



This is a section from the

2019

Mid-Atlantic

Commercial Vegetable

Production Recommendations

The manual, which is published annually, is **NOT** for home gardener use.

The **full manual**, containing recommendations specific to New Jersey, can be found on the Rutgers NJAES website in the Publications section:

<http://njaes.rutgers.edu/pubs/publication.asp?pid=E001>.

The **label** is a legally-binding contract between the user and the manufacturer. The user must follow all rates and restrictions as per label directions. The use of any pesticide inconsistent with the label directions is a violation of Federal law.

Cooperating Agencies: Rutgers, The State University of New Jersey, U.S. Department of Agriculture, and County Boards of Chosen Freeholders. Rutgers Cooperative Extension, a unit of the Rutgers New Jersey Agricultural Experiment Station, is an equal opportunity program provider and employer.

F. Commodity Recommendations

Pesticide Use Disclaimer

THE LABEL IS THE LAW

Before using a pesticide, check the label for up to date rates and restrictions.

Labels can be downloaded from: <http://www.cdms.net/>, <https://www.greenbook.net/> or <http://www.agrian.com/labelcenter/results.cfm>

Guide to the Recommended Pesticide Tables in the Following Crop Chapters:

1. Pesticides are listed by **group or code number based on chemical structure and mode of action**, as classified by the Weed Science Society of America (WSSA) for herbicides, the Insecticide Resistance Action Committee (IRAC) for insecticides, and the Fungicide Resistance Action Committee (FRAC) for fungicides.
If the number is in bold font, the product may have resistance concerns.
2. For **restricted use pesticides**, the restricted active ingredients are labeled with a *. See the Pesticide Safety chapter for more information.
3. **In addition to the pesticides listed below, other formulations or brands with the same active ingredient(s) may be available. ALWAYS CHECK THE LABEL:**
 - a) to ensure a pesticide is labeled for the same use,
 - b) to ensure the pesticide is labeled for the desired crop, and
 - c) for additional restrictions.
4. All pesticide recommendations are made for spraying a **broadcast area of 1 acre** (43,560 square feet). **Adjust the rate for banded applications** (for more information, see the Pest Management chapter, Calibrating Granular Applicators section).
5. Check the label for the maximum amount of pesticide per application and the maximum number of applications per year.
6. **Bee Toxicity Rating (Bee TR):** N=nontoxic; L=minimum impact on bees; M=moderately toxic, can be used if dosage, timing and method of application are correct, but should NOT be applied directly to crop if bees are present; H=highly toxic, severe losses expected, -- = data not available.

Pumpkins and Winter Squash

Recommended Varieties¹

Pumpkins, Less than 1 pound	WeeeeeOne* (PMR)	Pumpkins 10 to 20 pounds	Orange Sunrise* (PMT)	
	Jill Be Little* (PMR)		Bus Stop*	
	Wee-B-Little*		Secretariat* (PMR)	
	Baby Boo			
Pumpkins 1 to 3 pounds	Jack Sprat* (PMT)	Pumpkins More than 20 pounds	Cronos* (PMT)	
	Baby Bear*		Kratos* (PMT)	
	Touch of Autumn* (PMT)		Gladiator* (PMT)	
	Rockafellow* (PMT)		Aladdin* (PMT)	
Pumpkins 2 to 6 pounds	Prankster* (PMT)			Gold Medal*
	Cannonball* (hard shell)			Rhea* (PMT)
	Iron Man* (FR, PR, PMT) (hard shell)			Solid Gold*
	Field Trip*(PMT)		Pumpkins More than 50 pounds	Captain Jack*
	Orange Smoothie* (hard shell)	Atlantic Giant		
	Hybrid Pam*	Pumpkins, Ornamental	Prizewinner	
	Fall Splendor Plus*(PMT)		Knucklehead*	
	Mystic Plus* (PMT) (5-6 lbs, plant at closer spacing to reduce size)	Pumpkins, Processing	Goosebumps II*	
	Small Sugar (BRT)		Neck Pumpkin Types	
	Kakai (edible seeds)		Autumn Buckskin*	

Winter Squash Acorn Type	Table Ace*	Winter Squash Buttercup Type	Sunshine*(orange)
	Taybelle* (semi bush, PMT)		Buttercup
	Table Gold		Sweet Mama*
	Table Queen		Bonbon*
	Table Star* (PMT)		
	Autumn Delight* (PMT)	Winter Squash Hubbard Type	Hubbard Types
Winter Squash Butternut Type	Butterboy* (restricted vine)	Spaghetti Squash	Boston Marrow Types
	Early Butternut*		Pinnacle
	Metro* (restricted vine, PMR)		Primavera*
	Quantum*		Tivoli*
	Waltham Butternut	Processing Squash	Vegetable Spaghetti
		Atlas* and Other Butternut Types	

¹Varieties are listed by maturity within each type, earliest first. *Hybrid varieties. Disease resistance: BRT=Black rot tolerant, FR=*Fusarium* wilt resistant, PMR=Powdery mildew resistant, PMT=Powdery mildew tolerant, PR=*Phytophthora* resistant, ZYMVR=Zucchini yellow mosaic virus resistant.

