

Cucumber

Pest management

Asparagus

Bean

Carrot

Celery

Cole crops

Cucumber

Planting

Pickling cucumbers

Hand-harvested plantings: Rows—36–60 inches; **plants in row** —12–24 inches apart (narrower row spacings), 9–15 inches apart (wider row spacings). The resulting plant population will be 7,000–25,000 plants/a depending on variety.

Machine-harvested plantings: Rows—18–28 inches; **seed**—4–6 inches. The resulting plant population will be 50,000–90,000 plants/a.

Slicing cucumbers

Rows: 48–72 inches.

Plants in row: 12–24 inches apart.

Plant seed 0.75–1.5 inches deep, depending on soil type and moisture. Reduce planting depth on heavier soils or when soils are cool and moist at planting.

If hand harvesting, plant seeds with corn or bean planter and use appropriate cucumber plates. For machine harvesting, use precision planting to eliminate thinning.

Cucumbers will grow on a wide variety of soils if they are well drained and have a high fertility level. To use machine harvesting, the fields must be level and stone-free. Avoid excessive tillage, which can cause moisture loss, soil compaction, and crusting.

Cucumbers are a warm season crop and require growing temperatures of 60–75°F. They will not tolerate frost, so avoid fields that have frost pockets. Temperatures above 90°F or below 60°F slow growth. Good seed germination requires soil temperatures of 55–95°F. Because of these requirements, do not plant seed in northern Wisconsin before June 1.

Irrigation

Cucumbers require a constant supply of moisture, especially during blossom and fruit development. Silt and clay soils have a relatively high moisture-holding capacity, so normal rainfall is usually adequate for cucumber production on these soils. Sandy soils do not hold much moisture and irrigation is essential for profitable cucumber production. If the WISP scheduling program is used, the AD value for sands is 1.0 inch. The AD value for silt loams is 2.5 inches.

Lime and fertilizer

Lime: Use dolomitic limestone to maintain a pH of 5.8 on mineral soils and 5.6 on organic soils.

Fertilizer rates: Apply P₂O₅ and K₂O according to soil test recommendations. Use annual nitrogen, P₂O₅, and K₂O recommendations in table below. Take credits for previous legume crops and manure.

Application: For hand-harvested plantings, apply fertilizer in a band 2 inches below the seed at planting. For destructive, machine-harvested plantings, fertilizer can be planter applied or broadcast and worked in before planting.

Nitrogen: Split nitrogen recommendation into two or more applications during the season. Make the first application when plants have two to three true leaves. Make a second application when vines begin to fill the rows. For hand harvest, apply 15–20 lb N/a at 10–14 day intervals after harvest has begun. These applications can be made through the irrigation system.

Pollinating

Hand-harvested acreage: Typically, the natural bee population provides adequate pollination.

Machine-harvested acreage: Supplement the natural bee population by adding one colony (40,000–60,000 bees)/a in the field at blossoming time. (Note: many beekeepers provide pollinating services.)

Disease control

Many cucumber cultivars are resistant to several important diseases including angular leaf spot, anthracnose, cucumber mosaic virus, downy mildew, powdery mildew, and scab. Use resistant varieties and disease-free seed. Practice a 3- to 4-year rotation. Planting cultivars with multiple disease resistance minimizes the need for fungicide and bactericides on this crop.

Annual nitrogen, phosphate, and potash recommendations for cucumber

Nitrogen		Phosphate and potash		
Organic matter (%)	Amount to apply (lb/a)	Yield goal (bu/a)	Amount P ₂ O ₅ to apply* (lb/a)	Amount K ₂ O to apply* (lb/a)
<2	100	300–400	10	25
2.0–9.9	80			
10–20	60			
>20	30			

*Amounts shown are for optimum (O) soil test levels. Apply 50% of this rate if soil test is high (H) and omit if soil test is excessively high (EH). If soil test is low (L) or very low (VL), increase rates according to soil test recommendations.

Disease control in cucumber

Disease	Active ingredient	Rate/a of commercial product	Days to harvest	Remarks and suggestions
Alternaria leaf blight	azoxystrobin	11.0–15.4 fl oz Aframe, Equation, Quadris Flowable, Satori	1	Equation, Quadris, Satori, Reason, and Cabrio belong to the Group 11 (strobilurin) fungicide category. Quadris Opti contains a combination of Group 11 and M5 fungicides. Tanos contains a combination of Group 11 and Group 27 fungicides. Do not exceed 1 application of any of these products before alternating with a fungicide having a different mode of action. Do not exceed 4 applications of strobilurin fungicides per crop per year. Do not exceed 92.3 fl oz/a Equation, Quadris, or Satori; 1.0 lb ai/a Quadris Opti; 32.0 oz/a Tanos; 22.0 fl oz/a Reason; or 64.0 oz/a Cabrio per season. Tanos must be tank mixed with a contact fungicide such as mancozeb, chlorothalonil, or a copper-containing fungicide. Following the last application of Reason 500 SC, do not rotate to wheat for 30 days; for all other crops, wait 1 year before rotating.
	azoxystrobin + chlorothalonil	3.2 pt Quadris Opti	1	
	azoxystrobin + difenoconazole	12.0–14.0 fl oz Quadris Top	1	
	famoxadone + cymoxanil	8.0 oz Tanos	3	
	fenamidone	5.5 fl oz Reason 500 SC	14	
	pyraclostrobin	12.0–16.0 oz Cabrio EG	0	
boscaldid	6.5 oz Endura	0	Do not apply more than 26.0 oz/a Endura per year. Do not make more than 4 applications per year.	
	boscaldid + pyraclostrobin	12.5–18.5 oz Pristine WDG	0	Pristine belongs to Groups 7 and 11 fungicide categories. Do not exceed 1 application of Pristine before alternating to a labeled fungicide with a different mode of action. Do not exceed 4 applications of Pristine or any other Group 7 or 11 fungicides per season. Do not exceed 74.0 oz/a Pristine per season.
chlorothalonil	2.0–3.0 pt Bravo Weather Stik, Equus 720	0	Apply when conditions favor disease. Do not apply more than 15.75 lb ai/a of chlorothalonil products per year.	
	1.8–2.7 lb Bravo Ultrex 82.5WDG, Equus DF	0		
	2.25–2.75 pt Bravo Zn, Echo Zn, Equus 500 Zn	7		
chlorothalonil + cymoxanil	1.9–3.0 pt Ariston	3	Begin application when conditions are favorable for disease. Be aware of potential for phytotoxicity on watermelon.	
chlorothalonil + zoxamide	36.0 fl oz Zing	0	Do not make more than 2 sequential applications before alternating with a fungicide that has a different mode of action.	
cyprodinil + difenoconazole	16.0–20.0 fl oz Inspire Super	7	Do not apply more than 80.0 fl oz/a per year. Make no more than 2 sequential applications before alternating to an effective fungicide with a different mode of action.	
cyprodinil + fludioxonil	11.0–14.0 oz Switch 62.5WG	1	Do not apply more than 56.0 fl oz/a per year. Make no more than 2 sequential applications before alternating to an effective fungicide with a different mode of action.	
fluopyram + trifloxystrobin	7.6 fl oz Luna Sensation	0	Do not apply more than 27.1 fl oz of Luna Sensation per acre per year.	
fluoxastrobin	3.0–5.7 fl oz Aftershock, Evito 480 SC	1	Begin application preventively. Use higher rates when disease pressure is high. Do not tank mix with insecticides that are EC-based.	
fluxapyroxad + pyraclostrobin	4.0–5.5 fl oz Merivon	0	Make no more than 3 applications per season. Follow resistance management guidelines.	

