

# Chapter 7. Cucurbit Production

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## Botany and Planting

**Angled luffa** (silk squash) – *Luffa acutangula*

**Bittermelon** – (Chinese and Indian types) – *Momordica charantia*

**Butternut squash** - *Cucurbita moschata*.

**Chayote** – *Sechium edule*

**Chinese cucumber** – *Trichosanthes kirilowii*

**Cucumber** - *Cucumis sativus*, Cucurbitaceae.

**Cantaloupe**- *Cucumis melo*.

**Fuzzy melon** (immature fruit) and **Winter melon** – *Benincasa hispida*

**Long gourd** (oopoh) – *Lagenaria siceraria*

**Pumpkin** (jack-o-lantern is *C. pepo*; some processing pumpkins are *C. maxima* and *C. moschata*).

**Smooth luffa** – *Luffa aegyptica* (cylindrical)

**Snake gourd** – *Trichosanthes cucumerina*

**Summer squash** - *Cucurbita pepo*.

**Tropical pumpkin (calabaza)** - *Cucurbita moschata*.

**Watermelon** - *Citrullus lanatus*.

**Winter squash** - *Cucurbita maxima*

Table 7.1. Planting information for cucurbits.

Planting dates	Cucumber	Cantaloupe	Pumpkin	Squash	Watermelon	
North Florida	Feb - Apr; July - Aug	Feb - Apr	Early July	Feb - Apr; Aug - Sept	Feb - Apr	
Central Florida	Jan - Mar; Sept	Jan - Mar	Mid July	Jan - Apr; Aug - Sept	Jan - Mar	
South Florida	Sept - Feb	Dec - Mar	Early August	Aug - Mar	Dec - Mar	
Planting information				Bush	Vining	
Distance between rows (in)	48 - 60	60 - 72	60 - 108	36 - 48	60 - 108	60 - 108
Distance between plants (in)	6 - 12	20 - 36	36 - 60	12 - 24	36 - 60	24 - 48
Seeding depth (in)	0.5 - 0.75	0.5 - 1.0	1.5 - 2.0	1.0 - 1.5	1.5 - 2.0	1.5 - 2.0
Seed per acre (lb)	2 - 4	1 - 2	4 - 5	2 - 3	1 - 1.5	1 - 3
Days to maturity from seed	40 - 65	85 - 110	80 - 100	40 - 50	85 - 120	80 - 100
Days to maturity from transplant	Not recommended	70 - 90	70 - 90	Not recommended		60 - 90
Plant populations (acre)	21,780	4,356	2,904	7-14,520	2,904	1,815

## Cultivars

Table 7.2. Cultivars for cantaloupe.

Eastern Shipper			Harper Type		Calabaza (tropical pumpkin)
Aphrodite (H)	Athena (H)	Avatar (H)	Caribbean Gold	Infinite Gold	Agriset 9001 (vining type)
Ariel (H)	Atlantis (H)		Timeless Gold		La Estrella (compact plant)
H=hybrid					

**Table 7.3.** Cultivars for cucumber.

Pickling				Slicing		
Calypso (H) (GY)	Eureka (H) (MO)	Jackson Supreme	Supremo (H)	Bristol	Mongoose (H) (GY)	SV4719CS* (H) (GY)
Deli King	Excel (H) (GY)	Maxi Pack (H)	Transamerica (H)	Cobra (H) (GY)	Python (H)	Talledega (H) (GY)
Deli Star	Fancipak (H) (GY)	Maxi Pick (H)	Vlaspik (H)	Dominator (H) (GY)	Speedway (H) (GY)	Thunder(H) (GY)
Excursion	FMX 5020 (H)	Powerpak (H) (GY)		Impact (H) (GY)	SV3462CS* (H) (GY)	
Expedition (H)	Jackson Classic (H) (GY)	Royal (H) (GY)				

H=hybrid; flower habit: GY=gynoecious, MO=monoecious.

\* Improved Downy Mildew resistance.

**Table 7.4.** Cultivars for Halloween pumpkin (North Florida only).

Miniature: < 1 lb	Small: 1-5 lb	Medium: 5-10 lb	Large: 10-20 lb	Giant: 25-80 lb		
Bumpkin (H)	Hybrid Pam (H)	Autumn Gold (H)	Merlin (H)	Apogee (H)	Magic Wand (H)	Dill's Atlantic Giant
Gold Dust (H)	Pick-A-Pie (H)	Goose Bumps II (H)	October (H)	Connecticut Field	Magician (H)	Prizewinner (H)
Jill-Be-Little	Small Sugar	Jack of All Trades (H)		Early Giant (H)		
Wee-Be-Little (PVP)		Knucklehead (H)		Early King (H)		

PVP=Plant Variety Protection; H=hybrid

**Table 7.5.** Cultivars for squash.

Summer (yellow)			Acorn	Butternut	
Conqueror III (H) (SN)*	Goldprize (H) (SN)	Prelude II (H) (CN) *	Mesa Queen (H)	Atlas (H)	Quantam (H)
Enterprise (H) (SN)	Gold Star (H) (CN)	XPT 1832 III (H) (SN)*	Royal Ace (H)	Avalon (H)	Ultra (H)
Fortune (H) (SN)	Grand Prize (H) (SN)	Sunglo (H) (CN)	Table Ace (H)	Canesi (H)	Waltham
Gentry (H) (CN)	Lazor (H) (SN)		TayBelle PM (H)	Early Butternut (H)	Zenith (H)
Destiny III (H) (CN)*	Lioness (H) (SN)			Polaris (H)	

**Summer (zucchini)**

Summer (zucchini)			Summer (yellow zucchini)	Summer (grey zucchini)	
Everglades (H)	Justice III (H)*	Payroll (H)	Spineless King (H)	Golden Delight (H) (SN)	Hurakan (H)
Green Eclipse (H)	Pascola (H)	Respect (H)	Spineless Perfection (H)	Golden Glory (H) (SN)	Lolita (H)
Green Machine (H)	Paycheck (H)	Senator (H)	SV6009YG (H)*	Goldrush (H) (SN)	Luciana
Judgement III (H)*	Payload (H)	Spineless Beauty (H)			

H=hybrid; type: CN=crookneck, SN=straightneck.

\*Biotech: Specific requirements and restrictions apply to these products.

**Table 7.6.** Cultivars for watermelon.

Diploid		Triploid (seedless, large)				
Estrella (H)	Summer Flavor 790 (H)	ACX 6177 (H)	Crunchy Red (H)	Secretariat(H)	Unbridled (H)	
Gold Strike (H) (orange flesh)	Summer Flavor 800 (H)	Admiration (H)	Exclamation (H)	Sugar Heart (H)	Warrior (nun 1009) (H)	
Jamboree (H)	Summer Flavor 8490 (H)	Affirmed (H)	Fascination (H)	Sugar Fresh (H)	SS 7167 (H)	
Mardi Gras (H)	Summer Velvet 2800 (H)	Bold Ruler (H)	Joy Ride (SV 8298) (H)	Summer Breeze (H)	SS 7177 (H)	
Sangria (H)	Top Gun (H)	Bottle Rocket (H)	Kingman (H)	Sweet Gem (H)	SS 7197 (H)	
Sentinel (H)	Vista (H)	Captivation (H)	Maxima (H)	Sweet Polly (H)	SV 0241 (H)	
Starbrite (H)	SSX 8585 (H)	Citation (H)	Melody (H)	Talca (H)		
Stargazer (H)		Crisp N' Sweet (H)	Razorback (H)	Traveler (H)		
		Cronos (H)	Road Trip (H)	Troubadour (H)		
Non-Harvestable Pollenizer		Triploid (seedless, mini)				
Ace Plus	Polimax	Wildcard Plus	Ana (H)	Ocelot (H)	Promesa (H)	Sky View (H)
Accomplice	SP-6	Wing man	Extazy (H)	Sky Star (H)	Pixie (H)	Sky Line (H)
Patron	SP-7		Leopard (H)	Belmont (H)	Sugar Bite (H)	

H=hybrid

## Asian Cucurbits

This group includes cucurbit fruits that can be eaten either immature or mature and several vegetables with edible tender stems and leaves. All can be grown on raised beds, with or without plastic mulch, and with drip, overhead or subsurface irrigation. Most of the crops are trellised, primarily to maximize space and sufficient sunlight, minimize bud drop and fruit rot caused by over shading and exposure to soil moisture and pathogens and to promote straight fruit. Winter melon is the exception since it is generally too heavy to trellis. Fertilizer recommendations for cucumbers are applicable for fuzzy melon, long gourd, both luffas, Chinese cucumber, bittermelon and

snake gourd. There are two types of bittermelon: Indian and Chinese. The Indian type has smaller fruit with dark green color and rough skin, and the Chinese type has larger fruit with light green color and smooth skin. Chinese cucumber, though rarely commercially available, similar to European cucumber, has fruit more than 1 foot long with dark green color, very thin and rough skin and crisp texture. Recommendations for watermelon should be followed for winter melon and chayote. With the exception of chayote, where the entire fruit is planted, these crops are started from seed and grown as transplants prior to being set in the field.

**Table 7.7.** Planting information for Asian cucurbits.

Planting dates	Bittermelon	Long gourd	Angled luffa	Smooth luffa
North Florida	Feb – Apr; July – Aug	Feb – Apr; July – Aug	Feb – Apr; July – Aug	Feb – Apr; July – Aug
Central Florida	Jan – Mar; Sept	Jan – Mar; Sept	Jan – Mar; Sept	Jan – Mar; Sept
South Florida	Sept - Feb	Sept - Feb	Sept - Feb	Sept - Feb
Planting information				
Distance between rows (in)	60 – 72	60 – 72	60 – 72	60 – 72
Distance between plants (in)	36 – 60	36 – 60	36 – 60	36 – 60
Days to maturity from seed	80 – 100			
Plant populations (acre)	2904	2904	2904	2904
Planting dates	Fuzzy melon	Snake gourd	Chayote	Winter melon
North Florida	Feb-Apr; July-Aug	Feb-Apr; July-Aug	Not recommended	Feb – Apr
Central Florida	Jan – Mar; Sept	Jan – Mar; Sept	Not recommended	Jan – Mar
South Florida	Sept - Feb	Sept - Feb	Sept - Feb	Dec 15 – Mar 1
Planting information				
Distance between rows (in)	60 – 72	60 – 72	60 – 72	72 – 108
Distance between plants (in)	36 – 60	36 – 60	36 – 60	36 – 72
Seeding depth (in)	1.5 – 2.0	1.5 – 2.0	Whole fruit is used: It should be covered half way	1.5 – 2.0
Seed per acre			2904 – whole fruit	
Plant populations (acre)	2904	2904	2904	1452-2420

## Cultivars

**Table 7.8.** Cultivars for Asian cucurbits.

Bittermelon (Chinese)*	Bittermelon (Indian)*	Winter Melon	Snake Gourd*	Angled Luffa*
Hong Kong Green	Hybrid India Star	Giant Wax	Buag Ngu	Bonanza
Hybrid Bangkok Large	India Green Queen	Hybrid Red Doll	Extra Long Dancer	Buam Liam Hybrid
Japan Green Sprindle	India Green Long	Hybrid Small Round	Long EX	Hybrid Green Glory
Taiwan Large	Palee	Hybrid Wonder Wax	Hybrid Snaky	Lucky Boy
		Round Tong Gwa	Polo	Summer Long
Smooth Luffa*	Long Gourd*	Fuzzy Melon*	Chayote*	
Dok Hybrid	Bitter Gourd Long	Chiang Shin Joker	The seed is the viviparous fruit itself. There is some debate as to whether varieties remain true. Fruit purchased from grocery stores may not sprout.	
Hybrid Smooth Beauty	Hybrid Asia Short	Mokwa		
Smooth Boy	Hybrid India Long	Mokwa Long		
		Seven Star Long		

\* = Should be trellised

Table 7.9. Herbicides approved for managing weeds in cucurbit crops.

Labels change frequently. Be sure to read a current product label before applying any chemical.				
Active ingredient lb. a.i./A	Trade name product/A	MOA code	Crops	Weeds controlled / remarks
<b>*** PREEMERGENCE ***</b>				
<b>Bensulide</b> 5.0 - 6.0	(Prefar) 4 E 5 - 6 qt.	8	All cucurbits	Annual broadleaf and grass control. Incorporate or irrigate 1 to 2 in. within 36 hr. of application. Nonlabeled crops should not be planted within 120 days of application.
<b>Carfentrazone</b> up to 0.031	(Aim) 1.9 EW up to 2 fl. oz. (Aim) 2.0 EC up to 2 fl. oz.	14	All cucurbits	Apply as a preplant burn down for emerged broadleaf weeds. Use crop oil concentrate, methylated seed oil, or nonionic surfactant at recommended rates. Maximum rate of 0.096 lb. a.i./A per season. No pretransplant interval.
<b>Clomazone</b> 0.15 - 0.38	(Command) 3 ME 0.4 - 1 pt.	13	Cucumber	Annual broadleaf and grass weeds. Use lower rates on coarse soils.
<b>Clomazone</b> 0.15 - 0.25	(Command) 3 ME 0.4 - 0.67 pt.	13	Muskmelon, watermelon	Annual broadleaf and grass control. Use lower rates in coarse soils.
<b>Clomazone</b> 0.25 - 0.5	(Command) 3 ME 0.67 - 1.33 pt.	13	Summer squash	Annual broadleaf and grass weeds. Broadcast for bareground production; row middles only if growing on plastic.
<b>Clomazone</b> 0.25 - 0.75	(Command) 3 ME 0.67 - 2 pt.	13	Winter squash	Annual broadleaf and grass weeds. Broadcast for bareground production; row middles only if growing on plastic. Read labels for cultivar restrictions.
<b>Ethalfuralin + Clomazone</b> 0.4 - 0.6 + 0.13 - 0.19	(Strategy) 2 - 3 pt.	3 + 13	Cucumbers, melons, summer & winter squash, pumpkin, watermelon	Annual broadleaf and grass control. Must be applied no later than 2 days after seeding. Overhead irrigation or rainfall of 0.5 in. within 5 days. Do not apply under row mulch or over top of plants.
<b>Flumioxazin</b> up to 0.125	(Chateau) 51 WDG up to 4 oz.	14	Cucumber, muskmelon, watermelon, pumpkins, summer & winter squash	Broadleaf control. Row middles only. Do not apply after crops are transplanted/ seeded. Label is a Third-Party registration (TPR, Inc.). Use without a signed authorization and waiver of liability is a misuse of the product.
<b>Glyphosate</b>	(various formulations) consult labels	9	All cucurbits	Controls emerged broadleaf and grass weeds. Consult individual labels for restrictions.
<b>Halosulfuron</b> 0.024	(Sanda) 75 DG 0.5 oz.	2	Cantaloupe, cucumber, crenshaw, honeydew	Yellow and purple nutsedge and broadleaf control. Apply uniformly with ground equipment in a minimum of 15 gal. of water/A
<b>Halosulfuron</b> 0.024 - 0.036	(Sanda) 75 DG 0.5 - 0.75 oz.	2	Watermelon	Yellow and purple nutsedge and broadleaf control. May be applied preemergence to seeded watermelon on bareground or pre-seeding to mulch-cultured watermelon. Transplanting should be no sooner than 7 days after application. Use lighter rates on sandy soils with low organic matter.
<b>Halosulfuron</b> 0.024 - 0.036	(Sanda) 75 DG 0.5 - 0.75 oz.	2	Pumpkin, winter squash	Yellow and purple nutsedge and broadleaf control. Apply before soil cracking or pre-transplant. Transplanting should not be made sooner than 7 days after application. May be applied POST over-the-top when plants reach the 4 - 5 true leaf stage, but before first female flower appear.
<b>Paraquat</b> 0.63 - 0.94	(Gramoxone) 2 SL 2 - 4 pt. (Firestorm) 3 SL 1.3 - 2.7 pt.	22	Cucumber, muskmelon, cantaloupe, pumpkin, squash, watermelon	Controls emerged weeds. Apply prior, during, or after planting, but before crop emergence. Use a non-ionic surfactant.
<b>Pelargonic acid</b>	(Scythe) 4.2 EC 3 - 10% v/v	27	All cucurbits	Controls emerged weeds. Apply before emergence of crop. Product is a contact, nonselective, foliar applied herbicide. There is no residual activity. May be tank mixed with soil residual herbicides.
<b>Pendimethalin</b> 1	(Prowl H20) 2.1 pt.	3	Cantaloupe, citron melon, muskmelon, watermelon	Annual broadleaf and grass weeds. Apply to the row middles only. May be applied as a sequential application with 2.1 pt./A before and 2.1 pt./A after transplanting or seeding with 21 days between applications. Do not exceed 4.2 pt./A per season.
<b>S-metolachlor</b> 0.95 - 1.26	(Brawl, Dual Magnum) 1.0 - 1.33 pt.	15	Pumpkin	Annual broadleaf and grass weeds and nutsedge control. Apply as inter-row or inter-hill application. Leave a 1 ft. untreated area over the seeded row (6 in. on either side of the row). Use lower rates on lighter soils. Apply before weeds emerge.