Recommended Nutrients Based on Soil Tests

In addition to using the table below, check the suggestions on rate, timing, and placement of nutrients in your soil test report and the Soil and Nutrient Management chapter. Your state’s soil test report recommendations and/or your farm’s nutrient management plan supersede recommendations found below.

Pumpkins and Winter Squash ¹	N (lb/A)	Soil Phosphorus Level				Soil Potassium Level				Nutrient Timing and Method
		Low	Med	High (Opt)	Very High	Low	Med	High (Opt)	Very High	
		P ₂ O ₅ (lb/A)				K ₂ O (lb/A)				
	50-100	150	100	50	0 ²	200	150	100	0 ²	Total nutrient recommended
	25-50	150	100	50	0 ²	200	150	100	0 ²	Broadcast and disk-in
	25-50	0	0	0	0	0	0	0	0	Sidedress when vines start to run

¹For crops grown on plastic mulch, fertilization rates are based on a standard row spacing of 6 ft.

²In VA, crop replacement values of 25 lb/acre of P₂O₅ and 50 lb/acre of K₂O are recommended on soils testing Very High.

Seed Treatment

Check if seed has been treated with an insecticide and fungicide. See Disease Control below.

Planting and Spacing

Seed or transplant in the field between June 15 and July 5 in cooler areas, and between May 15 and July 15 in warmer, southern areas. Base plant spacing on vine habit and average fruit size of the variety. **Note.** Fruit size may be decreased at closer spacings.

Small vine/bush with fruit less than 8 lbs: Rows 5-6 ft apart with 2 ft between plants in the row.

Large/medium vine with fruit 8-15 lbs: Rows 6-7.5 ft apart with 3-4 ft between plants in the row.

Large vine with fruit 12 to 25 lbs: Rows 7.5-9 ft apart with 4 ft between plants in the row.

Large vine with fruit over 30 lbs: Rows 10-12 ft apart with 5-6 ft between plants in the row.

Conservation Tillage (No-Till) Pumpkins

Seed or transplanted no-till pumpkins planted into small grain cover crop or stubble, hairy vetch, or fallow ground has produced commercially acceptable yields. A cover crop on the soil surface will reduce dirty pumpkins at harvest, provide some weed suppression, and minimize fruit rot by creating a barrier between pumpkins and the soil. Since cultivation is not an option in a no-till planting system and few post-emergence herbicides are available to control escaped weeds, choose fields carefully for no-till production. The performance of residual preemergence herbicides depends on rainfall or overhead irrigation for activation. Moisture for activation is more critical in no-till fields consisting of a trash or straw layer. Postemergence, control grasses with Poast or Select, and use Sandea to control yellow nutsedge and certain annual broadleaf weeds. Sandea is an ALS inhibitor (Group 2), and is at high risk for weed resistance development. ALS resistant weed biotypes have been identified for common ragweed, common cocklebur, Palmer amaranth, and other pigweed species in the mid-Atlantic region. Sandea will NOT control certain pigweed species, common lambsquarters, annual morningglory, Eastern black nightshade, or any ALS resistant weed. Suggested cultural procedures are outlined below. **Not recommended in NJ due to the high risk of weed resistance development and the lack of postemergence control options for certain pigweed species, common lambsquarters, annual morningglory, Eastern black nightshade, or any ALS resistant weed.**

Cover Crop Establishment and Weed Management

Small grain stubble provides an ideal crop-mulch for pumpkins. Make sure the combine distributes straw uniformly. No other manipulation of the residue is required before planting pumpkins. An alternative crop-mulch is hairy vetch; seed in the fall 3-4 weeks before the average frost date at the rate of 20-25 lb/A with a grain drill or broadcast spreader. On sloping ground, mix a winter-killed variety of spring oats (0.5 bushel/A) with the vetch to decrease the time required for ground cover to reduce soil erosion. Adjust soil pH before vetch is seeded as tillage will not be performed before pumpkin planting. Application of P and K before seeding vetch is optional, depending on soil test results.

