

# Sustainable Disease Management of Cole Crops in the Home Garden

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## INTRODUCTION

Cabbage, broccoli, cauliflower, kohlrabi, and brussel sprouts, all cole crops, are excellent plants to integrate into gardens. During wet seasons, bacterial diseases, fungal leaf spots, and downy mildew are common problems, while powdery mildew is more common during dry seasons. Bacterial diseases are also benefited by hot weather with occasional strong storms, which injure plants and spread pathogens in the garden.

## CULTURAL PRACTICES

Choose the type and variety of cole crop based on its time to maturity, cold or heat tolerance, and disease resistance profile, all listed on seed packets. Sow treated or certified seed into well-drained, high organic matter soils that receive full sun. Space plants appropriately to reduce leaf wetness and bacterial and fungal diseases; for specific recommendations, please see UK ID-128. Once plants have emerged, a light layer of compost, plastic mulch, or newspaper is recommended to reduce weed pressure, maintain soil moisture, and prevent soil contact with leaves. Harvest carefully during the season to avoid injuring neighboring plants.

## 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. Cabbage varieties 'Bilko,' 'Blues,' 'China Pride,' 'Blue Vantage,' and 'Bronco' carry resistance to a broad range of diseases, such as downy mildew, Fusarium yellows, and/or black rot. Broccoli varieties 'Emperor,' 'Pinnacle,' and 'Green Magic,' as well as cauliflower variety 'Majestic' are resistant to downy mildew and/or black rot. 'Grand Duke' kohlrabi is resistant to black rot as well. For additional cole crop variety recommendations, see UK ID-133.

## USING THE TABLE

The following table focuses on cultural practices aimed at reducing risk of developing disease of cole 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 (UK)  
<http://www2.ca.uky.edu/agcollege/plantpathology/extension/pubs.html>
- Home Vegetable Gardening (ID-128, UK)  
<http://www.ca.uky.edu/agc/pubs/id/id128/id128.pdf>
- IPM Scouting Guide for Cole Crops (ID-216, UK)  
<http://www.ca.uky.edu/agc/pubs/ID/ID216/ID216.pdf>
- Vegetable Cultivars for Kentucky Gardens (ID-133, UK)  
<http://www2.ca.uky.edu/agc/pubs/id/id133/id133.pdf>
- Cornell University Tables of Resistant Vegetable Varieties  
<http://vegetablemdonline.ppath.cornell.edu/Tables/TableList.htm>

Time of Year <sup>1</sup>	Growth Stage	Cultural Management	Disease	Chemical Management <sup>2</sup>
Summer gardens <sup>3</sup> (seed prior to Apr 10; transplant prior to May 1)	Direct seed (collards, kale, kohlrabi, mustards, radish)  Transplant (broccoli, Brussels sprouts, cabbage, cauliflower)	Choose resistant varieties; Avoid planting diseased plants; Plant certified or heat-treated seed; Rotate plants into a different area of the garden; Plant in a well-drained location.	Bacterial soft rot	Copper*
			Black rot	Copper*
			Alternaria leaf spot	Chlorothalonil
			Black leg	--
			Downy mildew	Copper* or phosphorous acid <sup>4</sup> or sulfur* <sup>4</sup>
May - June, (leafy cole crops)  May - July, (heading cole crops)	Vegetative growth	Remove infected leaves; Sanitize tools between cuttings; Remove weeds; Avoid overhead watering.	Bacterial soft rot	Copper*
			Black rot	Copper*
			Alternaria leaf spot	Chlorothalonil
			Black leg	--
			Downy mildew	Copper* or phosphorous acid <sup>4</sup> or sulfur* <sup>4</sup>
July (heading cole crops only)	Head development	Remove infected leaves; Sanitize tools between cuttings; Remove weeds; Avoid overhead watering.	Bacterial soft rot	Copper*
			Black rot	Copper*
			Alternaria leaf spot	Chlorothalonil
			Black leg	--
			Downy mildew	Copper* or phosphorous acid <sup>4</sup> or sulfur* <sup>4</sup>
May - June, (leafy cole crops)  July - August (heading cole crops)	Harvest	Remove infected leaves; Sanitize tools between cuttings; Remove weeds; Avoid overhead watering; Minimize plant injury.	Bacterial soft rot	--
			Black rot	--
			Alternaria leaf spot	--
			Downy mildew	--
			August - September	End of Season

<sup>1</sup> Growth stage typically occurs during this time of year. However, time of year may vary from year to year depending on environmental conditions or successional planting.

<sup>2</sup> Products approved by the Organic Materials Review Institute (OMRI) for organic production are noted with an \*. Apply chemicals only to emerged plants.

<sup>3</sup> Some cole crops (such as broccoli, brussels sprouts, cabbage, kale, and mustard greens) are very amenable to spring and fall gardening. For additional information on gardening year-round, see *Home Vegetable Gardening in Kentucky* (ID-128)

<sup>4</sup> 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:** Matt Barton, UK Agricultural Communications

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