Pumpkin & squash

Planting

Most commercial growers start pumpkin and squash from seed. Delay planting until danger of frost is past and soils have warmed to at least 60°F. Planting generally begins around May 10 in southern Wisconsin and June 1 in northern Wisconsin. Pumpkin and squash are sensitive to transplanting. Plants are typically started in individual containers 3–4 weeks before transplanting in the field—May 20 in southern Wisconsin and June 1 in northern counties. Using too small a container or allowing the plants to grow too large before transplanting can impair root growth in the field.

Bush types

Rows: 24-48 inches.

Plants in row: 36-60 inches apart.

Vine types

Rows: 36-96 inches.

Plants in row: 36-60 inches apart.

Pollination

Pumpkins and squash have male and female flowers that are pollinated by insects, typically bees. To protect pollinators, insecticide applications should not be made during the day while they are active.

Lime and fertilizer

Lime: Use dolomitic limestone to maintain a pH of 6.0 on mineral soils and 5.6 on organic soils.

Fertilizer rates: Apply P_2O_5 and K_2O according to soil test recommendations. Use annual nitrogen, P_2O_5 , and K_2O recommendations in the table below.

Increase the rates shown below by 20% for high-yielding pumpkins. Take credits for previous legume crops and manure.

Application: Broadcast lime and fertilizer and work into the soil before planting. Apply fertilizer at planting time in a band 2 inches to the side and 2 inches below seed level.

Nitrogen: Split nitrogen recommendation into two or more applications during the season. Make the first application when plants have two or more true leaves. Make a second application when vines begin to fill the rows. Subsequent applications (15–20 lb N/a each) can be made at 10- to 14-day intervals after harvest has started. Excess nitrogen can delay maturity and result in green pumpkins.

Annual nitrogen, phosphate, and potash recommendations for pumpkin and squash

	Nitrog	jen	Phosphate and potash					
Crop	Organic matter (%)	Amount to apply (lb/a)	Yield goal (t/a)	Amount P ₂ O ₅ to apply* (lb/a)	Amount K ₂ 0 to apply* (lb/a)			
Pumpkin	<2	100	15–20	50	110			
	2.0-9.9	80						
	10-20	60						
	>20	30						
Squash	<2	80	12–16	40	90			
	2.0-9.9	60						
	10–20	40						
	>20	20						

^{*}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 pumpkin and squash

Disease	Active ingredient	Rate/a of commercial product	Days to harvest	Remarks and suggestions						
Angular leaf spot (Pseudomonas)	copper hydroxide	1.33 pt Champ Formula 2 Flowable	0	Do not apply more than 14.4 pt product per year.						
	fixed copper	1.5–2.0 qt Copper- Count-N	0	Use disease-free seed and rotate crops.						
		1.0–2.25 lb Kocide 2000 DF	0							
		0.5–1.25 lb Kocide 3000	0							
Anthracnose and other foliar diseases	azoxystrobin	11.0–15.5 fl oz Aframe, AzoxyStar, Equation, Quadris Flowable	AzoxyStar, Equation, 11 (strobilurin) categ Quadris Flowable Opti contains Groups							
(see label)	azoxystrobin + chlorothalonil	3.2 pt Quadris Opti	1	Tanos contains Groups 11 and 27 fungicides. Do nexceed 1 application of any of these products before alternating with a fungicide having a different more						
	azoxystrobin + difenoconazole	12.0–14.0 fl oz Quadris Top	1	of action. Do not exceed 4 applications of strobilurin fungicides per year. Do not exceed 1.92 qt/a Quadris						
	famoxadone + cymoxanil	8.0 oz Tanos	3	or Equation, 2.0 gal/a Quadris Opti, 32.0 oz/a Tanos, or 64.0 oz/a Cabrio per season.						
	fluoxastrobin	Tanos must be tank mixed with a contact fungicide such as mancozeb, chlorothalonil, or a copper-								
	pyraclostrobin	12.0–16.0 oz Cabrio EG	0	containing fungicide. Do not tank mix Quadris, Equation, Quadris Opti, or Cabrio with additives or adjuvants.						
	boscalid + pyraclostrobin	12.5–18.5 oz Pristine WDG	0	Pristine belongs to Groups 7 (anilide) and 11 (strobilurin) fungicide categories. Do not exceed 1 application of Pristine before alternating to a labeled fungicide with a different mode of action not in Group 7 or 11. 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	Anthracnose: 1.5–2.0 pt Bravo Weather Stik, Echo 720, Equus 720	0	Use in sufficient water to obtain adequate coverage. Begin application when plants are in first true leaf stage or when conditions are favorable for disease						
		1.4–1.8 lb Bravo Ultrex	0	development.						
		82.5WDG, Equus DF	•							
		1.3–1.6 lb Echo 90DF 2.25–2.75 pt Bravo Zn,	0							
		Echo Zn, Equus 500 Zn	O							
		Alternaria: 2.0–3.0 pt Bravo Weather Stik, Echo 720, Equus 720	0							
		1.8–2.7 pt Bravo Ultrex WDG, Equus DF	0							
		1.6-2.5 lb Echo 90DF	0							
		2.75–4.25 pt Bravo Zn, Echo Zn, Equus 500 Zn	0							
	chlorothalonil + cymoxanil	1.9–3.0 pt Ariston	3	Apply before infection and repeat at 7-day intervals.						
	cyprodinil + difenoconazole	16.0–20.0 fl oz Inspire Super	7	Apply no more than 80.0 fl oz/a per season. Make no more than 2 sequential applications before alternating to a fungicide with a different mode of action.						
				(continued)						