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Disease control in cucumber *(continued)*

Disease	Active ingredient	Rate/a of commercial product	Days to harvest	Remarks and suggestions
Alternaria leaf blight <i>(cont.)</i>	hydrogen dioxide	1:100–1:2000 dilution rate OxiDate	0	Root and cutting dip treatment, soil drench, and seed treatments are registered. See label for application details. Follow tank-mixing instructions on label; some incompatibility issues exist. Cucurbit section of label for further details among crop grouping. Allowable for use in organic systems.
	mancozeb <i>(Cercospora leaf spot)</i>	1.2–2.4 qt Penncozeb 4FL	5	Consult label for seasonal product limits.
		1.6–2.4 qt Dithane F-45, Manzate Flowable	5	
		2.0–3.0 lb Dithane DF Rainshield, Koverall, Manzate Pro-Stick	5	
		1.5–3.0 lb Penncozeb 75DF, 80WP	5	
	mancozeb + copper hydroxide	2.0–3.0 lb ManKocide	5	Do not make more than 8 applications per year. Some cantaloupe varieties may have sensitivity to ManKocide.
penthiopyrad	12.0–16.0 fl oz Fontelis	1	Make no more than 2 sequential applications before alternating to an effective fungicide with a different mode of action. Do not exceed 67.0 fl oz/a per year. Can be used on greenhouse-grown cucumbers. See label for specific instructions on greenhouse rates.	
	zoxamide + mancozeb	1.5–2.0 lb Gavel 75DF	5	Do not exceed 8 applications or apply more than 16.0 lb/a product (10.67 lb ai/a mancozeb and 1.33 lb ai/a zoxamide) per season.
Angular leaf spot <i>(Pseudo-monas)</i>	fixed copper	1.3 pt Champ Formula 2	0	Use disease-free seed and rotate crops. Many cultivars are resistant to this disease. If needed, begin applications before fruit appear. Copper sprays are most effective when applied immediately after a rain or wind storm has damaged foliage.
		1.5–3.0 lb Champion 77WP	0	
		1.5–2.0 lb Kocide 77WP, DF	0	
		2.0–2.3 pt Kocide LF 2.4F	0	
		1.0–2.25 lb Kocide 2000 DF	0	
	0.5–1.25 lb Kocide 3000	0		
mancozeb + copper hydroxide	2.0–3.0 lb ManKocide	5	Do not make more than 8 applications per year. Some cantaloupe varieties may have sensitivity to ManKocide.	
Anthraxnose	azoxystrobin	11.0–15.5 fl oz Aframe, Equation, Quadris Flowable, Satori	1	See remarks for these products in the Alternaria leaf blight listing. Make no more than 1 application of a strobilurin-containing fungicide before alternating to another fungicide with a different mode of action.
	azoxystrobin + chlorothalonil	3.2 pt Quadris Opti	1	
	azoxystrobin + difenoconazole	12.0–14.0 fl oz Quadris Top	1	
	cymoxanil + famoxadone	8.0 oz Tanos	3	
	pyraclostrobin	12.0–16.0 oz Cabrio EG	0	
	boscalid + pyraclostrobin	18.5 oz Pristine WDG	0	

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Anthracnose <i>(cont.)</i>	chlorothalonil	1.5–2.0 pt Bravo Weather Stik, Echo 720, Equus 720	0	Apply when conditions favor disease.
		1.4–1.8 lb Bravo Ultrex 82.5WDG, Equus DF	0	
		1.3–1.6 lb Echo 90DF	0	
	chlorothalonil + zoxamide	31.0 fl oz Zing	0	Do not make more than 2 sequential applications before alternating with a fungicide that has a different mode of action.
	cyprodinil + difenoconazole	16.0–20.0 fl oz Inspire Super	7	Do not apply more than 80.0 fl oz/a per year. Make no more than 2 sequential applications before alternating to an effective fungicide with a different mode of action.
	fluopyram + trifloxystrobin	7.6 fl oz Luna Sensation	0	Do not apply more than 27.1 fl oz of Luna Sensation per acre per year.
	fluoxastrobin	3.0–5.7 fl oz Aftershock, Evito 480 SC	1	Begin application preventively. Use higher rates when disease pressure is high. Do not tank mix with insecticides that are EC-based.
	fluxapyroxad + pyraclostrobin	5.5 fl oz Merivon	0	Make no more than 3 applications per season. Follow resistance management guidelines.
	hydrogen dioxide	1:100–1:2000 dilution rate OxiDate	0	Root and cutting dip treatment, soil drench, and seed treatments are registered. See label for application details. Follow tank-mixing instructions on label; some incompatibility issues exist. See cucurbit section of label for further details among crop grouping. Allowable for use in organic systems.
	mancozeb	1.2–2.4 qt Penncozeb 4FL	5	Do not apply more than 24.0 lb/a per year. Consult label for seasonal product limitations.
		1.6–2.4 qt Dithane F-45, Manzate Flowable	5	
		1.5–3.0 lb Penncozeb 75DF, 80WP	5	
		2.0–3.0 lb Dithane DF Rainshield, Koverall, Manzate Pro-Stick	5	
	thiophanate methyl	10.0 fl oz Topsin 4.5FL 0.5 lb Topsin M 70W, 70WDG, Topsin M WSB 0.2–0.4 lb Thiophanate methyl 85 WDG	0	Apply when disease first appears and repeat if needed every 7–14 days.
Bacterial wilt <i>(Erwinia)</i>	<i>Eliminate the cucumber beetles that carry this pathogen (see Insect Control table).</i>			
Belly rot	azoxystrobin	11.0–15.5 fl oz Equation, Quadris Flowable, Satori	1	See remarks for Equation, Quadris, Satori, and Cabrio in the Alternaria leaf blight listing. For belly rot control, the first application should be made at the one- to three-leaf crop stage with a second application just prior to vine tip or 10–14 days later.
	azoxystrobin + difenoconazole	12.0–14.0 fl oz Quadris Top	1	
	pyraclostrobin	12.0–16.0 oz Cabrio EG	0	
	fluopyram + trifloxystrobin	7.6 fl oz Luna Sensation	0	
	fluoxastrobin	3.0–5.7 fl oz Aftershock, Evito 480 SC	1	
Black rot	<i>See fungicide treatments recommended for anthracnose.</i> fixed copper			Use certified disease-free seed. Destroy infected plant refuse.

(continued)

Disease control in cucumber *(continued)*

Disease	Active ingredient	Rate/a of commercial product	Days to harvest	Remarks and suggestions
Downy mildew	ametoctradin + dimethomorph	14.0 fl oz Zampro	0	The addition of a spreading/penetrating adjuvant is recommended. Use prior to disease development.
	azoxystrobin + chlorothalonil	3.2 pt Quadris Opti	1	See remarks for this product in Alternaria leaf blight section.
	cymoxanil + famoxadone	8.0 oz Tanos 50DF	3	See remarks for this product in Alternaria leaf blight section.
	boscalid + pyraclostrobin	12.5–18.5 Pristine WDG	0	Pristine belongs to Groups 7 and 11 fungicide categories. Do not exceed 1 application of Pristine before alternating to a labeled fungicide with a different mode of action. Do not exceed 4 applications of Pristine or other Group 7 or Group 11 fungicides per season. Do not exceed 74.0 oz/a Pristine per season.
	chlorothalonil + cymoxanil	3.0 pt Ariston	3	Begin application when conditions are favorable for disease. Be aware of potential phytotoxicity on watermelon.
	chlorothalonil + zoxamide	36.0 fl oz Zing	0	Do not make more than 2 sequential applications before alternating with a fungicide that has a different mode of action.
	cyazofamid	2.1–2.75 fl oz Ranman	0	Ranman belongs to Group 21 fungicide category. Do not apply more than six sprays of Ranman per crop. Alternate Ranman sprays with a fungicide having a different mode of action. Do not apply more than 16.5 fl oz/a per year.
	cymoxanil	3.2–5.0 oz Curzate	3	Use only in combination with a protectant fungicide such as mancozeb, copper hydroxide, or chlorothalonil. Make no more than 9 applications of Curzate in 1 year.
	dimethomorph	6.0 fl oz Forum	0	Do not exceed 30.0 fl oz/a or 5 applications per season. Do not make more than 2 sequential applications before alternating to another effective fungicide with a different mode of action for at least 1 application.
	fenamidone	5.5 fl oz Reason 500 SC	14	Begin applications when conditions favor disease.
	fixed copper	1.5–3.0 lb Champion 77WP 1.3 pt Champ Formula 2 1.5–2.0 lb Kocide 77WP 1.5–2.0 lb Kocide DF 2.6 pt Kocide LF 2.4F 1.0–2.25 lb Kocide 2000 DF 0.5–1.25 lb Kocide 3000	0 0 0 0 0 0 0	Use disease-free seed and rotate crops. Begin applications before fruit form at less than 7-day intervals. After a rain and wind storm, make two or 3 applications as soon as possible after the storm at 2- to 3-day intervals.
	fluopicolide	3.0–4.0 fl oz Presidio Fungicide	2	Tank mix this product with another labeled non-Group 43 fungicide. Label recommends a 10-day spray interval. In 2015 field trials at Michigan State University, Presidio and Previcur Flex did not control downy mildew. Resistant pathogen strains are likely occurring in the Upper Midwest, rendering these two fungicides inefficient in downy mildew control.
	fluoxastrobin	3.0–5.7 fl oz Aftershock, Evito 480 SC	1	Begin application preventively. Use higher rates when disease pressure is high. Do not tank mix with insecticides that are EC-based.
	fosetyl-al	2.0–5.0 lb Aliette WDG, Linebacker WDG	12 hr	Begin applications when conditions favor disease development (high moisture and moderate temperatures). Repeat at 7- to 14-day intervals. Do not exceed 7 applications per season.