Soil moisture prior to planting is a critical factor for successful establishment of pumpkins. The living, hairy vetch cover crop may remove soil moisture and prevent pumpkin germination and growth. If irrigation is not available, kill the vetch 10-14 days prior to planting in order for rainfall to provide adequate soil moisture for seeding or transplanting. If rainfall is excessive, hairy vetch may remove water to facilitate timely planting. Irrigation will eliminate the concerns about soil moisture for pumpkin seeding and germination.

Termination Of The Cover Crop

Group	Product Name	Product Rate	Active Ingredient (* = Restricted Use)	Active Ingredient Rate	PHI (d)	REI (h)
9	Roundup PowerMax 4.5L "Generic" glyphosate 3L	16 to 32 fl oz/A 24 to 48 fl oz/A	glyphosate	0.75 to 1.13 lb acid equivalent/A	--	4
-Allow at least 5-7 days between application and planting. -Some glyphosate formulations may require an adjuvant, refer to label. -Glyphosate is not very effective for control of legumes (hairy vetch or crimson clover); glyphosate is preferred for the control for grasses. -Glyphosate-resistant horseweed is widespread in the region and will not be controlled with glyphosate. -Repeat applications are allowed, with maximum application of 5.3 qt/A per year.						

Termination Of The Cover Crop - continued on next page

Termination Of The Cover Crop - continued

22	Gramoxone 2SL	2.4 to 4 pt/A	paraquat *	0.6 to 1 lb/A	--	24
<p>-Apply before planting, a second application maybe required for complete control. Always include an adjuvant (nonionic surfactant or crop oil concentrate).</p> <p>-Tank-mix with appropriate herbicides for residual weed control; see Weed Control For Seeding Into Soil Without Plastic Mulch.</p> <p>-Paraquat may not control established grasses. Spray coverage is essential for optimum control.</p> <p>-See the label for additional information and warnings. Rainfastness 30 minutes. A maximum of 3 applications per year are allowed.</p>						

Pumpkin Planting

See the herbicide recommendations for pumpkins for further discussion. Use “no-till” corn planters equipped with coulters to cut through straw or cover crop stems killed by contact herbicides. Planters with finger pickup or air/vacuum units function well for seeding pumpkins. Plate planters may damage seed and should be evaluated carefully before use. Cole plate planters are satisfactory. A disk coulters on the seeding unit is essential to cut through the vetch or straw stems. Mount a 3-inch wide waffle coulters ahead of pot-transplanters to provide for effective penetration of the cover crop and plant placement.

Fertility

Hairy vetch will normally supply all the N requirements for pumpkins. However, if N deficiency symptoms appear before fruit production, topdress with 20-30 lb N/A. P and K amendments can be applied (based on soil tests) to the soil surface before planting cover crop or before planting pumpkins. When planting pumpkins into non-legume cover crops for grain stubble, apply the recommended P, K, lime, and other nutrients based on soil tests before planting. N rate recommendations may need to be increased based on fertilizer source, fertilizer application method, crop residue amount, and amount of time in a conservation tillage (no-till) production system. See Conservation Tillage Crop Production in the General Production Recommendations chapter.

Pollination

Honeybees, squash bees, bumblebees and other wild bees are important for proper set and pollination. Populations of pollinating insects may be adversely affected by insecticides applied to flowers or weeds in bloom. Apply insecticides only in the evening hours or wait until bloom is completed before application. See Pollination section in the General Production Recommendations chapter and/or the pesticide tables below for relative toxicity to bees.

Harvesting and Post Harvest Considerations

Disease-free fruit following a regular fungicide program during crop production will minimize postharvest fruit rots. Harvest when fruits are mature and prior to frost. Use care in handling fruit to prevent wounds. **Wounding can negate benefits from a season-long fungicide program.** Cure fruit after harvest at temperatures between 80 and 85°F (27-29°C) with a relative humidity of 75-80% for approximately 10 days. Temperatures below 50°F (10°C) cause chilling injury.

