

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)	Distance between plants (in)	Seeding depth (in)	Seed per acre (lb)	Days to maturity from seed	Days to maturity from transplant	Plant populations (acre)
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	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)	Maxi Pack (H)	Transamerica (H)	Bristol	Mongoose (H) (GY)	SV4719CS* (H) (GY)
Deli King	Excel (H) (GY)	Maxi Pick (H)	Vlaspik (H)	Cobra (H) (GY)	Python (H)	Talledega (H) (GY)
Deli Star	Fancipak (H) (GY)	Powerpak (H) (GY)		Dominator (H) (GY)	Speedway (H) (GY)	Thunder(H) (GY)
Excursion	FMX 5020 (H)	Royal (H) (GY)		Impact (H) (GY)	SV3462CS* (H) (GY)	
Expedition (H)	Jackson Classic (H) (GY)	Supremo (H)				

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)	Magician (H)	Dill's Atlantic Giant
Gold Dust (H)	Pick-A-Pie (H)	Goose Bumps II (H)	October (H)	Magic Lantern (H)	Mustang (H)	Prizewinner (H)
Jill-Be-Little	Small Sugar	Jack of All Trades (H)		Connecticut Field	Summit (H)	
Wee-Be-Little (PVP)		Knucklehead (H)		Gladiator (H)		

PVP=Plant Variety Protection; H=hybrid

Table 7.5. Cultivars for squash.

Summer (yellow)			Acorn	Butternut	
Conqueror III (H) (SN)*	Goldprize (H) (SN)	Ocelot (H) (CN)	Mesa Queen (H)	Atlas (H)	Quantam (H)
Enterprise (H) (SN)	Gold Star (H) (CN)	Prelude II (H) (CN) *	Royal Ace (H)	Avalon (H)	Ultra (H)
Fortune (H) (SN)	Lazor (H) (SN)	XPT 1832 III (H) (SN)*	Table Ace (H)	Canesi (H)	Waltham
Gentry (H) (CN)	Lemondrop L (H) (SN)	Sunglo (H) (CN)	TayBelle PM (H)	Early Butternut (H)	Zenith (H)
Destiny III (H) (CN)*	Lioness (H) (SN)			Polaris (H)	
Summer (zucchini)			Summer (yellow zucchini)		Summer (grey zucchini)
Green Eclipse (H)	Pascola (H)	Respect (H)	Spineless Perfection (H)	Golden Delight (H) (SN)	Hurakan (H)
Green Machine	Paycheck (H)	Senator (H)	SV6009YG (H)*	Golden Glory (H) (SN)	Lolita (H)
Judgement III (H)*	Payload (H)	Spineless Beauty (H)		Goldrush (H) (SN)	Luciana
Justice III (H)*	Payroll (H)	Spineless King (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 840 (H)	Affirmed (H)	Fascination (H)	Sugar Fresh (H)	4502 (H)
Mardi Gras (H)	Summer Velvet 2800 (H)	Bold Ruler (H)	Harmony (H)	Summer Breeze (H)	SS 7167 (H)
Sangria (H)	Top Gun (H)	Bottle Rocket (H)	Joy Ride (SV 8298) (H)	Sweet Gem (H)	SS 7177 (H)
Sentinel (H)	Vista (H)	Captivation (H)	Kingman (H)	Sweet Polly (H)	SS 7197 (H)
Starbrite (H)	SSX 8585 (H)	Citation (H)	Melody (H)	Traveler (H)	SV 0241 (H)
Stargazer (H)		Crisp N' Sweet (H)	Razorback (H)	Tri X 313 (H)	
		Cronos (H)	Road Trip (H)	Troubadour (H)	
Non-Harvestable Pollenizer		Triploid (seedless, mini)			
Ace	SP-6	Ana (H)	Ocelot	Pixie (H)	Sky Line
Accomplice	Wildcard	Extazy (H)	SKY STAR	Sugar Bite (H)	
Patron	Wing man	Leopard (H)	Promesa (H)	Sky View	
Polimax					

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, bit-

termelon 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
*** PREEMERGENCE ***				
Bensulide 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.
Carfentrazone 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.
Clomazone 0.15 - 0.38	(Command) 3 ME 0.4 - 1 pt.	13	Cucumber	Annual broadleaf and grass weeds. Use lower rates on coarse soils.
Clomazone 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.
Clomazone 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.
Clomazone 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.
Ethalfuralin + Clomazone 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.
Flumioxazin 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.
Glyphosate	(various formulations) consult labels	9	All cucurbits	Controls emerged broadleaf and grass weeds. Consult individual labels for restrictions.
Halosulfuron 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
Halosulfuron 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.
Halosulfuron 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.
Paraquat 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.
Pelargonic acid	(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.
Pendimethalin 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.
S-metolachlor 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.
*** POSTEMERGENCE ***				
Carfentrazone 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	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.

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
Clethodim 0.94 - 0.13 0.07 - 0.13	(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.
DCPA 4.5 - 10.5	(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.
Ethalfuralin + Clomazone	(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.
Glyphosate	(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.
Halosulfuron 0.04 - 0.05	(Sandea) 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.
Halosulfuron 0.02 - 0.05 0.02 - 0.04	(Sandea) 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.
Imazosufuron 0..19 - 0.3	(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
Paraquat 0.47 - 0.93	(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.
Pelargonic acid	(Scythe) 4.2 EC 3 - 10% v/v	27	Cucumber, gourd, muskmelon, cantaloupe, pumpkin, squash, watermelon	Controls emerged weeds. Row middles only. Use a shielded sprayer directed to the row middles to reduce drift to the crop.
Pendimethalin 1	(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 bed and in the spray area. If a preplant application was applied do not exceed 4.2 pt./A per season. PHI 35 days.
S-metolachlor 0.95 - 1.26	(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.
Sethoxydim 0.19 - 0.28	(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.
Terbacil 0.1 - 0.2	(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.
Trifluralin	(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.
*** POSTHARVEST ***				
Diquat 0.25	(Reglone Dessicant) 1.0 pt	22	Cantaloupe	Minimum of 35 gal./A. Include a NIS. Thorough coverage is required.
Diquat 0.38	(Reglone Dessicant) 1.5 pt	22	Cucumber, watermelon, squash (except acorn)	Minimum of 35 gal./A. Include a NIS. Thorough coverage is required.
Diquat 0.5	(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 19.2 for biopesticide and other alternative products labeled for disease management.

Insect or mite pest	MOA Code ¹	Trade Name (Active Ingredient) *Restricted	Rate (Product/acre)	Max rate product per season	Days to Harvest	REI (hours)	Remarks ²	
Aphids	1B	Dimethoate 4 EC (dimethoate)	melons: 1 pt watermelons: 0.5 – 1 pt	2 pt per year	3	48	Highly toxic to bees. Not for squash or cucumber.	
	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	1	24	5EC: Maximum number of applications per year is 2 8: Squash and cucumbers only	
	3A	*Brigade 2 EC (bifenthrin)	2.6-6.4 fl oz	19.2 fl oz	3	12	Do not make more than 2 applications after bloom. Highly toxic to foraging bees.	
	4A	Actara (thiamethoxam)	1.5-3.0 oz	11.0 oz	0	12	Apply before pests reach damaging levels. Highly toxic to foraging bees.	
	4A	Admire Pro (imidacloprid) (see appropriate labels for other brands)	7-10.5 oz Planthouse: 0.44 fl oz/10,000 plants	10.5 fl oz		soil: 21	12	Do not use with other Group 4A insecticides. Planthouse: One application to transplants. See label for use on mature greenhouse cucumbers.
	4A	Assail 30SG (acetamiprid)	2.5-4 oz	20.0 oz	0	12	No more than 5 applications per season. Do not use with other group 4A insecticides. Toxic to foraging bees.	
	4A	Belay Insecticide (clothianidin)	foliar: 3.0-4.0 fl oz soil: 9.0 - 12.0 fl oz	12 fl oz		foliar: 7 soil: 21	12	Do not apply when plants are blooming.
	4A	Platinum Platinum 75SG (thiamethoxam)	5-11 fl oz 1.66-3.67 oz	11 fl oz 3.67 oz	30	12	For most crops that are not on the label, a 120-day plant-back interval must be observed. Highly toxic to foraging bees.	
	4D	Sivanto Prime (flupyradifurone)	foliar: 7-14 fl oz soil: 21-28 fl oz	foliar: 28 fl oz soil: 28 fl oz per crop season		foliar: 1 soil: 21	4	foliar: Minimum application interval: 7 days soil: For soil application methods, see label. Soil maximum : no more than 3 crop seasons per year.
	9B	Fulfill (pymetrozine)	2.75 oz	5.5 oz	0	12	Minimum of 7 days between applications.	
	28	Exirel (cyantraniliprole)	13.5-20.5 fl oz	61.6 fl oz	1	12	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.	
	29	Beleaf 50 SG (flonicamid)	2.0-2.8 oz	8.4 oz	0	12	Begin applications before pests reach damaging levels.	
	--	Aza-Direct (azadirachtin)	1-2 pts, up to 3.5 pts, if needed		0	4	Antifeedant, repellent, insect growth regulator. OMRI-listed ² .	
	--	Azatin O (azadirachtin)	10-16 fl oz	16 fl oz	0	4	Antifeedant, repellent, insect growth regulator. Rate depends on pest-see label.	
	--	M-Pede (potassium salts of fatty acids)	1-2%V/V		0	12	OMRI-listed ² . Do not apply to stressed plants (high heat or drought conditions).	
--	Oil, Insecticidal; SunSpray 98.8%; Ultra-Fine; JMS Stylet Oil, Saf-T-Side, Others	1-2 gal/100 gal JMS: 3-6 qt/100 gal (JMS)		0	4	Organic Stylet-Oil and Saf-T-Side are OMRI- listed ² .		
Beetles (including cucumber beetle, flea beetle)	1A	Sevin 4F, XLR (carbaryl)	4F, XLR: 0.5-1.0 qt	4F, XLR: 6 qt	3	12	Do not apply when plants are wet. Use of carbaryl has been reported to flare (increase) mites. Do not apply to plants in bloom.	