Table 7.9. Herbicides approved for managing weeds in cucurbit crops. (continued)

Labels change frequently. Be sure to read a current product label before applying any chemical.				
Active ingredient lb. a.i./A	Trade name product/A	MOA code	Crops	Weeds controlled / remarks
<b>*** POSTEMERGENCE ***</b>				
<b>Carfentrazone up to 0.031</b>	(Aim) 1.9 EW up to 2 fl. oz (Aim) 2.0 EC up to 2 fl. oz.	14	All cucurbits	Emerged broadleaf control. Post-direct hooded application to row middles for burndown of emerged broadleaf weeds. Use crop oil concentrate or nonionic surfactant at recommended rates. PHI 0 days.
<b>Clethodim 0.94 - 0.13 0.07 - 0.13</b>	(Arrow, Intensity, Select) 2 EC 6 - 8 oz. (Select Max) 1 EC 9 - 16 fl. oz.	1	Cucumber, squash, melons, and all commodities in crop group	Annual and perennial grass control. Use a crop oil concentrate at 1% v/v spray volume. Use nonionic surfactant in Select Max. PHI 14 days.
<b>DCPA 4.5 - 10.5</b>	(Dacthal) W 75 6 - 14 lb. (Dacthal) 6 F 6 - 14 pt.	3	Muskmelon, cantaloupe, honeydew, watermelon	Annual grasses and certain broadleaf control. Apply only when plants have 4 - 5 true leaves, are well-established, and growing conditions are favorable for good plant growth. Cultivate prior to application to control emerged weeds.
<b>Ethalfuralin + Clomazone</b>	(Strategy) 2 - 3 pt.	3 + 13	Cucumber, melon, summer & winter squash, pumpkin, watermelon	Annual broadleaf and grass control. After transplanting apply to row middles only. Does not control emerged weeds.
<b>Glyphosate</b>	(various formulations) consult labels	9	All cucurbits	Control emerged broadleaf and grass weeds. Apply to row middles only. Use a hooded sprayer to reduce drift. Consult individual labels for restrictions.
<b>Halosulfuron 0.04 - 0.05</b>	(Sanda) 75 DF 0.5 - 1 oz.	2	Cucumber, cantaloupe, honeydew, crenshaw melon	Apply after the 3-5 true leaf stage (no sooner than 14 days after transplanting) but before the first female flower. Spot spray a POST application if a PRE application was made. Cucumber PHI 30 days. Cantaloupe, honeydew, crenshaw 57 days.
<b>Halosulfuron 0.02 - 0.05 0.02 - 0.04</b>	(Sanda) 75 DF 0.5 - 1.0 oz. 0.5 - 0.75 oz.	2	Watermelon, summer squash  Pumpkin, winter squash	Nutsedge and broadleaf weeds. Apply to the row middles only. Include a NIS in the spray solution. PHI 57 days in watermelon. PHI 30 days for summer/winter squash and pumpkin.
<b>Imazosufuron 0.19 - 0.3</b>	(League) 75 WG 4 - 6.4 oz.	2	Muskmelon, watermelon	Nutsedge and broadleaf weeds. No more than 6.4 oz/A/yr. One application per years. Surfactant is needed if weeds are emerged. Row middles only. PHI 45 days
<b>Paraquat 0.47 - 0.93</b>	(Gramoxone) 2 SL 1.88 - 3.72	22	Cucumber, muskmelon, cantaloupe, pumpkin, squash, watermelon	Controls emerged weeds. Row middles only. Limit of 3 applications per year. Gramoxone SL is a supplemental label consult labels for other paraquat formulations.
<b>Pelargonic acid</b>	(Scythe) 4.2 EC 3 - 10% v/v	27	Cucumber, gourd, muskmelon, canta- loupe, pumpkin, squash, watermelon	Controls emerged weeds. Row middles only. Use a shielded sprayer directed to the row middles to reduce drift to the crop.
<b>Pendimethalin 1</b>	(Prowl H20) 2.1 pt.	3	Cantaloupe, citron melon, muskmelon, watermelon	Annual broadleaf and grass weeds. Apply to the row middles only. Apply 2.1 pt./A after transplanting or seeding and before vines are off the off the bed and in the spray area. If a preplant application was applied do not exceed 4.2 pt./A per season. PHI 35 days.
<b>S-metolachlor 0.95 - 1.26</b>	(Brawl, Dual Magnum) 7.62 EC 1.0 - 1.33 pt.	15	Pumpkin	Annual broadleaf and grass weeds and nutsedge. Apply as inter-row or inter-hill application. Leave a 1 ft. untreated area over the plant (6 in. on either side of the row). Use lower rates on lighter soils. Apply before weeds emerge. PHI 30 days.
<b>Sethoxydim 0.19 - 0.28</b>	(Poast) 1.5 EC 1.0 - 1.5 pt.	1	All cucurbits	Growing grass weeds. Include a crop oil concentrate. Efficacy is decreased if weeds are under stress. Use 1 pt. for seedling grasses and 1.5 pt. on perennial grasses. PHI 14 days.
<b>Terbacil 0.1 - 0.2</b>	(Sinbar) 80 WP 2 - 4 oz.	5	Watermelon	Annual broadleaf weeds. Apply to row middles only. Do not allow contact with plant foliage. Do not exceed 4 oz. per year. PHI 70 days.
<b>Trifluralin</b>	(Treflan) 4 EC 1.0 pt (Treflan) TR 10 5 lb.	3	All cucurbits	Annual broadleaf and grass control. Apply after crop is 3 to 4 true leaf stage. Row middles only. PHI 30 days except for watermelon 60 days.
<b>*** POSTHARVEST ***</b>				
<b>Diquat 0.25</b>	(Reglone Dessicant) 1.0 pt	22	Cantaloupe	Minimum of 35 gal./A. Include a NIS. Thorough coverage is required.
<b>Diquat 0.38</b>	(Reglone Dessicant) 1.5 pt	22	Cucumber, watermelon, squash (except acorn)	Minimum of 35 gal./A. Include a NIS. Thorough coverage is required.
<b>Diquat 0.5</b>	(Reglone Dessicant) 2.0 pt	22	Squash (acorn)	Minimum of 35 gal./A. Include a NIS. Thorough coverage is required.

**Table 7.10.** Insecticides labeled for management of arthropod pests of cucurbit crops.

Labels change frequently. Be sure to read a current product label before applying any chemical.  
Also refer to Table XX for biopesticide and other alternative products labeled for disease management.

Insect or mite pest	MOA Code <sup>1</sup>	Trade Name (Active Ingredient) *Restricted	Rate (Product/acre)	Max rate product per season	REI (hours)	Days to Harvest	Remarks <sup>2</sup>
Aphids	1B	<b>Dimethoate 4 EC</b> (dimethoate)	<b>melons:</b> 1 pt <b>watermelons:</b> 0.5 – 1 pt	2 pt per year	48	3	Highly toxic to bees. <b>Not for squash or cucumber.</b>
	1B	<b>Malathion 5EC</b> <b>Malathion 8</b> (malathion)	<b>5EC:</b> cucumber: 1.5-2.8 pt; summer squash: 2.0-2.8 pt; winter squash: 1.6 pt ; watermelon: 1.5-2.5 pt; melon: 1.6 pt <b>8:</b> summer squash: 1.75; winter squash: 1.75 pt; cucumber: 1.75 pt	<b>5EC:</b> 5.6 pt for cucumber 8.4 pt for summer squash, 4.8 pt for winter squash, 5 pt for watermelon <b>8:</b> 3.5 pt for cucumber, 5.25 for summer squash, 5.25 pt for winter squash	24	1	<b>5EC:</b> Maximum number of applications per year is 2 <b>8: Squash and cucumbers only</b>
	3A	<b>*Brigade 2 EC</b> (bifenthrin)	2.6-6.4 fl oz	19.2 fl oz	12	3	Do not make more than 2 applications after bloom. Highly toxic to foraging bees.
	3A	<b>*Athena</b> (Bifenthrin)	7-17 fl oz	51 fl oz	12	7	Do not make more than 2 consecutive applications. Do not apply more than 2 applications after bloom.
	3A	<b>*Danitol 2.4 EC</b> (fenpropathrin)	10.67-16 fl oz	42.67 fl oz	24	7	Highly toxic to foraging bees. In tank mix with 3-4 oz of Belay insecticide
	4A	<b>Actara</b> (thiamethoxam)	1.5-3.0 oz	11.0 oz	12	0	Apply before pests reach damaging levels. Highly toxic to foraging bees.
	4A	<b>Admire Pro</b> (imidacloprid) (see appropriate labels for other brands)	7-10.5 oz <b>Planthouse:</b> 0.44 fl oz/10,000 plants	10.5 fl oz	12	<b>soil:</b> 21	Do not use with other Group 4A insecticides. <b>Planthouse:</b> One application to transplants. See label for use on mature greenhouse cucumbers.
	4A	<b>Assail 30SG</b> (acetamiprid)	2.5-4 oz	20.0 oz	12	0	No more than 5 applications per season. Do not use with other group 4A insecticides. Toxic to foraging bees.
	4A	<b>Belay Insecticide</b> (clothianidin)	<b>foliar:</b> 3.0-6.0 fl oz <b>soil:</b> 9.0 - 12.0 fl oz	12 fl oz	12	<b>foliar:</b> Do not make application after 4th true leaf on main stem is unfolded <b>soil:</b> 21	Do not apply when plants are blooming.
	4A	<b>Platinum Platinum 75SG</b> (thiamethoxam)	5-11 fl oz 1.66-3.67 oz	11 fl oz 3.67 oz	12	30	For most crops that are not on the label, a 120-day plant-back interval must be observed. Highly toxic to foraging bees.
	4D	<b>Sivanto Prime</b> (flupyradifurone)	<b>foliar:</b> 7-14 fl oz <b>soil:</b> 21-28 fl oz	<b>foliar:</b> 28 fl oz <b>soil:</b> 28 fl oz per crop season	4	<b>foliar:</b> 1 <b>soil:</b> 21	<b>foliar:</b> Minimum application interval: 7 days <b>soil:</b> Soil maximum : no more than 3 crop seasons per year.
	9B	<b>Fulfill</b> (pymetrozine)	2.75 oz	5.5 oz	12	0	Minimum of 7 days between applications.
	28	<b>Exirel</b> (cyantraniliprole)	13.5-20.5 fl oz	61.6 fl oz	12	1	Do not apply a total of more than 0.4 lb ai per acre of cyazypyr or cyantraniliprole-containing products per crop, either as foliar or soil applications.
	28	<b>Verimark</b> (cyantraniliprole)	<b>at planting:</b> 10-13.5 fl oz <b>drip chemigation:</b> 10 fl oz	<b>at planting:</b> 13.5 fl oz <b>drip chemigation:</b> 20 fl oz (or 10 fl oz if at plant also used)	4	1	Both at plant and drip chemigation. Do not apply more than 2 drip chemigation applications (one of at plant application used).
	29	<b>Beleaf 50 SG</b> (flonicamid)	2.0-2.8 oz	8.4 oz	12	0	Begin applications before pests reach damaging levels.
	--	<b>Azaguard</b> (azadirachtin)	10-16 fl. Oz		4	0	Use in combination with 0.25 – 1.0% non-phytotoxic crop oil. OMRI-listed <sup>2</sup> .
	--	<b>Azatin O</b> (azadirachtin)	10-16 fl oz	16 fl oz	4	0	Antifeedant, repellent, insect growth regulator. Rate depends on pest-see label.
-	<b>M-Pede</b> (potassium salts of fatty acids)	1-2%V/V		12	0	OMRI-listed <sup>2</sup> . Do not apply to stressed plants (high heat or drought conditions).	

**Table 7.10.** Insecticides labeled for management of arthropod pests of cucurbit crops. (continued)

Labels change frequently. Be sure to read a current product label before applying any chemical. Also refer to Table XX for biopesticide and other alternative products labeled for disease management.

Insect or mite pest	MOA Code <sup>1</sup>	Trade Name (Active Ingredient) *Restricted	Rate (Product/acre)	Max rate product per season	REI (hours)	Days to Harvest	Remarks <sup>2</sup>
	--	<b>Oil, Insecticidal; SunSpray 98.8%; Ultra-Fine; JMS Stylet Oil, Saf-T-Side, Others</b>	1-2 gal/100 gal <b>JMS:</b> 3-6 qt/100 gal (JMS)		4	0	Organic Stylet-Oil and Saf-T-Side are OMRI- listed <sup>2</sup> .
<b>Beetles</b> (including cucumber beetle, flea beetle)	1A	<b>Sevin 4F, XLR</b> (carbaryl)	<b>4F, XLR:</b> 0.5-1.0 qt	<b>4F, XLR:</b> 6 qt	12	3	Do not apply when plants are wet. Use of carbaryl has been reported to flare (increase) mites. Do not apply to plants in bloom.
	1B	<b>Malathion 5EC</b> <b>Malathion 8</b> (malathion)	<b>5EC:</b> cucumber: 1.5-2.8 pt; summer squash: 2.0-2.8 pt; winter squash: 1.6 pt; watermelon: 1.5-2.5 pt; melon: 1.6 pt <b>8:</b> summer squash: 1.75; winter squash: 1.75 pt; cucumber: 1.75 pt	<b>5EC:</b> 5.6 pt for cucumber 8.4 pt for summer squash, 4.8 pt for winter squash, 5 pt for watermelon <b>8:</b> 3.5 pt for cucumber, 5.25 for summer squash, 5.25 pt for winter squash	24	1	<b>5EC:</b> Maximum number of applications per year is 2 <b>8:</b> <b>Squash and cucumbers only</b>
	3A	<b>*Brigade 2 EC</b> (bifenthrin)	2.6-6.4 fl oz	19.2 fl oz	12	3	Do not make more than 2 applications after bloom. Highly toxic to foraging bees.
	3A	<b>*Baythroid XL</b> (beta-cyfluthrin)	2.4-2.8 fl oz	11.2 fl oz	12	0	Can be used on all cucurbits in Crop Group 9. Highly toxic to foraging bees.
	3A	<b>*Capture LFR</b> (bifenthrin)	6.8-8.5 fl oz, at planting	8.5 fl oz	12	N/A-applied at planting	At planting, banded over open furrow or in-furrow with seed or transplant.
	3A	<b>*Danitol 2.4 EC</b> (fenpropathrin)	10.67-16 fl oz	42.67 fl oz	24	7	Highly toxic to foraging bees.
	3A	<b>*Pounce 25 WP</b> (permethrin)	6.4-12.8 oz	76.8 oz, 51.2 for cantaloupe	12	0	Use high rate for aphids and squash bug. Highly toxic to foraging bees.
	3A	<b>*Warrior II</b> (lambda-cyhalothrin)	1.28-1.92 fl oz	11.5 fl oz	24	1	Do not apply to blooming crops.
	4A	<b>Admire Pro</b> (imidacloprid) (see appropriate labels for other brands)	7-10.5 oz	10.5 fl oz	12	21	Do not use with other Group 4A insecticides. <b>Not for planthouse</b>
	4A	<b>Actara</b> (thiamethoxam)	1.5-3.0 oz	11.0 oz	12	0	Apply before pests reach damaging levels. Highly toxic to foraging bees.
	4A	<b>Assail 30SG</b> (acetamiprid)	2.5-5.3 oz	26.5 oz	12	0	No more than 5 applications per season. Do not use with other group 4A insecticides. Toxic to foraging bees.
	4A	<b>Belay Insecticide</b> (clothianidin)	<b>foliar:</b> 3.0-6.0 fl oz <b>soil:</b> 9.0 - 12.0 fl oz	12 fl oz	12	<b>foliar:</b> Do not make application after 4th true leaf on main stem is unfolded <b>soil:</b> 21	Do not apply when plants are blooming.
	4A	<b>Scorpion 35SL Insecticide</b> (dinotefuran)	<b>foliar:</b> 2-7 fl oz <b>soil:</b> 9-10.5 fl oz	<b>foliar:</b> 10.5 fl oz <b>soil:</b> 21 fl oz	12	<b>foliar:</b> 1 <b>soil:</b> 21	Use only one application method (soil or foliar). Do not use with other Group 4A insecticides. Highly toxic to foraging bees for more than 38 hours after application. See label.
	4A	<b>Venom Insecticide</b> (dinotefuran)	<b>foliar:</b> 1-4 oz	6 oz	12	<b>foliar:</b> 1	Highly toxic to foraging bees. Use only foliar application for beetles. Note that pests controlled differ depending on application method.
	15	<b>Rimon 0.83EC</b> (novaluron)	9-12 fl oz	36 fl oz	12	1	Do not apply more often than every 14 days.
28	<b>Exirel</b> (cyantraniliprole)	13.5-20.5 fl oz	61.6 fl oz	12	1	Do not apply a total of more than 0.4 lb ai per acre of cyazypyr or cyantraniliprole-containing products per crop, either as foliar or soil applications.	