The hard-shelled squashes, such as Butternut, Delicious, Spaghetti, and the Hubbard strains, can be stored at 55°F (13°C) and 50-70% relative humidity. Acorn squash will store for 5-8 weeks; pumpkins for 2-3 months and other hard-shelled squashes will store for 3 months except hubbard that may hold for 5-6 months. Remove squash from the field before they have chilling injury and do not allow fruits to be exposed to extended periods below 50°F (10°C). Handle fruits carefully to eliminate bruising or damage and remove stems from squash like butternuts that can damage adjacent fruit. Store winter squash in a cool, dry, well-ventilated area. The longer keeping winter squash types can be kept in saleable condition through late winter into spring (3-6 months). Research has not documented any benefit to post-harvest fruit fungicide dips.

Weed Control

THE LABEL IS THE LAW - See the Pesticide Use Disclaimer on the first page of section F. Recommended Herbicides

1. Identify the weeds in each field and select recommended herbicides. More information is available in the “Herbicide Effectiveness on Common Weeds in Vegetables” (Table E-2) in the Pest Management chapter.
2. Minimize herbicide resistance development. Identify the herbicide site of action group number and follow recommended good management practices; **bolded group numbers in tables below are herbicides at higher risk for selecting resistant weed populations.** Include non-chemical weed control whenever possible.

F Pumpkins and Winter Squash

Labeled Applications Sites for Pumpkins									
Herbicides	WSSA group number	Plastic mulch production					Bare-ground production		
		Soil-Applied		Postemergence			Soil-applied	POST	Post-harvest
		Under Plastic	Row Middles	Over Plastic	Row Middles	Post-Harvest			
Sandea	2		YES		YES		YES	YES	
Curbit	3		YES				YES		
Prefar	8	YES	YES				YES		
Command	13		YES				YES		
Strategy			YES				YES		
Reflex*	14		YES		YES		YES**		
Dual	15		YES				YES**		
Select	1			YES				YES	
Select Max	1			YES				YES	
Poast	1			YES				YES	
Gramoxone*	22				YES	YES			YES

*Special Local Needs Label (24c), be sure it is registered for the specific state and for the intended use.

**Dual and Reflex are labeled for bareground only if the spray is directed to the row middles.

1. Soil Applied						
Group	Product Name	Product Rate	Active Ingredient (*=Restricted Use)	Active Ingredient Rate	PHI (d)	REI (h)
2	Sandea 75DF	0.5 to 1 oz/A	halosulfuron	0.023 to 0.047 lb/A	30	12
<p>-Plasticulture row middles application only: apply before or after weed emergence; apply as a shielded application to avoid contact with the crop. If weeds have emerged, use a non-ionic surfactant at 0.25% v/v or include a non-selective herbicide.</p> <p>-Bareground: apply broadcast after seeding but before crop emergence or no sooner than 7 days before transplanting.</p> <p>-Suppresses or controls yellow nutsedge and certain broadleaf weeds. Sandea provides both residual and postemergence control of susceptible weed species. Effective postemergence control requires an adjuvant.</p> <p>-Sandea is an ALS inhibiting herbicide and resistant weed populations are common in the region. Do not use Group 2 herbicides repeatedly in the same field.</p> <p>-Do not apply Sandea to crops treated with a soil applied organophosphate insecticide, or use a foliar applied organophosphate insecticide within 21 days before or 7 days after a Sandea application.</p> <p>-Maximum number of Sandea applications per year is 2 and do not exceed 2 oz/A during the crop season.</p>						
3	Curbit 3EC	1 to 3 pt/A	ethalfluralin	0.38 to 1.13 lb/A	--	24
<p>-Plasticulture: row middles only: apply as a banded spray after crop emergence or transplanting. Do not soil incorporate.</p> <p>-Bareground: apply broadcast after direct-seeding but prior to crop emergence; do not use on transplanted pumpkins.</p> <p>-Controls annual grasses and certain annual broadleaf weeds, including carpetweed and pigweed sp.</p> <p>-Use lower rate for coarse-textured soils or soils with low organic matter.</p> <p>-Where overhead irrigation is available, activate Curbit with 0.5 inch of irrigation within 2 days after application; if no irrigation or rainfall occurs within 5 days of application, activity of Curbit can be reduced.</p> <p>-Available as a pre-mix herbicide Strategy. Strategy at 3 pt/A= Curbit at 26 fl oz (0.6 lb ai) and Command at 8 fl oz (0.188 lb ai)</p> <p>-Maximum applications per season: not specified</p>						
3 + 13	Strategy 2.1SC	1.5 to 6 pt/A	ethalfluralin plus clomazone	0.39 to 1.58 lb/A	45	24
<p>-Plasticulture: row middles application only.</p> <p>-Bareground: apply broadcast just before planting or after planting but before crop emergence.</p> <p>-Strategy is a prepackage mixture of Curbit 3EC and Command 3ME. Refer to individual products for comments.</p> <p>-Clomazone spray or vapor drift may injure susceptible crops and other vegetation, refer to Command 3ME for comments.</p> <p>-Do not apply prior to planting crop. Do not soil incorporate.</p> <p>-Maximum applications per season: not specified.</p>						
8	Prefar 4E	5 to 6 qt/A	bensulide	5 to 6 lb/A	--	12
<p>-Plasticulture: under plastic: apply in a band under the plastic, immediately before laying the mulch. Plasticulture: row middles application is labeled.</p> <p>-Bareground: apply preemergence or preplant incorporated.</p> <p>-Preemergence applications should be followed by irrigation within 36 hrs (apply enough water to wet the soil at least 2 to 4 inches deep). Preplant incorporated applications should be incorporated 1 to 2 inches deep (deeper than 2 inches will result in reduced weed control).</p> <p>-Provides control/suppression of some annual grass weeds and some broadleaves including pigweeds, purslane, and lambsquarters.</p> <p>-Do not apply within 45 days of harvesting squash</p> <p>-Do not apply more than 6 lbs ai/A per season.</p>						