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 19.2 for biopesticide and other alternative products labeled for disease management.

Insect or mite pest	MOA Code ¹	Trade Name (Active Ingredient) *Restricted	Rate (Product/acre)	Max rate product per season	Days to Harvest	REI (hours)	Remarks ²
Caterpillars (including armyworms, cabbage looper, corn earworm, cutworm, melonworm, pickleworm)	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	1	24	5EC: Maximum number of applications per year is 2 8: Squash and cucumbers only
	3A	*Brigade 2 EC (bifenthrin)	2.6-6.4 fl oz	19.2 fl oz	3	12	Do not make more than 2 applications after bloom. Highly toxic to foraging bees.
	3A	*Baythroid XL (beta-cyfluthrin)	2.4-2.8 fl oz	11.2 fl oz	0	12	Can be used on all cucurbits in Crop Group 9. Highly toxic to foraging bees.
	3A	*Capture LFR (bifenthrin)	6.8-8.5 fl oz, at planting	8.5 fl oz	N/A- applied at planting	12	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	7	24	Highly toxic to foraging bees.
	3A	*Pounce 25 WP (permethrin)	6.4-12.8 oz	76.8 oz, 51.2 for cantaloupe	0	12	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	1	24	Do not apply to blooming crops.
	4A	Admire Pro (imidacloprid) (see appropriate labels for other brands)	7-10.5 oz	10.5 fl oz	21	12	Do not use with other Group 4A insecticides. Not for planthouse
	4A	Actara (thiamethoxam)	1.5-3.0 oz	11.0 oz	0	12	Apply before pests reach damaging levels. Highly toxic to foraging bees.
	4A	Assail 30SG (acetamiprid)	2.5-5.3 oz	26.5 oz	0	12	No more than 5 applications per season. Do not use with other group 4A insecticides. Toxic to foraging bees.
	4A	Belay Insecticide (clothianidin)	Foliar: 3.0-4.0 fl oz soil: 9.0 - 12.0 fl oz	12 fl oz	foliar: 7 soil: 21	12	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	foliar: 1 soil: 21	12	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	6 oz	foliar: 1	12	Highly toxic to foraging bees. Use only foliar application for beetles. Note that pests controlled differ depending on application method.
	15	Rimon 0.83EC (novaluron)	9-12 fl oz	36 fl oz	1	12	Do not apply more often than every 14 days.
	1A	Sevin 4F, XLR (carbaryl)	4F, XLR: 0.5-1.0 qt	4F, XLR: 6 qt	3	12	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	1	24	5EC: Maximum number of applications per year is 2 8: Squash and cucumbers only	
3A	*Ambush 25W (permethrin)	6.4-12.8 oz	1.6 lb	0	12	Do not apply more than 8 applications at the highest rate per season. Highly toxic to bees.	

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 19.2 for biopesticide and other alternative products labeled for disease management.

Insect or mite pest	MOA Code ¹	Trade Name (Active Ingredient) *Restricted	Rate (Product/acre)	Max rate product per season	Days to Harvest	REI (hours)	Remarks ²
	3A	*Asana XL (0.66 EC) (esfenvalerate)	5.8-9.6 fl oz	48 fl oz	3	12	Do not apply more than 5 applications at high rate. For cucumber, melons, pumpkin, summer and winter squash. Highly toxic to foraging bees.
	3A	*Baythroid XL (beta-cyfluthrin)	0.8-2.8 fl oz	11.2 fl oz	0	12	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	3	12	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	N/A- applied at planting	12	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	7	24	Highly toxic to foraging bees.
	3A	*Pounce 25 WP (permethrin)	6.4-12.8 oz	76.8 oz, 51.2 for cantaloupe	0	12	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	1	24	Do not apply to blooming crops.
	4A	Assail 30SG (acetamiprid)	2.5-5.3 oz	26.5 oz	0	12	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	3; 1 for cucumbers	4	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		0	4	Apply when larvae are small for best control. OMRI-listed ² .
	11A	Biobit HP (<i>Bacillus thuringiensis</i> subspecies <i>kurstaki</i>)	0.5-2.0 lb		0	4	Treat when larvae are young. Good coverage is essential. Can be used in the greenhouse. OMRI-listed ² .
	11A	Crymax WDG (<i>Bacillus thuringiensis</i> subspecies <i>kurstaki</i>)	0.5-2.0 lb		0	4	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		0	4	Use higher rates for armyworms. OMRI-listed ² .
	11A	DiPel DF (<i>Bacillus thuringiensis</i> subspecies <i>kurstaki</i>)	0.5-2.0 lb		0	4	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		0	4	Treat when larvae are young. Thorough coverage is essential. Use higher rates for armyworms. OMRI-listed ² .
	11A	Xentari DF (<i>Bacillus thuringiensis</i> subspecies <i>aizawai</i>)	0.5-2.0 lb		0	4	Treat when larvae are young. Thorough coverage is essential. May be used in the greenhouse. Can be used in organic production.
	15	Rimon 0.83EC (novaluron)	12 fl oz	36 fl oz	1	12	Do not apply more often than every 14 days.
	18	Intrepid 2F (methoxyfenozide)	4-10 fl oz	64 fl oz	3	4	Do not make more than 4 applications per season.
	22	Avaunt (indoxacarb)	2.5-6.0 oz	24 oz	3	12	Highly toxic to foraging bees.
	28	Coragen (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)	1	4	May be applied through drip (chemigation), as well as to soil at planting, or as a foliar spray.

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 19.2 for biopesticide and other alternative products labeled for disease management.

Insect or mite pest	MOA Code ¹	Trade Name (Active Ingredient) *Restricted	Rate (Product/acre)	Max rate product per season	Days to Harvest	REI (hours)	Remarks ²
Fire ants	28	Exirel (cyantraniliprole)	7.0-13.5 fl oz	61.6 fl oz	1	12	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.
	7A	Extinguish ((S)-methoprene)	0.75 lb		0	4	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	Esteem Ant Bait (pyriproxyfen)	1.5-2.0 lb	2.0 lb	1	12	Apply when ants are actively foraging.
Leafminers	1B	Dimethoate 4 EC (dimethoate)	melons: 1 pt watermelons: 0.5 – 1 pt	2 pt per year	3	48	Highly toxic to bees. Not for squash or cucumber.
	3A	*Ambush 25W (permethrin)	12.8 oz	1.6 lb	0	12	Do not apply more than 8 applications at the highest rate per season. Highly toxic to 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	foliar: 1 soil: 21	12	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: 5-7.5 oz	foliar: 6 oz soil: 12 oz	foliar: 1 soil: 21	12	Highly toxic to foraging bees. Use only one application method (soil or foliar). Note that pests controlled differ depending on application method.
	5	Radiant SC (spinetoram)	5-10 fl oz	34 fl oz	3 cucumbers: 1	4	No more than 6 applications. Toxic to bees for up to 3 hours following application.
	6	*Agri-Mek SC (abamectin)	1.75-3.50 fl oz	10.25 fl oz	7	12	No more than 2 sequential applications. Must be mixed with an adjuvant-see label for types. Highly toxic to foraging bees.
	15	Rimon 0.83EC (novaluron)	9-12 fl oz	36 fl oz	1	12	Do not apply more often than every 14 days.
17	Trigard (cyromazine)	2.66 oz	15.96 oz	0	12	Do not make more than six applications.	
Mites	28	Coragen (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)	1	4	May be applied through drip (chemigation), as well as to soil at planting, or as a foliar spray.
	28	Exirel (cyantraniliprole)	13.5-20.5 fl oz	61.6 fl oz	1	12	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.
	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	1	24	5EC: Maximum number of applications per year is 2 8: Squash and cucumbers only
	3A	*Danitol 2.4 EC (fenpropathrin)	10.67-16 fl oz	42.67 fl oz	7	24	Highly toxic to foraging bees.
	6	*Agri-Mek SC (abamectin)	1.75-3.50 fl oz	10.25 fl oz	7	12	No more than 2 sequential applications. Must be mixed with an adjuvant-see label for types. Highly toxic to foraging bees.