**Table 7.10.** Insecticides labeled for management of arthropod pests of cucurbit crops. (continued)

Labels change frequently. Be sure to read a current product label before applying any chemical.  
Also refer to Table XX for biopesticide and other alternative products labeled for disease management.

Insect or mite pest	MOA Code <sup>1</sup>	Trade Name (Active Ingredient) *Restricted	Rate (Product/acre)	Max rate product per season	REI (hours)	Days to Harvest	Remarks <sup>2</sup>
Caterpillars (including armyworms, cabbage looper, corn earworm, cutworm, melonworm, pickleworm)	1A	Sevin 4F, XLR (carbaryl)	4F, XLR: 0.5-1.0 qt	4F, XLR: 6 qt	12	3	Do not apply when plants are wet. Use of carbaryl has been reported to flare (increase) mites. Do not apply to plants in bloom. Pickleworm and melonworm only.
	1B	Malathion 5EC Malathion 8 (malathion)	5EC: cucumber: 1.5-2.8 pt; summer squash: 2.0-2.8 pt; winter squash: 1.6 pt; watermelon: 1.5-2.5 pt; melon: 1.6 pt 8: summer squash: 1.75; winter squash: 1.75 pt; cucumber: 1.75 pt	5EC: 5.6 pt for cucumber 8.4 pt for summer squash, 4.8 pt for winter squash, 5 pt for watermelon 8: 3.5 pt for cucumber, 5.25 for summer squash, 5.25 pt for winter squash	24	1	5EC: Maximum number of applications per year is 2 8: Squash and cucumbers only
	3A	*Ambush 25W (permethrin)	6.4-12.8 oz	1.2 lb (0.8 lb for cantaloupe)	12	0	Do not apply more than 8 applications at the highest rate per season. Highly toxic to bees.
	3A	*Asana XL (0.66 EC) (esfenvalerate)	5.8-9.6 fl oz	48 fl oz	12	3	Do not apply more than 5 applications at high rate. For cucumber, melons, pumpkin, summer and winter squash. Highly toxic to foraging bees.
	3A	*Athena (Bifenthrin)	7-17 fl oz	51 fl oz	12	7	Do not make more than 2 consecutive applications. Do not apply more than 2 applications after bloom.
	3A	*Baythroid XL (beta-cyfluthrin)	0.8-2.8 fl oz	11.2 fl oz	12	0	Can be used on all cucurbits in Crop Group 9. Highly toxic to foraging bees.
	3A	*Brigade 2 EC (bifenthrin)	2.6-6.4 fl oz	19.2 fl oz	12	3	Do not make more than 2 applications after bloom. Highly toxic to foraging bees.
	3A	*Capture LFR (bifenthrin)	3.4-6.8 fl oz, at planting	8.5 fl oz	12	N/A-applied at planting	At planting, banded over open furrow or in-furrow with seed or transplant.
	3A	*Danitol 2.4 EC (fenpropathrin)	10.67-16 fl oz	42.67 fl oz	24	7	Highly toxic to foraging bees.
	3A	*Mustang (zeta-cypermethrin)	3.0-4.3 oz	25.8 fl oz	7	12	Do not make applications less than 7 days apart
	3A	*Pounce 25 WP (permethrin)	6.4-12.8 oz	76.8 oz, 51.2 for cantaloupe	12	0	Use high rate for aphids and squash bug. Highly toxic to foraging bees.
	3A	*Warrior II (lambda-cyhalothrin)	1.28-1.92 fl oz	11.5 fl oz	24	1	Do not apply to blooming crops.
	4A	Assail 30SG (acetamiprid)	2.5-5.3 oz	26.5 oz	12	0	No more than 5 applications per season. Do not use with other group 4A insecticides. Toxic to foraging bees.
	5	Radiant SC (spinetoram)	5-10 fl oz	34 fl oz	4	3; 1 for cucumbers	No more than 6 applications. Toxic to bees for up to 3 hours following application.
	11A	Agree WG ( <i>Bacillus thuringiensis</i> subspecies <i>aizawai</i> )	0.5-2.0 lb		4	0	Apply when larvae are small for best control. OMRI-listed <sup>2</sup> .
	11A	Biobit HP ( <i>Bacillus thuringiensis</i> subspecies <i>kurstaki</i> )	0.5-2.0 lb		4	0	Treat when larvae are young. Good coverage is essential. Can be used in the greenhouse. OMRI-listed <sup>2</sup> .
11A	Crymax WDG ( <i>Bacillus thuringiensis</i> subspecies <i>kurstaki</i> )	0.5-2.0 lb		4	0	Use high rate for armyworms. Treat when larvae are young. Genetically engineered strain of Bt containing toxins from both Bt <i>kurstaki</i> and Bt <i>aizawai</i> strains. Not for organic production.	
11A	Deliver ( <i>Bacillus thuringiensis</i> subspecies <i>kurstaki</i> )	0.25-1.5 lb		4	0	Use higher rates for armyworms. OMRI-listed <sup>2</sup> .	
11A	DiPel DF ( <i>Bacillus thuringiensis</i> subspecies <i>kurstaki</i> )	0.5-2.0 lb		4	0	Treat when larvae are young. Good coverage is essential. For organic production.	
11A	Javelin WG ( <i>Bacillus thuringiensis</i> subspecies <i>kurstaki</i> )	0.12-1.50 lb		4	0	Treat when larvae are young. Thorough coverage is essential. Use higher rates for armyworms. OMRI-listed <sup>2</sup> .	

**Table 7.10.** Insecticides labeled for management of arthropod pests of cucurbit crops. (continued)

Labels change frequently. Be sure to read a current product label before applying any chemical. Also refer to Table XX for biopesticide and other alternative products labeled for disease management.							
Insect or mite pest	MOA Code <sup>1</sup>	Trade Name (Active Ingredient) *Restricted	Rate (Product/acre)	Max rate product per season	REI (hours)	Days to Harvest	Remarks <sup>2</sup>
	11A	<b>Xentari DF</b> ( <i>Bacillus thuringiensis</i> subspecies aizawai)	0.5-2.0 lb		4	0	Treat when larvae are young. Thorough coverage is essential. May be used in the greenhouse. Can be used in organic production.
	15	<b>Rimon 0.83EC</b> (novaluron)	12 fl oz	36 fl oz	12	1	Do not apply more often than every 14 days.
	18	<b>Intrepid 2F</b> (methoxyfenozide)	4-10 fl oz	64 fl oz	4	3	Do not make more than 4 applications per season.
	22	<b>Avaunt</b> (indoxacarb)	2.5-6.0 oz	24 oz	12	3	Highly toxic to foraging bees. Do not apply this product or allow it to drift to blooming crops or weeds while bees are foraging in the treatment area. The minimum interval between sprays is 5 days.
	22	<b>Avaunt</b> (indoxacarb)	2.5-6.0 oz	24 oz	12	3	Highly toxic to foraging bees. Do not apply this product or allow it to drift to blooming crops or weeds while bees are foraging in the treatment area. The minimum interval between sprays is 5 days.
	28	<b>Coragen</b> (chlorantraniliprole)	drip: 2.0-7.5 fl oz soil at planting: 3.5-7.5 foliar: 2.0-7.0	15.4 fl oz (10 fl oz for combined at plant and drip chemigation soil application)	4	1	May be applied through drip (chemigation), as well as to soil at planting, or as a foliar spray.
	28	<b>Exirel</b> (cyantraniliprole)	7.0-13.5 fl oz	61.6 fl oz	12	1	Do not apply a total of more than 0.4 lb ai per acre of cyazypyr or cyantraniliprole-containing products per crop, either as foliar or soil applications.
	28	<b>Verimark</b> (cyantraniliprole)	at planting: 6.75-13.5 fl oz drip chemigation: 5-10 fl oz	at planting: 13.5 fl oz drip chemigation: 20 fl oz (or 10 fl oz if at plant also used)	4	1	Both at plant and drip chemigation. Do not apply more than 2 drip chemigation applications (one if an at plant application used).
<b>Fire ants</b>	7A	<b>Extinguish</b> ((S)-methoprene)	0.75 lb		4	0	Slow-acting IGR (insect growth regulator). Best applied early spring and fall where crop will be grown. Colonies will be reduced after three weeks and eliminated after 8 to 10 weeks. May be applied by ground equipment or aerially.
	7C	<b>Esteem Ant Bait</b> (pyriproxyfen)	1.5-2.0 lb	2.0 lb	12	1	Apply when ants are actively foraging.
<b>Leafminers</b>	1B	<b>Dimethoate 4 EC</b> (dimethoate)	melons: 1 pt watermelons: 0.5 – 1 pt	2 pt per year	48	3	Highly toxic to bees. <b>Not for squash or cucumber.</b>
	3A	<b>*Ambush 25W</b> (permethrin)	6.4-12.8 oz	1.2 lb (0.8 lb for cantaloupe)	12	0	Do not apply more than 8 applications at the highest rate per season. Highly toxic to bees.
	3A	<b>*Athena</b> (Bifenthrin)	13.5-17 fl oz	51 fl oz	12	7	Do not make more than 2 consecutive applications. Do not apply more than 2 applications after bloom.
	3A	<b>*Danitol 2.4 EC</b> (fenpropathrin)	10.67-16 fl oz	42.67 fl oz	24	7	Highly toxic to foraging bees.
	4A	<b>Scorpion 35SL Insecticide</b> (dinotefuran)	foliar: 2-7 fl oz soil: 9-10.5 fl oz	foliar: 10.5 fl oz soil: 21 fl oz	12	foliar: 1 soil: 21	Use only one application method (soil or foliar). Do not use with other Group 4A insecticides. Highly toxic to foraging bees for more than 38 hours after application. See label.
	4A	<b>Belay Insecticide</b> (clothianidin)	foliar: 3.0-6.0 fl oz soil: 9.0 - 12.0 fl oz	12 fl oz	12	foliar: Do not make application after 4th true leaf on main stem is unfolded soil: 21	Do not apply when plants are blooming.

**Table 7.10.** Insecticides labeled for management of arthropod pests of cucurbit crops. (continued)

Labels change frequently. Be sure to read a current product label before applying any chemical.  
Also refer to Table XX for biopesticide and other alternative products labeled for disease management.

Insect or mite pest	MOA Code <sup>1</sup>	Trade Name (Active Ingredient) *Restricted	Rate (Product/acre)	Max rate product per season	REI (hours)	Days to Harvest	Remarks <sup>2</sup>
	4A	<b>Venom Insecticide</b> (dinotefuran)	<b>foliar:</b> 1-4 oz <b>soil:</b> 5-7.5 oz	<b>foliar:</b> 6 oz <b>soil:</b> 12 oz	12	<b>foliar:</b> 1 <b>soil:</b> 21	Highly toxic to foraging bees. Use only one application method (soil or foliar). Note that pests controlled differ depending on application method.
	5	<b>Radiant SC</b> (spinetoram)	5-10 fl oz	34 fl oz	4	3 cucumbers: 1	No more than 6 applications. Toxic to bees for up to 3 hours following application.
	6	<b>*Agri-Mek SC</b> (abamectin)	1.75-3.50 fl oz	10.25 fl oz	12	7	No more than 2 sequential applications. <b>Must</b> be mixed with an adjuvant-see label for types. Highly toxic to foraging bees.
	15	<b>Rimon 0.83EC</b> (novaluron)	9-12 fl oz	36 fl oz	12	1	Do not apply more often than every 14 days.
	17	<b>Trigard</b> (cyromazine)	2.66 oz	15.96 oz	12	0	Do not make more than six applications.
	28	<b>Coragen</b> (chlorantraniliprole)	<b>drip:</b> 2.0-7.5 fl oz <b>soil at planting:</b> 3.5-7.5 <b>foliar:</b> 2.0-7.0	15.4 fl oz (10 fl oz for combined at plant and drip chemigation soil application)	4	1	May be applied through drip (chemigation), as well as to soil at planting, or as a foliar spray.
	28	<b>Exirel</b> (cyantraniliprole)	13.5-20.5 fl oz	61.6 fl oz	12	1	Do not apply a total of more than 0.4 lb ai per acre of cyazypyr or cyantraniliprole-containing products per crop, either as foliar or soil applications.
	28	<b>Verimark</b> (cyantraniliprole)	<b>at planting:</b> 6.75-13.5 fl oz <b>drip chemigation:</b> 5-10 fl oz	<b>at planting:</b> 13.5 fl oz <b>drip chemigation:</b> 20 fl oz (or 10 fl oz if at plant also used)	4	1	Both at plant and drip chemigation. Do not apply more than 2 drip chemigation applications (one if an at plant application used).
	--	<b>Azaguard</b> (azadirachtin)	10-16 fl. Oz		4	0	Use in combination with 0.25 – 1.0% non-phytotoxic crop oil. OMRI-listed <sup>2</sup> .
<b>Mites</b>	1B	<b>Malathion 5EC</b> <b>Malathion 8</b> (malathion)	<b>5EC:</b> cucumber: 1.5-2.8 pt; summer squash: 2.0-2.8 pt; winter squash: 1.6 pt; watermelon: 1.5-2.5 pt; melon: 1.6 pt <b>8:</b> summer squash: 1.75; winter squash: 1.75 pt; cucumber: 1.75 pt	<b>5EC:</b> 5.6 pt for cucumber 8.4 pt for summer squash, 4.8 pt for winter squash, 5 pt for watermelon <b>8:</b> 3.5 pt for cucumber, 5.25 for summer squash, 5.25 pt for winter squash	24	1	<b>5EC:</b> Maximum number of applications per year is 2 <b>8: Squash and cucumbers only</b>
	3A	<b>*Danitol 2.4 EC</b> (fenpropathrin)	10.67-16 fl oz	42.67 fl oz	24	7	Highly toxic to foraging bees.
	3A	<b>*Athena</b> (Bifenthrin)	13.5-17 fl oz	51 fl oz	12	7	Do not make more than 2 consecutive applications. Do not apply more than 2 applications after bloom.
	6	<b>*Agri-Mek SC</b> (abamectin)	1.75-3.50 fl oz	10.25 fl oz	12	7	No more than 2 sequential applications. <b>Must</b> be mixed with an adjuvant-see label for types. Highly toxic to foraging bees.
	10B	<b>Zeal</b> (etoxazole)	2.0-3.0 oz	3.0 oz <b>cucumbers:</b> 6 oz	12	7	Apply when populations are low. One application per season, except two for cucumbers (supplemental label).
	20B	<b>Kanemite 15 SC</b> (acequinocyl)	31 fl oz	62 fl oz	12	1	Do not apply more than twice per season. Do not apply by air. <b>Melons, watermelon, and cucumbers only.</b>
	21A	<b>Portal XLO</b> (fenpyroximate)	1.0-2.0 pt	4.0 pt	12	3 cucumbers: 1	<b>All melons, watermelon, and cucumbers.</b> Two applications per season. Effective for broad mite control.
	23	<b>Oberon 2SC</b> (spiromesifen)	7.0-8.5 fl oz	25.5 fl oz	12	7	No more than 3 applications. See label for plant-back intervals.
	--	<b>Acramite-50WS</b> (bifenazate)	0.75-1.0 lb	1.0 lb	12	3	One application per season.
	--	<b>Azaguard</b> (azadirachtin)	10-16 fl. Oz		4	0	Use in combination with 0.25 – 1.0% non-phytotoxic crop oil. OMRI-listed <sup>2</sup> .

**Table 7.10.** Insecticides labeled for management of arthropod pests of cucurbit crops. (continued)

Labels change frequently. Be sure to read a current product label before applying any chemical. Also refer to Table XX for biopesticide and other alternative products labeled for disease management.