Disease	Active ingredient	Rate/a of commercial product	Days to harvest	Remarks and suggestions
Anthracnose and other foliar diseases (cont.)	fenamidone	5.5 fl oz Reason 500 SC	14	For Alternaria leaf blight only. Reason belongs to the Group 11 (strobilurin) fungicide category. Do not exceed 1 application of Reason or other Group 11 materials before alternating with a fungicide having a different mode of action. Do not exceed 4 applications of Group 11 fungicides per year. Do not exceed 22.0 fl oz/a Reason per season.
				Following the last application of Reason 500 SC, wait 30 days before planting wheat and 1 year for all other crops.
	fluopyram + trifloxystrobin	7.6 fl oz Luna Sensation	0	Make no more than 4 applications per year. Do not apply more than 27.1 fl oz/a per season.
	fluoxastrobin	Alternaria: 3.0–5.7 fl oz Evito 480 SC	1	Begin application preventively. Use higher rates when disease pressure is high.
	fluxapyroxad + pyraclostrobin	4.0–5.5 fl oz Merivon	0	Make no more than 3 applications per acre per year. Follow resistance management guidelines.
	hydrogen dioxide	1:100–1:2000 dilution OxiDate	0	See label for specific cucurbit application instructions. Can be used on certified organic operations.
	mancozeb	1.6–2.4 qt Dithane F-45, Manzate Flowable, Penncozeb 4FL 1.5–3.0 lb Penncozeb 75DF, Penncozeb 80WP 2.0–3.0 lb Dithane DF Rainshield, Dithane M45, Koverall, Manzate	5 5 5	For use on summer squash only. Consult label for seasonal product use limits. Spray every 5–10 days depending on disease and weather pressures.
	thiophanate methyl	Pro-Stick 0.2–0.4 lb Thiophanate methyl 85WDG 0.5 lb Topsin M 70WSB	0	
	zoxamide + chlorothalonil	36.0 fl oz Zing	0	For downy mildew management. Follow resistance management guidelines.
Bacterial wilt (Erwinia)	Control the cucumb	er beetles that carry this path	ogen (see l	Insect Control table).
Black rot (Didymella)	other than cucurbits		e at the en	se-free seed and practice long rotations with crops d of the growing season. Handle storage squash and
Downy mildew (Pseudoperonospora	ametoctradin + dimethomorph	14.0 fl oz Zampro	0	Make no more than 2 sequential applications before alternating to a different mode of action. Do not apply more than 42.0 fl oz/a Zampro per season.
cubensis) and Phytophthora blight or crown rot (Phytophthora	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.
capsici)	cymoxanil	downy mildew: 3.2–5.0 oz Curzate 60DF	3	Apply no more than 30.0 oz per 12-month period. Use Curzate only in combination with a labeled rate of a protectant fungicide such as products containing mancozeb, copper hydroxide, or chlorothalonil.
	dimethomorph	6.0 oz Forum	0	Do not exceed 30.0 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. (continued)

