



Tomato & Pepper IPM Guide for Small Acreage & Backyard Production

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INTRODUCTION

Tomato and pepper 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.
- Prune and trellis plants to open the canopy and increase air circulation.
- 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 tomato and pepper 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 tomato and pepper. 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.

Time of Year ¹	Growth Stage	Cultural Practices		Diseases			Insects		
		Target Organism	Cultural Management	Target Disease	Crops Affected ²	Fungicide/Bactericide Management ³	Target Insect	Crops Affected ²	Insecticide/Miticide Management ^{3,5}
March-April	Indoor seeding	-Seedling diseases	Utilize new or pasteurized potting mix; Use new or sanitized trays/pots; Plant certified or heat-treated seed.			NONE			NONE
May-June	Transplants	-All diseases (leaf, fruit, and root/crown diseases)	Choose resistant or tolerant varieties; Plant certified or heat-treated seed; Rotate plants into a different area of the garden (3-year rotation); Use wide spacing for air circulation; Avoid/reduce wounding; Stake plants and use mulch to reduce soil contact.			NONE	-Aphids	T, P	azadirachtin* or insecticidal soap*
		-Damping-off -Fusarium crown rot -Fusarium wilt -Pythium root rot -Timber rot -Southern blight	Plant certified or heat-treated seed; Rotate plants to a different area of the garden (3-year rotation); Remove and destroy diseased transplants and seedlings.				-Colorado potato beetle	T, E, P	acetamiprid or imidacloprid or spinosad*
		-Aphids -Whiteflies	Row covers can be used over small transplants; Reflective mulches reduce aphid colonization.				-Whiteflies	T	azadirachtin* or insecticidal soap*
June	Vegetative growth	-Bacterial spot -Bacterial speck -Early blight -Septoria leaf spot	Remove infected plants/plant parts (do not compost); Remove weeds; Reduce/eliminate overhead watering; Stake plants and use mulch to reduce soil contact.	-Bacterial spot -Bacterial speck	T, P	copper*	-Aphids	T, P	acetamiprid or insecticidal soap* or pyrethrins*
		-Colorado potato beetle -Hornworms -Stink bugs	Scout for insects and remove by hand if few in number; Row covers can be used over small transplants; Trap cropping for stink bugs can reduce damage.	-Early blight -Septoria leaf spot	T	chlorothalonil ⁴ or copper* or mancozeb	-Colorado potato beetle	T, E, P	imidacloprid or spinosad*
							-Spider mites	T	insecticidal soap*
June-July	Early bloom	-Bacterial spot -Bacterial speck -Early blight -Septoria leaf spot	Remove infected plants/plant parts (do not compost); Remove weeds; Reduce/eliminate overhead watering; Stake plants and use mulch to reduce soil contact; Sanitize tools.	-Bacterial speck -Bacterial spot	T, P	copper*	DO NOT USE broad-spectrum insecticides during bloom.		
		-Aphids -Colorado potato beetle -Hornworms -Stink bugs	Scout for insects and remove by hand; Look for Colorado potato beetle egg masses on undersides of leaves; Trap cropping for stink bugs can reduce damage.	-Early blight -Septoria leaf spot	T	chlorothalonil ⁴ or copper* or mancozeb			

See the foot notes on page 3 for superscript explanations.

Time of Year ¹	Growth Stage	Cultural Practices		Diseases			Insects				
		Target Organism	Cultural Management	Target Disease	Crops Affected ²	Fungicide/Bactericide Management ³	Target Insect	Crops Affected ²	Insecticide/Miticide Management ^{3,5}		
July-August	Fruit bearing	-Bacterial speck -Bacterial spot	Remove infected leaves/fruit/plant tissues (do not compost); Remove weeds; Reduce/eliminate overhead watering; Prune and stake to increase air circulation; Sanitize tools.	-Bacterial speck -Bacterial spot	T, P	copper*	-Aphids	T, P	acetamiprid or insecticidal soap*		
		-Anthracnose -Early blight -Leaf mold -Septoria leaf spot	Remove infected leaves/fruit/plant tissues (do not compost); Remove weeds; Reduce/eliminate overhead watering; Prune and stake to increase air circulation; Stake plants and use mulch to reduce soil contact; Remove all damaged fruit.	-Anthracnose -Early blight -Leaf mold -Septoria leaf spot	T, P	chlorothalonil ⁴ or copper* or mancozeb	-Colorado potato beetle	T, E, P	acetamiprid or spinosad*		
		-Fusarium wilt -Southern blight	Remove diseased plants/roots (do not compost).				-Hornworms	T, P	acetamiprid or Bt* or permethrin		
		-Aphids -Armyworms -Colorado potato beetle -Hornworms -Leaf-footed bugs -Stink bugs -Thrips -Whitefly	Scout for insects; Remove beetles and caterpillars by hand; Watch for hornworm frass on the soil as a sign of activity; Trap cropping for stink bugs can reduce damage.				-Leaf-footed bugs	T	acetamiprid or permethrin		
							-Spider mites	T	insecticidal soap*		
									-Stink bugs	T, P	permethrin or acetamiprid
									-Tomato fruitworm	T	acetamiprid or Bt* or permethrin
									-Yellow-striped armyworm	T, P	acetamiprid or Bt* or permethrin
September	End of Season	-Bacterial diseases -Fruit spots/rots -Fungal leaf spots/blights -Aphids	Remove all plant material (do not compost diseased material) ; Do not save seed from infected fruit; Wash/sanitize stakes, cages, and trellising or discard those that cannot be sanitized.			NONE	-Aphids		acetamiprid or insecticidal soap*		

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

²Crops Affected Key: T - Tomato, P - Pepper, E - Eggplant.

³Products 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 the University of Kentucky Publication *Homeowner's Guide to Fungicides* (PPFS-GEN-07).

⁴Chlorothalonil may be harmful to pollinators.

⁵For a list of insecticides approved for use in residential areas see: *General Use Insecticides For Home Gardeners* (ENTFACT-445).

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 Pests of Solanaceous Crops in Kentucky (ID-172)
<https://www2.ca.uky.edu/agcomm/pubs/id/id172/id172.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 Department of Plant Pathology Extension Publications website for additional resources.*

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