Insect or mite pest	MOA Code <sup>1</sup>	Trade Name (Active Ingredient) *Restricted	Rate (Product/acre)	Max rate product per season	REI (hours)	Days to Harvest	Remarks <sup>2</sup>	
Squash bug, leaf-footed bug	1A	Sevin 4F, XLR (carbaryl)	4F, XLR: 0.5-1.0 qt	4F, XLR: 6 qt	12	3	Do not apply when plants are wet. Use of carbaryl has been reported to flare (increase) mites. Do not apply to plants in bloom.	
	3A	*Ambush 25W (permethrin)	6.4-12.8 oz	1.2 lb (0.8 lb for cantaloupe)	12	0	Do not apply more than 8 applications at the highest rate per season. Highly toxic to bees.	
	3A	*Athena (Bifenthrin)	13.5-17 fl oz	51 fl oz	12	7	Do not make more than 2 consecutive applications. Do not apply more than 2 applications after bloom.	
	3A	*Brigade 2 EC (bifenthrin)	2.6-6.4 fl oz	19.2 fl oz	12	3	Do not make more than 2 applications after bloom. Highly toxic to foraging bees.	
	3A	*Danitol 2.4 EC (fenpropathrin)	10.67-16 fl oz	42.67 fl oz	24	7	Highly toxic to foraging bees.	
	3A	*Pounce 25 WP (permethrin)	6.4-12.8 oz	76.8 oz cantaloupes: 51.2 oz	12	0	Use high rate for aphids and squash bug. Highly toxic to foraging bees.	
	3A	*Warrior II (lambda-cyhalothrin)	1.28-1.92 fl oz	11.5 fl oz	24	1	Do not apply to blooming crops.	
	4A	Assail 30SG (acetamiprid)	5.3 oz	26.5 oz	12	0	No more than 5 applications per season. Do not use with other group 4A insecticides. Application for squash bug are most effective against newly laid eggs and nymphs. Toxic to foraging bees.	
	4A	Belay Insecticide (clothianidin)	foliar: 3.0-6.0 fl oz soil: 9.0 - 12.0 fl oz	12 fl oz	12	foliar: Do not make application after 4th true leaf on main stem soil: 21	Do not apply when plants are blooming.	
	4A	Scorpion 35SL Insecticide (dinotefuran)	foliar: 2-7 fl oz soil: 9-10.5 fl oz	foliar: 10.5 fl oz soil: 21 fl oz	12	foliar: 1 soil: 21	Use only one application method (soil or foliar). Do not use with other Group 4A insecticides. Highly toxic to foraging bees for more than 38 hours after application. See label.	
	4A	Venom Insecticide (dinotefuran)	foliar: 1-4 oz soil: 5-6 oz	foliar: 6 oz soil: 12 oz	12	foliar: 1 soil: 21	Highly toxic to foraging bees. Use only one application method (soil or foliar). Note that pests controlled differ depending on application method.	
	4D	Sivanto Prime (flupyradifurone)	foliar: 10.5-14 fl oz soil: 21-28 fl oz	foliar: 28 fl oz 28 fl oz per crop season	soil: 4	4	foliar: 1 soil: 21	foliar: Minimum application interval: 7 days soil: Soil maximum : no more than 3 crop seasons per year.
	15	Rimon 0.83EC (novaluron)	9-12 fl oz	36 fl oz	12	1	Do not apply more often than every 14 days.	
	Thrips (check label for species controlled)	1B	Dimethoate 4 EC (dimethoate)	melons: 1 pt watermelons: 0.5 – 1 pt	2 pt per year	48	3	Highly toxic to bees. <b>Not for squash or cucumber.</b>
		4A	Admire Pro (imidacloprid) (see appropriate labels for other brands)	7-10.5 oz	10.5 fl oz	12	soil: 21	Do not use with other Group 4A insecticides. <b>Not for planthouse.</b> Only for foliage feeding thrips, will not control thrips feeding on flowers.
4A		Platinum Platinum 75SG (thiamethoxam)	5-11 fl oz 75SG: 1.66-3.67 oz	11 fl oz 3.67 oz	12	30	For most crops that are not on the label, a 120-day plant-back interval must be observed. Highly toxic to foraging bees.	
4A		Scorpion 35SL Insecticide (dinotefuran)	foliar: 2-7 fl oz soil: 9-10.5 fl oz	foliar: 10.5 fl oz soil: 21 fl oz (soil)	12	foliar: 1 soil: 21	Use only one application method (soil or foliar). Do not use with other Group 4A insecticides. Highly toxic to foraging bees for more than 38 hours after application. See label.	

**Table 7.10.** Insecticides labeled for management of arthropod pests of cucurbit crops. (continued)

Labels change frequently. Be sure to read a current product label before applying any chemical.  
Also refer to Table XX for biopesticide and other alternative products labeled for disease management.

Insect or mite pest	MOA Code <sup>1</sup>	Trade Name (Active Ingredient) *Restricted	Rate (Product/acre)	Max rate product per season	REI (hours)	Days to Harvest	Remarks <sup>2</sup>
	4A	<b>Venom Insecticide</b> (dinotefuran)	foliar: 1-4 oz soil: 5-7.5 oz	foliar: 6 oz soil: 12 oz	12	foliar: 1 soil: 21	Highly toxic to foraging bees. Use only one application method (soil or foliar). Note that pests controlled differ depending on application method.
	5	<b>Radiant SC</b> (spinetoram)	6-10 fl oz	34 fl oz	4	3; 1 for cucumbers	No more than 6 applications. Toxic to bees for up to 3 hours following application.
	5	<b>Entrust SC</b> (spinosad)	6-8 fl oz	29 fl oz	1	4	No more than 5 applications per year. OMRI-listed.
	28	<b>Exirel</b> (cyantraniliprole)	13.5-20.5 fl oz	61.6 fl oz	12	1	Do not apply a total of more than 0.4 lb ai per acre of cyazypyr or cyantraniliprole-containing products per crop, either as foliar or soil applications.
	--	<b>Azaguard</b> (azadirachtin)	10-16 fl. Oz		4	0	Use in combination with 0.25 – 1.0% non-phytotoxic crop oil. OMRI-listed <sup>2</sup> .
<b>Whitefly</b>	3A	<b>*Athena</b> (Bifenthrin)	13.5-17 fl oz	51 fl oz	12	7	Only for adults. Do not make more than 2 consecutive applications. Do not apply more than 2 applications after bloom.
	3A	<b>*Brigade 2 EC</b> (bifenthrin)	2.6-6.4 fl oz	19.2 fl oz	12	3	Do not make more than 2 applications after bloom. Highly toxic to foraging bees.
	4A	<b>Actara</b> (thiamethoxam)	1.5-5.5 oz	11.0 oz	12	0	Apply before pests reach damaging levels. Highly toxic to foraging bees.
	4A	<b>Admire Pro</b> (imidacloprid) (see appropriate labels for other brands)	7-10.5 oz <b>Planthouse:</b> 0.44 fl oz/10,000 plants	10.5 fl oz	12	soil: 21	Do not use with other Group 4A insecticides. <b>Planthouse:</b> One application to transplants. See label for use on mature greenhouse cucumbers.
	4A	<b>Assail 30SG</b> (acetamiprid)	2.5-5.3 oz	26.5 oz	12	0	No more than 5 applications per season. Do not use with other group 4A insecticides. Toxic to foraging bees.
	4A	<b>Platinum 75SG</b> (thiamethoxam)	5-11 fl oz <b>75SG:</b> 1.66-3.67 oz	11 fl oz 3.67 oz	12	30	For most crops that are not on the label, a 120-day plant-back interval must be observed. Highly toxic to foraging bees.
	4A	<b>Scorpion 35SL Insecticide</b> (dinotefuran)	foliar: 2-7 fl oz soil: 9-10.5 fl oz	foliar: 10.5 fl oz soil: 21 fl oz	12	foliar: 1 soil: 21	Use only one application method (soil or foliar). Do not use with other Group 4A insecticides. Highly toxic to foraging bees for more than 38 hours after application. See label.
	4A	<b>Venom Insecticide</b> (dinotefuran)	foliar: 1-4 oz soil: 5-7.5 oz	foliar: 6 oz soil: 12 oz	12	foliar: 1 soil: 21	Highly toxic to foraging bees. Use only one application method (soil or foliar). Note that pests controlled differ depending on application method.
	4D	<b>Sivanto Prime</b> (flupyradifurone)	foliar: 10.5-14 fl oz soil: 21-28 fl oz	foliar: 28 fl oz 28 fl oz per crop season	soil: 4	foliar: 1 soil: 21	foliar: Minimum application interval: 7 days soil: Soil maximum : no more than 3 crop seasons per year.
	7C	<b>Knack IGR</b> (pyriproxyfen)	8-10 fl oz	20 fl oz	12	7	Immatures only. Apply when nymphs first appear. Do not apply more than twice per growing season.
	9B	<b>Fulfill</b> (pymetrozine)	2.75 oz	5.5 oz	12	0	Minimum of 7 days between applications.
	15	<b>Rimon 0.83EC</b> (novaluron)	9-12 fl oz	36 fl oz	12	1	Do not apply more often than every 14 days.
	16	<b>Courier 40SC</b> (buprofezin)	9.0-13.6 fl oz	27.2 fl oz	12	7	Immatures only. Insect growth regulator. Do not make more than 2 applications per season per crop or 4 per year.
	23	<b>Oberon 2SC</b> (spiromesifen)	7.0-8.5 fl oz	25.5 fl oz	12	7	No more than 3 applications.
	28	<b>Exirel</b> (cyantraniliprole)	13.5-20.5 fl oz	61.6 fl oz	12	1	Do not apply a total of more than 0.4 lb ai per acre of cyazypyr or cyantraniliprole-containing products per crop, either as foliar or soil applications.

**Table 7.10.** Insecticides labeled for management of arthropod pests of cucurbit crops. (continued)

**Labels change frequently. Be sure to read a current product label before applying any chemical. Also refer to Table XX for biopesticide and other alternative products labeled for disease management.**

Insect or mite pest	MOA Code <sup>1</sup>	Trade Name (Active Ingredient) *Restricted	Rate (Product/acre)	Max rate product per season	REI (hours)	Days to Harvest	Remarks <sup>2</sup>
	28	<b>Verimark</b> (cyantraniliprole)	6.75-13.5 fl oz	<b>at planting:</b> 13.5 fl oz <b>drip chemigation:</b> 20 fl oz (or 10 fl oz if at plant also used)	4	1	Both at plant and drip chemigation. Do not apply more than 2 drip chemigation applications (one of at plant application used).
	-	<b>M-Pede</b> (potassium salts of fatty acids)	1-2%V/V		12	0	OMRI-listed <sup>2</sup> . Do not apply to stressed plants (high heat or drought conditions).
<b>Wireworm</b>	1B	<b>*Diazinon 50 W, *AG500</b> (diazinon)	<b>AG500:</b> 2-4 qt <b>4-8 lb</b>	<b>50W:</b> 4 qt 8 lb	72	preplant	<b>Melons and watermelons only.</b> Not for squash or cucumbers. One application per year.
	3A	<b>*Capture LFR</b> (bifenthrin)	3.4-8.5 fl oz, at planting	8.5 fl oz	12	N/A-applied at planting	At planting, banded over open furrow or in-furrow with seed or transplant.

<sup>1</sup> Mode of Action (MOA) codes for plant pest insecticides from the Insecticide Resistance Action Committee (IRAC) Mode of Action Classification v. 8.2, March 2017. Number codes (1 through 29) are used to distinguish the main insecticide mode of action groups, with additional letters for certain sub-groups within each main group. All insecticides within the same group (with same number) indicate same active ingredient or similar mode of action. This information must be considered for the insecticide resistance management decisions. - = unknown, or a mode of action that has not been classified yet.

<sup>2</sup> Information provided in this table applies only to Florida. Be sure to read a current product label before applying any product. The use of brand names and any mention or listing of commercial products or services in the publication does not imply endorsement by the University of Florida Cooperative Extension Service nor discrimination against similar products or services not mentioned. OMRI listed: Listed by the Organic Materials Review Institute for use in organic production.

\* Restricted use insecticide.

**Table 7.11.** Cucurbit fungicides ordered by disease and then FRAC group according to their mode of action.

**Labels change frequently. Be sure to read a current product label before applying any chemical. Refer to Table 19.2 for biopesticide and other alternative products labeled for disease management.**

Pertinent Diseases or Pathogens	Fungicide Group <sup>1</sup>	Chemical (active ingredients)	Max. Rate/Acre		Min. Days to		Remarks <sup>2</sup>
			Applic.	Season	Harvest	Reentry	
Alternaria leaf spot/blight	M1	(copper compounds) <b>Many brands available:</b> AmeriCop 40 DF, Badge SC, Badge X2, Basic Copper 53, Camelot-O, Champ DP Dry Prill, Champ Formula 2 FL, Champ WG, ChampION++, Copper-Count-N, CS 2005, Cueva, Cuprofix Ultra 40 Dispers, Cuproxat, Kentan DF, Kocide 2000, Kocide 3000, Kocide 3000-O, KOP-5, Kop-Hydroxide, MasterCop, Nordox 75WG, Nu-Cop 3L, Nu-Cop 50 WP, Nu-Cop 50DF, Nu-Cop HB, Nu-Cop 30 HB, Nu-Cop XLR, Phytan 27 AG, Previsto	SEE INDIVIDUAL LABELS		1	Varies from 4 hr to 2 days	Check label for specific guidelines
	M1 & M3	ManKocide (copper hydroxide + mancozeb)	3 lb	24 lb	5	2	Some cantaloupe varieties are sensitive. Check label for details.
	M3	(mancozeb) <b>Many brands available:</b> Dexter Max, Dithane DF Rainshield, Dithane F45 Rainshield, Dithane M45, Fortuna 75 WDG, Koverall, KOVERALL, Manzate Max, Manzate Pro-Stick, Penncozeb 75DF, Penncozeb 80WP, Protect DF, Roper DF Rainshield	SEE INDIVIDUAL LABELS		5	1	Check label for specific guidelines
	M5	(chlorothalonil) <b>Many brands available:</b> Arius ADV, Bravo Ultrex, Bravo Weather Stik, Bravo ZN, Choloronil 720, Chlorothalonil 720, Chlorothalonil 720 SC, Echo 720, Echo 90 DF, Echo Zn, EQUUS 720 SST, Equus 720 SST, Equus DF, Initiate 720, Initiate ZN, Orondis Opti B, Praiz	SEE INDIVIDUAL LABELS		0	1	Check label for crop specific guidelines. Follow label recommendations on watermelon after fruit set. Do not apply to mature watermelons under dry, hot and other environmental conditions as indicated on the label.