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 19.2 for biopesticide and other alternative products labeled for disease management.

Insect or mite pest	MOA Code ¹	Trade Name (Active Ingredient) *Restricted	Rate (Product/acre)	Max rate product per season	Days to Harvest	REI (hours)	Remarks ²
Squash bug, leaf-footed bug	10B	Zeal (etoxazole)	2.0-3.0 oz	3.0 oz cucumbers: 6 oz	7	12	Apply when populations are low. One application per season, except two for cucumbers (supplemental label).
	20B	Kanemite 15 SC (acequinocyl)	31 fl oz	62 fl oz	1	12	Do not apply more than twice per season. Do not apply by air. Melons, watermelon, and cucumbers only.
	21A	Portal XLO (fenpyroximate)	2.0 pt	4.0 pt	3 cucumbers: 1	12	All melons, watermelon, and cucumbers. Two applications per season. Effective for broad mite control.
	23	Oberon 2 SC (spiromesifen)	7.0-8.5 fl oz	25.5 fl oz	7	12	No more than 3 applications. See label for plant-back intervals.
	--	Acramite-50WS (bifenazate)	0.75-1.0 lb	1.0 lb	3	12	One application per season.
	1A	Sevin 4F, XLR (carbaryl)	4F, XLR: 0.5-1.0 qt	4F, XLR: 6 qt	3	12	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)	12.8 oz	1.6 lb	0	12	Do not apply more than 8 applications at the highest rate per season. Highly toxic to bees.
	3A	*Brigade 2 EC (bifenthrin)	2.6-6.4 fl oz	19.2 fl oz	3	12	Do not make more than 2 applications after bloom. Highly toxic to foraging bees.
	3A	*Pounce 25 WP (permethrin)	6.4-12.8 oz	76.8 oz cantaloupes: 51.2 oz	0	12	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	1	24	Do not apply to blooming crops.
Thrips (check label for species controlled)	4A	Assail 30SG (acetamiprid)	5.3 oz	26.5 oz	0	12	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	Scorpion 35SL Insecticide (dinotefuran)	foliar: 2-7 fl oz soil: 9-10.5 fl oz	foliar: 10.5 fl oz soil: 21 fl oz	foliar: 1 soil: 21	12	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	foliar: 1 soil: 21	12	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: 7-14 fl oz soil: 21-28 fl oz	foliar: 28 fl oz soil: 28 fl oz per crop season	foliar: 1 soil: 21	4	foliar: Minimum application interval: 7 days soil: For soil application methods, see label. Soil maximum : no more than 3 crop seasons per year.
	15	Rimon 0.83EC (novaluron)	9-12 fl oz	36 fl oz	1	12	Do not apply more often than every 14 days.
	1B	Dimethoate 4 EC (dimethoate)	melons: 1 pt watermelons: 0.5 – 1 pt	2 pt per year	3	48	Highly toxic to bees. Not for squash or cucumber.
	4A	Admire Pro (imidacloprid) (see appropriate labels for other brands)	7-10.5 oz	10.5 fl oz	soil: 21	12	Do not use with other Group 4A insecticides. Not for planthouse. 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	30	12	For most crops that are not on the label, a 120-day plant-back interval must be observed. Highly toxic to foraging bees.

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 19.2 for biopesticide and other alternative products labeled for disease management.

Insect or mite pest	MOA Code ¹	Trade Name (Active Ingredient) *Restricted	Rate (Product/acre)	Max rate product per season	Days to Harvest	REI (hours)	Remarks ²
Whitefly	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)	foliar: 1 soil: 21	12	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: 5-7.5 oz	foliar: 6 oz soil: 12 oz	foliar: 1 soil: 21	12	Highly toxic to foraging bees. Use only one application method (soil or foliar). Note that pests controlled differ depending on application method.
	5	Radiant SC (spinetoram)	6-10 fl oz	34 fl oz	3; 1 for cucumbers	4	No more than 6 applications. Toxic to bees for up to 3 hours following application.
	28	Exirel (cyantraniliprole)	13.5-20.5 fl oz	61.6 fl oz	1	12	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.
	3A	*Brigade 2 EC (bifenthrin)	2.6-6.4 fl oz	19.2 fl oz	3	12	Do not make more than 2 applications after bloom. Highly toxic to foraging bees.
	4A	Actara (thiamethoxam)	1.5-5.5 oz	11.0 oz	0	12	Apply before pests reach damaging levels. Highly toxic to foraging bees.
	4A	Admire Pro (imidacloprid) (see appropriate labels for other brands)	7-10.5 oz Planthouse: 0.44 fl oz/10,000 plants	10.5 fl oz	soil: 21	12	Do not use with other Group 4A insecticides. Planthouse: One application to transplants. See label for use on mature greenhouse cucumbers.
	4A	Assail 30SG (acetamiprid)	2.5-5.3 oz	26.5 oz	0	12	No more than 5 applications per season. Do not use with other group 4A insecticides. Toxic to foraging bees.
	4A	Platinum Platinum 75SG (thiamethoxam)	5-11 fl oz 75SG: 1.66-3.67 oz	11 fl oz 3.67 oz	30	12	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	foliar: 1 soil: 21	12	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: 5-7.5 oz	foliar: 6 oz soil: 12 oz	foliar: 1 soil: 21	12	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: 7-14 fl oz soil: 21-28 fl oz	foliar: 28 fl oz soil: 28 fl oz per crop season	foliar: 1 soil: 21	4	foliar: Minimum application interval: 7 days soil: For soil application methods, see label. Soil maximum : no more than 3 crop seasons per year.
	7C	Knack IGR (pyriproxyfen)	8-10 fl oz	20 fl oz	7	12	Immatures only. Apply when nymphs first appear. Do not apply more than twice per growing season.
	9B	Fulfill (pymetrozine)	2.75 oz	5.5 oz	0	12	Minimum of 7 days between applications.
	15	Rimon 0.83EC (novaluron)	9-12 fl oz	36 fl oz	1	12	Do not apply more often than every 14 days.
	16	Courier 40SC (buprofezin)	9.0-13.6 fl oz	27.2 fl oz	7	12	Immatures only. Insect growth regulator. Do not make more than 2 applications per season per crop or 4 per year.
23	Oberon 2SC (spiromesifen)	7.0-8.5 fl oz	25.5 fl oz	7	12	No more than 3 applications.	
28	Exirel (cyantraniliprole)	13.5-20.5 fl oz	61.6 fl oz	1	12	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 19.2 for biopesticide and other alternative products labeled for disease management.

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

¹ 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.

²Information 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.

Pertinent Diseases or Pathogens	Fungicide Group ¹	Chemical (active ingredients)	Max. Rate/Acre		Min. Days to		Remarks ²
			Applic.	Season	Harvest	Reentry	
Labels change frequently. Be sure to read a current product label before applying any chemical. Refer to Table 19.1 for biopesticide and other alternative products labeled for disease management.							
Alternaria leaf spot/blight	M1	(copper compounds) Many brands available: AmeriCop 40 DF, Badge SC, Badge X2, Basic Copper 53, Champ DP Dry Prill, Champ Formula 2 FL, Champ WG, Champion++, Copper-Count-N, Cueva, Cuprofix Ultra 40 Disperss, Cuproxat, Kentan DF, Kocide 2000, Kocide 3000, Kocide DF, Kop-Hydroxide, MasterCop, Nordox, Nordox 75WG, Nu-Cop 3L, Nu-Cop 50 WP, Nu-Cop 50DF, Nu-Cop HB, Nu-Cop 30 HB, Nu-Cop XLR, Previsto, Kop-Hydroxide	SEE INDIVIDUAL LABELS		1	Varies from 4 hr to 2 days	See label for crop guidelines
	M1 & M3	ManKocide (copper hydroxide + mancozeb)	3 lb	24 lb	5	2	Labeled for all cucurbits. Some cantaloupe varieties are sensitive. See label.
	M3	(mancozeb) Many brands available: Dithane F45 Rainshield, Dithane M45, Fortuna 75WDG, Koverall, Manzate Max, Manzate Pro-Stick, Penncozeb 75DF, Penncozeb 80WP, Protect DF, Roper DF Rainshield	SEE INDIVIDUAL LABELS		5	1	Labeled for all cucurbits.