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Disease control in cucumber (continued)

	Disease	Active ingredient	Rate/a of commercial product	Days to harvest	Remarks and suggestions
Pest management	Downy mildew (cont.)	hydrogen dioxide	1:100–1:2000 dilution rate OxiDate	0	Root and cutting dip treatment, soil drench, and seed treatments are registered. See label for application details. Follow tank-mixing instructions on label; some incompatibility issues exist. See cucurbit section of label for further details among crop grouping. Allowable for use in organic systems.
		Asparagus	mancozeb	1.6–2.4 qt Dithane F-45 2.0–3.0 lb Dithane DF Rainshield	5 5
2.0–3.0 lb Koverall	5				
1.6–2.4 qt Manzate Flowable	5				
2.0–3.0 lb Koverall, Manzate Pro-Stick	5				
1.2–2.4 qt Penncozeb 4FL	5				
1.5–3.0 lb Penncozeb 75DF, 80WP	5				
Bean	mancozeb + copper hydroxide	2.0–3.0 lb ManKocide	5	Do not make more than 8 applications per year.	
	mandipropamid	8.0 fl oz Revus	0	Make no more than 1 application before switching to another effective non-Group 40 fungicide.	
Carrot	mefenoxam + chlorothalonil	2.5 pt Ridomil Gold Bravo SC	0	Initiate application prior to disease onset. Apply a full rate of protectant fungicide between applications of Ridomil Gold Bravo (14-day interval). Avoid applications when the crop begins to senesce.	
	oxathiapiprolin	2.0–4.8 fl oz Orondis Opti A, Orondis Ultra A	0	Make no more than 2 sequential applications before rotating to a fungicide with a different mode of action. Do not exceed 19.2 fl oz/a per year. Begin foliar applications prior to disease development and continue on a 5- to 14-day interval.	
Celery	phosphorous acid, mono- and dibasic sodium, potassium, and ammonium salts	2.5–5.0 pt Phostrol	0	Do not exceed 7 applications per season.	
	potassium phosphite	1.0–3.0 qt Fosphite/100 gal water	0	Do not apply to plants that are stressed due to heat or moisture. Do not apply when leaf wetness periods of more than 4 hours are expected. Do not apply at less than 3-day intervals.	
Cole crops	propamocarb hydrochloride	1.2 pt Previcur Flex 0.6–1.2 pt Previcur Flex + tank-mix partner	2	Do not apply more than 6.0 pt/a Previcur Flex per season. Most effective when applied preventively. In 2015 field trials at Michigan State University, Presidio and Previcur Flex did not control downy mildew. Resistant pathogen strains are likely occurring in the Upper Midwest, rendering these two fungicides inefficient in downy mildew control.	
Cucumber	pyraclostrobin	8.0–12.0 oz Cabrio EG	0	See remarks for this product in Alternaria leaf blight section.	
	trifloxystrobin	4.0 oz Flint	0	Do not make more than 4 applications per crop per year of Flint. Do not make subsequent applications of Flint. Alternate fungicide modes of action to limit development of resistance.	

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Disease control in cucumber *(continued)*

Disease	Active ingredient	Rate/a of commercial product	Days to harvest	Remarks and suggestions
Downy mildew <i>(cont.)</i>	zoxamide + mancozeb	1.5–2.0 lb Gavel 75DF	5	Do not exceed 8 applications or apply more than 16.0 lb/a product (10.67 lb ai/a mancozeb or 1.33 lb ai/a zoxamide) per season.
Fusarium wilt	<i>The only practical control is to grow wilt-resistant varieties. Rotate with crops other than melons.</i>			
Mosaic	<i>Plant resistant varieties. When possible, control by isolation from the following plants: burdock, catnip, china aster, chrysanthemum, wild cucumber, geranium, gladiolus, wild ground cherry, horse nettle, hyacinth, jimsonweed, larkspur, lily, marigold, milkweed, morning glory, nasturtium, petunia, phlox, pokeweed, salvia, snapdragon, lowering spurge, tulip, white cockle, and zinnia. Control aphids that spread the disease (see Insect Control table).</i>			
Phytophthora blight or crown rot <i>(Phytophthora capsici)</i>	ametoctradin + dimethomorph	14.0 fl oz Zampro	0	The addition of a spreading or penetrating adjuvant is recommended. Use prior to disease development.
	cyazofamid	2.75 fl oz Ranman 400SC	0	Do not apply more than six sprays or 16.5 fl oz/a per year. Alternate Ranman (Group 21) sprays with a fungicide having a different mode of action. Crops not listed on the label should not be planted within 30 days after the last application.
	dimethomorph	6.0 fl oz Forum	0	Do not exceed 30.0 fl oz/a or 5 applications per season. Do not make more than 2 sequential applications of Forum before alternating to another effective fungicide with a different mode of action for at least 1 application.
	famoxadone + cymoxanil	8.0–10.0 oz Tanos	3	Do not make more than 1 application before alternating with a fungicide having a different mode of action. Do not exceed 4 applications of Tanos or other Group 11 fungicides per season and do not alternate Tanos with other Group 11 fungicides. Do not exceed 32.0 oz/a Tanos per crop per season. Tanos is helpful for suppressing Phytophthora blight, but it must be tank mixed with a contact fungicide such as mancozeb, chlorothalonil, or a copper-containing fungicide.
	fluopicolide	3.0–4.0 fl oz Presidio Fungicide	2	Tank mix this product with another labeled non-Group 43 fungicide. Label recommends a 10-day spray interval.
	fosetyl-al	2.0–5.0 lb Aliette WDG, Linebacker WDG	12 hr	Begin applications when conditions favor disease development (high moisture and moderate temperatures). Repeat at 7- to 14-day intervals. Do not exceed 7 applications per season.
	hydrogen dioxide	1:100–1:2000 dilution rate OxiDate	0	Root and cutting dip treatment, soil drench, and seed treatments are registered. See label for application details. Follow tank-mixing instructions on label; some incompatibility issues exist. See cucurbit section of label for further details among crop grouping. Allowable for use in organic systems.
	mandipropamid	8.0 fl oz Revus	0	Do not exceed 1 application before switching to another effective non-Group 40 fungicide.
	oxathiapiprolin	2.0–4.8 fl oz Orondis Opti A, Orondis Ultra A 2.4–19.2 fl oz Orondis Gold 200	0	For foliar application of Orondis Ultra A, begin foliar applications prior to disease development and continue on a 3- to 14-day interval. For pickle fruit protection, apply with a copper fungicide starting at 1-inch fruit on 3- to 5-day intervals. For soil-applied Orondis Gold 200, apply at-planting, in-furrow, by drip, or in transplant water. Do not follow soil applications of Orondis Gold 200 with foliar applications of Orondis Ultra A.