**Table 7.11.** Cucurbit fungicides ordered by disease and then FRAC group according to their mode of action. (continued)

Pertinent Diseases or Pathogens	Fungicide Group <sup>1</sup>	Chemical (active ingredients)	Max. Rate/Acre		Min. Days to		Remarks <sup>2</sup>
			Applic.	Season	Harvest	Reentry	
<b>Labels change frequently. Be sure to read a current product label before applying any chemical. Refer to Table 19.2 for biopesticide and other alternative products labeled for disease management.</b>							
M5 & 27	Ariston	(chlorothalonil + cymoxanil)	3 pt	17.5 pt	3	0.5	
M5 & U15	Orondis Opti	(chlorothalonil + oxathiapiprolin)	2.5 pt	10 pt/ year	0	0.5	Check label for additional guidelines. Make no more than 2 sequential applications before rotating to a fungicide with different mode of action.
3	Mettle 125 ME	(tetraconazole)	8 fl oz	24 fl oz/ year	0	0.5	Make no more than 2 sequential applications before rotating to another fungicide with alternate mode of action
4 & M5	Ridomil Gold Bravo SC	(mefenoxam + chlorothalonil)	3.25 pt	See label	0	2	Limit is 4 appl/crop.
7	Endura	(boscalid)	6.5 oz	26 oz	0	0.5	
7	Fontelis	(penthiopyrad)	16 fl oz	67 fl oz/ year	1	0.5	Maximum rate is for year. Do not make more than 2 app sequentially or any FRAC 7 containing fungicide
7 & 3	Aprovia Top	(benzovindiflupyr + difenoconazole)	13.5 fl oz	See label	0	0.5	See label for guidelines
7 & 3	Luna Experience	(fluopyram + tebuconazole)	17 fl oz	34 fl oz	7	0.5	No more than 2 sequential apps before rotating to a non-FRAC 7 and non-FRAC 3 fungicide
7 & 11	Luna Sensation	(fluopyram + trifloxystrobin)	7.6 fl oz	27.1 fl oz	0	0.5	No more than 2 sequential apps before rotating to a non-FRAC 7 and non-FRAC 11 fungicide
7 & 11	Pristine	(boscalid + pyraclostrobin)	18.5 oz	74 oz	0	0.5	See label
7 & 11	Merivon	(fluxapyroxad + pyraclostrobin)	5.5 fl oz	16.5 fl oz	0	0.5	Check label
9 & 3	Inspire Super	(cyprodinil + difenoconazole)	20 fl oz	80 fl/A	7	0.5	Do not make more than two consecutive applications.
9 & 12	Switch 62.5WG	(cyprodinil + fludioxonil)	14 oz	56 oz/ year	1	0.5	Do not make more than two consecutive applications before switching to fungicide with a different mode of action.
11	Reason 500SC	(fenamidone)	5.5 fl oz	22 oz	14	0.5	See label
11	(azoxystrobin)	<b>Many brands available:</b> A-Zox 25SC, Acadia 2 SC, Aframe, Azoxy 2 SC, AzoxyStar, Azoxyzone, AZteroid FC, Equation, Equation SC, Quadris, Satori, Tetraban, Trevo	<b>SEE INDIVIDUAL LABELS</b>		1	4 hr	Limit is 4 appl/crop & alternate chemistry. See label for tankmixing restrictions.
11	Cabrio	(pyraclostrobin)	16 oz	64 oz	0	0.5	See label for tankmixing restrictions.
11	Évito 480 SC, Tepera	(fluoxastrobin)	See label	See label	See label	See label	
11 & 3	Topguard EQ	(azoxystrobin + flutriafol)	8 fl oz	See label	1	0.5	See label for crop specific use
11 & M5	Quadris Opti	(azoxystrobin + chlorothalonil)	3.2 pt	See label	1	0.5	Limit is 4 appl/crop for all QoI fungicides. Do not make more than one consecutive application. Do not apply to mature watermelons under dry, hot and other environmental conditions listed on label.
11 & 3	Quadris Top	(azoxystrobin + difenoconazole)	14 fl oz	56 fl oz	1	0.5	Must be rotated with a non-QoI containing fungicide.
11 & 7	Mural	(azoxystrobin + benzovindiflupyr)	SEE LABEL		0	0.5	Only for vegetable plants grown for resale to consumers
12	Emblem	(fludioxonil)	7 fl oz	28 fl oz/ year	1	0.5	
19	PH-D	(polyoxin D zinc salt)	6.2 oz	See label	0	4 h	

**Table 7.11.** Cucurbit fungicides ordered by disease and then FRAC group according to their mode of action. (continued)

Pertinent Diseases or Pathogens	Fungicide Group <sup>1</sup>	Chemical (active ingredients)	Max. Rate/Acre		Min. Days to		Remarks <sup>2</sup>
			Applic.	Season	Harvest	Reentry	
<b>Labels change frequently. Be sure to read a current product label before applying any chemical. Refer to Table 19.2 for biopesticide and other alternative products labeled for disease management.</b>							
	22 & M3	Gavel 75DF (zoxamide + mancozeb)	2 lb	16 lb	5	2	Limit is 8 appl/crop. Some cantaloupe varieties are sensitive, check label.
	25 & M5	Zing (zoxamide + chlorothalonil)	36 fl oz	See label	0	0.5	
	27 & 11	Tanos (cymoxanil + famoxadone)	8 oz	See label	3	0.5	Limit is 4 appl/crop. Must tankmix with a contact fungicide.
	29	Omega 500 F (fluazinam)	1.5 pt	7-9 pt/ year	7	0.5	See label for crop use guidelines
<b>Angular leaf spot</b>	M1	(copper compounds) <b>Many brands available:</b> AmeriCop 40 DF, Badge SC, Badge X2, Basic Copper 53, Camelot-O, Champ DP Dry Prill, Champ Formula 2 FL, Champ WG, ChampION++, Copper-Count-N, CS 2005, Cueva, Cuprofix Ultra 40 Disperss, Cuproxat, Kentan DF, Kocide 2000, Kocide 3000, Kocide 3000-O, KOP-5, Kop-Hydroxide, MasterCop, Nordox 75WG, Nu-Cop 50 WP, Nu-Cop 3L, Nu-Cop HB, Nu-Cop 30 HB, Nu-Cop 50DF, Nu-Cop XLR, Phytan 27 AG, Previsto	<b>SEE INDIVIDUAL LABELS</b>		1	Varies from 4 hr to 2 days	Check label for crop specific guidelines
	M1 & M3	ManKocide (copper hydroxide + mancozeb)	3 lb	24 lb	5	2	Some cantaloupe varieties are sensitive. See label for details.
	21	Actigard 50WG (acibenzolar-S-methyl)	1 oz	8 oz	0	0.5	Apply preventively prior disease development. Suppression of disease.
<b>Anthracnose</b>	M1	(copper compounds) <b>Many brands available:</b> AmeriCop 40 DF, Badge SC, Badge X2, Basic Copper 53, C-O-C-S WDG, Camelot-O, Champ DP Dry Prill, Champ Formula 2 FL, Champ WG, ChampION++, Copper-Count-N, CS 2005, Cueva, Cuprofix Ultra 40 Disperss, Cuproxat, Kentan DF, Kocide 2000, Kocide 3000, Kocide 3000-O, KOP-5, Kop-Hydroxide, MasterCop, Nordox 75WG, NorDox 50WP, Nu-Cop 3L, Nu-Cop 30 HB, Nu-Cop 50DF, Nu-Cop HB, Nu-Cop XLR, Phytan 27 AG, Previsto, Stretch	<b>SEE INDIVIDUAL LABELS</b>		1	Varies from 4 hr to 2 days	Check label for crop specific guidelines
	M1 & M3	ManKocide (copper hydroxide + mancozeb)	3 lb	24 lb	5	2	Some cantaloupe varieties are sensitive. Check label for details.
	M3	(mancozeb) <b>Many brands available:</b> Dexter Max, Dithane DF Rainshield, Dithane F45 Rainshield, Dithane M45, Fortuna 75WDG, Koverall, KOVERALL, Manzate Max, Manzate Pro-Stick, Penncozebe 75DF, Penncozebe 80WP, Protect DF, Roper DF Rainshield	<b>SEE INDIVIDUAL LABELS</b>		5	1	Check label for crop specific guidelines
	M5	(chlorothalonil) <b>Many brands available:</b> Arius ADV, Bravo Ultrex, Bravo Weather Stik, Bravo ZN, Chloronil 720, Chlorothalonil 720, Chlorothalonil 720 SC, Echo 720, Echo 90 DF, Echo ZN, EQUUS 720 SST, Equus 720 SST, Equus DF, Initiate 720, Initiate ZN, Orondis Opti B, Praiz	<b>SEE INDIVIDUAL LABELS</b>		0	1	Check label for crop specific guidelines. Follow label recommendations on watermelon after fruit set. Do not apply to mature watermelons under dry, hot and other environmental conditions as indicated on the label.
	4 & M5	Ridomil Gold Bravo SC (mefenoxam + chlorothalonil)	3.25 pt	See label	7	2	Limit is 4 appl/crop.
	M5 & U15	Orondis Opti (chlorothalonil + oxathiapiprolin)	2.5 pt	10 pt/ year	0	0.5	Check label for additional guidelines. Make no more than 2 sequential applications before rotating to a fungicide with different mode of action.

**Table 7.11.** Cucurbit fungicides ordered by disease and then FRAC group according to their mode of action. (continued)

Pertinent Diseases or Pathogens	Fungicide Group <sup>1</sup>	Chemical (active ingredients)	Max. Rate/Acre		Min. Days to		Remarks <sup>2</sup>
			Applic.	Season	Harvest	Reentry	
<b>Labels change frequently. Be sure to read a current product label before applying any chemical. Refer to Table 19.2 for biopesticide and other alternative products labeled for disease management.</b>							
M5 & 27	Ariston	(chlorothalonil + cymoxanil)	3 pt	17.5 pt	3	0.5	
4 & M5	Ridomil Gold Bravo SC	(mefenoxam + chlorothalonil)	3.25 pt	See label	0	2	Limit is 4 appl/crop.
1	(thiophanate-methyl)	<b>Many brands available:</b> 3336 EG, 3336 F, 3336 WP, Cercobin, Incognito 4.5F, Incognito 85 WDG, T-Methyl 4.5 AG, T-Methyl 4.5 F, T-Methyl 70 WP, Talaris 4.5F, Talaris 70 WSB, Thiophanate methyl 85 WDG, TM 4.5 F, Topsin 4.5 FL, Topsin M WSB	<b>SEE INDIVIDUAL LABELS</b>		1	1	Follow resistance management guidelines on label. Check label for additional guidelines
7 & 3	Aprovia Top	(benzovindiflupyr + difenoconazole)	13.5 fl oz	See label	0	0.5	See label for guidelines
7 & 3	Luna Experience	(fluopyryam + tebuconazole)	17 fl oz	34 fl oz	7		No more than 2 sequential apps before rotating to a non-FRAC 7 and non-FRAC 3 fungicide.
7 & 11	Pristine 38WG	(boscalid + pyraclostrobin)	18.5 oz	74 oz	0	0.5	Limit is 4 appl/crop & alternate chemistry.
7 & 11	Luna Sensation	(fluopyryam + trifloxystrobin)	7.6 fl oz	27.1 fl oz	0	0.5	No more than 2 sequential apps before rotating to a non-FRAC 7 and non-FRAC 11 fungicide
7 & 11	Merivon	(fluxapyroxad + pyraclostrobin)	5.5 fl oz	16.5 fl oz	0	0.5	Do not make more than one application before alternating to a non-FRAC 7 or non-FRAC 11 group fungicide.
9 & 3	Inspire Super	(cyprodinil + difenoconazole)	20 fl oz	80 fl/A	7		Do not make more than two consecutive applications.
11	Cabrio EG	(pyraclostrobin)	16 oz	64 oz	0	0.5	4 appl maximum. Maximum number of sequential applications is one. Maximum rate is less for downy mildew.
11	(azoxystrobin)	<b>Many brands available:</b> A-Zox 25SC, Acadia 2SC, Aframe, Azoxy 2 SC, Azoxystar, Azoxyzone, AZteroid FC, Equation, Equation SC, Quadris, Satori, Tetraban, Trevo	<b>SEE INDIVIDUAL LABELS</b>		1	4 hr	Limit is 4 appl/crop & alternate chemistry. See label for tankmixing restrictions.
11	Evito 480 SC, Tepera	(fluoxastrobin)	<b>SEE INDIVIDUAL LABELS</b>		See label	See label	See label
11 & 3	Topguard EQ	(azoxystrobin + flutriafol)	8 fl oz	See label	1	0.5	See label for crop specific use
11 & M5	Quadris Opti	(azoxystrobin + chlorothalonil)	3.2 pt	See label	1	0.5	Limit is 4 appl/crop for all QoI fungicides. Do not make more than one consecutive application. Do not apply to mature watermelons under dry, hot and other environmental conditions listed on label.
11 & 3	Quadris Top	(azoxystrobin + difenoconazole)	14 fl oz	56 fl oz	1	0.5	Must be rotated with a non-QoI containing fungicide.
11 & 7	Mural	(azoxystrobin + benzovindiflupyr)	SEE LABEL		0	0.5	Only for vegetable plants grown for resale to consumers
19	Oso 5% SC	(polyoxin D zinc salt)	SEE LABEL		0	4 h	
27 & 11	Tanos	(cymoxanil + famoxadone)	8 oz	See label	3	0.5	Limit is 4 appl/crop. Must tankmix with a contact fungicide.
25 & M5	Zing	(zoxamide + chlorothalonil)	36 fl oz	See label	0	0.5	

**Table 7.11.** Cucurbit fungicides ordered by disease and then FRAC group according to their mode of action. (continued)

Pertinent Diseases or Pathogens	Fungicide Group <sup>1</sup>	Chemical (active ingredients)	Max. Rate/Acre		Min. Days to		Remarks <sup>2</sup>
			Applic.	Season	Harvest	Reentry	
<b>Labels change frequently. Be sure to read a current product label before applying any chemical. Refer to Table 19.2 for biopesticide and other alternative products labeled for disease management.</b>							
<b>Bacterial fruit blotch</b>	M1	(copper compounds) <b>Many brands available:</b> Americop 40 DF, Badge SC, Badge X2, Basic Copper 53, Camelot-O, Champ DP Dry Prill, Champ Formula 2 FL, Champ WG, ChampION++, Copper-Count-N, CS 2005, Cueva, Cuprofix Ultra 40 Disperss, Cuproxat, Kentan DF, Kocide 2000, Kocide 3000, Kocide 3000-O, KOP-5, Kop-Hydroxide, MasterCop, Nordox 75 WG, Nu-Cop 50 WP, Nu-Cop 3L, Nu-Cop 30HB, Nu-Cop 50 DF, Nu-Cop HB, Nu-Cop XLR, Previsto, Stretch	<b>SEE INDIVIDUAL LABELS</b>		1	Varies from 4 hr to 2 days	Suppression only. Check label for crop specific guidelines
	M1 & M3	ManKocide (copper hydroxide + mancozeb)	3 lb	24 lb	5	2	Some cantaloupe varieties are sensitive. Check label for details
	27 & 11	Tanos 50DF (cymoxanil + famoxadone)	8 oz	See label	3	0.5	Limit is 4 appl/crop. Must tankmix with a contact fungicide. Bacterial fruit blotch disease suppression only
	21	Actigard 50WG (acibenzolar-S-methyl)	1 oz	8 oz	0	0.5	Apply preventively prior disease development. Suppression of disease.
<b>Belly rot</b>	1	(thiophanate-methyl) <b>Many brands available:</b> 3336 EG, 3336 F, 3336 WP, Cercobin, T-Methyl 4.5 AG, T-Methyl 4.5 F, T-Methyl 70 WP, Incognito 4.5F, Incognito 85WDG, Talaris 70 WSB, Thiophanate methyl 85 WDG, TM 4.5 F, Topsin 4.5 FL, Topsin M WSB	<b>SEE INDIVIDUAL LABELS</b>		1	1	Follow resistance management guidelines on label.
	7 & 3	Aprovia Top (benzovindiflupyr + difenoconazole)	13.5 fl oz	See label	0	0.5	See label for guidelines
	7 & 3	Luna Experience (fluopyram + tebuconazole)	17 fl oz	34 fl oz	7		No more than 2 sequential apps before rotating to a non-FRAC 7 and non-FRAC 3 fungicide.
	7 & 11	Luna Sensation (fluopyram + trifloxystrobin)	7.6 fl oz	27.1 fl oz	0	0.5	No more than 2 sequential apps before rotating to a non-FRAC 7 and non-FRAC 11 fungicide. Disease suppression only.
	11	Evito 480 SC, Tepera (fluoxastrobin)	<b>SEE INDIVIDUAL LABELS</b>		See label	See label	See label
	11	(azoxystrobin) <b>Many brands available:</b> A-Zox 25SC, Acadia 2SC, Aframe, Azoxy 2 SC, Azoxystar, Azoxyzone, AZteroid FC, Equation, Equation SC, Quadris, Satori, Tetraban, Trevo	<b>SEE INDIVIDUAL LABELS</b>		1	4 hr	Limit is 4 appl/crop & alternate chemistry. See label for tankmixing restrictions.
	11 & 3	Topguard EQ (azoxystrobin + flutriafol)	8 fl oz	See label	1	0.5	See label for crop specific use
	11 & M5	Quadris Opti (azoxystrobin + chlorothalonil)	3.2 pt	See label	1	0.5	Limit is 4 appl/crop for all QoI fungicides. Do not make more than one consecutive application. Do not apply to mature watermelons under dry, hot and other environmental conditions listed on label.
	11 & 3	Quadris Top (azoxystrobin + difenoconazole)	14 fl oz	56 fl oz	1	0.5	Must be rotated with a non-QoI containing fungicide.
	19	PH-D (polyoxin D zinc salt)	6.2 oz	See label	0	4 h	
<b>Cercospora leaf spot</b>	M1 & M3	ManKocide (copper hydroxide + mancozeb)	3 lb	24 lb	5	2	Some cantaloupe varieties are sensitive. Check label for details.
	M3	(mancozeb) <b>Many brands available:</b> Dexter Max, Dithane DF Rainshield, Dithane F45 Rainshield, Dithane M45, Fortuna 75WDG, Koverall, KOVERALL, Manzate Max, Manzate Pro-Stick, Penncozeb 75DF, Penncozeb 80WP, Roper DF Rainshield, Protect DF	<b>SEE INDIVIDUAL LABELS</b>		5	1	Check label for crop specific guidelines