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 ¹	Chemical (active ingredients)	Max. Rate/Acre		Min. Days to		Remarks ²
			Applic.	Season	Harvest	Reentry	
Labels change frequently. Be sure to read a current product label before applying any chemical. Refer to Table 19.1 for biopesticide and other alternative products labeled for disease management.							
	M5	(chlorothalonil) Many brands available: Bravo Ultrex, Bravo Weather Stik, Bravo ZN, Choloronil 720, Chlorothalonil 720SC, Echo 720, Echo 90 DF, Echo Zn, Equus 500 ZN, Equus 720 SST, Equus DF, Initiate 720, Initiate ZN, Orondis Opti B, Praiz	SEE INDIVIDUAL LABELS		0	1	Labeled for all cucurbits. Recommended maximum rate is less for certain diseases including downy mildew. 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 & 27	Ariston (chlorothalonil + cymoxanil)	3.0 pt	17.5 pt	3	0.5	
	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	Luna Privilege (fluopyram)	6.84 fl oz	13.7 fl oz	See label	0.5	Only labeled for watermelon. Do not make more than 2 app sequentially or any FRAC 7 containing fungicide
	7 & 3	Luna Experience (fluopyram + tebuconazole)	17 fl oz	34 fl oz	7	0.5	Only labeled for watermelon. 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	Only labeled on watermelon. 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	Labeled for all cucurbits. Do not make more than two consecutive applications.
	9 & 12	Switch 62.5WG (cyprodinil + fludioxonil)	14 fl oz	See label	1	0.5	Labeled for all cucurbits. Do not apply more than 56 oz/A per plot of land per year. 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	Limit is 4 appl/crop & alternate chemistry. Labeled for all cucurbits.
	11	(azoxystrobin) Many brands available: Aframe, Azoxystar, Azoxyzone, Equation, Quadris, Satori, Trevo, Willowood Azoxy 2SC	SEE INDIVIDUAL LABELS		1	4 hr	Limit is 4 appl/crop & alternate chemistry. Labeled for all cucurbits. See label for tankmixing restrictions.
	11	Cabrio (pyraclostrobin)	16 oz	64 oz	0	0.5	Labeled for all cucurbits. See label for tankmixing restrictions.
	11	Evito 480 SC (fluoaxastrobin)	5.7 fl oz	22.8 fl oz	0.5	1	
	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. Labeled for all cucurbits. Do not apply to mature watermelons under dry, hot and other environmental conditions listed on label.
	11 & 3	Topguard EQ (azoxystrobin + flutriafol)	8 fl oz	See label	1	0.5	
	11 & 3	Quadris Top (azoxystrobin + difenoconazole)	14 fl oz	56 fl oz	1	0.5	Must be rotated with a non-QoI containing fungicide. Labeled for all cucurbits.
	11 & 7	Mural (azoxystrobin + benzovindiflupyr)	SEE LABEL		0	0.5	Only for vegetable plants grown for resale to consumers
	19	PH-D (polyoxin D zinc salt)	6.2 oz	See label	0	4 h	
	22 & M3	Gavel 75DF (zoxamide + mancozeb)	2 lb	16 lb	5	2	Limit is 8 appl/crop. Some cantaloupe varieties are sensitive, check label. Labeled for all cucurbits.

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 ¹	Chemical (active ingredients)	Max. Rate/Acre		Min. Days to		Remarks ²
			Applic.	Season	Harvest	Reentry	
Labels change frequently. Be sure to read a current product label before applying any chemical. Refer to Table 19.1 for biopesticide and other alternative products labeled for disease management.							
Angular leaf spot	25 & M5	Zing (Zoxamide + chlorothalonil)	36 fl.oz	See label	0	0.5	
	27 & 11	Tanos 50DF (cymoxanil + famoxadone)	8 oz	See label	3	0.5	Limit is 4 appl/crop. Must tankmix with a contact fungicide. Labeled for all cucurbits.
	29	Omega 500 F (fluzinam)	1.5 pts	9 pts	30	0.5	Labeled on melon crop subgroup 9A crops only. See label
	M1	(copper compounds) Many brands available: AmeriCop 40 DF, Badge SC, Badge X2, Basic Copper 53, Champ DP Dry Prill, Champ Formula 2 FL, Champ WG, Champion++, Copper-Count-N, Cueva, Cuprofix Ultra 40 Disperss, Cuproxat, Kentan DF, Kocide 2000, Kocide 3000, Kocide DF, Kop-Hydroxide, Master Cop, Nordox, Nordox 75WG, Nu-Cop 50 WP, Nu-Cop 3L, Nu-Cop HB, Nu-Cop 30 HB, Nu-Cop 50DF, Nu-Cop XLR, Prevsito	SEE INDIVIDUAL LABELS		1	Varies from 4 hr to 2 days	
	M1 & M3	ManKocide (copper hydroxide + mancozeb) (copper hydroxide + mancozeb)	3 lb	24 lb	5	2	Labeled for all cucurbits. Some cantaloupe varieties are sensitive. See label
	P	Actigard 50WG (acibenzolar-S-methyl)	1 oz	8 oz	0	0.5	Apply preventively prior disease development. Suppression of disease. Labeled for all cucurbits.
	Anthracnose	M1	(copper compounds) Many brands available: AmeriCop 40 DF, Badge SC, Badge X2, Basic Copper 53, C-O-C-S WDG, Champ DP Dry Prill, Champ Formula 2 FL, Champ WG, Champion++, Copper-Count-N, Cueva, Cuprofix Ultra 40 Disperss, Cuproxat, Kentan DF, Kocide 2000, Kocide 3000, Kocide DF, Kop-Hydroxide, Kop-Hydroxide 50W, MasterCop, Nordox, Nordox 75WG, NorDox 50WP, 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
M1 & M3		ManKocide (copper hydroxide + mancozeb)	3 lb	24 lb	5	2	Labeled for all cucurbits. Some cantaloupe varieties are sensitive. See label.
M3		(mancozeb) Many brands available: Dithane F45 Rainshield, Dithane M45, Fortuna 75WDG, Koverall, Manzate Max, Manzate Pro-Stick, Penncozeb 75DF, Penncozeb 80WP, Roper DF Rainshield, Protect DF	SEE INDIVIDUAL LABELS		5	1	Labeled for all cucurbits.
M5		(chlorothalonil) Many brands available: Bravo Ultrex, Bravo Weather Stik, Bravo ZN, Choloronil 720, Echo 720, Echo 90DF, Echo ZN, Equus 500 ZN, Equus 720 SST, Equus DF, Initiate 720, Initiate ZN, Orondis Opti B, Praiz	SEE INDIVIDUAL LABELS		0	1	Labeled for all cucurbits. Recommended maximum rate is less for certain diseases including downy mildew. 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 & 27		Ariston (chlorothalonil + cymoxanil)	3.0 pints	17.5 pints	3	0.5	
4 & M5		Ridomil Gold Bravo SC (mefenoxam + chlorothalonil)	3.25 pt	See label	0	2	Limit is 4 appl/crop. Labeled for all cucurbits.
1		(thiophanate-methyl) Many brands available: 3336 EG, 3336 F, 3336 WP, T-Methyl 4.5 Ag, Incognito 4.5F, Incognito 85 WDG, Thiophanate methyl 85WDG, Topsin 4.5FL, Topsin M WSB	SEE INDIVIDUAL LABELS		1	1	Follow resistance management guidelines on label. Labeled for all cucurbits.