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Disease	Active ingredient	Rate/a of commercial product	Days to harvest	Remarks and suggestions
Phytophthora blight or crown rot <i>(cont.)</i>	phosphorous acid, mono- and dibasic sodium, potassium, and ammonium salts	2.5–5.0 pt Phostrol	0	Do not exceed 7 applications per season.
	potassium phosphite	1.0–3.0 qt Fosphite/100 gal water	0	Do not apply to plants that are stressed due to heat or moisture. Do not apply when leaf wetness periods of more than 4 hours are expected. Do not apply at less than 3-day intervals.
	zoxamide + mancozeb	1.5–2.0 lb Gavel 75DF	5	Do not exceed 8 applications or apply more than 16.0 lb/a product (10.67 lb ai/a mancozeb or 1.33 lb ai/a zoxamide) per season.
Powdery mildew	azoxystrobin	11.0–15.5 fl oz Aframe, Equation, Quadris Flowable, Satori	1	Equation, Quadris, Satori, Cabrio, and Flint are Group 11 (strobilurin) fungicides. Do not exceed 1 application of any of these products before alternating with a fungicide having a different mode of action. Do not make more than 4 applications of Group 11 fungicides or exceed 1.92 qt/a Equation, Quadris, or Satori; 8.0 oz/a Flint; or 64.0 oz/a Cabrio per crop per season. Do not tank mix any of these products with additives or adjuvants. See labels for listing of products that should not be tank mixed with these materials.
	pyraclostrobin	12.0–16.0 oz Cabrio EG	0	
	trifloxystrobin	1.5–2.0 oz Flint	0	
	boscalid + pyraclostrobin	12.5–18.5 oz Pristine WDG	0	Pristine belongs to Group 7 and 11 fungicide categories. Do not exceed 2 sequential applications of Pristine before alternating to a fungicide with a different mode of action. Do not exceed 4 applications of Pristine or other Group 7 or Group 11 fungicides per season. Do not exceed 74.0 oz/a Pristine per season.
	clarified hydrophobic extract of neem oil	0.5–1.0% Trilogy in 25–100 gal water or 2.0 pt in at least 5 gal water/a	0	Do not apply more than 2 gal of Trilogy/a. OMRI-approved.
	cyflufenamid	3.4 oz Torino	0	Do not make more than 2 applications/a per year. Do not exceed a total of 6.8 oz/a per year.
	cyprodinil + difenoconazole	16.0–20.0 fl oz Inspire Super	7	Do not apply more than 80.0 fl oz/a per year. Make no more than 2 sequential applications before alternating to an effective fungicide with a different mode of action.
	cyprodinil + fludioxonil	11.0–14.0 oz Switch 62.5WG	1	Do not apply more than 56.0 fl oz/a per year. Make no more than 2 sequential applications before alternating to an effective fungicide with a different mode of action.
	fluopyram + trifloxystrobin	4.0–7.6 fl oz Luna Sensation	0	Do not apply more than 27.1 fl oz of Luna Sensation per acre per year.
fluoxastrobin	3.0–5.7 fl oz Aftershock, Evito	1	Being application preventively. Use higher rates when disease pressure is high.	
flutriafol	10.0–14.0 fl oz Topguard	0	Do not make more than 4 applications per year. Also provides control of gummy stem blight.	

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Disease control in cucumber *(continued)*

Disease	Active ingredient	Rate/a of commercial product	Days to harvest	Remarks and suggestions
Powdery mildew <i>(cont.)</i>	hydrogen dioxide	1:100–1:2000 dilution rate OxiDate	0	Root and cutting dip treatment, soil drench, and seed treatments are registered. See label for application details. Follow tank-mixing instructions on label; some incompatibility issues exist. See cucurbit section of label for further details among crop grouping. Allowable for use in organic systems.
	kresoxim methyl	3.2–4.8 oz Sovran	0	Do not apply more than 19.2 oz/a per season. Begin application prior to onset of disease.
	metrafenone	15.4 fl oz Vivando	0	Do not make more than 3 applications per year. Do not mix with oils.
	myclobutanil	2.5–5.0 oz Rally 40WSP	0	Do not exceed 1.5 lb/a product (0.6 lb ai/a) per year. Observe a 30-day plantback interval between last application and planting new crops. Resistance has been noted in several WI locations.
	neem oil	0.5–1.0% Trilogy in 25–100 gal water	0	Has fungicide and miticide benefits. Organic (OMRI) approved. Reapply every 7–21 days.
	potassium phosphite	1.0–3.0 qt Fosphite/100 gal water	0	Do not apply to plants that are stressed due to heat or moisture. Do not apply when leaf wetness periods of more than 4 hours are expected. Do not apply at less than 3-day intervals.
	sulfur	various, depending on product and formulation	0	Do not apply sulfur to sensitive crops. Do not apply during high temperatures. Do not use within 2 weeks of an oil treatment. When grown for processing, consult processor prior to use.
	tebuconazole	4.0–6.0 fl oz Folicur 3.6 F, Monsoon, Orius 3.6F, Tebusha 3.6FL, TebuStar 3.6L, Tebuzol 3.6F, Toledo	7	Do not exceed 24.0 fl oz per season. Most effective when applied preventively.
	thiophanate methyl	0.5 lb Topsin M 70W, Topsin M WSB 10 fl oz Topsin 4.5FL 0.2–0.4 lb Thiophanate methyl 85WDG	0 0 0	Apply when disease first appears and repeat if needed every 7–14 days.
	triflumizole	4.0–8.0 oz Procure 50WS, Procure 480SC	0	Do not apply more than 40.0 oz of Procure per season. See product label for plantback restrictions for leafy vegetables (30 days), root vegetables (60 days) and all other crops (1 yr).
Seed rot and damping-off	captan	0.5–1.0 teaspoon Captan 50% WP/lb of dry seed	—	Use disease-free soil. Water plants in morning. Chemical listed is seed treatment. Do not use treated seed for feed or food.
	fludioxonil	0.08–0.16 fl oz/100 lb seed Dyna-Shield, Maxim 4FS, Spirato	—	Follow manufacturer's directions. Not for feed or food.
	mefenoxam	1.0–2.0 pt Ridomil Gold SL 2.0–4.0 pt Ultra Flourish	— —	Preplant-incorporated application or surface application at planting. Preplant to top 2 inches of soil.
		0.085–0.64 fl oz Apron XL/100 lb seed	—	Follow manufacturer's directions. Do not use treated seed for feed or food.
	mefenoxam + azoxystrobin	0.34 fl oz Uniform/1,000 ft row	—	Apply Uniform as an in-furrow spray in a minimum of 5 gal of water per acre at planting.

(continued)

Pest
management

Asparagus

Bean

Carrot

Celery

Cole crops

Cucumber

Disease control in cucumber *(continued)*

Disease	Active ingredient	Rate/a of commercial product	Days to harvest	Remarks and suggestions
Seed rot and damping-off <i>(cont.)</i>	metalaxyl	4.0–8.0 pt MetaStar 2E AG	—	Preplant-incorporated application or surface application at planting. Preplant to top 2 inches of soil.
		0.7 fl oz Sebring 2.65 ST/100 lb seed	—	Follow manufacturer's directions. Do not use treated seed for feed or food.
		0.75 fl oz/100 lb seed Acquire, Allegiance FL, Metalaxyl 265 ST	—	
	thiram	0.75 teaspoon Thiram 50%WP/lb seed	—	Use disease-free soil. Water plants in morning. Chemical listed is seed treatment. Do not use treated seed for feed or food.

Scouting calendar for insect pests in cucumber

	April			May			June			July			August			September		
	early	mid	late	early	mid	late	early	mid	late	early	mid	late	early	mid	late	early	mid	late
Wireworms																		
				Striped and spotted cucumber beetles														
				Seed maggot														
	Aphids									Aphids								
										Mites								

Insect control in cucumber

(Note: Heavy applications and certain formulations may be phytotoxic to cucumbers.)

