



# Cucurbit Crop IPM Guide for Small Acreage & Backyard Production

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Nicole Gauthier, Plant Pathology Extension Specialist; Kimberly Leonberger, Plant Pathology Extension Associate;  
April Lamb, Plant Pathology Postdoctoral Scholar; Ric Bessin, Entomology Extension Specialist;  
and Shawn Wright, Horticulture Extension Specialist

## INTRODUCTION

Cucurbit crops (cucumber, summer squash, cantaloupe, watermelon, pumpkins, and winter squash) are common 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 planting 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 cucurbit 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 cucurbit 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.

Time of Year <sup>1</sup>	Growth Stage	Cultural Practices		Disease		Insect						
		Target Disease/Insect	Cultural Management	Target Disease	Fungicide/Bactericide Management <sup>2</sup>	Target Insect	Crops Affected <sup>3</sup>	Insecticide/Miticide Management <sup>2,7</sup>				
March-April	Indoor seeding	-Damping-off -Seedling diseases	Utilize new or pasteurized potting mix; Use new or sanitized trays/pots; Plant certified or heat-treated seed.		NONE			NONE				
May (cucumber, squash, melons)	Direct Seeding/ Transplanting	-Alternaria leaf blight -Anthracnose -Damping-off	Plant resistant cultivars; Sow pathogen free seeds; Plant into warm soils; Avoid planting in extremely wet areas; Increase spacing between plants; Clean tools after each use; Avoid movement of soil and debris between crops.	-Damping-off	Use pretreated seed	-Cucumber beetles <sup>4</sup>	C, P, S, W, Z	pyrethroid (protect pollinators by applying insecticides in late afternoon)				
June (pumpkin)		-Squash bugs <sup>4</sup> (adults & nymphs)				P, S, Z			pyrethroid (protect pollinators by applying insecticides in late afternoon)			
		-Bacterial wilt				Manage cucumber beetles (disease vector) by covering plants with row covers.						
		-Cucumber beetles -Squash bugs <sup>4</sup>	Protect seedlings and transplants from feeding with row covers.									
June-July (cucumber, squash, melons)	Vegetative growth	-Alternaria leaf blight -Anthracnose -Downy mildew -Powdery mildew	Remove infected leaves/vines (do not compost); Remove weeds; Avoid overhead watering.	-Alternaria leaf blight -Anthracnose	chlorothalonil or copper* or mancozeb or myclobutanil	-Cucumber beetles <sup>4</sup>	C, P, S, W, Z	pyrethroid (protect pollinators by applying insecticides in late afternoon)				
July-August (pumpkin)		-Bacterial wilt		Manage cucumber beetles (disease vector).		-Downy mildew			chlorothalonil or copper* or mancozeb or phosphorous acid <sup>5</sup>	-Spider mites	W	insecticidal soap*
		-Cucumber beetles <sup>4</sup> -Spider mites -Squash beetle -Squash bugs <sup>4</sup> -Squash vine borer		Protect plants from insect feeding with row covers; Remove row covers when female flowers begin to open (male flowers open several weeks before female flowers); Scout for insects.						-Squash beetle	P, S, Z	pyrethroid (protect pollinators by applying insecticides in late afternoon)
						-Powdery mildew			copper* or myclobutanil	-Squash bugs <sup>4</sup> (adults & nymphs)	P, S, Z	pyrethroid (protect pollinators by applying insecticides in late afternoon)
						-Squash vine borer	P, S, Z	Bt* or pyrethroid (protect pollinators by applying insecticides in late afternoon)				

See the foot notes on page 4 for superscript explanations.

Time of Year <sup>1</sup>	Growth Stage	Cultural Practices		Disease		Insect		
		Target Disease/Insect	Cultural Management	Target Disease	Fungicide/Bactericide Management <sup>2</sup>	Target Insect	Crops Affected <sup>3</sup>	Insecticide/Miticide Management <sup>2,7</sup>
June-July (cucumber, squash, melons)  August (pumpkin)	Bloom	-Alternaria leaf blight -Anthracnose -Downy mildew -Powdery mildew	Remove infected leaves/vines/fruit (do not compost); Remove weeds; Avoid overhead watering.	-Alternaria leaf blight -Anthracnose	chlorothalonil <sup>6</sup> or copper* or mancozeb or myclobutanil	DO NOT USE Broad-spectrum insecticides during bloom.		
		-Bacterial wilt	Manage cucumber beetles (disease vector).	-Downy mildew	chlorothalonil <sup>6</sup> or copper* or mancozeb or phosphorous acid <sup>5</sup>			
		-Cucumber beetles <sup>4</sup> -Spider mites -Squash beetle -Squash bugs <sup>4</sup> -Squash vine borer	Protect plants from insect feeding with row covers; Remove row covers when female flowers begin to open (male flowers open several weeks before female flowers); Scout for insects.	-Powdery mildew	copper* or myclobutanil			
June-July (cucumber, squash, melons)  August-September (pumpkin)	Fruit bearing	-Alternaria leaf blight -Anthracnose -Downy mildew -Powdery mildew	Remove infected leaves/vines/fruit (do not compost); Remove weeds; Avoid overhead watering.	-Alternaria leaf blight -Anthracnose	chlorothalonil <sup>6</sup> or copper* or mancozeb or myclobutanil	-Cucumber beetles <sup>4</sup>	C, P, S, W, Z	pyrethroid (protect pollinators by applying insecticides in late afternoon)
		-Bacterial wilt	Manage cucumber beetles (disease vector).	-Downy mildew	chlorothalonil <sup>6</sup> or copper* or mancozeb or phosphorous acid <sup>5</sup>	-Spider mites	W	insecticidal soap*
		-Cucumber beetles <sup>4</sup> -Spider mites -Squash beetle -Squash bugs <sup>4</sup> -Squash vine borer	Protect plants from insect feeding with row covers; Remove row covers when female flowers begin to open (male flowers open several weeks before female flowers); Scout for insects.	-Powdery mildew	copper* or myclobutanil	-Squash beetle	P, S, Z	pyrethroid (protect pollinators by applying insecticides in late afternoon)
						-Squash bugs <sup>4</sup>	P, S, Z	pyrethroid (protect pollinators by applying insecticides in late afternoon)
						-Squash vine borer	P, S, Z	Bt* or pyrethroid (protect pollinators by applying insecticides in late afternoon)

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Growth Stage	Cultural Practices		Disease	Insect		
	Target Disease/Insect	Cultural Management	Target Disease	Fungicide/Bactericide Management <sup>2</sup>	Target Insect	Crops Affected <sup>3</sup> Insecticide/Miticicide Management <sup>2,7</sup>
End of season	-Alternaria leaf blight -Anthracnose -Downy mildew -Powdery mildew -Cucumber beetles <sup>4</sup> -Melonworm -Spider mites -Squash beetle -Squash bugs <sup>4</sup> -Squash vine borer	Remove all leaves/fruit/plant tissues and destroy (do not compost diseased material); Deep-till soil.		NONE		NONE

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

<sup>2</sup>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 the University of Kentucky Publication *Homeowner's Guide to Fungicides* (PPFS-GEN-07).

<sup>3</sup>Crops Affected Key: C - Cucumber; P - Pumpkin; S - Squashes; W- Watermelon; Z - Zucchini.

<sup>4</sup> Manage cucumber beetles and squash bugs when an average of one insect per plant is detected.

<sup>5</sup> Not all phosphorous acid products are approved for use on cucurbits; check label prior to application.

<sup>6</sup> Chlorothalonil may be harmful to pollinators, avoid use during bloom.

<sup>7</sup> For 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>
- 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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