**Table 7.11.** Cucurbit fungicides ordered by disease and then FRAC group according to their mode of action. (continued)

Pertinent Diseases or Pathogens	Fungicide Group <sup>1</sup>	Chemical (active ingredients)	Max. Rate/Acre		Min. Days to		Remarks <sup>2</sup>
			Applic.	Season	Harvest	Reentry	
<b>Labels change frequently. Be sure to read a current product label before applying any chemical. Refer to Table 19.2 for biopesticide and other alternative products labeled for disease management.</b>							
	M5	(chlorothalonil) <b>Many brands available:</b> Arius ADV, Bravo Ultrex, Bravo Weather Stik, Bravo ZN, Chloronil 720, Chlorothalonil 720, Chlorothalonil 720 SC, Echo 720, Echo 90 DF, Echo ZN, EQUUS 720 SST, Equus 720 SST, Equus DF, Initiate 720, Initiate ZN, Orondis Opti B, Praiz	<b>SEE INDIVIDUAL LABELS</b>		0	1	Check label for crop specific guidelines. Follow label recommendations on watermelon after fruit set. Do not apply to mature watermelons under dry, hot and other environmental conditions listed on label.
	M5 & U15	Orondis Opti (chlorothalonil + oxathiapiprolin)	2.5 pt	10 pt/year	0	0.5	Check label for additional guidelines. Make no more than 2 sequential applications before rotating to a fungicide with different mode of action.
	27 & M5	Ariston (chlorothalonil + cymoxanil)	3.0 pt	17.5 pt	3	0.5	See label
	4 & M5	Ridomil Gold Bravo SC (mefenoxam + chlorothalonil)	3.25 pt	See label	0	2	Limit is 4 appl/crop.
	3	Mettle 125 ME (tetraconazole)	8 fl oz	24 fl oz/year	0	0.5	Make no more than 2 sequential applications before rotating to another fungicide with alternate mode of action
	7 & 3	Aprovia Top (benzovindiflupyr + difenoconazole)	13.5 fl oz	See label	0	0.5	See label for guidelines
	7 & 11	Pristine (boscalid + pyraclostrobin)	18.5 oz	74 oz	0	0.5	Limit is 4 appl/crop & alternate chemistry.
	7 & 11	Merivon (fluxapyroxad + pyraclostrobin)	5.5 fl oz	16.5 fl oz	0	0.5	Do not make more than one application before alternating to a non-FRAC 7 or non-FRAC 11 group fungicide.
	9 & 3	Inspire Super (cyprodinil + difenoconazole)	20 fl oz	80 fl/A	7		Do not make more than two consecutive applications.
	11	Cabrio 20EG (pyraclostrobin)	16 fl oz	64 fl oz	0	0.5	4 appl maximum. Maximum number of sequential applications is one. Maximum rate is less for downy mildew.
	11	(azoxystrobin) <b>Many brands available:</b> A-Zox 25SC, Acadia 2SC, Aframe, Azoxy 2SC, Azoxystar, Azoxyzone, AZteroid FC, Equation, Equation SC, Quadris, Satori, Tetraban, Trevo	<b>SEE INDIVIDUAL LABELS</b>		1	4 hr	Limit is 4 appl/crop & alternate chemistry. See label for tankmixing restrictions.
	11	Evito 480 SC, Tepera (fluoxastrobin)	See label	See label	See label	See label	See label
	11 & 3	Topguard EQ (azoxystrobin + flutriafol)	8 fl oz	See label	1	0.5	See label for crop specific use
	11 & M5	Quadris Opti (azoxystrobin + chlorothalonil)	3.2 pt	See label	1	0.5	Limit is 4 appl/crop for all QoI fungicides. Do not make more than one consecutive application. Do not apply to mature watermelons under dry, hot and other environmental conditions listed on label.
	11 & 3	Quadris Top (azoxystrobin + difenoconazole)	14 fl oz	56 fl oz	1	0.5	Must be rotated with a non-QoI containing fungicide.
	11 & 7	Mural (azoxystrobin + benzovindiflupyr)	SEE LABEL		0	0.5	Only for vegetable plants grown for resale to consumers
	22 & M3	Gavel 75DF (zoxamide + mancozeb)	2 lb	16 lb	5	2	Some cantaloupe varieties are sensitive, check label.
	25 & M5	Zing (zoxamide + chlorothalonil)	36 fl oz	See label	0	0.5	

**Table 7.11.** Cucurbit fungicides ordered by disease and then FRAC group according to their mode of action. (continued)

Pertinent Diseases or Pathogens	Fungicide Group <sup>1</sup>	Chemical (active ingredients)	Max. Rate/Acre		Min. Days to		Remarks <sup>2</sup>
			Applic.	Season	Harvest	Reentry	
<b>Labels change frequently. Be sure to read a current product label before applying any chemical. Refer to Table 19.2 for biopesticide and other alternative products labeled for disease management.</b>							
Downy Mildew	M1	(copper compounds) <b>Many brands available:</b> AmeriCop 40 DF, Badge SC, Badge X2, Basic Copper 53, Camelot-O, Champ DP Dry Prill, Champ Formula 2 FL, Champ WG, ChampION ++, Copper-Count-N, CS 2005, Cueva, Cuprofix Ultra 40 Disperss, Cuproxat, Kentan DF, Kocide 2000, Kocide 3000, Kocide 3000-O, KOP-5, Kop-Hydroxide, MasterCop, Nordox 75WG, Nu-Cop 50 WP, Nu-Cop 3L, Nu-Cop 50DF, Nu-Cop HB, Nu-Cop XLR, Previsto, Stretch	SEE INDIVIDUAL LABELS		1	Varies from 4 hr to 2 days	Check label for crop specific guidelines
M1 & M2	Top Cop w Sulfur (copper + sulfur)		SEE LABEL		-	1	Do not apply if air temperatures greater than 90°F are expected.
M1 & M3	ManKocide (copper hydroxide + mancozeb)		3 lb	24 lb	5	2	Some cantaloupe varieties are sensitive. Check label for details.
M3	(mancozeb) <b>Many brands available:</b> Dexter Max, Dithane DF Rainshield, Dithane F45 Rainshield, Dithane M45, Fortuna 75WDG, Koverall, KOVERALL, Manzate Max, Manzate Pro-Stick, Penncozeb 75DF, Penncozeb 80WP, Protect DF, Roper DF Rainshield		SEE INDIVIDUAL LABELS		5	1	Check label for crop specific guidelines
M5	(chlorothalonil) <b>Many brands available:</b> Arius ADV, Bravo Ultrex, Bravo Weather Stik, Bravo ZN, Choloronil 720, Chlorothalonil 720, Chlorothalonil 720 SC, Echo 720, Echo 90 DF, Echo ZN, EQUUS 720 SST, Equus 720 SST, Equus DF, Initiate 720, Initiate ZN, Orondis Opti B, Praiz		SEE INDIVIDUAL LABELS		0	1	Check label for crop specific guidelines. Recommended maximum rate is less for downy mildew. Follow label recommendations on watermelon after fruit set. Do not apply to mature watermelons under dry, hot and other environmental conditions as indicated on the label.
U15 & 40	Orondis Ultra (oxathiapiprolin + mandipropamid)		8 fl oz	32 fl oz/year	0	4 h	Make no more than 2 sequential applications before rotating to a fungicide with a different mode of action. Check label for additional details.
4 & M1	Ridomil Gold Copper (mefenoxam + copper hydroxide)		2 lb	8 lb	5	2	Limit is 4 appl/crop
4 & M3	Ridomil Gold MZ WG (mancozeb + mefenoxam)		2.5 lb	10lb	5	2	Limit is 4 appl/crop. Rate for downy mildew is lower.
4 & M5	Ridomil Gold Bravo SC (mefenoxam + chlorothalonil)		2.5 pt	See label	0	2	Limit is 4 appl/crop.
M5 & U15	Orondis Opti (chlorothalonil + oxathiapiprolin)		2.5 pt	10 pt/year	0	0.5	Check label for additional guidelines. Make no more than 2 sequential applications before rotating to a fungicide with different mode of action.
3 & 33	Viathon (tebuconazole + potassium phosphite)		4 pt	12 pt	7	0.5	Disease suppression only. See label
7 & 11	Pristine (boscalid + pyraclostrobin)		18.5 oz	74 oz	0	0.5	Limit is 4 appl/crop & alternate chemistry.
7 & 11	Merivon (fluxapyroxad + pyraclostrobin)		5.5 fl oz	16.5 fl oz	0	0.5	(Downy mildew suppression only). Do not make more than one application before alternating to a non-FRAC 7 or non-FRAC 11 group fungicide.
11	Cabrio 20 EG (pyraclostrobin)		12 fl oz	64 fl oz	0	0.5	Maximum number of sequential applications is one. Maximum rate is less for downy mildew.
11	Evito 480 SC, Tepera (fluoxastrobin)		See label	See label	See label	See label	See label
11	Flint Extra, Flint (trifloxystrobin)		4 oz	8 oz	0	0.5	(Disease suppression) Limit is 4 appl/crop & alternate chemistry. Maximum rate is higher for downy mildew suppression.

**Table 7.11.** Cucurbit fungicides ordered by disease and then FRAC group according to their mode of action. (continued)

Pertinent Diseases or Pathogens	Fungicide Group <sup>1</sup>	Chemical (active ingredients)	Max. Rate/Acre		Min. Days to		Remarks <sup>2</sup>
			Applic.	Season	Harvest	Reentry	
<b>Labels change frequently. Be sure to read a current product label before applying any chemical. Refer to Table 19.2 for biopesticide and other alternative products labeled for disease management.</b>							
	11	(azoxystrobin) <b>Many brands available:</b> A-Zox 25SC, Acadia 2SC, Aframe, Azoxy 2 SC, Azoxystar, Azoxyzone, AZteroid FC, Equation, Equation SC, Quadris, Satori, Tetraban, Trevo	<b>SEE INDIVIDUAL LABELS</b>		1	4 hr	Limit is 4 appl/crop & alternate chemistry. See label for tankmixing restrictions.
	11	Reason 500SC (fenamidone)	5.5 fl oz	22 oz	14	0.5	See label
	11 & 3	Topguard EQ (azoxystrobin + flutriafol)	8 fl oz	See label	1	0.5	See label for crop specific use
	11 & M5	Quadris Opti (azoxystrobin + chlorothalonil)	3.2 pt	See label	1	0.5	Limit is 4 appl/crop for all QoI fungicides. Do not make more than one consecutive application. Do not apply to mature watermelons under dry, hot and other environmental conditions listed on label.
	11 & 3	Quadris Top (azoxystrobin + difenoconazole)	14 fl oz	56 fl oz	1	0.5	Must be rotated with a non-QoI containing fungicide.
	11 & 7	Mural (azoxystrobin + benzovindiflupyr)	SEE LABEL		0	0.5	Only for vegetable plants grown for resale to consumers
	21	Ranman, Ranman 400 SC (cyazofamid)	2.75 fl oz	16.5 fl oz	0	0.5	Limit is 6 appl/crop. Follow resistance management guidelines on label.
	21	Actigard 50WG (acibenzolar-S-methyl)	1 oz	8 oz	0	0.5	Apply preventively prior disease development. Suppression of disease.
	22	Elumin (ethaboxam)	8 fl oz	16 fl oz/ year	2	0.5	Application interval should not be less than 14 days
	25 & M5	Zing (zoxamide + chlorothalonil)	36 fl oz	See label	0	0.5	
	22 & M3	Gavel 75DF (zoxamide & mancozeb)	2 lb	16 lb	5	2	Limit is 8 appl/crop. Some cantaloupe varieties are sensitive, check label.
	27	Curzate 60DF (cymoxanil)	5 oz	30 oz	3	0.5	Use only with a labeled rate of protectant fungicide.
	27 & 11	Tanos (cymoxanil + famoxadone)	8 oz	See label	3	0.5	Limit is 4 appl/crop. Must tankmix with a contact fungicide.
	27 & M5	Ariston (chlorothalonil + cymoxanil)	3.0 pt	17.5 pt	3	0.5	
	28	Previcur Flex, Promess (propamocarb hydrochloride)	1.2 pt	6 pt	2	0.5	See label for instructions
	29	Omega 500 F (fluazinam)	1.5 pt	7-9 pt/ year	7	0.5	See label for crop specific guidelines
	33	Aliette 80WDG Linebacter WDG (fosetyl-Al)	5 lb	35 lb	12 hr	0.5	Do not tank mix with copper fungicides. See label for specific product.
	40	Forum (dimethomorph)	6 oz	30 oz	When spray is dried	0.5	Limit is 5 appl/ crop. Apply with another fungicide that has a different mode of action and alternate. Minimum gallons per acre required.
	40	Orondis Ultra B, Revus (mandipropamid)	8 fl oz	32 fl oz	0	4 h	See label. For suppression only
	43	Presidio (fluopicolide)	4 fl oz	12 fl oz	2	0.5	Tankmix with another fungicide product with a different mode of action.
	45 & 40	Zampro (ametoctradin + dimethomorph)	14 fl oz	42 fl oz	0	0.5	No more than 2 sequential appl. Addition of a spreading/penetrating adjuvant is recommended.
	U15	Orondis Opti A, Orondis Ultra A (oxathiapiprolin)	4.8 fl oz	19.2 fl oz/ year	0	4 h	Cucurbit vegetables, Crop group 9. See label for more information

**Table 7.11.** Cucurbit fungicides ordered by disease and then FRAC group according to their mode of action. (continued)

Pertinent Diseases or Pathogens	Fungicide Group <sup>1</sup>	Chemical (active ingredients)	Max. Rate/Acre		Min. Days to		Remarks <sup>2</sup>
			Applic.	Season	Harvest	Reentry	
<b>Labels change frequently. Be sure to read a current product label before applying any chemical. Refer to Table 19.2 for biopesticide and other alternative products labeled for disease management.</b>							
Gummy stem blight	M1	(copper compounds) <b>Many brands available:</b> AmeriCop 40 DF, Badge SC, Badge X2, Basic Copper 53, Camelot-O, Champ DP Dry Prill, Champ Formula 2 FL, Champ WG, ChampION++, Copper-Count-N, CS 2005, Cueva, Cuprofix Ultra 40 Disperss, Cuproxat, Kentan DF, Kocide 2000, Kocide 3000, Kocide 3000-O, KOP-5, Kop-Hydroxide, MasterCop, Nordox 75WG, Nu-Cop 50 WP, Nu-Cop 3L, Nu-Cop 30 HB, Nu-Cop 50DF, Nu-Cop HB, Nu-Cop XLR, Previsto	SEE INDIVIDUAL LABELS		1	Varies from 4 hr to 2 days	Check label for crop specific guidelines
	M2 + 3	Unicorn (sulfur + tebuconazole)	5 lb	15 lb	14	0.5	Suppression only. Only available for use on certain crops, see label for details.
	M1 & M3	ManKocide (Copper hydroxide & Mancozeb)	3 lb	24 lb	5	2	Some cantaloupe varieties are sensitive. Check label for details.
	M3	(mancozeb) <b>Many brands available:</b> Dexter Max, Dithane DF Rainshield, Dithane F45 Rainshield, Dithane M45, Fortuna 75WDG, Koverall, KOVERALL, Manzate Max, Manzate Pro-Stick, Penncozeb 75DF, Penncozeb 80WP, Protect DF, Roper DF Rainshield	SEE INDIVIDUAL LABELS		5	1	Check label for crop specific guidelines
	M5	(chlorothalonil) <b>Many brands available:</b> Arius ADV, Bravo Ultrex, Bravo Weather Stik, Bravo ZN, Choloronil 720, Chlorothalonil 720, Chlorothalonil 720 SC, Echo 720, Echo 90 DF, Echo ZN, EQUUS 720 SST, Equus 720 SST, Equus DF, Initiate 720, Initiate ZN, Orondis Opti B, Praiz	SEE INDIVIDUAL LABELS		0	1	Check label for crop specific guidelines. Follow label recommendations on watermelon after fruit set. Do not apply to mature watermelons under dry, hot and other environmental conditions as indicated on the label.
	1	(thiophanate-methyl) <b>Many brands available:</b> 3336 EG, 3336 F, 3336 WP, Cercobin, Incognito 4.5F, Incognito 85WDG, T-Methyl 4.5 AG, T-Methyl 70 WP, Talaris 4.5 F, Talaris 70 WSB, T-Methyl 4.5 F, TM 4.5 F, Topsin 4.5 FL, Topsin M WSB	SEE INDIVIDUAL LABELS		1	1	Follow resistance management guidelines indicated on the label. Check label for additional guidelines
	3	Topguard (Flutriafol)	14 fl oz	56 fl oz	0	0.5	See label
	3	(tebuconazole) <b>Many brands available:</b> Incognito 4.5F, Monsoon, Onset 3.6L, Orius 3.6F, Teb 3.6 SC, Tebu-Crop 3.6F, Tebuconazole 3.6 F, Tebustar 3.6L, Tebuzol 3.6F, Toledo, Vibe	8 fl oz	24 fl oz	7	0.5	Gummy stem blight suppression is only for watermelon, squash, pumpkin, and melons. See label for individual brands.
	3	Proline (prothioconazole)	5.7 fl oz	17.1 fl oz	7	0.5	Limit is 1 soil application and 2 foliar applications per year.
	3	Rhyme (flutriafol)	7 fl oz	28 fl oz/year	0	0.5	Do not apply more than 2 sequential applications before rotating with a different FRAC group fungicide
	3	Mettle 125 ME (tetraconazole)	8 fl oz	24 fl oz/year	0	0.5	Make no more than 2 sequential applications before rotating to another fungicide with alternate mode of action. Suppression only
	3 & M5	Muscle ADV (tebuconazole + chlorothalonil)	1.6 pt	6.4 pt	7	0.5	watermelon, squash, pumpkin and melon only.
	3 & 33	Viathon (tebuconazole + potassium phosphite)	4 pt	12 pt	7	0.5	
4 & M5	Ridomil Gold Bravo SC (mefenoxam + chlorothalonil)	3.25 pt	See label	0	2	Limit is 4 appl/crop.	