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Disease	Active ingredient	Rate/a of commercial product	Days to harvest	Remarks and suggestions
Downy mildew and Phytophthora	famoxadone + cymoxanil	downy mildew: 8.0 oz Tanos	3	Do not make more than 1 application of Tanos before alternating with a fungicide having a different mode of action. Do not make more than 4
blight or crown rot (cont.)		Phytophthora: 8.0–10.0 oz Tanos	3	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. Tanos 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	2	Tank mix this product with another labeled non–Group 43 fungicide.
	fosetyl-al	2.5–5.0 lb Aliette WDG, Linebacker	12 hr	Begin applications when conditions favor disease. The lower rates of Aliette WDG (2.0–3.0 lb) can be used when tank mixed with another fungicide (other than copper) labeled for downy mildew control.
	mandipropamid	8.0 fl oz Revus	0	Make no more than 1 application before switching to another effective non–Group 40 fungicide.
	oxathiapiprolin	2.0–4.8 fl oz Orondis Opti A, Orondis Ultra A Phytophthora crown and fruit rot only: 2.4–19.2 fl oz Orondis Gold 200	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. Do not use Orondis Ultra A as a foliar application if you have already used Orondis Gold 200 on the soil at time of planting. Soil applications of Orondis Gold 200 are to be applied at-plant, in-furrow, or by drip irrigation treatment only.
	phosphorous acid, mono- and dibasic sodium, potassium, and ammonium salts	2.5–5.0 pt Phostrol	0	Do not exceed 7 applications/a per season. Begin applications when conditions favor disease.
	potassium phosphite	1.0–3.0 qt Fosphite/100 gal water	0	Do not apply at intervals less than 3 days. Do not apply to heat- or moisture-stressed plants.
	propamocarb hydrochloride	1.2 pt Previcur Flex or 0.6–1.2 pt Previcur Flex plus tank-mix partner (protectant)	2	Do not apply more than 6 pt/a Previcur Flex per season.
	zoxamide + chlorothalonil	36.0 fl oz Zing	0	For downy mildew management. Follow resistance management guidelines.
	zoxamide + mancozeb	1.5–2.0 lb Gavel 75DF	5	For use on squash and pumpkin. Do not exceed 8 applications or apply more than 16.0 lb/a product (10.67 lb mancozeb or 1.33 lb zoxamide) per season.
Mosaic	Plant resistant variet	ties.		
Powdery mildew	azoxystrobin 11.0–15.5 fl oz Aframe, AzoxyStar, Equation, Quadris Flowable, Satori		1	Equation, Quadris, Cabrio, and Flint belong to the Group 11 (strobilurin) category of fungicides. Quadris Opti contains a combination of Groups 11 and M5 fungicides. Do not exceed 1 application
	azoxystrobin + chlorothalonil	3.2 pt Quadris Opti	1	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
	pyraclostrobin	12.0–16.0 oz Cabrio EG	0	year. Do not exceed 64.0 oz/a Cabrio, 8.0 oz/a Flint,
	trifloxystrobin	1.5–2.0 oz Flint	0	1.92 qt/a Quadris or Equation, or 2 gal/a Quadris Opti per season.
				Do not tank mix Cabrio, Flint, Quadris, Equation, or Quadris Opti with additives or adjuvants.
				(continued)

Disease	Active ingredient	Rate/a of commercial product	Days to harvest	Remarks and suggestions
Powdery mildew (cont.)	boscalid + pyraclostrobin	12.5–18.5 oz Pristine WDG	0	Pristine belongs to Group 7 and Group 11 (strobilurin) fungicide categories. Do not exceed 2 sequential applications before alternating to a labeled fungicide with a different mode of action. Do not exceed 4 applications of Pristine or other Group 7 or 11 fungicides per season. Limit of 74.0 oz/a per season.
	clarified hydrophobic extract of neem oil	0.5–1.0% Trilogy in 25–100 gal water <i>or</i> 2.0 pt in at least 5 gal water	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 per year. Do not apply more than once every 7 days. Do not exceed total of 6.8 oz/a product per year.
	cyprodinil + fludioxonil	11.0–14.0 oz Switch 62.5WG	1	Do not apply more than 56.0 oz/a Switch per season. After 2 applications, alternate with a fungicide with a different mode of action for 2 applications.
	fluopyram + tebuconazole	6.0–17.0 fl oz Luna Experience	7	A mild yellowing on leaf margins is sometimes noted following application.
	fluopyram + trifloxystrobin	4.0–7.6 fl oz Luna Sensation	0	Do not apply more than 27.1 fl oz/a per season.
	flutriafol	10.0–14.0 fl oz Topguard	0	Follow resistance management guidelines.
	kresoxim-methyl	3.2–4.8 oz Sovran	0	Do not exceed 19.2 oz/a per season. Consult label for comments on adjuvant usage.
	metrafenone	15.4 fl oz Vivando	0	Make no more than 3 applications per year.
	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 the last application and planting new crops. (Formerly Nova.) Resistance has been noted in WI.
	neem oil	0.5–1.0% Trilogy in 25–100 gal water	0	Has fungicide and miticide benefits. Organic (OMRI) approved.
	penthiopyrad	12.0–16.0 fl oz Fontelis	1	For disease control in greenhouse cucurbits, use at a rate range of 0.375–0.5 fl oz per gallon of spray per 1,360 sq ft. These rates equal field rates of 12.0–16.0 fl oz/a. Make no more than 2 sequential applications before switching to a fungicide with a different mode of action. Do not apply more than 67.0 fl oz/a per year.
	potassium bicarbonate	2.5–5.0 lb Kaligreen	1	Use higher rates when disease pressure is high. Apply at first sign of disease for best results.
	quinoxyfen	4.0–6.0 fl oz Quintec	3	Do not apply more than 32.0 fl oz Quintec per calendar year. Under certain environmental conditions, Quintec may cause leaf spotting or chlorosis. If symptoms occur after applying Quintec, discontinue use.
	sulfur	various, depending on product and formulation	0	Do not apply to sensitive crops. Do not apply during hot weather. Do not use within 2 weeks of an oil treatment. Consult with processor prior to use.
	tebuconazole	4.0–6.0 fl oz Folicur 3.6 F, Monsoon, Onset 3.6L, Orius 3.6F, Tebusha 3.6FL, TebuStar 3.6L, Tebuzol 3.6F, Toledo	7	Do not exceed 24.0 fl oz/a per season.