Insect	Rate/a of active ingredient	Rate/a of commercial product	Days to harvest	Remarks and suggestions
Bean aphid and soybean aphid	alpha-cypermethrin	3.4–3.8 fl oz *Fastac	1	Apply when pests reach or exceed established thresholds. Do not apply more than 11.4 fl oz of Fastac per acre per crop season.
	flupyradifurone	foliar: 7.0–12.0 fl oz Sivanto	1	Apply when pests reach or exceed established thresholds. Do not apply more than 28.0 fl oz of Sivanto per acre per crop season.
		soil: 21.0–28.0 fl oz Sivanto	21	
	lambda-cyhalothrin + chlorantraniliprole	9.0 fl oz *Voliam Xpress	1	Allow at least 5 days between applications. Do not apply more than 31.0 fl oz/a Voliam Xpress per season.
spirotetramat	4.0–5.0 fl oz Movento	1 (edible) 7 (dry)	Do not apply more than 10.0 fl oz/a per season and allow at least 7 days between applications.	
Cucumber beetles (striped, spotted)	<i>Treat when there are more than 4–5 adults per 50 plants. Cucumber beetles are vectors of bacterial wilt. High beetle populations (more than 20 per plant) may overwhelm the ability of the insecticide to control beetles quickly enough to stop the transmission of the wilt-causing bacterium.</i>			
	0.047–0.10 lb acetamiprid	2.5–5.3 oz Assail 30 SG	0	Do not exceed 5 applications or 26.5 oz/a product per crop season.
	0.05–0.10 lb acetamiprid	1.1–2.3 oz Assail 70WP	0	Do not exceed 5 applications or 11.5 oz/a of product per crop season.

*Restricted-use pesticide.

(continued)

Insect control in cucumber (continued)

Insect	Rate/a of active ingredient	Rate/a of commercial product	Days to harvest	Remarks and suggestions	
Cucumber beetles (cont.)	alpha-cypermethrin	3.0–3.8 fl oz *Fastac	1	Apply when pests reach or exceed established thresholds. Do not apply more than 11.4 fl oz of Fastac per acre per crop season.	
	0.019–0.022 lb beta-cyfluthrin	2.4–2.8 fl oz *Baythroid XL	0	Apply every 7 days as needed. Do not exceed 11.2 fl oz/a.	
	0.04–0.10 lb bifenthrin	2.6–6.4 fl oz *Brigade 2EC	3	Apply before insects reach threshold levels. May repeat applications after 7 days, but do not make more than 2 applications after bloom. Do not exceed 0.3 lb ai/a per season.	
	0.08–0.10 lb bifenthrin	6.8–8.5 fl oz *Capture LFR	21	Do not apply more than 0.1 lb ai/a per season as an at-plant application. Do not apply more than 0.5 lb ai/a per season including other bifenthrin products (e.g., Brigade 2EC).	
	bifenthrin + zeta-cypermethrin	4.0–10.3 fl oz *Hero	3	Do not apply more than 10.3 fl oz/a per season and allow at least 7 days between applications. Do not apply more than 41.2 fl oz of product/a per crop season.	
	0.5–1.0 lb carbaryl	2.0 lb Sevin 50WP 1.25 lb Sevin 80S 1.0 qt Sevin XLR Plus	1	See label for rate. Do not apply during maximum flowering or fruit set, or when pollinating bees are in the field. Spray during the evening.	
	clothianidin		foliar: 3.0–4.0 fl oz Belay	21	Do not apply more than 12.0 fl oz/a per season and allow at least 7 days between applications.
			soil: 9.0–12.0 fl oz Belay	—	Do not apply more than 12.0 fl oz/a per season. Apply as a narrow band centered on the plant row; as an in-furrow spray at planting; as a sidedress to both sides of the row; as a transplant water drench; or as chemigation into root zone through drip, trickle or micro-sprinkler, or similar equipment.
	0.018–0.028 lb deltamethrin	1.5–2.4 fl oz *Delta Gold	3	Apply every 3 days as needed. Do not exceed 14.4 fl oz/a per season.	
	0.132–0.179 lb dinotefuran	3.0–4.0 oz Venom 70SG	1	Do not exceed 6.0 oz/a Venom per season.	
	0.03–0.05 lb esfenvalerate	5.8–9.6 fl oz *Asana XL	3	Do not exceed 0.25 lb ai/a per season.	
	0.2–0.3 lb fenpropathrin	10.66–16.0 oz *Danitol 2.4EC	7	Do not exceed 2.66 pt/a per season.	
	0.25–0.375 lb imidacloprid	7.0–10.5 fl oz Admire Pro	21	Apply in a narrow band centered on plant row within 14 days before planting or as an in-furrow treatment during planting. Do not exceed 0.38 lb ai/a per year.	
	0.02–0.03 lb lambda-cyhalothrin	1.28–1.92 fl oz *Warrior II	4	Do not exceed 0.18 lb ai/a per season. Reapply at intervals of 5 or more days.	
	lambda-cyhalothrin + chlorantraniliprole	6.0–9.0 fl oz *Voliam Xpress	3	Do not exceed 31.0 fl oz/a of Voliam Xpress or 0.24 lb ai/a of products containing lambda-cyhalothrin or 0.2 lb ai/a of products containing chlorantraniliprole per growing season.	
lambda-cyhalothrin + thiamethoxam	4.0–4.5 fl oz *Endigo ZC	1	Apply when pests reach or exceed established thresholds. Do not apply more than 19.0 fl oz/a Endigo ZC per crop season and allow at least 5 days between applications.		
0.9–1.75 lb malathion	several formulations	1			

*Restricted-use pesticide.

(continued)

Pest management

Asparagus

Bean

Carrot

Celery

Cole crops

Cucumber

Insect control in cucumber *(continued)*

Insect	Rate/a of active ingredient	Rate/a of commercial product	Days to harvest	Remarks and suggestions	
Cucumber beetles <i>(cont.)</i>	0.5–1.0 lb methomyl	1.5–3.0 pt *Lannate LV 0.5–1.0 lb *Lannate SP	1–3	See label for days to harvest.	
	0.5–1.0 lb oxamyl	2.0–4.0 pt *Vydate L	1	Make first application 2–4 weeks after planting. Repeat 2–3 weeks later.	
Asparagus	0.1–0.2 lb permethrin	*Ambush, *Pounce	0	See label for rate. Do not apply more than 1.6 lb ai/a per season.	
	thiamethoxam	3.0–5.5 oz Actara 25WDG	5	Do not follow applications of Platinum with foliar applications of any other neonicotinoid insecticide. Platinum may be applied to direct-seeded crops in-furrow at seeding or transplant depth or as a narrow surface band above the seedling and followed by irrigation. Do not apply more than 11.0 oz of Actara 25WDG or Platinum 2SC and no more than 3.67 oz Platinum 75SG per acre per crop season and apply sufficient water volume after in-ground application to ensure incorporation into the seed zone. Actara is applied as a foliar spray.	
		5.0–11.0 fl oz Platinum 2SC	30		
1.66–3.67 oz Platinum 75SG	30				
Bean	0.198–0.257 lb thiamethoxam + chlorantraniliprole	10.0–13.0 fl oz Durivo	30	Do not exceed a total of 13.0 fl oz/a Durivo (0.257 lb ai/a) per growing season. Do not exceed 0.172 lb ai/a of thiamethoxam-containing products or 0.2 lb ai/a of chlorantraniliprole-containing products per season.	
	0.018–0.025 lb zeta-cypermethrin	2.8–4.0 oz *Mustang Maxx	1	Apply at thresholds and do not exceed 24.0 oz/a Mustang Maxx per season.	
Carrot	Cutworms, cabbage looper	alpha-cypermethrin	1.4–3.8 fl oz *Fastac	1	Apply when pests reach or exceed established thresholds. Do not apply more than 11.4 fl oz of Fastac per acre per crop season.
	0.0065–0.0125 lb beta-cyfluthrin	0.8–1.6 fl oz *Baythroid XL	0	Apply every 7 days as needed. Do not exceed 11.2 fl oz/a.	
	bifenthrin	2.6–6.4 fl oz *Brigade 2EC	3	Apply before insects reach threshold levels. May repeat applications after 7 days, but do not make more than 2 applications after bloom. Do not exceed 0.3 lb ai/a per season.	
3.4–6.8 fl oz *Capture LFR		21	Do not apply more than 0.1 lb ai/a per season as an at-plant application. Do not apply more than 0.3 lb ai/a per season including other bifenthrin products (e.g., Brigade 2EC).		
Celery	bifenthrin + zeta-cypermethrin	4.0–10.3 fl oz *Hero	3	Do not apply more than 10.3 fl oz/a per season and allow at least 7 days between applications. Do not apply more than 41.2 fl oz of product/a per crop season.	
	1.0 lb carbaryl	Sevin Bait	1	See label for rate. Broadcast when cutworms are present in damaging numbers.	
	chlorantraniliprole	3.5–7.5 fl oz Coragen	1	Do not make more than 4 applications per crop season and allow at least 3 days between applications. Do not apply more than 15.4 fl oz/a Coragen per season.	