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 ¹	Chemical (active ingredients)	Max. Rate/Acre		Min. Days to		Remarks ²
			Applic.	Season	Harvest	Reentry	
Labels change frequently. Be sure to read a current product label before applying any chemical. Refer to Table 19.1 for biopesticide and other alternative products labeled for disease management.							
	7 & 3	Luna Experience (fluopyrym + tebuconazole)	17 fl oz	34 fl oz	7		Only labeled for watermelon. 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	Labeled for all cucurbits. Limit is 4 appl/crop & alternate chemistry.
	7 & 11	Luna Sensation (fluopyrym + trifloxystrobin)	7.6 fl oz	27.1 fl oz	0	0.5	Only labeled on watermelon. 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	Labeled for all cucurbits. 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		Labeled for all cucurbits. 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. Labeled for all cucurbits
	11	(azoxystrobin) Many brands available: Aframe, Azoxystar, Azoxyzone, Equation, Quadris, Satori, Trevo, Willowood Azoxy 2SC	SEE INDIVIDUAL LABELS		1	4 hr	Limit is 4 appl/crop & alternate chemistry. Labeled for all cucurbits. See label for tankmixing restrictions.
	11	Evito (fluoaxastrobin)	5.7 fl oz	22.8 fl oz	1	0.5	Maximum of 4 applications per season, and a minimum interval of 7 days between application. See label for more information. Labeled for use on squash/cucumbers Subgroup 9B only.
	11 & 3	Topguard EQ (azoxystrobin + flutriafol)	8 fl oz	See label	1	0.5	
	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. Labeled for all cucurbits. 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. Labeled for all cucurbits.
	11 & 7	Mural (azoxystrobin + benzovindiflupyr)	SEE LABEL		0	0.5	Only for vegetable plants grown for resale to consumers
	19	Oso 5% SC, PH-D (polyoxin D zinc salt)	SEE LABEL		0	4 hr	
	27 & 11	Tanos 50DF (cymoxanil + famoxadone)	8 oz	See label	3	0.5	Limit is 4 appl/crop. Must tankmix with a contact fungicide. Labeled for all cucurbits.
	25 & M5	Zing (Zoxamide + chlorothalonil)	36 fl.oz	See label	0	0.5	
Bacterial fruit blotch	M1	(copper compounds) Many brands available: Americop 40 DF, Badge SC, Badge X2, Basic Copper 53, Champ DP Dry Prill, Champ Formula 2 FL, Champ WG, Champion++, Copper-Count-N, Cuprofix Ultra 40 Dispers, Cuproxat, Kentan DF, Kocide 2000, Kocide 3000, Kocide DF, Kop-Hydroxide 50W, MasterCop, Nordox, Nordox 75 WG, Nu-Cop 50 WP, Nu-Cop 3L, Nu-Cop 30HB, Nu-Cop 50 DF, Nu-Cop HB, Nu-Cop XLR, Previsto	SEE INDIVIDUAL LABELS		1	Varies from 4 hr to 2 days	Suppression only
	M1 & M3	ManKocide (copper hydroxide + mancozeb)	3 lb	24 lb	5	2	Labeled on all cucurbits. Some cantaloupe varieties are sensitive. See 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 ¹	Chemical (active ingredients)	Max. Rate/Acre		Min. Days to		Remarks ²
			Applic.	Season	Harvest	Reentry	
Labels change frequently. Be sure to read a current product label before applying any chemical. Refer to Table 19.1 for biopesticide and other alternative products labeled for disease management.							
Belly rot	27 & 11	Tanos 50DF (cymoxanil + famoxadone)	8 oz	See label	3	0.5	Limit is 4 appl/crop. Must tankmix with a contact fungicide. Labeled for all cucurbits. Bacterial fruit blotch disease suppression only
	P	Actigard 50WG (acibenzolar-S-methyl)	1 oz	8 oz	0	0.5	Apply preventively prior disease development. Suppression of disease. Labeled for all cucurbits.
	1	(thiophanate-methyl) Many brands available: 3336 EG, 3336 F, 3336 WP, Cercobin, Helena T-Methyl 4.5 AG, Incognito 4.5F, Incognito 85WDG, Thiophanate methyl 85WDG, Topsin 4.5FL, Topsin M WSB	SEE INDIVIDUAL LABELS		1	1	Follow resistance management guidelines on label. Labeled for all cucurbits.
	7 & 3	Luna Experience (fluopyryram + tebuconazole)	17 fl oz	34 fl oz	7		Only labeled for watermelon. No more than 2 sequential apps before rotating to a non-FRAC 7 and non-FRAC 3 fungicide.
	7 & 11	Luna Sensation (fluopyryram + trifloxystrobin)	7.6 fl oz	27.1 fl oz	0	0.5	Only labeled on watermelon. No more than 2 sequential apps before rotating to a non-FRAC 7 and non-FRAC 11 fungicide
	11	Evito (flouxastrobin)	5.7 fl oz	22.8 fl oz	1	0.5	Maximum of 4 applications per season, and a minimum interval of 7 days between application. See label for more information. Labeled for use on squash/cucumbers Subgroup 9B only.
	11	(azoxystrobin) Many brands available: Aframe, Azoxystar, Azoxyzone, Equation, Quadris, Satori, Trevo, Willowood Azoxy 2SC	SEE INDIVIDUAL LABELS		1	4 hr	Limit is 4 appl/crop & alternate chemistry. Labeled for all cucurbits. See label for tankmixing restrictions.
	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. Labeled for all cucurbits. 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. First appl. should be made at the 1- to 3-leaf stage with 2nd appl. prior to fine tip or 10-14 days later. Labeled for all cucurbits.
	11 & 3	Topguard EQ (azoxystrobin + flutriafol)	8 fl oz	See label	1	0.5	
Cercospora leaf spot	19	PH-D (polyoxin D zinc salt)	6.2 oz	See label	0	4 h	
	M1 & M3	ManKocide (copper hydroxide + mancozeb)	3 lb	24 lb	5	2	Labeled on all cucurbits. Some cantaloupe varieties are sensitive. See label.
	M3	(mancozeb) Many brands available: Dithane F45 Rainshield, Dithane M45, Fortuna 75WDG, Koverall, Manzate Max, Manzate Pro-Stick, Penncozeb 75DF, Penncozeb 80WP, Protect DF, Roper DF Rainshield	SEE INDIVIDUAL LABELS		5	1	Labeled for all cucurbits.
	M5	(chlorothalonil) Many brands available: Bravo Ultrex, Bravo Weather Stik, Bravo ZN, Choloronil 720, Echo 720, Echo 90DF, Echo ZN, Equus 500 ZN, Equus 720 SST, Equus DF, Initiate 720, Initiate ZN, Orondis Opti B, Ppraiz,	SEE INDIVIDUAL LABELS		0	1	Labeled for all cucurbits. Recommended maximum rate is less for certain diseases including downy mildew. Follow label recommendations on watermelon after fruit set. Do not apply to mature watermelons under dry, hot and other environmental conditions listed on label.
	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. Labeled for all cucurbits.

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 ¹	Chemical (active ingredients)	Max. Rate/Acre		Min. Days to		Remarks ²
			Applic.	Season	Harvest	Reentry	
Labels change frequently. Be sure to read a current product label before applying any chemical. Refer to Table 19.1 for biopesticide and other alternative products labeled for disease management.							
	7 & 11	Pristine 38WG (boscalid + pyraclostrobin)	18.5 oz	74 oz	0	0.5	Labeled for all cucurbits. Limit is 4 appl/crop & alternate chemistry.
	7 & 11	Merivon (fluxapyroxad + pyraclostrobin)	5.5 fl oz	16.5 fl oz	0	0.5	Labeled for all cucurbits. 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		Labeled for all cucurbits. 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. Labeled for all cucurbits.
	11	(azoxystrobin) Many brands available: Aframe, Azoxystar, Azoxyzone, Equation, Quadris, Satori, Trevo, Willowood Azoxy 2SC	SEE INDIVIDUAL LABELS		1	4 hr	Limit is 4 appl/crop & alternate chemistry. Labeled for all cucurbits. See label for tankmixing restrictions.
	11	Evito (fluoxastrobin)	5.7 fl oz	22.8 fl oz	1		Maximum of 4 applications per season, and a minimum interval of 7 days between application. See label for more information. Labeled for use on squash/cucumbers Subgroup 9B only.
	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. Labeled for all cucurbits. Do not apply to mature watermelons under dry, hot and other environmental conditions listed on label.
	11 & 3	Topguard EQ (azoxystrobin + flutriafol)	8 fl oz	See label	1	0.5	
	11 & 3	Quadris Top (azoxystrobin + difenoconazole)	14 fl oz	56 fl oz	1	0.5	Must be rotated with a non-QoI containing fungicide. Labeled for all cucurbits.
	22 & M3	Gavel 75DF (zoxamide + mancozeb)	2 lb	16 lb	5	2	Limit is 8 appl/crop. Some cantaloupe varieties are sensitive, check label. Labeled for all cucurbits.
Downy Mildew	M1	(copper compounds) Many brands available: AmeriCop 40 DF, Badge SC, Badge X2, Basic Copper 53, Champ DP Dry Prill, Champ Formula 2 FL, Champ WG, Champion ++, Copper-Count-N, Cueva, Cuprofix Ultra 40 Disperss, Cuproxat, Kentan DF, Kocide 2000, Kocide 3000, Kocide DF, Kop-Hyrdoxide, Kop-Hydroxide 50 W, MasterCop, Nordox, Nordox 75WG, Nu-Cop 50 WP, Nu-Cop 3L, Nu-Cop 50DF, Nu-Cop HB, Nu-Cop XLR, Previsto	SEE INDIVIDUAL LABELS		1	Varies from 4 hr to 2 days	
	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	Labeled on all cucurbits. Some cantaloupe varieties are sensitive. See label.
	M3	(mancozeb) Many brands available: Dithane F45 Rainshield, Dithane M45, Fortuna 75WDG, Koverall, Manzate Max, Manzate Pro-Stick, Penncozeb 75DF, Penncozeb 80WP, Roper DF Rainshield, Protect DF	SEE INDIVIDUAL LABELS		5	1	Labeled for all cucurbits.
	M5	(chlorothalonil) Many brands available: Bravo Ultrex, Bravo Weather Stik, Bravo ZN, Choloronil 720, Echo 720, Echo 90DF, Echo ZN, Equus 500 ZN, Equus 720 SST, Equus DF, Initiate 720, Initiate ZN, Orondis Opti B, Praiz	SEE INDIVIDUAL LABELS		0	1	Labeled for all cucurbits. Recommended maximum rate is less for certain diseases including downy mildew. Follow label recommendations on watermelon after fruit set. Do not apply to mature watermelons under dry, hot and other environmental conditions listed on 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 ¹	Chemical (active ingredients)	Max. Rate/Acre		Min. Days to		Remarks ²
			Applic.	Season	Harvest	Reentry	
Labels change frequently. Be sure to read a current product label before applying any chemical. Refer to Table 19.1 for biopesticide and other alternative products labeled for disease management.							
4 & M1		Ridomil Gold/Copper 64.8 W (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. Labeled for all cucurbits.
4 & M5		Ridomil Gold Bravo SC (mefenoxam + chlorothalonil)	2.5 pt	See label	7	2	Limit is 4 appl/crop. Labeled for all cucurbits.
3 & 33		Viathon (tebuconazole + potassium phosphite)	4 pt	12 pt	7	0.5	Disease suppression only. See label
7 & 11		Pristine 38WG (boscalid + pyraclostrobin)	18.5 oz	74 oz	0	0.5	Labeled for all cucurbits. 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). Labeled for all cucurbits. Do not make more than one application before alternating to a non-FRAC 7 or non-FRAC 11 group fungicide.
11		Cabrio 20EG (pyraclostrobin)	12 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. Labeled for all cucurbits.
11		Evito (fluoxastrobin)	5.7 fl oz	22.8 fl oz	1	0.5	Maximum of 4 applications per season, and a minimum interval of 7 days between application. See label for more information. Labeled for use on squash/cucumbers Subgroup 9B only.
11		Flint 50WP (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. Labeled for all cucurbits.
11		(azoxystrobin) Many brands available: Aframe, Azoxystar, Azoxyzone, Equation, Quadris, Satori, Trevo, Willowood Azoxy 2SC	SEE INDIVIDUAL LABELS		1	4 hr	Limit is 4 appl/crop & alternate chemistry. Labeled for all cucurbits. See label for tankmixing restrictions.
11		Reason 500SC (fenamidone)	5.5 fl oz	22 oz	14	0.5	Limit is 4 appl/crop & alternate chemistry. Labeled for all cucurbits.
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. Labeled for all cucurbits. 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. Labeled for all cucurbits.
11 & 3		Topguard EQ (azoxystrobin + flutriafol)	8 fl oz	See label	1	0.5	
11 & 7		Mural (azoxystrobin + benzovindiflupyr)	SEE LABEL		0	0.5	Only for vegetable plants grown for resale to consumers
21		Ranman 400 SC, Ranman (cyazofamid)	2.75 fl oz	16.5 fl oz	0	0.5	Limit is 6 appl/crop. Follow resistance management guidelines on label. Labeled for all cucurbits.
P		Actigard 50WG (acibenzolar-S-methyl)	1 oz	8 oz	0	0.5	Apply preventively prior disease development. Suppression of disease. Labeled for all cucurbits.
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. Labeled for all cucurbits.