Disease	Active ingredient	Rate/a of commercial product	Days to harvest	Remarks and suggestions
Powdery mildew (cont.)	thiophanate methyl	0.5 lb Topsin M 70W, Topsin M WSB 10.0 fl oz Topsin 4.5FL 0.2–0.4 lb Thiophanate methyl WDG	0	Apply when disease first appears and repeat if needed every 7–14 days.
	triflumizole	4.0–8.0 oz Procure 50WS 4.0–8.0 fl oz Procure 480 SC	0	Do not exceed 40.0 oz/a of Procure 50WS or 40.0 fl oz/a of Procure 480 SC 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 thiram			Plant seed that has been pretreated with Captan or Thiram.

Scouting calendar for insect pests of pumpkin and squash

	April			May			June			July			August		Se	eptembe	er
early	mid	late	early	mid	late	early	mid	late	early	mid	late	early	mid	late	early	mid	late
							Squas	h vine	borer								
							Mites										
								Aphic	ls								
									Squas	h bugs	;						
									Stripe	d and s	spotted	d cucun	nber be	eetle			

Insect control in pumpkin and squash

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 soil: 21.0–28.0 fl oz Sivanto	1 21	Apply when pests reach or exceed established thresholds. Do not apply more than 28.0 fl oz of Sivanto per acre per crop season.					
	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 beetle (striped,		Treat when there are more than four to five adults per 50 plants. If the plants are not touching within the row, treatment is justified if the field averages more than five beetles per plant.							
spotted)	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 of 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 pest	ticide.			(continued)					

^{*}Restricted-use pesticide.

Insect	Rate/a of active ingredient	Rate/a of commercial product	Days to harvest	Remarks and suggestions
Cucumber beetle (cont.)	alpha-cypermethrin 3.0–3.8 fl oz *Fastac			Apply when pests reach or exceed established thresholds. Do not apply more than 11.4 fl oz of Fastac per acre per crop season.
	beta-cyfluthrin	2.4–2.8 fl oz *Baythroid XL	0	Maximum Baythroid XL allowed per 7-day interval is 2.8 fl oz/a and season total allowed per crop season is 16.8 fl oz/a.
	bifenthrin	2.6–6.4 fl oz *Brigade 2EC	3	Treat every 7 days as needed. Do not exceed 0.3 lb ai/a per season. Do not make more than 2 applications after bloom.
		6.8–8.5 fl oz *Capture LFR	21	Do not exceed 0.1 lb ai/a as an at-plant application; do not exceed 0.3 lb ai/a per season of all bifenthrin products.
	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)	0	Do not apply during maximum flowering or fruit set, or when pollinating bees are in the field. Make applications after 8 p.m.
	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.
	0.045–0.268 lb dinotefuran	foliar: 1.0–4.0 oz Venom 70SG soil: 5.0–6.0 oz Venom 70SG	1 21	Do not follow soil applications with foliar application of any other neonicotinoid insecticide. Use only one application method. Do not apply more than 6.0 oz/a per year using foliar applications, or 12.0 oz/a per season using soil applications. See product label for application directions.
	0.2–0.3 lb fenpropathrin	10.66–16.0 oz *Danitol 2.4EC	7	Do not exceed 2.66 pt/a Danitol (0.8 lb ai/a) per season. Control may be improved by the addition of a non-ionic surfactant.
	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 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 + 6.0–9.0 fl oz *Voliam chlorantraniliprole Xpress		1	Do not exceed a total of 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 season.
*Restricted-use pe	esticide.			(continued)