**Table 7.11.** Cucurbit fungicides ordered by disease and then FRAC group according to their mode of action. (continued)

Pertinent Diseases or Pathogens	Fungicide Group <sup>1</sup>	Chemical (active ingredients)	Max. Rate/Acre		Min. Days to		Remarks <sup>2</sup>
			Applic.	Season	Harvest	Reentry	
<b>Labels change frequently. Be sure to read a current product label before applying any chemical. Refer to Table 19.2 for biopesticide and other alternative products labeled for disease management.</b>							
M5 & U15	Orondis Opti	(chlorothalonil + oxathiapiprolin)	2.5 pt	10 pt/ year	0	0.5	Check label for additional guidelines. Make no more than 2 sequential applications before rotating to a fungicide with different mode of action.
7	Endura	(boscalid)	6.5 oz	26 oz	0	0.5	Do not make more than one application of Endura before alternating to another labeled fungicide with a different mode of action for at least one application.
7	Fontelis	(penthiopyrad)	16 fl oz	67 fl oz/ year	1	0.5	Maximum rate is for year. Do not make more than 2 app sequentially
7 & 3	Aprovia Top	(benzovindiflupyr + difenoconazole)	13.5 fl oz	See label	0	0.5	See label for guidelines
7 & 3	Luna Experience	(fluopyryam + tebuconazole)	17 fl oz	34 fl oz	7	0.5	No more than 2 sequential apps before rotating to a non-FRAC 7 and non-FRAC 3 fungicide.
7 & 11	Luna Sensation	(fluopyryam + trifloxystrobin)	7.6 fl oz	27.1 fl oz	0	0.5	No more than 2 sequential apps before rotating to a non-FRAC 7 and non-FRAC 11 fungicide. Only for disease suppression.
7 & 11	Pristine	(boscalid + pyraclostrobin)	18.5 oz	74 oz	0	0.5	Limit is 4 appl/crop & alternate chemistry.
7 & 11	Merivon	(fluxapyroxad + pyraclostrobin)	5.5 fl oz	16.5 fl oz	0	0.5	Do not make more than one application before alternating to a non-FRAC 7 or non-FRAC 11 group fungicide. In areas where gummy stem blight resistance to FRAC 7 or 11 fungicides have been reported, tank mix with chlorothalonil at full rate
9 & 3	Inspire Super	(cyprodinil + difenoconazole)	20 fl oz	80 fl oz	7	0.5	Do not make more than two consecutive applications.
9 & 12	Switch 62.5WG	(cyprodinil + fludioxonil)	14 oz	56 oz/ year	1	0.5	Do not make more than two consecutive applications before switching to fungicide with a different mode of action.
11	Evito 480 SC, Tepera	(fluoastrobilin)	See label	See label	See label	See label	See label
11	Cabrio 20EG	(pyraclostrobin)	16 fl oz	64 fl oz	0	0.5	4 appl maximum. Maximum number of sequential applications is one. Maximum rate is less for downy mildew.
11	(azoxystrobin)	<b>Many brands available:</b> A-Zox 25SC, Acadia 2SC, Aframe, Azoxy 2 SC, Azoxystar, Azoxyzone, AZteroid FC, Equation, Equation SC, Quadris, Satori, Tetraban, Trevo	<b>SEE INDIVIDUAL LABELS</b>		1	4 hr	Limit is 4 appl/crop & alternate chemistry. See label for tankmixing restrictions.
11	Spirato	(kresoxim-methyl)	4.8 oz	19.2 oz	0	0.5	Follow resistance management guidelines on label.
11 & 3	Topguard EQ	(azoxystrobin + flutriafol)	8 fl oz	See label	1	0.5	See label for crop specific use
11 & 3	Quadris Top	(azoxystrobin + difenoconazole)	14 fl oz	56 fl oz	1	0.5	Must be rotated with a non-QoI containing fungicide.
11 & M5	Quadris Opti	(azoxystrobin + chlorothalonil)	3.2 pt	See label	1	0.5	Limit is 4 appl/crop for all QoI fungicides. Do not make more than one consecutive application. Do not apply to mature watermelons under dry, hot and other environmental conditions listed on label.
11 & 7	Mural	(azoxystrobin + benzovindiflupyr)	SEE LABEL		0	0.5	Only for vegetable plants grown for resale to consumers
12	Emblem	(fludioxonil)	7 fl oz	28 fl oz/ year	1	0.5	
19	<b>Many brands available:</b> (polyoxin D zinc salt)	Affirm WDG, Oso 5% SC, PH-D	<b>SEE INDIVIDUAL LABELS</b>		0	4 h	
25 & M5	Zing	(zoxamide + chlorothalonil)	36 fl oz	See label	0	0.5	

**Table 7.11.** Cucurbit fungicides ordered by disease and then FRAC group according to their mode of action. (continued)

Pertinent Diseases or Pathogens	Fungicide Group <sup>1</sup>	Chemical (active ingredients)	Max. Rate/Acre		Min. Days to		Remarks <sup>2</sup>
			Applic.	Season	Harvest	Reentry	
<b>Labels change frequently. Be sure to read a current product label before applying any chemical. Refer to Table 19.2 for biopesticide and other alternative products labeled for disease management.</b>							
	27 & M5	Ariston (chlorothalonil + cymoxanil)	3.0 pt	17.5 pt	3	0.5	
	29	Omega 500 F (fluazinam)	1.5 pt	7-9 pt/ year	7	0.5	See label for crop specific guidelines
	U15 & 40	Orondis Ultra (oxathiapiprolin + mandipropamid)	8 fl oz	32 fl oz/ year	0	4 h	Make no more than 2 sequential applications before rotating to a fungicide with a different mode of action. Check label for additional details.
Phytophthora blight/fruit and root rot	4	Orondis Gold B, Ridomil Gold SL (mefenoxam)	See label	See label	See label	See label	See label for application specific guidelines (soil-injected or soil incorporated, soil-directed and other foliar). Suppression only
	4 & M1	Ridomil Gold Copper (mefenoxam + copper hydroxide)	2 lb	8 lb	5	2	For suppression only
	21	Ranman 400 SC, Ranman (cyazofamid)	2.75 fl oz	16.5 fl oz	0	0.5	Follow resistance management guidelines on label
	22	Elumin (ethaboxam)	8 fl oz	16 fl oz/ year	2	0.5	Application interval should not be less than 14 days
	22 & M3	Gavel 75DF (zoxamide + mancozeb)	2 lb	16 lb	5	2	Some cantaloupe varieties are sensitive, check label.
	27 & 11	Tanos (cymoxanil + famoxadone)	8 oz	See label	3	0.5	Limit is 4 appl/crop. Must tankmix with a contact fungicide. Phytophthora blight foliar and fruit phase only (disease suppression)
	29	Omega 500 F (fluazinam)	1.5 pt	7-9 pt/ year	7	0.5	See label for crop specific guidelines
	33	Aliette 80WDG Linebacter WDG (fosetyl-Al)	5 lb	35 lb	12 hr	0.5	Do not tank mix with copper fungicides.
	40	Forum (dimethomorph)	6 oz	30 oz	When spray is dried	0.5	Apply with another fungicide that has a different mode of action and alternate. Minimum gallons per acre required.
	40	Orondis Ultra B, Revus (mandipropamid)	8 fl oz	32 fl oz	0	4 hr	An adjuvant is recommended for best control. Phytophthora blight (suppression).
	43	Presidio (fluopicolide)	4 fl oz	12 fl oz	2	0.5	Tankmix with another fungicide product with a different mode of action.
	45 & 40	Zampro (ametoctradin + dimethomorph)	14 fl oz	42 fl oz	0	0.5	No more than 2 sequential appl. Addition of a spreading/penetrating adjuvant is recommended.
		U15	Orondis Gold 200, Orondis Opti A, Orondis Ultra A (oxathiapiprolin)	<b>SEE INDIVIDUAL LABELS</b>		0	4 h
Powdery mildew	M1	(copper compounds) <b>Many brands available:</b> Americop 40 DF, Badge SC, Badge X2, Basic Copper 53, Camelot-O, Champ DP Dry Prill, Champ Formula 2 FL, Champ WG, ChampION++, Copper-Count-N, CS 2005, Cueva, Cuprofix Ultra 40 Disperss, Cuproxat, Kentan DF, Kocide 2000, Kocide 3000, Kocide 3000-O, KOP-5, Kop-Hydroxide, MasterCop, Nordox 75WG, Nu-Cop 50 WP, Nu-Cop 3L, Nu-Cop 30HB, Nu-Cop 50DF, Nu-Cop HB, Nu-Cop XLR, Phyton 27 AG, Previsto	<b>SEE INDIVIDUAL LABELS</b>		1	Varies from 4 hr to 2 days	Check label for crop specific guidelines
	M1 & M2	Top Cop w Sulfur (copper + sulfur)	<b>SEE LABEL</b>		-	1	Do not apply if air temperatures greater than 90°F are expected.
	M1 & M3	ManKocide (copper hydroxide + mancozeb)	3 lb	24 lb	5	2	Some cantaloupe varieties are sensitive. Check label for details.

**Table 7.11.** Cucurbit fungicides ordered by disease and then FRAC group according to their mode of action. (continued)

Pertinent Diseases or Pathogens	Fungicide Group <sup>1</sup>	Chemical (active ingredients)	Max. Rate/Acre		Min. Days to		Remarks <sup>2</sup>	
			Applic.	Season	Harvest	Reentry		
<b>Labels change frequently. Be sure to read a current product label before applying any chemical. Refer to Table 19.2 for biopesticide and other alternative products labeled for disease management.</b>								
	M2	(sulfur) <b>Many brands available:</b> Accoidal, Cosavet DF, Cosavet DF Edge, Crusade DF, Defend DF, Micronized Wetttable Sulfur, Micro Sulf, Suffa, Sulfur 6L, Sulfur 90W, Thiolux	SEE INDIVIDUAL LABELS			1	See individual label. Do not use when temperatures are greater than 90 F or on sulfur-sensitive various. Check label labeled for crop specific use.	
	M2 & 3	Unicorn (sulfur + tebuconazole)	3.75 lb	15 lb	14	0.5	Suppression only. Only available for use on certain crops, see label for details.	
	M5	(chlorothalonil) <b>Many brands available:</b> Arius ADV, Bravo Ultrex, Bravo Weather Stik, Bravo ZN, Choloronil 720, Chlorothalonil 720, Chlorothalonil 720 SC, Echo 720, Echo 90 DF, Echo ZN, EQUUS 720 SST, Equus 720 SST, Equus DF, Initiate 720, Initiate ZN, Orondis Opti B, Praiz	SEE INDIVIDUAL LABELS			0	1	Check label for crop specific guidelines. Follow label recommendations on watermelon after fruit set. Do not apply to mature watermelons under dry, hot and other environmental conditions as indicated on the label.
	M5 & U15	Orondis Opti (chlorothalonil + oxathiapiprolin)	2.5 pt	10 pt/year	0	0.5	Check label for additional guidelines. Make no more than 2 sequential applications before rotating to a fungicide with different mode of action.	
	U8	Prolivo 300 SC (pyrifenone)	5 fl oz	16 fl oz/year	0			Do not make more than 2 sequential applications before rotating to another fungicide with a different mode of action.
	1	(thiophanate-methyl) <b>Many brands available:</b> 3336 EG, 3336 F, 3336 WP, Cercobin, Incognito 4.5F, Incognito 85 WDG, T-Methyl 4.5 AG, T-Methyl 70 WP, Talaris 4.5F, Talaris 70 WSB, T-Methyl 4.5 F, Thiophanate methyl 85WDG, TM 4.5 F, Topsin 4.5 FL, Topsin M WSB	SEE INDIVIDUAL LABELS			1	1	Follow resistance management guidelines indicated on the label.
	3	Rally 40WSP (myclobutanil)	5 oz	1.5 lb	0	1	Note that a 30 day plant back restriction exists. Follow resistance management guidelines on label.	
	3	(tebuconazole) <b>Many brands available:</b> Monsoon, Onset 3.6L, Orius 3.6F, Teb 3.6 SC, Tebu-Crop 3.6F, Tebuconazole 3.6 F, Tebustar 3.6L, Tebuzol 3.6F, Toledo, Vibe	See label	24 fl oz	7	0.5	Maximum rate is lower for powdery mildew.	
	3	Procure 480SC (triflumizole)	8 fl oz	24 fl oz	0	0.5	Follow resistance management guidelines on label.	
	3	Trionic 4 SC (triflumizole)	8 fl oz	24 fl oz	1	0.5		
	3	Proline (prothioconazole)	5.7 fl oz	17.1 fl oz	7	0.5	Limit is 1 soil application and 2 foliar applications per year.	
	3	Mettle 125 ME (tetraconazole)	8 fl oz	24 fl oz/year	0	0.5	Make no more than 2 sequential applications before rotating to another fungicide with alternate mode of action	
	3 & M5	Muscle ADV (tebuconazole + chlorothalonil)	1.6 pt	6.4 pt	7	0.5		
	3	Topguard (flutriafol)	14 fl oz	56 fl oz	0	0.5		
	3	Rhyme (flutriafol)	7 fl oz	28 fl oz/year	0	0.5	Do not apply more than 2 sequential applications before rotating with a different FRAC group fungicide	
	M2 + 3	Unicorn (sulfur + tebuconazole)	5 lb	15 lb	14	0.5	Suppression only. Only available for use on certain crops, see label for details.	
	3 & 33	Viathon (tebuconazole + potassium phosphite)	3 pt	12 pt	7	0.5		

**Table 7.11.** Cucurbit fungicides ordered by disease and then FRAC group according to their mode of action. (continued)