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 ¹	Chemical (active ingredients)	Max. Rate/Acre		Min. Days to		Remarks ²
			Applic.	Season	Harvest	Reentry	
Labels change frequently. Be sure to read a current product label before applying any chemical. Refer to Table 19.1 for biopesticide and other alternative products labeled for disease management.							
	27	Curzate 60DF (cymoxanil)	5 oz	30 oz	3	0.5	Use only with a labeled rate of protectant fungicide.
	27 & 11	Tanos 50DF (cymoxanil + famoxadone)	8 oz	See label	3	0.5	Limit is 4 appl/crop. Must tankmix with a contact fungicide. Labeled for all cucurbits.
	27 & M5	Ariston (chlorothalonil + cymoxanil)	3.0 pt	17.5 pt	3	0.5	
	28	Previcur Flex (propamocarb hydrochloride)	1.2 pt	6 pt	2	0.5	
	29	Omega 500 F (fluazinam)	1.5 pt	9 pt	30	0.5	Labeled on melon crop subgroup 9A crops only. See label
	33	Aliette 80WDG Linebacter WDG (fosetyl-AI)	5 lb	35 lb	12 hr	0.5	Limit is 7 appl/crop. Do not tank mix with copper fungicides. Labeled for all cucurbits. 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. Labeled for all cucurbits.
	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. Labeled for all cucurbits.
	45 & 40	Zapro (ametoctradin + dimethomorph)	14 fl oz	42 fl oz	0	0.5	Limit is 3 appl/season. No more than 2 sequential appl. Addition of a spreading/ penetrating adjuvant is recommended. Labeled for all cucurbits.
	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
Gummy stem blight	M1	(copper compounds) Many brands available: AmeriCop 40 DF, Badge SC, Badge X2, Basic Copper 53, Champ DP Dry Prill, Champ Formula 2 FL, Champ WG, Champion ++, Copper-Count-N, Cueva, Cuprofix Ultra 40 Disperss, Cuproxat, Kentan DF, Kocide 2000, Kocide 3000, Kocide DF, Kop-Hydroxide, MasterCop, Nordox, 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	
	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	Labeled on all cucurbits. Some cantaloupe varieties are sensitive. See label.
	M3	(mancozeb) Many brands available: Dithane F45 Rainshield, Dithane M45, Fortuna 75WDG, Koverall, Manzate Max, Manzate Pro-Stick, Penncozeb 75DF, Penncozeb 80WP, Protect DF, Roper DF Rainshield	SEE INDIVIDUAL LABELS		5	1	Labeled for all cucurbits.
	M5	(chlorothalonil) Many brands available: Bravo Ultrex, Bravo Weather Stik, Bravo ZN, Choloronil 720, Echo 720, Echo 90DF, Echo ZN, Equus 500 ZN, Equus 720 SST, Equus DF, Initiate 720, Initiate ZN, Orondis Opti B, Praiz	SEE INDIVIDUAL LABELS		0	1	Labeled for all cucurbits. Recommended maximum rate is less for certain diseases including downy mildew. Follow label recommendations on watermelon after fruit set. Do not apply to mature watermelons under dry, hot and other environmental conditions listed on 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 ¹	Chemical (active ingredients)	Max. Rate/Acre		Min. Days to		Remarks ²
			Applic.	Season	Harvest	Reentry	
Labels change frequently. Be sure to read a current product label before applying any chemical. Refer to Table 19.1 for biopesticide and other alternative products labeled for disease management.							
	1	(thiophanate-methyl) Many brands available: 3336 EG, 3336 F, 3336 WP, Cercobin, Helena T-Methyl 4.5 Ag, Incognito 4.5F, Incognito 85WDG, NuFarm T-Methyl 4.5 F, Topsin 4.5FL, Topsin M WSB, Topsin M 70WDG	SEE INDIVIDUAL LABELS		1	1	Follow resistance management guidelines on label. Labeled for all cucurbits.
	3	Topguard (Flutriafol)	14 fl oz	56 fl oz	0	0.5	See label
	3	(tebuconazole) Many brands available: Incognito 4.5F, Monsoon, Onset 3.6L, Orius 3.6F, Tebu-Crop 3.6F, Tebucon 3.6 F, Tebustar 3.6L, Tebuzol 3.6F, Thiophanate Methyl 85-WDG, Toledo, Willowood Teb 3.6 SC	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	
3 & M5		Muscle ADV (tebuconazole + chlorothalonil)	1.6 pt	6.4 pt	7	0.5	
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	7	2	Limit is 4 appl/crop. Labeled for all cucurbits.
	7	Endura (boscalid)	6.5 oz	26 oz	0	0.5	Labeled for all cucurbits. 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	Luna Privilege (fluopyram)	6.84 fl oz	13.7 fl oz	See label	0.5	Only labeled for watermelon. Do not make more than 2 app sequentially or any FRAC 7 containing fungicide
	7 & 3	Luna Experience (fluopyram + tebuconazole)	17 fl oz	34 fl oz	7	0.5	Only labeled for watermelon. 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	Only labeled on watermelon. No more than 2 sequential apps before rotating to a non-FRAC 7 and non-FRAC 11 fungicide
	7 & 11	Pristine 38WG (boscalid + pyraclostrobin)	18.5 oz	74 oz	0	0.5	Labeled for all cucurbits. Limit is 4 appl/crop & alternate chemistry.
	7 & 11	Merivon (fluxapyroxad + pyraclostrobin)	5.5 fl oz	16.5 fl oz	0	0.5	Labeled for all cucurbits. 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	Labeled for all cucurbits. Do not make more than two consecutive applications.
	9 & 12	Switch 62.5WG (cyprodinal + fludioxonil)	14 oz	See label	1	0.5	Labeled for all cucurbits. Do not apply more than 56 oz/A per plot of land per year. Do not make more than two consecutive applications before switching to fungicide with a different mode of action.
	11	Evito (flouxastrobin)	5.7 fl oz	22.8 fl oz	1	0.5	Maximum of 4 applications per season, and a minimum interval of 7 days between application. See label for more information. Labeled for use on squash/cucumbers Subgroup 9B only.