*Restricted-use pesticide. (continued)

Insect	Rate/a of active ingredient	Rate/a of commercial product	Days to harvest	Remarks and suggestions
Cucumber beetle (cont.)	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	3 (pumpkin) 1 (squash)	Do not apply before vining or to wet plants.
	0.5-1.0 lb methomyl	1.5–3.0 pt *Lannate LV 0.5–1.0 lb *Lannate SP		See label for days to harvest.
	0.1–0.2 lb permethrin	*Ambush, *Pounce	0	Several formulations; see label for rate. Spray during the evening. No more than 1.6 lb total.
	thiamethoxam	3.0–5.5 oz Actara 25WDG 5.0–11.0 fl oz Platinum 2SC 1.66–3.67 oz Platinum 75SG	0 30 30	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.
	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 products containing thiamethoxam or 0.2 lb ai/a of products containing chlorantraniliprole per season.
	0.02–0.025 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.
Cutworms and loopers	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.
	beta-cyfluthrin	0.8–2.4 fl oz *Baythroid XL	0	Maximum Baythroid XL allowed per 7-day interval is 2.8 fl oz/a and season total allowed per crop season is 16.8 fl oz/a.
	bifenthrin	2.6–6.4 fl oz *Brigade 2EC	3	Treat every 7 days as needed. Do not exceed 0.3 lb ai/a per season. Do not make more than 2 applications after bloom.
		6.8–8.5 fl oz *Capture LFR	21	Do not exceed 0.1 lb ai/a as an at-plant application; do not exceed 0.3 lb ai/a per season of all bifenthrin products.
	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 (several formulations)	0	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.

Insect	Rate/a of active ingredient	Rate/a of commercial product	Days to harvest	Remarks and suggestions
Cutworms and loopers (cont.)	0.088–0.176 lb cyantraniliprole (soil) 0.065–0.11 lb cyantraniliprole (foliar)	6.75–13.5 fl oz Verimark 10.0–17.0 fl oz Exirel	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.
	0.012–0.028 lb deltamethrin	1.0–2.4 fl oz *Delta Gold	3	Apply every 3 days as needed. Do not exceed 14.4 fl oz/a per season.
	0.05–0.18 lb dinotefuran (foliar)	2.0–7.0 oz Scorpion SL	1	Can repeat at 7-day intervals. Do not apply more than 10.5 oz per year.
	0.132–0.179 lb dinotefuran	3.0–4.0 oz Venom 70SG	1	Do not apply more than 6.0 oz/a per year using foliar applications. See product label for application directions.
	0.03–0.05 lb esfenvalerate	5.8–9.6 fl oz *Asana XL	3	Spray when cutworms are present in damaging numbers.
	0.03–0.045 lb flubendiamide	2.0–3.0 oz Synapse WG	1	Do not apply more than 3.0 oz/a (0.045 lb ai/a) in a 7-day period or 9.0 oz/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 a total of 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 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. No more than 1.6 lb total.
	0.01–0.025 lb zeta-cypermethrin	1.28–4.0 oz *Mustang Maxx	1	Apply at thresholds and do not exceed 24.0 oz/a Mustang Maxx per season.
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	Treat every 7 days as needed. Do not exceed 0.3 lb ai/a per season. Do not make more than 2 applications after bloom.
*Restricted-use pes	ticide.			(continued)