*Restricted-use pesticide.

(continued)

Insect control in cucumber *(continued)*

Insect	Rate/a of active ingredient	Rate/a of commercial product	Days to harvest	Remarks and suggestions
Cutworms, cabbage looper <i>(cont.)</i>	0.088–0.176 lb cyantraniliprole (<i>soil</i>)	6.75–13.5 fl oz Verimark	1	Do not apply more than 13.5 fl oz/a Verimark per crop per season. Do not apply more than 0.4 lb ai/a cyantraniliprole-containing products per crop whether applied as soil or foliar applications. The pH of the application solution should be adjusted to between pH 4 and 6. Minimum application interval between foliar sprays is 5 days.
	0.065–0.11 lb cyantraniliprole (<i>foliar</i>)	10.0–17.0 fl oz Exirel	1	
	0.012–0.028 lb deltamethrin	1.0–2.4 fl oz *Delta Gold	3	
	0.03–0.05 lb esfenvalerate	5.8–9.6 fl oz *Asana XL	3	
	0.03–0.045 lb flubendiamide	2.0–3.0 oz Synapse WG	1	
	flubendiamide + buprofezin	12.0–17.0 fl oz Vetica	7	
	lambda-cyhalothrin + chlorantraniliprole	6.0–9.0 fl oz *Voliam Xpress	3	
	lambda-cyhalothrin + thiamethoxam	4.0–4.5 fl oz *Endigo ZC	1	
	0.1–0.2 lb permethrin	*Ambush EC, WP	0	
	0.008–0.025 lb zeta-cypermethrin	1.28–4.0 oz *Mustang Maxx	1	
Melon aphid	0.047–0.075 lb acetamiprid	2.5–4.0 oz Assail 30 SG	0	Do not exceed 5 applications or 26.5 oz/a of product per crop season.
	0.05–0.10 lb acetamiprid	1.1–1.7 oz Assail 70WP	0	Do not exceed 5 applications or 11.5 oz/a of product per crop season.
	alpha-cypermethrin	3.4–3.8 fl oz *Fastac	1	Apply when pests reach or exceed established thresholds. Do not apply more than 11.4 fl oz of Fastac per acre per crop season.
	0.04–0.10 lb bifenthrin	2.6–6.4 fl oz *Brigade 2EC	3	Apply before insects reach threshold levels. May repeat applications after 7 days, but do not make more than 2 applications after bloom. Do not exceed 0.3 lb ai/a per season.
	bifenthrin + zeta-cypermethrin	4.0–10.3 fl oz *Hero	3	Do not apply more than 10.3 fl oz/a per season and allow at least 7 days between applications. Do not apply more than 41.2 fl oz of product/a per crop season.
	clothianidin	<i>foliar</i> : 3.0–4.0 fl oz Belay	21	Do not apply more than 12.0 fl oz/a per season and allow at least 7 days between applications.
		<i>soil</i> : 9.0–12.0 fl oz Belay	—	Do not apply more than 12.0 fl oz/a per season. Apply as a narrow band centered on the plant row; as an in-furrow spray at planting; as a sidedress to both sides of the row; as a transplant water drench; or as chemigation into root zone through drip, trickle or micro-sprinkler, or similar equipment.

*Restricted-use pesticide.

(continued)

Pest management

Asparagus

Bean

Carrot

Celery

Cole crops

Cucumber

Insect control in cucumber *(continued)*

Insect	Rate/a of active ingredient	Rate/a of commercial product	Days to harvest	Remarks and suggestions
Melon aphid <i>(cont.)</i>	0.088–0.176 lb cyantraniliprole (<i>soil</i>)	6.75–13.5 fl oz Verimark	1	Do not apply more than 13.5 fl oz/a Verimark per crop per season. Do not apply more than 0.4 lb ai/a cyantraniliprole-containing products per crop whether applied as soil or foliar applications.
	0.088–0.133 lb cyantraniliprole (<i>foliar</i>)	13.5–20.5 fl oz Exirel	1	The pH of the application solution should be adjusted to between pH 4 and 6. Minimum application interval between foliar sprays is 5 days.
	0.25–0.75 lb diazinon	several formulations	3	Apply as soon as aphids are noticed. Apply no more than 5 applications per season.
	0.045–0.268 lb dinotefuran	<i>foliar</i> : 1.0–4.0 oz Venom 70SG	1	Do not follow soil applications with foliar applications of any other neonicotinoid insecticide. Use only one application method. Do not apply more than 12.0 oz/a per season using soil applications. See product label for application directions.
		<i>soil</i> : 5.0–6.0 oz Venom 70SG	21	
	0.05–0.18 lb dinotefuran (<i>foliar</i>)	2.0–7.0 oz Scorpion 35SL	1	Can repeat at 7-day intervals. Do not apply more than 10.5 oz per year. Use only one application method.
	0.23–0.27 lb dinotefuran (<i>soil</i>)	9.0–10.5 oz Scorpion 35SL	21	Do not apply more than 21.0 oz per year. Use only one application method.
	0.062–0.089 lb flonicamid	2.0–2.8 oz Beleaf SG	0	Begin applications before aphid populations build. Do not exceed 2.8 oz/a Beleaf per application and do not apply more than 8.4 oz/a (0.267 lb ai/a) per season.
	flupyradifurone	<i>foliar</i> : 10.5–14.0 fl oz Sivanto	1	Apply when pests reach or exceed established thresholds. Do not apply more than 28.0 fl oz of Sivanto per acre per crop season.
		<i>soil</i> : 21.0–28.0 fl oz Sivanto	21	
	0.25–0.38 lb imidacloprid	7.0–10.5 fl oz Admire Pro	21	Apply in a narrow band centered on plant row within 14 days before planting or as an in-furrow treatment during planting. Do not exceed 0.38 lb ai/a per year.
	0.03 lb lambda-cyhalothrin	1.92 fl oz *Warrior II	4	Do not exceed 0.18 lb ai/a per season. Reapply at intervals of 5 or more days. For suppression only.
	lambda-cyhalothrin + chlorantraniliprole	9.0 fl oz *Voliam Xpress	1	Do not exceed 31.0 fl oz/a of Voliam Xpress or 0.18 lb ai/a of products containing lambda-cyhalothrin or 0.2 lb ai/a of products containing chlorantraniliprole per growing season.
	lambda-cyhalothrin + thiamethoxam	4.0–4.5 fl oz *Endigo ZC	1	Apply when pests reach or exceed established thresholds. Do not apply more than 19.0 fl oz/a Endigo ZC per crop season and allow at least 5 days between applications.
	1.0–2.0 lb malathion	several formulations	1	Do not apply before vining or to wet plants.
	0.45–0.9 lb methomyl	1.5–3.0 pt *Lannate LV		See label for days to harvest. Do not exceed 5.4 lb ai/a per season.
		0.5–1.0 lb *Lannate SP		
	0.86 lb pymetrozine	2.75 oz Fulfill	14	Controls melon and green peach aphids. Treat when aphids first appear. May repeat in 7 days. Do not exceed 5.5 oz/a per season or more than 2 applications per crop.