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 ¹	Chemical (active ingredients)	Max. Rate/Acre		Min. Days to		Remarks ²
			Applic.	Season	Harvest	Reentry	
Labels change frequently. Be sure to read a current product label before applying any chemical. Refer to Table 19.1 for biopesticide and other alternative products labeled for disease management.							
Phytophthora blight/ fruit and root rot	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. Labeled for all cucurbits.
	11	(azoxystrobin) Many brands available: Aframe, Azoxystar, Azoxyzone, Equation, Quadris, Satori, Trevo, Willowood Azoxy 2SC	SEE INDIVIDUAL LABELS		1	4 hr	Limit is 4 appl/crop & alternate chemistry. Labeled for all cucurbits. See label for tankmixing restrictions.
	11	Sovran (kresoxim-methyl)	4.8 oz	19.2 oz	0	0.5	Follow resistance management guidelines on label. Labeled for all cucurbits.
	11 & 3	Topguard EQ	8 fl oz	See label	1	0.5	See 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. Labeled for all cucurbits.
	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. Labeled for all cucurbits. 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
	19	Affirm WDG, Oso 5% SC, PH-D (polyoxin D zinc salt)	SEE INDIVIDUAL LABELS		0	4 h	
	27 & M5	Ariston (chlorothalonil + cymoxanil)	3.0 pt	17.5 pt	3	0.5	
	29	Omega 500 F (fluazinam)	1.5 pts	9 pts	30	0.5	Labeled on melon crop subgroup 9A crops only. See label
	21	Ranman 400 SC, Ranman (cyazofamid)	2.75 fl oz	16.5 fl oz	0	0.5	Limit is 6 appl/crop. Follow resistance management guidelines on label. Labeled for all cucurbits.
	22 & M3	Gavel 75DF (zoxamide + mancozeb)	2 lb	16 lb	5	2	Limit is 8 appl/crop. Some cantaloupe varieties are sensitive, check label. Labeled for all cucurbits.
	27 & 11	Tanos 50DF (cymoxanil + famoxadone)	8 oz	See label	3	0.5	Limit is 4 appl/crop. Must tankmix with a contact fungicide. Labeled for all cucurbits. Phytophthora blight foliar and fruit phase only (disease suppression)
	33	Aliette 80WDG Linebacter WDG (fosetyl-AI)	5 lb	35 lb	12 hr	0.5	Limit is 7 appl/crop. Do not tank mix with copper fungicides. Labeled for all cucurbits. See label for specific brand. Phytophthora root and fruit rot
	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. Labeled for all cucurbits. Phytophthora blight and crown rot
	40	Orondis Ultra B, Revus (mandipropamid)	8 fl oz	32 fl oz	0	4 hr	An adjuvant is recommended for best control. Limit is 4 appl./crop. Phytophthora blight (supression).
	43	Presidio (fluopicolide)	4 fl oz	12 fl oz	2	0.5	Tankmix with another fungicide product with a different mode of action. Labeled for all cucurbits.
45 & 40	Zampro (ametoctradin + dimethomorph)	14 fl oz	42 fl oz	0	0.5	Limit is 3 appl/season. No more than 2 sequential appl. Addition of a spreading/ penetrating adjuvant is recommended. Labeled for all cucurbits.	

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 ¹	Chemical (active ingredients)	Max. Rate/Acre		Min. Days to		Remarks ²
			Applic.	Season	Harvest	Reentry	
Labels change frequently. Be sure to read a current product label before applying any chemical. Refer to Table 19.1 for biopesticide and other alternative products labeled for disease management.							
Powdery mildew	U15	Orondis Gold 200, Orondis Opti A, Orondis Ultra A (Oxathiapiprolin)	SEE INDIVIDUAL LABELS		0	4 h	Cucurbit vegetables, Crop group 9. Must be tank-mixed with an appropriate partner. See label for more information
	M1	(copper compounds) Many brands available: Americop 40 DF, Badge SC, Badge X2, Basic Copper 53, Champ DP Dry Prill, Champ Formula 2 FL, Champ WG, Champion ++, Copper-Count-N, Cueva, Cuprofix Ultra 40 Disperss, Cuproxat, Kentan DF, Kocide 2000, Kocide 3000, Kocide DF, Kop-Hydroxide, MasterCop, Nordox, Nordox 75WG, Nu-Cop 50 WP, Nu-Cop 3L, Nu-Cop 30HB, Nu-Cop 50DF, Nu-Cop HB, Nu-Cop XLR	SEE INDIVIDUAL LABELS		1	Varies from 4 hr to 2 days	See label
	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	Labeled on all cucurbits. Some cantaloupe varieties are sensitive. See label.
	M2	(sulfur) Many brands available: Cosavet DF, Cosavet DF Edge, Crusade DF, Kumulus DF, Kumulus DF, Micro Sulf, Microfine Sulfure, Microthiol Disperss, Suffa, 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. Labeled for all cucurbits.
	M5	(chlorothalonil) Many brands available: Bravo Ultrex, Bravo Weather Stik, Bravo ZN, Choloronil 720, Echo 720, Echo 90DF, Echo ZN, Equus 500 ZN, Equus 720 SST, Equus DF, Initiate 720, Initiate ZN, Orondis Opti B, Praiz	SEE INDIVIDUAL LABELS		0	1	Labeled for all cucurbits. Recommended maximum rate is less for certain diseases including downy mildew. Follow label recommendations on watermelon after fruit set. Do not apply to mature watermelons under dry, hot and other environmental conditions listed on label.
	1	(thiophanate-methyl) Many brands available: 3336 EG, 3336 F, 3336 WP, Cercobin, Helena T-Methyl 4.5 Ag, Incognito 4.5F, Incognito 85 WDG, NuFarm T-Methyl 4.5F, Thiophanate methyl 85WDG, Topsin 4.5FL, Topsin M WSB,	SEE INDIVIDUAL LABELS		1	1	Follow resistance management guidelines on label. Labeled for all cucurbits.
	3	Rally 40WSP Sonoma 40WSP (myclobutanil)	5 oz	1.5 lb	0	1	Note that a 30 day plant back restriction exists. Follow resistance management guidelines on label. Labeled for all cucurbits.
	3	(tebuconazole) Many brands available: Monsoon, Onset 3.6L, Orius 3.6F, TebuCrop 3.6F, Tebucon 3.6 F, Tebustar 3.6L, Tebuzol 3.6F, Toledo, Willowood Teb 3.6 SC	8 fl oz	24 fl oz	7	0.5	Maximum rate is lower for powdery mildew. Gummy stem blight suppression is only for watermelon, squash, pumpkin, and melons. See label for individual brands.
	3	Procure 480SC (triflumizole)	8 oz	40 oz	0	0.5	Follow resistance management guidelines on label. Labeled for all cucurbits.
	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 & 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		
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.	

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 ¹	Chemical (active ingredients)	Max. Rate/Acre		Min. Days to		Remarks ²
			Applic.	Season	Harvest	Reentry	
Labels change frequently. Be sure to read a current product label before applying any chemical. Refer to Table 19.1 for biopesticide and other alternative products labeled for disease management.							
3 & 33		Viathon (tebuconazole + potassium phosphite)	3 pt	12 pt	7	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
7		Endura (boscalid)	6.5 oz	26 oz	0	0.5	Labeled for all cucurbits. 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)
7		Luna Privilege Velum Prime (fluopyram)	6.84 fl oz	13.7 fl oz	0	0.5	Only labeled for watermelon. Do not make more than 2 app sequentially or any FRAC 7 containing fungicide
7 & 3		Luna Experience (fluopyram + tebuconazole)	17 fl oz	34 fl oz	7	0.5	Only labeled for watermelon. 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	Labeled for all cucurbits. Limit is 4 appl/crop & alternate chemistry.
7 & 11		Luna Sensation (fluopyram + trifloxystrobin)	7.6 fl oz	27.1 fl oz	0	0.5	Only labeled on watermelon. 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	Labeled for all cucurbits. 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	Labeled for all cucurbits. Do not make more than two consecutive applications.
9 & 12		Switch 62.5WG (cyprodinil + fludioxonil)	14 oz	See label	1	0.5	Labeled for all cucurbits. Do not apply more than 56 oz/A per plot of land per year. 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	4 appl maximum. Maximum number of sequential applications is one. Maximum rate is less for downy mildew. Labeled for all cucurbits.
11		Evito (fluoxastrobin)	5.7 fl oz	22.8 fl oz	1	0.5	Maximum of 4 applications per season, and a minimum interval of 7 days between application. See label for more information. Labeled for use on squash/cucumbers Subgroup 9B only.
11		Flint 50WP (trifloxystrobin)	2 oz	8 oz	0	0.5	Limit is 4 appl/crop & alternate chemistry. Maximum rate is higher for downy mildew suppression. Labeled for all cucurbits.
11		(azoxystrobin) Many brands available: Aframe, Azoxystar, Azoxyzone, Equation, Quadris, Satori, Trevo, Willowood Azoxy 2SC	SEE INDIVIDUAL LABELS		1	4 hr	Limit is 4 appl/crop & alternate chemistry. Labeled for all cucurbits. See label for tankmixing restrictions.
11		Sovran (kresoxim-methyl)	4.8 oz	19.2 oz	0	0.5	Follow resistance management guidelines on label. Labeled for all cucurbits.
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. Labeled for all cucurbits. 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. Labeled for all cucurbits.
11 & 3		Topguard EQ (azoxystrobin + flutriafol)	8 fl oz	See label	1	0.5	See label
11 & 7		Mural (azoxystrobin + benzovindiflupyr)	See label	See label	0	0.5	Only for vegetable plants grown for resale to consumers