	Insect co
rea	Insect
Σ.	Melon a (cont.)
Pepper	

Potato

Zeta-cypermethrin	nsect	Rate/a of active ingredient	Rate/a of commercial product	Days to harvest	Remarks and suggestions
season and allow at least 7 days betwee applications. Soil: 9.0–12.0 fl oz Belay Contact	Melon aphid (cont.)		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 foz of product/a per crop season.
season. Apply as a narrow band center on the plant row, as a in-furrow spray planting; as a sidedress to both sides of the row; as a transplant water drench; cas chemigation into root zone through drip, trickle or micro-sprinkler, or simila equipment. 0.088–0.176 lb cyantraniliprole (soil) 0.088–0.133 lb cyantraniliprole (foliar) 13.5–20.5 fl oz Exirel 1 Do not apply more than 13.5 fl oz/a Verimark per crop per season. Do not a more than 0.4 lb ai/a cyantraniliprole containing products per orpo 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. 0.25–0.75 lb diazinon several formulations 3 (winter squash) 7 (summer squash) 8 d cy2/a (0.267 lb ai/a) per season. 7 (summer squash) 8 d cy2/a (0.267 lb ai/a) per season. 8 d cy2/a (0.267 lb ai/a) per season. 9 d cycled thresholds. Do not apply more than 2.0 fl oz of Sivanto per acre per construction of the squash sq		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.
cyantraniliprole (soil) 0.088–0.133 lb cyantraniliprole (foliar) 13.5–20.5 fl oz Exirel 1 application solution should b adjusted to between pH 4 and 6. Minimum application interval between pH 4 and 6. Minimum application interval between foliar sprays is 5 days. 0.25–0.75 lb diazinon several formulations 3 (winter squash) 7 (summer squash) 7 (summer squash) 6 (0.062–0.089 lb flonicamid 0.062–0.089 lb flonicamid 2.0–2.8 oz Beleaf SG 0 Begin applications before aphid popula build. Do not exceed 2.8 oz/a Beleaf pe application and do not apply more than 8.4 oz/a (0.267 lb ai/a) per season. 6 (0.25 lb ai/a) per season. 7 (summer squash) 7 (summer squash) 7 (summer squash) 7 (summer squash) 8 (20.267 lb ai/a) per season. 8 (20.267 lb ai/a) per season. 1 Apply when pests reach or exceed established thresholds. Do not apply more than 2.0 lb ai/a per season. 1 (20.20-0.03 lb lambda-cyhalothrin + chlorantraniliprole 1 (20.20-0.03 lb lambda-cyhalothrin + chlorantraniliprole) 2 (20.20-0.03 lb lambda-cyhalothrin + chlorantraniliprole) 2 (20.20-0.03 lb lambda-cyhalothrin + chlorantraniliprole) 3 (20.20-0.03 lb lambda-cyhalothrin + chlorantraniliprole) 4 (20.20-0.03 lb lambda-cyhalothrin + chlorantraniliprole) 4 (20.20-0.03 lb lambda-cyhalothrin + chlorantraniliprole) 5 (20.20-0.03 lb lambda-cyha			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.
cyantraniliprole (foliar) 1		cyantraniliprole (soil)		1	Verimark per crop per season. Do not apply more than 0.4 lb ai/a cyantraniliprole-
Commerce of the properties o			13.5–20.5 fl oz Exirel	1	applied as soil or foliar applications. The pH of the application solution should be
Squash 7 7 (summer squash) 7 7 (summer squash) 7 1 1 1 1 1 1 1 1 1					Minimum application interval between foliar sprays is 5 days.
Comparison of the product of the p		0.25–0.75 lb diazinon	several formulations	squash) 7 (summer	Apply as soon as aphids are noticed.
Sivanto soil: 21.0–28.0 fl oz Sivanto imidacloprid 7.0–10.5 fl oz Admire Pro 21 Apply in a narrow band centered on pla row within 14 days before planting or a in-furrow treatment during planting. De exceed 0.38 lb ai/a per season. 0.02–0.03 lb lambda-cyhalothrin + chlorantraniliprole lambda-cyhalothrin + thiamethoxam 1.0–2.0 lb malathion Sivanto 21 Apply in a narrow band centered on pla row within 14 days before planting or a in-furrow treatment during planting. De exceed 0.38 lb ai/a per season. Po not exceed 0.18 lb ai/a per season. Reapply at intervals of 5 or more days. Do not exceed a total of 31.0 fl oz/a of Voliam Xpress or 0.18 lb ai/a of product containing lambda-cyhalothrin or 0.2 lb of products containing chlorantranilipr per season. Apply when pests reach or exceed established thresholds. Do not apply more than 19.0 fl oz/a Endigo ZC per cr season and allow at least 5 days betwee applications. 1.0–2.0 lb malathion several formulations 3 Do not apply before vining or when pla		0.062–0.089 lb flonicamid	2.0–2.8 oz Beleaf SG	-	Begin applications before aphid population 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.
imidacloprid 7.0–10.5 fl oz Admire Pro 21 Apply in a narrow band centered on platrow within 14 days before planting or a in-furrow treatment during planting. Do exceed 0.38 lb ai/a per season. 0.02–0.03 lb		flupyradifurone	Sivanto <i>soil:</i> 21.0–28.0 fl oz		established thresholds. Do not apply more than 28.0 fl oz of Sivanto per acre per crop
lambda-cyhalothrinReapply at intervals of 5 or more days.lambda-cyhalothrin + chlorantraniliprole9.0 fl oz *Voliam Xpress1Do not exceed a total of 31.0 fl oz/a of Voliam Xpress or 0.18 lb ai/a of product containing lambda-cyhalothrin or 0.2 lk of products containing chlorantranilipr per season.lambda-cyhalothrin + thiamethoxam4.0-4.5 fl oz *Endigo ZC1Apply when pests reach or exceed established thresholds. Do not apply more than 19.0 fl oz/a Endigo ZC per cr season and allow at least 5 days between applications.1.0-2.0 lb malathionseveral formulations3Do not apply before vining or when plant		imidacloprid		21	Apply in a narrow band centered on plant row within 14 days before planting or as an in-furrow treatment during planting. Do no
chlorantraniliprole Voliam Xpress or 0.18 lb ai/a of product containing lambda-cyhalothrin or 0.2 lb of products containing chlorantranilipr per season. Iambda-cyhalothrin + 4.0–4.5 fl oz *Endigo ZC thiamethoxam 4.0–4.5 fl oz *Endigo ZC asablished thresholds. Do not apply more than 19.0 fl oz/a Endigo ZC per croseason and allow at least 5 days between applications. 1.0–2.0 lb malathion several formulations 3 Do not apply before vining or when plants as a positive containing lambda-cyhalothrin or 0.2 lb of products containing chlorantranilipr per season. 1.0–2.0 lb malathion several formulations 3 Do not apply before vining or when plants as a positive containing lambda-cyhalothrin or 0.2 lb of products containing lambda-cyhalothrin			1.28–1.92 fl oz *Warrior II	4	•
thiamethoxam established thresholds. Do not apply more than 19.0 fl oz/a Endigo ZC per cr season and allow at least 5 days between applications. 1.0–2.0 lb malathion several formulations 3 Do not apply before vining or when plants.			9.0 fl oz *Voliam Xpress	1	Voliam Xpress or 0.18 lb ai/a of products containing lambda-cyhalothrin or 0.2 lb ai/of products containing chlorantraniliprole
			4.0–4.5 fl oz *Endigo ZC	1	established thresholds. Do not apply more than 19.0 fl oz/a Endigo ZC per crop season and allow at least 5 days between
1 (squash)		1.0-2.0 lb malathion	several formulations	(pumpkin) 1	Do not apply before vining or when plants are wet.

