

Sustainable Disease Management of Solanaceous Crops in the Home Garden

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INTRODUCTION

Solanaceous crops, including tomatoes, peppers, eggplants, and potatoes, may be the most popular garden plants, but many diseases commonly affect them. Early blight and Septoria leaf spot occur each year under even the best disease management, and bacterial spot may be spread easily under rainy conditions. A combination of approaches, such as using resistant varieties, record-keeping, cultural, and chemical management, is the best practice for minimizing vegetable garden diseases.

CULTURAL PRACTICES

Choose a site with well-drained soil that receives full sun for the majority of the day. If this is not possible, a site with evening shade is better than one with morning shade, to speed the drying of morning dew on leaves. Seven- to eight-week old tomato and pepper plants should be deeply transplanted (soil up to the seed leaves) after risk of frost has passed. Plant treated or certified disease-free potato seed pieces into moist soils at a depth of about 3 inches. Do not store untreated, cut potato seed pieces, as the cut surfaces can become infected by common airborne fungi. Water transplants and seed pieces after setting, then apply about an inch of compost to maintain soil moisture and reduce soil splash onto young plants. Stake or cage plants to reduce contact with soil and increase air flow through foliage. Avoid staking plants while they are visibly wet to reduce plant injury.

RESISTANCE

Vegetable seed catalogs readily list varieties with resistance to different diseases. Choose resistant varieties based on diseases that have been problems in the past, or ones that are very common for the region. Early blight is arguably the most common disease of tomatoes in Kentucky. Tomatoes with some resistance to early blight are 'Matt's Wild Cherry' and 'Sun Gold' (small cherry tomatoes), 'Juliet' and 'Plum Regal' (Roma size), and 'Mountain Fresh Plus' and 'Iron Lady' (slicing size). Try mid- and later-maturing potato varieties, such as 'Allegany' and 'Castile,' for their tolerance to early blight. Pepper varieties with resistance to multiple races of the bacterial spot pathogen are 'Allegiance,' 'Hunter,' 'Islamorada,' 'Naples,' 'Regiment,' and 'Vanguard,' among others.

USING THE TABLE

The following table focuses on cultural practices aimed at reducing risk of developing diseases of solanaceous crops. Cultural practices should be implemented in each plant growth stage, regardless of fungicide program, for optimal disease management. Many cultural practices target multiple diseases, as shown in the table. If disease pressure is high, growers may consider the fungicides listed in the right-hand column. Organic fungicides (OMRI-approved) are marked with an asterisk (*). All fungicides require excellent coverage of plant tissue and recurrent applications for maximum effectiveness. For best results, most fungicides should be reapplied when residues are no longer visible or on a 10-day interval, whichever occurs sooner.

RESOURCES

- Plant Pathology Extension Publications
<http://www2.ca.uky.edu/agcollege/plantpathology/extension/pubs.html>
- Home Vegetable Gardening (ID-128)
<http://www.ca.uky.edu/agc/pubs/id/id128/id128.pdf>
- IPM Scouting Guide for Common Pests of Solanaceous Crops in Kentucky (ID-172)
<http://www.ca.uky.edu/agc/pubs/id/id172/id172.pdf>
- Tomato Diseases and Disorders – Diagnostic Images
http://www.ca.uky.edu/agcollege/plantpathology/ext_files/DiagnosticImagesOtherVegetables.htm
- Cornell University Tables of Resistant Vegetable Varieties
<http://vegetablemdonline.ppath.cornell.edu/Tables/TableList.htm>
- The Potato Association of America
<http://potatoassociation.org/industry/varieties>

Time of Year ¹	Growth Stage	Cultural Management	Disease	Crops Affected	Chemical Management ⁵
April-May (potatoes) May-June (all others)	Seeding (potato only) Transplant	Choose resistant or tolerant varieties; Avoid planting diseased plants; Plant certified or heat-treated seed; Rotate plants into a different area of the garden; Increase spacing between plants; Stake plants and use mulch to prevent soil from splashing leaves. Gray Mold- Lime excessively acid soils to promote calcium uptake.	Early blight ²	Tomato/Potato	Chlorothalonil or copper* or mancozeb (tomato and potato only) or sulfur ^{7*}
			Gray mold	Tomato	
			Septoria leaf spot/blight	Tomato	
			Anthracnose ³	Pepper/Tomato	
			Bacterial diseases ⁴	Tomato/Pepper	Copper*
June	Vegetative growth	Remove infected leaves and destroy (do not compost); Remove weeds; Reduce/eliminate overhead watering; Stake plants and use mulch to reduce soil contact; Sanitize tools. Early blight - Ensure adequate potassium fertility.	Early blight ²	Tomato/Potato	Chlorothalonil or copper* or mancozeb (tomato and potato only)
			Septoria leaf spot/blight	Tomato	
			Bacterial diseases ⁴	Tomato/Pepper	Copper*
June-July	Blossom	Remove infected leaves/plant tissue and destroy (do not compost); Remove weeds; Reduce/eliminate overhead watering; Stake plants and use mulch to reduce soil contact; Sanitize tools. Early blight - Ensure adequate potassium fertility. Gray mold - Ensure adequate calcium nutrition.	Early blight ²	Tomato/Potato	Chlorothalonil or copper* or mancozeb (tomato and potato only)
			Gray mold	Tomato	
			Septoria leaf spot/blight	Tomato	
			Bacterial diseases ⁴	Tomato/Pepper	Copper*
July-August	Fruit bearing	Remove infected leaves/fruit/plant tissues and destroy (do not compost); Remove weeds; Reduce/eliminate overhead watering; Stake plants and use mulch to reduce soil contact; Sanitize tools. Early blight - Ensure adequate potassium fertility.	Early blight ²	Tomato/Potato	Chlorothalonil or copper* or mancozeb (tomato and potato only)
			Gray mold	Tomato	
			Septoria leaf spot/blight	Tomato	
			Anthracnose ³	Pepper/Tomato	
			Bacterial diseases ⁴	Tomato/Pepper	Copper*
September	End of Season	Remove infected leaves/fruit/plants and destroy (do not compost); Sanitize metal stakes and cages.			

¹ Growth stage typically occurs during this time of year. However, time of year may vary from year to year depending on environmental conditions

² Confirm diagnosis of early blight as symptoms are often confused with blossom end rot (lack of calcium)

³ Confirm diagnosis of anthracnose as symptoms are often confused with sunburn (environmental cause)

⁴ Bacterial Diseases include bacterial canker (tomato), bacterial speck (tomato), and bacterial spot (tomato/pepper)

⁵ Products approved by the Organic Materials Review Institute (OMRI) for organic production are noted with an *

⁶ Avoid spraying chlorothalonil on blossoms, as it may pose a risk to honeybees

⁷ Phosphorous acid and/or sulfur dust may injure plants; test on a small area, wait at least 3 days, and inspect for damage prior to treating entire planting.

Reviewed by: Dr. Shubin Saha, Department of Horticulture, University of Kentucky

Photo credit: USDA-ARS

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