethroid |

¹ The growth stage indicated typically occurs during this time of year; however, this may vary from year to year depending on environmental conditions.

² Products noted with * indicate those that may be used in organic production. For a list of products approved by Organic Materials Review Institute (OMRI) please see University of Kentucky Publication Homeowner's Guide to Fungicides (PPFS-GEN-07).

³ For a list of insecticides approved for use in residential areas see: General Use Insecticides for Home Gardeners (ENTFACT-445).

Spring-planted Cole Crops

| | | Cultural Practices | | Disease | | Insect | |
|---------------------------|---------------|---|---|---------------------------|--------------------------|---------------|---------------------------|
| Time of Year ¹ | Growth Stage | Target | Cultural Management | Fungicide/ Bactericide | Insecticide/ Miticide | Target Insect | Management ^{2,3} |
| | | Disease/Insect | | Management ² | | | |
| End of season | After harvest | -Alternaria leaf spot -Bacterial soft rot -Blackleg -Black rot -Cercospora leaf spot -Pythium root & crown rot -Aphids -Diamondback moth -Flea beetles -Imported cabbageworm | Gather all remaining plant tissues and destroy (do not compost diseased material); Deep-till to encourage decomposition. | NONE | | | NONE |

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Fall-planted Cole Crops

| | | Cultural Practices | | Disease | | Insect | |
|---------------------------|--------------|---|--|--------------------------------------|--|---|---|
| Time of Year ¹ | Growth Stage | Target Disease/Insect | Cultural Management | Target Disease | Fungicide/ Bactericide Management ² | Target Insect | Insecticide/ Miticide Management ^{2,3} |
| | | July-August | Planting or transplant | -Damping-off (Pythium & Rhizoctonia) | Utilize new or pasteurized potting mix; Use new or sanitized trays/pots; Plant certified or heat-treated seed; Rotate plants into a different area of the garden; Solarize soil prior to planting; Plant in a well-drained location. | | NONE |
| | | -Beet armyworm -Cabbage looper -Cross-striped cabbageworm -Diamondback moth -Fall armyworm -Harlequin bug -Imported cabbageworm -Southern cabbageworm -Yellowstriped armyworm | Protect plants from insect feeding with row covers; Scout for insects. | | | -Fall armyworm -Imported cabbageworm -Southern cabbageworm -Yellowstriped armyworm | |
| | | | | | | -Harlequin bug | pyrethroid |

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| | | Disease/Insect | | | Management ² | | Management ^{2,3} |
| August- November | Vegetative growth and harvest | -Alternaria leaf spot -Bacterial soft rot -Black rot -Cercospora leaf spot -Pythium root & crown rot -Rhizoctonia root & crown rot | Use wide spacing for air circulation; Avoid overhead watering; Improve drainage; Remove diseased plants and debris (do not compost); Sanitize tools. | -Alternaria leaf spot -Cercospora leaf spot | chlorothalonil | -Aphids | insecticidal soap* or neem* |
| | | -Beet armyworm -Cabbage looper -Cross-striped cabbageworm -Diamondback moth -Fall armyworm -Harlequin bug -Imported cabbageworm -Southern cabbageworm -Yellowstriped armyworm | | Protect plants from insect feeding with row covers; Scout for insects. | -Bacterial soft rot -Black rot | copper* | -Beet armyworm -Cabbage looper -Cross-striped cabbageworm -Diamondback moth -Fall armyworm -Imported cabbageworm -Southern cabbageworm -Yellowstriped |
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ADDITIONAL RESOURCES

- Entomology Extension Publications/Vegetable Pests
<https://entomology.ca.uky.edu/entfacts/vegetables>
- Horticulture Extension Publications/Home Vegetables
<https://horticulture.ca.uky.edu/growers/home/vegetables>
- Plant Pathology Extension Publications
<https://plantpathology.ca.uky.edu/extension/publications>
- Home Vegetable Gardening in Kentucky (ID-128)
<https://www2.ca.uky.edu/agcomm/pubs/id/id128/id128.pdf>
- General Use Insecticides for Home Gardens (ENTFACT-445)
<https://entomology.ca.uky.edu/ef445>
- IPM Scouting Guide for Common Problems of Cole Crops in Kentucky ID-216
<https://www2.ca.uky.edu/agcomm/pubs/ID/ID216/ID216.pdf>
- Veggie Scout Website
<https://veggiescout.ca.uky.edu/>
- Homeowner’s Guide to Fungicides (PPFS-GEN-07)
<https://plantpathology.ca.uky.edu/files/PPFS-GEN-07.pdf>
- Cleaning & Disinfecting Hand Tools & Planting Supplies (PPFS-GEN-17)
<https://plantpathology.ca.uky.edu/files/PPFS-GEN-17.pdf>
- Vegetable Cultivars for Kentucky Gardens – 2013 (ID-133)
<https://www2.ca.uky.edu/agcomm/pubs/id/id133/id133.pdf>
- Cornell University Resource of Resistant Vegetable Varieties
<https://www.vegetables.cornell.edu/pest-management/disease-factsheets/disease-resistant-vegetable-varieties/>

*For larger fields and commercial acreage refer to the
UK Plant Pathology Extension Publications website for additional resources.*

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