Insect	Rate/a of active ingredient	Rate/a of commercial product	Days to harvest	Remarks and suggestions
Melon aphid (cont.)	pymetrozine	2.75 oz Fulfill 50WDG	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.
	thiamethoxam	1.5–3.0 oz Actara 25WDG 5.0–11.0 fl oz Platinum 2SC 1.66–3.67 oz Platinum 75SG	0 30 30	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
	0.198-0.257 lb thiamethoxam + chlorantraniliprole	10.0–13.0 fl oz Durivo	30	applied as a foliar spray. 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 products containing thiamethoxam or 0.2 lb ai/a of products containing chlorantraniliprole per season.
	0.02–0.025 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.
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 (soil)	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.
	bifenazate	0.75–1.0 lb Acramite 50WS	3	Limit of 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 after 7 days. Do not apply more than twice after bloom or 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.
	0.2 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	4.5 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	3 (pumpkin) 1 (squash)	Do not apply before vining or to wet plants.
	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)

Insect	Rate/a of active ingredient	Rate/a of commercial product	Days to harvest	Remarks and suggestions		
Squash bug	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. At early flowering, treat if you find more than one egg mass per plant. Destroy crop residue in fall to reduce overwinter survival of this pest.					
	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	Treat every 7 days as needed. Do not exceed 0.3 lb ai/a per season. Do not make more than 2 applications after bloom.		
	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)	0	Do not apply to wet foliage or when rain or high humidity is expected within 2 days of treatment.		
	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.		
	0.05–0.18 lb dinotefuran (foliar)	2.0–7.0 oz Scorpion 35SL	1	Can repeat at 7-day intervals. Do not apply more than 10.5 oz per year.		
	0.132–0.179 lb dinotefuran	3.0–4.0 oz Venom 70SG	1	Do not exceed 6.0 oz/a per year using foliar applications. See label for application directions.		
	0.03–0.05 lb esfenvalerate	5.8–9.6 fl oz *Asana XL	3	Do not exceed 0.25 lb ai/a per year.		
	flupyradifurone	foliar: 10.5–14.0 fl oz Sivanto soil: 21.0–28.0 fl oz	1 21	Apply when pests reach or exceed established thresholds. Do not apply more than 28.0 fl oz of Sivanto per acre per crop		
	0.02-0.03 lb	Sivanto 1.28–1.92 fl oz *Warrior II	4	Do not exceed 0.18 lb ai/a per season.		
	lambda-cyhalothrin lambda-cyhalothrin + chlorantraniliprole	6.0–9.0 fl oz *Voliam Xpress	1	Reapply at intervals of 5 or more days. Do not exceed a total of 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 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.		