*Restricted-use pesticide.

(continued)

Insect control in cucumber *(continued)*

Insect	Rate/a of active ingredient	Rate/a of commercial product	Days to harvest	Remarks and suggestions
Melon aphid <i>(cont.)</i>	thiamethoxam	1.5–3.0 oz Actara 25WDG	0	Do not follow applications of Platinum with foliar applications of any other neonicotinoid insecticide. Platinum may be applied to direct-seeded crops in-furrow at the seeding or transplant depth or as a narrow surface band above the seedling and followed by irrigation. Do not apply more than 11.0 oz of Actara 25WDG or Platinum 2SC and no more than 3.67 oz Platinum 75SG per acre per crop season and apply sufficient water volume after in-ground application to ensure incorporation into the seed zone. Actara is applied as a foliar spray.
		5.0–11.0 fl oz Platinum 2SC	30	
		1.66–3.67 oz Platinum 75SG	30	
	0.198–0.257 lb thiamethoxam + chlorantraniliprole	10.0–13.0 fl oz Durivo	30	Do not exceed a total of 13.0 fl oz/a Durivo (0.257 lb ai/a) per growing season. Do not exceed 0.172 lb ai/a of thiamethoxam-containing products or 0.2 lb ai/a of chlorantraniliprole-containing products per season.
	0.02–0.025 lb zeta-cypermethrin	3.2–4.0 oz *Mustang Maxx	1	Apply at thresholds and do not exceed 24.0 oz/a Mustang Maxx per season.
Seed corn maggot	0.04–0.08 lb bifenthrin	3.4–6.8 oz *Capture LFR		Apply as a 5- to 7-inch band over an open furrow or in-furrow with the seed. Do not apply more than 0.1 lb/a Capture LFR per season as an at-plant application.
	0.13–0.176 lb cyantraniliprole (<i>soil</i>)	10.0–13.5 fl oz Verimark	1	Do not apply more than 13.5 fl oz/a Verimark per crop per season. Do not apply more than 0.4 lb ai/a cyantraniliprole-containing products per crop whether applied as soil or foliar applications. The pH of the application solution should be adjusted to between pH 4 and 6.
Spider mite	0.938–1.88 lb abamectin	8.0–16.0 fl oz *Agri-Mek 0.15EC	7	May repeat after 7 days, but do not make more than two sequential treatments or exceed 5.64 lb ai/a per year.
	0.375–0.5 lb bifenazate	0.75–1.0 lb Acramite 50WS	1	Do not exceed 1 application per season.
	0.08–0.10 lb bifenthrin	5.12–6.4 fl oz *Brigade 2EC	3	Apply before insects reach threshold levels. May repeat applications after 7 days, but do not make more than 2 applications after bloom. Do not exceed 0.3 lb ai/a per season.
	bifenthrin + zeta-cypermethrin	10.3 fl oz *Hero	3	Do not apply more than 10.3 fl oz/a per season and allow at least 7 days between applications. Do not apply more than 41.2 fl oz of product/a per crop season.
	0.625 lb dicofol	20.0 oz Dicofol 4E	2	Do not make more than 1 application per season. Do not use in mixtures with other materials.
	0.2 lb fenpropathrin	10.0–66.0 fl oz *Danitol 2.4EC	7	Treat when mites first appear and repeat every 7 days as needed. Do not exceed 0.8 lb ai/a per season.
	lambda-cyhalothrin + thiamethoxam	4.0–4.5 fl oz *Endigo ZC	1	Apply when pests reach or exceed established thresholds. Do not apply more than 19.0 fl oz/a Endigo ZC per crop season and allow at least 5 days between applications.
	1.5–2.0 lb malathion	several formulations	1	Do not apply before vining or to wet plants.
0.11–0.13 lb spiromesifen	7.0–8.5 fl oz Oberon 2 SC	7	Apply every 7 days as needed. Do not exceed 25.5 fl oz/a per season.	

*Restricted-use pesticide.

(continued)

Pest management

Asparagus

Bean

Carrot

Celery

Cole crops

Cucumber

Insect control in cucumber *(continued)*

Insect	Rate/a of active ingredient	Rate/a of commercial product	Days to harvest	Remarks and suggestions
Squash bug	<i>Check undersides of leaves for squash bug eggs laid in neat rows. Eggs hatch within 1–2 weeks. Treat when squash bugs are young; they are difficult to control as older nymphs or adults. Destroy crop residue in fall to reduce overwinter survival of this pest.</i>			
	0.10 lb acetamiprid	2.3 oz Assail 70WP	0	Do not exceed 5 applications or 11.5 oz/a of product per crop season.
		5.3 oz Assail 30 SG	0	Do not exceed 5 applications or 26.5 oz/a of product per crop season.
	alpha-cypermethrin	3.0–3.8 fl oz *Fastac	1	Apply when pests reach or exceed established thresholds. Do not apply more than 11.4 fl oz of Fastac per acre per crop season.
	0.04–0.10 lb bifenthrin	2.6–6.4 fl oz *Brigade 2EC	3	Apply before insects reach threshold levels. May repeat applications after 7 days, but do not make more than 2 applications after bloom. Do not exceed 0.3 lb ai/a per season.
	0.5–1.0 lb carbaryl	Sevin WP	3	See label for rate.
	bifenthrin + zeta-cypermethrin	4.0–10.3 fl oz *Hero	3	Do not apply more than 10.3 fl oz/a per season and allow at least 7 days between applications. Do not apply more than 41.2 fl oz of product/a per crop season.
	clothianidin	foliar: 3.0–4.0 fl oz Belay	21	Do not apply more than 12.0 fl oz/a per season and allow at least 7 days between applications.
		soil: 9.0–12.0 fl oz Belay	—	Do not apply more than 12.0 fl oz/a per season. Apply as a narrow band centered on the plant row; as an in-furrow spray at planting; as a sidedress to both sides of the row; as a transplant water drench; or as chemigation into root zone through drip, trickle or micro-sprinkler, or similar equipment.
	0.03–0.05 lb esfenvalerate	5.8–9.6 fl oz *Asana XL	3	Do not exceed 0.25 lb ai/a per season.
	flupyradifurone	foliar: 10.5–14.0 fl oz Sivanto	1	Apply when pests reach or exceed established thresholds. Do not apply more than 28.0 fl oz of Sivanto per acre per crop season.
		soil: 21.0–28.0 fl oz Sivanto	21	
	0.02–0.03 lb lambda-cyhalothrin	1.28–1.92 fl oz *Warrior II	4	Do not exceed 0.18 lb ai/a per season. Reapply at intervals of 5 or more days.
	lambda-cyhalothrin + chlorantraniliprole	6.0–9.0 fl oz *Voliam Xpress	1	Do not exceed 31.0 fl oz/a of Voliam Xpress or 0.24 lb ai/a of products containing lambda-cyhalothrin or 0.2 lb ai/a of products containing chlorantraniliprole per growing season.
	lambda-cyhalothrin + thiamethoxam	4.0–4.5 fl oz *Endigo ZC	1	Apply when pests reach or exceed established thresholds. Do not apply more than 19.0 fl oz/a Endigo ZC per crop season and allow at least 5 days between applications.
	0.1–0.2 lb permethrin	*Ambush, *Pounce	0	Will kill adult squash bugs. See label for rate.
	0.018–0.025 lb zeta-cypermethrin	2.8–4.0 oz *Mustang Maxx	1	Apply at thresholds and do not exceed 24.0 oz/a Mustang Maxx per season.

*Restricted-use pesticide.