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 ¹	Chemical (active ingredients)	Max. Rate/Acre		Min. Days to		Remarks ²
			Applic.	Season	Harvest	Reentry	
Labels change frequently. Be sure to read a current product label before applying any chemical. Refer to Table 19.1 for biopesticide and other alternative products labeled for disease management.							
Pythium	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 appls. 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	
	P	Actigard 50WG (acibenzolar-S-methyl)	1 oz	8 oz	0	0.5	Apply preventively prior disease development. Suppression of disease. Labeled for all cucurbits.
	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	Limit is 2 appl. per year. Labeled for all cucurbits.
	U8	Vivando (Metrafenone)	15.4 fl oz	42.2 fl oz	0	0.5	Supplemental label. See label for instructions
	4	Apron XL, Orondis Gold B Ridomil Gold SL Ultra Flourish (mefenoxam)	SEE INDIVIDUAL LABELS				
	4	(metalaxyl) Many brands available: Acquire, Allegiance FL, Dyna-Shield Metalaxyl 318 FS, Metalaxyl 265 ST, Metalaxyl 4.0 ST, Metalaxyl 2E, Metastar 2E, 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.
Target spot	28	Previcur Flex (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. Labeled for all cucurbits.
	M5	(chlorothalonil) Many brands available: Bravo Ultrex, Bravo Weather Stik, Bravo ZN, Choloronil 720, Echo 720, Echo 90DF, Echo ZN, Equus 500 ZN, Equus 720 SST, Equus DF, Initiate 720, Initiate ZN, Orondis Opti B, Praiz	SEE INDIVIDUAL LABELS		0	1	Labeled for all cucurbits. Recommended maximum rate is less for certain diseases including downy mildew. Follow label recommendations on watermelon after fruit set. Do not apply to mature watermelons under dry, hot and other environmental conditions listed on label.
	1	(thiophanate-methyl) Many brands available: 3336 EG, 3336 F, 3336 WP, Cercobin, Helena T-Methyl 4.5 Ag, Incognito 4.5F, Incognito 85 WDG, NuFarm T-Methyl 4.5F, Topsin 4.5FL, Topsin M WSB, Thiophanate methyl 85WDG, Topsin M 70WDG, T-methyl E-Ag 70WSB	SEE INDIVIDUAL LABELS		1	1	Follow resistance management guidelines on label. Labeled for all cucurbits.
	3	Topguard (flutriafol)	14 fl oz	56 fl oz	0	0.5	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. Labeled for all cucurbits.

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 ¹	Chemical (active ingredients)	Max. Rate/Acre		Min. Days to		Remarks ²
			Applic.	Season	Harvest	Reentry	
Labels change frequently. Be sure to read a current product label before applying any chemical. Refer to Table 19.1 for biopesticide and other alternative products labeled for disease management.							
Scab	11	Evito (fluoxastrobin)	5.7 fl oz	22.8 fl oz	1	0.5	Maximum of 4 applications per season, and a minimum interval of 7 days between application. See label for more information. Labeled for use on squash/cucumbers Subgroup 9B only.
	11	(azoxystrobin) Many brands available: Aframe, Azoxystar, Azoxyzone, Equation, Quadris, Satori, Trevo, Willowood Azoxy 2SC	SEE INDIVIDUAL LABELS		1	4 hr	Limit is 4 appl/crop & alternate chemistry. Labeled for all cucurbits. See label for tankmixing restrictions.
	7 & 11	Merivon (fluxapyroxad + pyraclostrobin)	5.5 fl oz	16.5 fl oz	0	0.5	Labeled for all cucurbits. Do not make more than one application before alternating to a non-FRAC 7 or non-FRAC 11 group fungicide
	19	Oso 5% SC, PH-D (polyoxin D zinc salt)	SEE LABEL		0	4 h	
	27 & M5	Ariston (chlorothalonil + cymoxanil)	3.0 pt	17.5 pt	3	0.5	
	M1	Cueva (copper octanoate)	SEE LABEL		0	4	SEE LABEL FOR CROPS LABELED
	M3	(mancozeb) Many brands available: Dithane F45 Rainshield, Dithane M45, Fortuna 75WDG, Koverall, Manzate Max, Manzate Pro-Stick, Penncozeb 75DF, Roper DF Rainshield	SEE INDIVIDUAL LABELS		5	1	Labeled for all cucurbits.
	M1 & M3	ManKocide (copper hydroxide & mancozeb)	3 lb	24 lb	5	2	Labeled on all cucurbits. Some cantaloupe varieties are sensitive. See label.
	M5	(chlorothalonil) Many brands available: Bravo Ultrex, Bravo Weather Stik, Bravo ZN, Choloronil 720, Echo 720, Echo 90DF, Echo ZN, Equus 500 ZN, Equus 720 SST, Equus DF, Initiate 720, Initiate ZN, Orondis Opti B, Praiz	SEE INDIVIDUAL LABELS		0	1	Labeled for all cucurbits. Recommended maximum rate is less for certain diseases including downy mildew. 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 & 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	7	2	Limit is 4 appl/crop. Labeled for all cucurbits.
	19	Affirm WDG Oso 5% SC PH-D (polyoxin D zinc salt)	SEE INDIVIDUAL LABELS		0	4 h	
	P	Actigard 50WG (acibenzolar-S-methyl)	1 oz	8 oz	0	0.5	Apply preventively prior disease development. Suppression of disease. Labeled for all cucurbits.

¹ 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 2017; <http://www.frac.info/> (FRAC = Fungicide Resistance Action Committee).

² 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 cucurbits in Florida.

Product	Broadcast or overall rates		Row rates	
	Per acre	Per 1000 sq ft	Per acre, 84" row spacing	Per 1000 ft of row, any row spacing
Mocap 15G*	---	---	13 lb	2.1 lb
Vydate L	Preplant and planting treatment: Apply 1 to 2 gals/acre (broadcast or use proportionately less for band treatment). Foliar application of 1 to 2 qt / acre in sufficient water to cover foliage uniformly, repeating according to label instructions. Do not apply more than 3 gal per acre per season, or 8 applications per season. Drip chemigation require specific methods and irrigation equipment. The product is currently unavailable and new production and marketplace sales is not expected until September 2017.			
Nimitz	All applications to tomato, peppers, and eggplant must be incorporated either physically or via drip or overhead irrigation. Make preplant applications at a rate of 3.5 to 5 pints, (56.0 to 80.0 fl. oz.) per acre, a minimum of seven 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 and provides no residual control. 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. Other restrictions may apply. Product is commercially available but is still actively under assessment in field trial evaluations.			

* Cucumbers only. Do not use as a seed furrow treatment or allow products to contact seed. Incorporate 2 to 4 inches into soil immediately after application according to label instructions. Apply in a 12 to 15 inch band on the row at planting.

These products are not as consistently effective against root nematodes as the fumigants, but are registered as indicated.

Table 7.13. Fumigant nematicides for cucurbits in Florida.

Nematicide	Broadcast Application ¹		In the Row Applications
	Gallons or Lbs Per acre	Fl oz /1000 ft / chisel spaced 12" apart	
Telone II ^{2,3}	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 ^{2,3}	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 ^{2,3}	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 gal	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.
Dimethyl ² Disulfide (DMDS)	51.3 gal	-	Compared to broadcast application, apply proportionately less for in the row applications based on the ratio of bed width to row spacing. Consult the product label for additional detail and rate modifying recommendation.
Allyl Isothiocyanate (AITC)	40 gal	-	For drip or in-row fumigation and crop termination, consult product label for overall rates, drip concentration and or other flow modifying directions
Dominus			

¹ 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.

² 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 label details for additional use restrictions based on soil characteristics, buffer zones, requirements for Fumigant Management Plans (FMP) and Personal Protective Equipment (PPE), mandatory good agricultural practices (GAP's), product and applicator training certification, and other rate modifying recommendations with use of highly retentive mulch films.

³ 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.