^{*}Restricted-use pesticide. (continued)

Table beet

Tomato

Pea

Potato

Insect	Rate/a of active ingredient	Rate/a of commercial product	Days to harvest	Remarks and suggestions
Squash bug (cont.)	0.2 lb permethrin	*Ambush, *Pounce	0	Will kill adult squash bugs. See label for rate. Do not exceed 1.6 lb ai/a per season.
	0.02–0.025 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.
Squash vine borer	boring in the main stem co cause economic damage. to confirm the presence of	an kill the entire plant, while los Look for sawdust-like excreme	ss of a runr nt coming eat applica	runners are less than 2 feet long. Larvae ner or two when the plant is larger will not from holes in the stems, and open the stems tions at 5- to 7-day intervals throughout the be done to control this pest.
	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	Treat every 7 days as needed. Do not exceed 0.3 lb ai/a per season. Do not make more than 2 applications after bloom.
	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.
	0.5–1.5 lb carbaryl	Sevin (several formulations)	0	Do not apply to wet foliage or when rain or high humidity is expected within 2 days of treatment.
	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 a total of 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 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.
	0.02–0.025 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.

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Weed control in pumpkin and squash

Weed	Rate/a of active ingredient	Rate/a of commercial product	Days to harvest	Remarks and suggestions
Annual weeds	0.25–0.75 lb clomazone	pumpkins and winter squash: 0.67–2.0 pt Command 3ME summer squash: 0.67– 1.33 pt Command 3ME	45	Pumpkin (processed only), winter squash, and summer squash only. For suppression and control of annual grasses and broadleaves, make a single preemergent soil application before seeding or transplanting. Place seed or roots of transplants below the chemical barrier when planting. Consult variety restrictions on label. 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 of this product 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 EC		Make a single broadcast application within 2 days after seeding. Rate varies with soil texture and organic matter. A shallow cultivation or 1/2 inch of water is needed for activation. Heavy rain following application or seeding may result in crop injury. Do not incorporate prior to planting, 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 before weed emergence. Rate varies by squash type. Make 1 application before crop emergence or apply as a banded spray between rows following emergence or transplanting. Do not make broadcast applications to transplants or use under plastic mulch. Rainfall, irrigation, or a shallow cultivation 2–5 days after application required for activation. Because of the potential for offsite movement and severe crop injury, strictly follow all precautions and restrictions listed on the label.
	s-metolachlor	1.0–1.33 pt Dual Magnum or Dual II Magnum	30	Apply preemergence as an inter-row or inter-hill application in pumpkin only. Leave 1 foot of untreated area over the row, or 6 inches to each side of the planted hill and/or any emerged pumpkin foliage. Broadcast sprays over the planted row or hill, and applications made directly to crop foliage will increase the risk of stand loss, delayed maturity, and yield loss. Rate depends on soil type.
Annual grasses	5.0-6.0 lb bensulide	5.0–6.0 qt Prefar 4E		Apply before planting and incorporate 1–2 inches deep to avoid losses due to volatilization. Use on mineral soils only.
Nutsedge and some broad- leaves	0.023–0.047 lb halosulfuron	0.5–1.0 oz Sandea (rate varies by crop use and application timing—see label)	30	Sandea controls several broadleaf weeds and nutsedge. It will not control grasses. Sandea has both pre- and postemergence activity. Broadcast applications to non-processing crops should not exceed 0.75 oz/a Sandea. Application of Sandea to summer squash is limited to directed spray to row middles, avoiding contact with the crop. Do not exceed 2 applications or apply more than 2.0 oz per 12-month period. Soil or foliar applications of organophosphate insecticides to Sandea-treated crops may cause severe crop injury. Consult label for rate, maximum Sandea use per crop cycle, application timing, and other important usage information and precautions.

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 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 planting. 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 and transplanting should be performed with minimal soil disturbance. Always add crop oil concentrate or nonionic 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
	0.094–0.125 lb clethodim	6.0–8.0 oz Select 2EC	14	days before or after application. Include appropriate surfactant as required by product label. Do not apply if rain is expected within 1 hour.
	0.094-0.28 lb sethoxydim	0.5–1.5 pt Poast	14	Make postemergence applications to actively growing grasses at the sizes indicated on the label. Check the label for wild proso millet or rescue treatment rates as well as precautions and restrictions. Do not exceed 3.0 pt/a Poast per season. Always add 2.0 pt/a of oil concentrate.

^{*}Restricted-use pesticide.