(continued)

Pest management

Asparagus

Bean

Carrot

Celery

Cole crops

Cucumber

Insect control in cucumber (continued)

Insect	Rate/a of active ingredient	Rate/a of commercial product	Days to harvest	Remarks and suggestions
Squash vine borer	<i>Treat when adults are observed (900 DD₅₀ or when chicory is in bloom), especially when runners are less than 2 feet long. Larvae boring in the main stem can kill the entire plant, while loss of a runner or two when the plant is larger will not cause economic damage. Look for sawdust-like excrement coming from holes in the stems, and open the stems to confirm the presence of squash vine borer larvae. Repeat applications at 5- to 7-day intervals throughout the 3-week egg-laying period.</i>			
	0.10 lb acetamiprid	2.3 oz Assail 70WP	0	Do not exceed 5 applications or 11.5 oz/a of product per crop season.
		5.3 oz Assail 30 SG	0	Do not exceed 5 applications or 26.5 oz/a of product per crop season.
	alpha-cypermethrin	3.0–3.8 fl oz *Fastac	1	Apply when pests reach or exceed established thresholds. Do not apply more than 11.4 fl oz of Fastac per acre per crop season.
	0.04–0.10 lb bifenthrin	2.6–6.4 fl oz *Brigade 2EC	3	Apply before insects reach threshold levels. May repeat applications after 7 days, but do not make more than 2 applications after bloom. Do not exceed 0.3 lb ai/a per season.
	bifenthrin + zeta-cypermethrin	4.0–10.3 fl oz *Hero	3	Do not apply more than 10.3 fl oz/a per season and allow at least 7 days between applications. Do not apply more than 41.2 fl oz of product/a per crop season.
	0.5–1.0 lb carbaryl	Sevin (several formulations)	3	Do not apply during maximum flowering or fruit set, or when pollinating bees are in the field. Spray during the evening.
	0.03–0.05 lb esfenvalerate	5.8–9.6 fl oz *Asana XL	3	Do not exceed 0.25 lb ai/a per season.
	flubendiamide + buprofezin	12.0–17.0 fl oz Vetica	7	Do not apply more than 38.0 fl oz/a per season and allow at least 7 days between applications. Do not make more than 3 applications per crop season.
	0.02–0.03 lb lambda-cyhalothrin	1.28–1.92 fl oz *Warrior II	4	Do not exceed 0.18 lb ai/a per season. Reapply at intervals of 5 or more days.
	lambda-cyhalothrin + chlorantraniliprole	6.0–9.0 fl oz *Voliam Xpress	1	Do not exceed 31.0 fl oz/a of Voliam Xpress or 0.24 lb ai/a of products containing lambda-cyhalothrin or 0.2 lb ai/a of products containing chlorantraniliprole per growing season.
	lambda-cyhalothrin + thiamethoxam	4.0–4.5 fl oz *Endigo ZC	1	Apply when pests reach or exceed established thresholds. Do not apply more than 19.0 fl oz/a Endigo ZC per crop season and allow at least 5 days between applications.
	0.1–0.2 lb permethrin	*Ambush, *Pounce	0	Several formulations; see label for rate. Do not apply more than 1.6 lb ai/a per season.
0.018–0.025 lb zeta-cypermethrin	2.8–4.0 oz *Mustang Maxx	1	Apply at thresholds and do not exceed 24.0 oz/a Mustang Maxx per season.	

*Restricted-use pesticide.

Pest management

Asparagus

Bean

Carrot

Celery

Cole crops

Cucumber

Weed control in cucumber

Weed	Rate/a of active ingredient	Rate/a of commercial product	Days to harvest	Remarks and suggestions
Annual weeds	0.15–0.38 lb clomazone	0.4–1.0 pt Command 3ME	45	For suppression and control of annual grasses and broadleaves, make a single preemergent soil application before seeding or transplanting, or after seeding but prior to crop emergence. Place seed or roots of transplants below the chemical barrier when planting. Strictly follow all precautions and restrictions on the label to minimize offsite movement and carryover. Read and understand the vegetable disclaimer section of the label—the end user assumes all liability for failure to perform and crop injury resulting from its use.
	1.1–1.7 lb ethalfluralin	3.0–4.5 pt Curbit 3EC		Make a single broadcast application within 2 days after seeding. Rate varies with soil texture and organic matter. A shallow cultivation or ½ inch of water is needed to activate the herbicide. Heavy rain following application or shallow seeding may result in crop injury. Do not incorporate prior to planting or use under plastic mulch, broadcast over transplants, or apply through irrigation. Do not use on soils with more than 10% organic matter.
	0.4–1.2 lb ethalfluralin + 0.125–0.375 lb clomazone	2.0–6.0 pt Strategy	45	Use only as a postplant surface-applied herbicide. Make 1 application before crop and weeds emerge or apply as a banded spray between rows following crop emergence or transplanting. Strategy requires rainfall, irrigation, or a shallow cultivation within 2–5 days after application for activation. Because of the potential for offsite movement and severe crop injury, strictly follow all precautions and restrictions on the label.
	trifluralin	several manufacturers	30	Direct-spray between rows when plants have reached the three- to four-leaf stage. Set incorporation equipment to move treated soil around the base of plants. Controls annual grasses and some broadleaf weeds, but is weak on wild mustard, smartweed, common ragweed, velvetleaf, and black nightshade. Rate varies with soil texture and organic matter. Follow recommended soil preparation, application, and incorporation procedures. Must be incorporated within 24 hours. See label for plantback restrictions. Ineffective on peat and muck soils.
Annual grasses	5.0–6.0 lb bensulide	5.0–6.0 qt Prefar 4E		Apply preplant or preemergence. Follow application instructions on label. Use on mineral soils only.
Nut-sedge and some broad-leaves	0.023–0.047 lb halosulfuron	0.5–1.0 oz Sandea	14	Sandea controls several broadleaf weeds and nutsedge. It will not control grasses. Sandea has both pre- and postemergence activity and can be used under plastic mulch. Do not exceed 2 applications per crop cycle or 2.0 oz/a per 12-month period. See label for organophosphate insecticide restrictions. Consult label for rate, application timing, and other important usage information and precautions.

*Restricted-use pesticide.

(continued)

Pest management

Asparagus

Bean

Carrot

Celery

Cole crops

Cucumber

Weed control in cucumber *(continued)*

Weed	Rate/a of active ingredient	Rate/a of commercial product	Days to harvest	Remarks and suggestions
Emerged weeds	glyphosate	several manufacturers and formulations		See manufacturer's label to assure that the formulation is labeled for this crop and for specific instructions. Some formulations require a wait of 3 days between application and seeding. Crop contact will result in severe injury or death. If weeds have been mowed or tilled, do not treat until they have resumed active growth and reached the recommended stage on the label. Unless otherwise stated, allow 7 or more days before tilling treated fields. Do not tank mix with soil-residual herbicides unless otherwise specified.
	*paraquat	several manufacturers and formulations, not all are registered for this use		Prepare seedbed early to allow for maximum weed emergence. Application can be made as a banded or broadcast treatment before, during, or after planting, but before crop emergence. In preplant and preemergence (to the crop) uses, do not apply to soils lacking clay minerals (i.e., muck, pure sand). Use the higher rate for heavy weed infestations. Seeding should be performed with minimal soil disturbance. Always add crop oil concentrate or non-ionic surfactant to spray mixture. Follow precautions on label.
Emerged grasses	0.068–0.12 lb clethodim	9.0–16.0 oz Select Max	14	Apply to actively growing grasses. Repeat treatments may be made at 14-day intervals up to the maximum annual use rate. Do not cultivate grasses within 7 days before or after application. Include appropriate surfactant as required by product label. Do not apply if rain is expected within 1 hour.
	0.094–0.125 lb clethodim	6.0–8.0 oz Select 2EC	14	
	0.094–0.28 lb sethoxydim	0.5–1.5 pt Poast	3	Make postemergence applications to actively growing grasses within the size ranges indicated on the label. Check the label for wild proso millet or rescue treatment rates. Do not apply more than 3.0 pt/a Poast in one crop season. Always add 2.0 pt/a crop oil concentrate. Check the label for additional precautions and restrictions.

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Pest management

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