Pertinent Diseases or Pathogens	Fungicide Group <sup>1</sup>	Chemical (active ingredients)	Max. Rate/Acre		Min. Days to		Remarks <sup>2</sup>
			Applic.	Season	Harvest	Reentry	
<b>Labels change frequently. Be sure to read a current product label before applying any chemical. Refer to Table 19.2 for biopesticide and other alternative products labeled for disease management.</b>							
	7	Fontelis (penthiopyrad)	16 fl oz	67 fl oz/ year	1	0.5	Maximum rate is for year. Do not make more than 2 app sequentially
	7	Endura (boscalid)	6.5 oz	26 oz	0	0.5	Do not make more than one application of Endura before alternating to another labeled fungicide with a different mode of action for at least one application. (suppression only)
	7	Velum Prime (fluopyram)	6.84 fl oz	13.7 fl oz	0	0.5	
	7 & 3	Aprovia Top (benzovindiflupyr + difenoconazole)	13.5 fl oz	See label	0	0.5	See label for guidelines
	7 & 3	Luna Experience (fluopyram + tebuconazole)	17 fl oz	34 fl oz	7	0.5	No more than 2 sequential apps before rotating to a non-FRAC 7 and non-FRAC 3 fungicide.
	7 & 11	Pristine (boscalid & pyraclostrobin)	18.5 oz	74 oz	0	0.5	Limit is 4 appl/crop & alternate chemistry.
	7 & 11	Luna Sensation (fluopyram + trifloxystrobin)	7.6 fl oz	27.1 fl oz	0	0.5	No more than 2 sequential apps before rotating to a non-FRAC 7 and non-FRAC 11 fungicide
	7 & 11	Merivon (fluxapyroxad + pyraclostrobin)	5.5 fl oz	16.5 fl oz	0	0.5	Do not make more than one application before alternating to a non-FRAC 7 or non-FRAC 11 group fungicide
	9 & 3	Inspire Super (cyprodinil + difenoconazole)	20 fl oz	80 fl oz	7	0.5	Do not make more than two consecutive applications.
	9 & 12	Switch 62.5WG (cyprodinil + fludioxonil)	14 oz	56 oz/ year	1	0.5	Do not make more than two consecutive applications before switching to fungicide with a different mode of action.
	11	Cabrio 20EG (pyraclostrobin)	16 fl oz	64 fl oz	0	0.5	Maximum number of sequential applications is one. Maximum rate is less for downy mildew.
	11	Evito 480 SC, Tepera (fluoastrobin)	See label	See label	See label	See label	See label
	11	Flint Extra, Flint (trifloxystrobin)	2 oz	8 oz	0	0.5	Maximum rate is higher for downy mildew suppression.
	11	(azoxystrobin) <b>Many brands available:</b> Acadia 2SC, A-Zox 25SC, Aframe, Azoxy 2 SC, Azoxystar, Azoxyzone, AZteroid FC, Equation, Equation SC, Quadris, Satori, Tetraban, Trevo	<b>SEE INDIVIDUAL LABELS</b>		1	4 hr	Limit is 4 appl/crop & alternate chemistry. See label for tankmixing restrictions.
	11	Sovran (kresoxim-methyl)	4.8 oz	19.2 oz	0	0.5	Follow resistance management guidelines on label.
	11 & 3	Topguard EQ (azoxystrobin + flutriafol)	8 fl oz	See label	1	0.5	See label for crop specific use
	11 & M5	Quadris Opti (azoxystrobin + chlorothalonil)	3.2 pt	See label	1	0.5	Limit is 4 appl/crop for all QoI fungicides. Do not make more than one consecutive application. Do not apply to mature watermelons under dry, hot and other environmental conditions listed on label.
	11 & 3	Quadris Top (azoxystrobin + difenoconazole)	14 fl oz	56 fl oz	1	0.5	Must be rotated with a non-QoI containing fungicide.
	11 & 7	Mural (azoxystrobin + benzovindiflupyr)	See label	See label	0	0.5	Only for vegetable plants grown for resale to consumers
	12	Emblem (fludioxonil)	7 fl oz	28 fl oz/ year	1	0.5	
	13	Quintec (quinoxifen)	6 fl oz	See label	3	0.5	Do not make more than 4 appl. Do not make more than two consecutive apps. Not labeled on all cucurbits; labeled on various melons, cantaloupe, winter squash, gourds, pumpkins, and watermelon.
	19	Affirm WDG Oso 5% SC PH-D (polyoxin D zinc salt)	13 fl oz	See label	0	4 hr	

**Table 7.11.** Cucurbit fungicides ordered by disease and then FRAC group according to their mode of action. (continued)

Pertinent Diseases or Pathogens	Fungicide Group <sup>1</sup>	Chemical (active ingredients)	Max. Rate/Acre		Min. Days to		Remarks <sup>2</sup>
			Applic.	Season	Harvest	Reentry	
<b>Labels change frequently. Be sure to read a current product label before applying any chemical. Refer to Table 19.2 for biopesticide and other alternative products labeled for disease management.</b>							
	21	Actigard 50WG (acibenzolar-S-methyl)	1 oz	8 oz	0	0.5	Apply preventively prior disease development. Suppression of disease.
	27 & M5	Ariston (chlorothalonil + cymoxanil)	3.0 pt	17.5 pt	3	0.5	See label
	3 & 33	Viathon (Tebuconazole + Potassium Phosphite)	4 pt	12 pt	7	0.5	Disease suppression only. See label
	U6	Torino (cyflufenamid)	3.4 oz	6.8 oz	0	4 hr	
	U8	Vivando (Metrafenone)	15.4 fl oz	42.2 fl oz	0	0.5	See label for instructions
<b>Pythium spp. (damping-off)</b>	4	Apron XL, Orondis Gold B Ridomil Gold SL Ultra Flourish (mefenoxam)	SEE INDIVIDUAL LABELS				
	4	(metalaxyl) <b>Many brands available:</b> Acquire, Allegiance FL, Metalaxyl 318 FS, Metalaxyl 265 ST, Metalaxyl 4.0 ST, Metastar 2E, Metastar 4S, MetXL, Sebring 318 FS, Sebring 480 FS	SEE INDIVIDUAL LABELS				
	4 & 11	Uniform (Mefonoxam & Azoxystrobin)	SEE LABEL			0	Apply 0.34 fl oz/1000 ft. of row as in-furrow spray in a minimum of 5 gal. of water per acre at planting. Make only one application per season.
	28	Previcur Flex, Promess (propamocarb hydrochloride)	1.2 pt	6 pt	2	0.5	Use a tank mix partner. See label for directions using a contact fungicide and Pythium suppression.
<b>Target spot</b>	M5	(chlorothalonil) <b>Many brands available:</b> Arius ADV, Bravo Ultrex, Bravo Weather Stik, Bravo ZN, Choloronil 720, Chlorothalonil 720, Chlorothalonil 720 SC, Echo 720, Echo 90 DF, Echo ZN, EQUUS 720 SST, Equus 720 SST, Equus DF, Initiate 720, Initiate ZN, Orondis Opti B, Praiz	SEE INDIVIDUAL LABELS		0	1	Check label for crop specific guidelines. Follow label recommendations on watermelon after fruit set. Do not apply to mature watermelons under dry, hot and other environmental conditions as indicated on the label.
	M5 & U15	Orondis Opti (chlorothalonil + oxathiapiprolin)	2.5 pt	10 pt/ year	0	0.5	Check label for additional guidelines. Make no more than 2 sequential applications before rotating to a fungicide with different mode of action.
	1	(thiophanate-methyl) <b>Many brands available:</b> 3336 EG, 3336 F, 3336 WP, Cercobin, Incognito 4.5F, Incognito 85 WDG, T-Methyl 4.5 AG, T-Methyl 4.5 F, T-Methyl 70 WP, Talaris 4.5F, Talaris 70 WSB, Topsin 4.5FL, Topsin M WSB, Thiophanate methyl 85WDG, TM 4.5 F, Topsin 4.5 FL, Topsin M WSB	SEE INDIVIDUAL LABELS		1	1	Follow resistance management guidelines indicated on the label.
	3	Topguard (flutriafol)	14 fl oz	56 fl oz	0	0.5	See label
	3	Rhyme (flutriafol)	7 fl oz	28 fl oz/ year	0	0.5	Do not apply more than 2 sequential applications before rotating with a different FRAC group fungicide
	11	Cabrio 20EG (pyraclostrobin)	16 fl oz	64 fl oz	0	0.5	Maximum number of sequential applications is one. Maximum rate is less for downy mildew.
	11	Evito 480 SC, Tepera (fluoxastrobin)	See label	See label	See label	See label	See label
	11	(azoxystrobin) <b>Many brands available:</b> A-Zox 25SC, Azoxy 2 SC, Aframe, Azoxystar, Azoxyzone, AZteroid FC, Quadris, Satori, Tetraban, Trevo	SEE INDIVIDUAL LABELS		1	4 hr	Limit is 4 appl/crop & alternate chemistry. See label for tankmixing restrictions.

**Table 7.11.** Cucurbit fungicides ordered by disease and then FRAC group according to their mode of action. (continued)

Pertinent Diseases or Pathogens	Fungicide Group <sup>1</sup>	Chemical (active ingredients)	Max. Rate/Acre		Min. Days to		Remarks <sup>2</sup>
			Applic.	Season	Harvest	Reentry	
<b>Labels change frequently. Be sure to read a current product label before applying any chemical. Refer to Table 19.2 for biopesticide and other alternative products labeled for disease management.</b>							
	7 & 3	Aprovia Top (benzovindiflupyr + difenoconazole)	13.5 fl oz	See label	0	0.5	See label for guidelines
	7 & 11	Merivon (fluxapyroxad + pyraclostrobin)	5.5 fl oz	16.5 fl oz	0	0.5	Do not make more than one application before alternating to a non-FRAC 7 or non-FRAC 11 group fungicide
	11 & 3	Topguard EQ (azoxystrobin + flutriafol)	8 fl oz	See label	1	0.5	See label for crop specific use
	19	Affirm WDG, Oso 5% SC, PH-D (polyoxin D zinc salt)	SEE LABEL		0	4 h	
	25 & M5	Zing (zoxamide + chlorothalonil)	36 fl oz	See label	0	0.5	
	27 & M5	Ariston (chlorothalonil + cymoxanil)	3.0 pt	17.5 pt	3	0.5	
<b>Scab</b>	M1	Cueva (copper octanoate)	SEE LABEL		0	4	See label for crops labeled
	M3	(mancozeb) <b>Many brands available:</b> Dexter Max, Dithane DF Rainshield, Dithane F45 Rainshield, Dithane M45, Fortuna 75WDG, Koverall, KOVERALL, Manzate Max, Manzate Pro-Stick, Penncozeb 75DF, Roper DF Rainshield	SEE INDIVIDUAL LABELS		5	1	Check label for crop specific guidelines
	M1 & M3	ManKocide (copper hydroxide & mancozeb)	3 lb	24 lb	5	2	Some cantaloupe varieties are sensitive. See label.
	M5	(chlorothalonil) <b>Many brands available:</b> Bravo Ultrex, Bravo Weather Stik, Bravo ZN, Chloronil 720, Chlorothalonil 720, Chlorothalonil 720 SC, Echo 720, Echo 90 DF, Echo ZN, EQUUS 720 SST, Equus 720 SST, Equus DF, Initiate 720, Initiate ZN, Orondis Opti B, Praiz	SEE INDIVIDUAL LABELS		0	1	Check label for crop specific guidelines. Follow label recommendations on watermelon after fruit set. Do not apply to mature watermelons under dry, hot and other environmental conditions as indicated on the label.
	M5 & U15	Orondis Opti (chlorothalonil + oxathiapiprolin)	2.5 pt	10 pt/year	0	0.5	Check label for additional guidelines. Make no more than 2 sequential applications before rotating to a fungicide with different mode of action.
	M5 & 27	Ariston (chlorothalonil + cymoxanil)	3.0 pt	17.5 pt	3	0.5	See label
	4 & M5	Ridomil Gold Bravo SC (mefenoxam + chlorothalonil)	3.25 pt	See label	0	2	Limit is 4 appl/crop.
	7 & 3	Aprovia Top (benzovindiflupyr + difenoconazole)	13.5 fl oz	See label	0	0.5	See label for guidelines
	19	Affirm WDG Oso 5% SC PH-D (polyoxin D zinc salt)	SEE INDIVIDUAL LABELS		0	4 h	
	21	Actigard 50WG (acibenzolar-S-methyl)	1 oz	8 oz	0	0.5	Apply preventively prior disease development. Suppression of disease.
<b>Fusarium wilt</b>	3	Proline (prothioconazole)	5.7 fl oz	17.1 fl oz	7	0.5	Limit is 1 soil application and 2 foliar applications per year.

<sup>1</sup> FRAC code (fungicide group): Number (1 through 46) and letter U is used to distinguish the fungicide mode of action groups. All fungicides within the same group (with same number or letter) indicate same active ingredient or similar mode of action. This information must be considered for the fungicide resistance management decisions. U = unknown, or a mode of action that has not been classified yet. Source: FRAC Code List 2018; <http://www.frac.info/> (FRAC = Fungicide Resistance Action Committee).

<sup>2</sup> Information provided in this table applies only to Florida. Be sure to read a current product label before applying any chemical. The use of brand names and any mention or listing of commercial products or services in the publication does not imply endorsement by the University of Florida Cooperative Extension Service nor discrimination against similar products or services not mentioned.

**Table 7.12.** Non-fumigant nematicides for crucifer / cole crops in Florida. (continued)

Product	Application Directions
Mocap 15G (a.i. ethoprop)	Apply 13 pounds per acre (36 inch row spacing) or 0.9 pounds per 1,000 linear feet of row in a band of 15 inches wide on the row at-planting. Mix with the top 2 to 4 inches of soil with mechanical equipment right after application. If broadcast, apply 34 lbs/acre from 1 week before planting to at planting time and mix with 2-4 inches of soil. DO NOT use as a seed furrow treatment or allow granules to contact the seed. Only 1 application per season
Nimitz (a.i. fluensulfone)	All applications must be incorporated either physically or via drip or overhead irrigation. Make preplant applications at a rate of 3.5 to 7 pints, (56.0 to 80.0 fl. oz.) per acre, a minimum of thirty days before planting. Do not plant any unlisted crops into treated land for 365 days after application of the product. Do not apply more than one application per crop, and no more than 112 fl. oz. of product per acre, per year (365 days). Provides control only for nematodes. Growers applying Nimitz must consult the product label to observe the plant-back (recropping) intervals for a variety of leafy vegetables and brassica crops, onions, bananas, sugarcane, and other crops.
Velum (a.i. fluopyram)	Apply max 6.84 fl oz/acre using only Chemigation into root-zone through low-pressure drip, trickle, micro-sprinkler or equivalent equipment. Observe minimum 5-day interval between soil applications. Do not apply more than 13.7 fl oz of Velum (0.446 lbs Fluopyram) per acre per year, regardless of formulation (Velum and/or Luna) or method of application (soil or foliar). For soil application, to limit the potential for development of disease resistance to this chemical class, the first foliar fungicide application after Velum should be a product from a different FRAC group.

Mocap is an insecticide/nematicide; Velum is a fungicide/nematicide; Nimitz is a true nematicide. Unlike fumigants, these products are not volatile and will move through the soil via water; depending on the water solubility, these products will have different recommendations as far as how to best apply them (see specific label recommendations); when nematode pressure is high, they may not be as consistently effective against root nematodes as the fumigants.

**Table 7.13.** Fumigant nematicides for crucifer / cole crops in Florida.

Nematicide	Broadcast Application <sup>1</sup>		In the Row Applications
	Gallons or Lbs Per acre	Fl oz /1000 ft / chisel spaced 12" apart	
Telone II <sup>2,3</sup>	9 to 12 gal	26 to 35	For any row spacing, application rates given may be concentrated in the row, but shall never exceed the labeled maximum for broadcast applications. Consult the product label for additional detail.
Telone C-17 <sup>2,3</sup>	10.8 to 17.1 gal	31.8 to 50.2	For any row spacing, application rates given may be concentrated in the row, but shall never exceed the labeled maximum for broadcast applications. Consult the product label for additional detail.
Telone C-35 <sup>2,3</sup>	13 to 20.5 gal	38 to 60	For any row spacing, application rates given may be concentrated in the row, but shall never exceed labeled maximum for broadcast applications. Consult the product label for additional detail.
Pic-Clor 60	19 to 31.5	57 to 90	For any row spacing, application rates should never exceed the labeled maximum for broadcast applications. Consult the product label for additional detail.
Vapam HL	75 gal	-	For drip or in-row chisel fumigation, consult product label for proportionately reduced overall rates, drip concentration and flow modifying directions and procedures.
KPam HL	60 gal	-	For drip or in-row chisel fumigation, consult product label for proportionately reduced overall rates, drip concentration and flow modifying directions.
Allyl isothiocyanate (AITC) Dominus	40 gal	-	For drip or in-row fumigation and crop termination, consult product label for proportionately reduced overall rates, drip concentration and flow modifying directions

<sup>1</sup> Gallons /acre and Fl oz / 1000 feet provided only for mineral soils. Higher rates may be possible for heavier textured (loam, silt, clay) or highly organic soils.

<sup>2</sup> All of the fumigants mentioned are for retail sale and use only by state certified applicators or persons under their direct supervision. New supplemental labeling for the Telone products must be in the hands of the user at the time of application. See new product label details for additional use restrictions based on soil characteristics, buffer zones, requirements for Personal Protective Equipment (PPE), mandatory good agricultural practices (GAP's), product and applicator training certification, and other rate modifying recommendations.

<sup>3</sup> Higher application rates are possible in the presence of cyst-forming nematodes.

Rates are believed to be correct for products named, and similar products of other brand names, when applied to mineral soils. Higher rates are required for muck (organic) soils. However, the **grower** has the final responsibility to see that each product is used legally; **read the label** of the product to be sure that you are using it properly.