1. Soil Applied - continued on next page

1. Soil Applied - continued

13	Command 3ME	0.67 to 2 pt/A	clomazone	0.025 to 0.75 lb/A	45	12
<p>-Labeled for winter squash and processing pumpkins; not labeled for jack-o-lantern pumpkins. -Plasticulture: row middles application only. Bareground: apply broadcast just before planting but before crop emergence, or just before transplanting. Use the lower rate when used on coarse-textured soils low in organic matter, when weed pressure is light, or to minimize herbicide carryover that could affect subsequent crops. -Controls annual grasses and many broadleaf weeds including common lambsquarters, velvetleaf, spurred anoda, and jimsonweed. Carpetweed, morningglory sp., pigweed sp., and yellow nutsedge will not be controlled. Higher rates will improve control (or expand number of species controlled) such as common cocklebur, common ragweed, or jimsonweed (refer to label for specific weeds and rates). -WARNINGS: 1. Command spray or vapor drift may injure sensitive crops and other vegetation up to several hundred yards from the point of application. Do not apply adjacent to sensitive crops (see label) or vegetation, or under unfavorable wind or weather conditions. 2. Command may limit subsequent cropping options, see the label. -Available as a pre-mix herbicide Strategy: Strategy at 3 pt/A= Command at 8 fl oz (0.188 lb ai) and Curbit at 26 fl oz (0.6 lb ai) -Maximum number of Command applications per year: 1.</p>						
14	Reflex 2SL	Rates vary, refer to the specific label	fomesafen	0.13 to 0.38 lb/A	32	24
<p>-For pumpkins ONLY. A Special Local-Needs Label 24c has been approved for the use of Reflex 2SL to control weeds in pumpkins in DE, MD and VA (expires 12/31/2020). The use of this product is legal ONLY if a waiver of liability has been completed (see https://www.syngenta-us.com/labels/indemnified-label-login). -Rates differ by states, soil types, and planting method. Rates as low as 10 fl oz/A can cause injury on coarse-textured soils. -Plasticulture: row middles application only. -Bareground: apply broadcast within 24 hrs after direct-seeding and follow with 0.2 to 0.5 inches of overhead irrigation at least 36 hr before pumpkin begin to crack through the soil. For transplants, apply Reflex and then irrigate with 0.2 to 0.5 inches of water and then transplant. Do not prepare transplant holes until after Reflex application and irrigation. -Foliar application of Reflex will severely damage or kill pumpkin. The potential of crop injury is greater on lighter textured soils combined with intensive irrigation programs or high amounts of rainfall, therefore, adjust rates accordingly. -Reflex provides both residual and postemergence control of susceptible weed species. Effective postemergence control requires an adjuvant. Pumpkin varieties may vary in their response to Reflex. Treat small acreages first to determine tolerance, especially when applying to a new variety. -Reflex rates lower than 16 fl oz/A may not provide full-season control and should be used with other herbicides and/or other methods of weed control. -Consider rotational crops when applying fomesafen. If crop is replanted, do not re-apply Reflex. Refer to 24c label for specifics on rotational restrictions. Maximum for Reflex application in DE, MD, and VA: 24 fl oz/A IN ALTERNATE YEARS.</p>						
15	Dual Magnum 7.62E	1 to 1.33 pt/A	s-metolachlor	0.95 to 1.27 lb/A	30	24
<p>-For pumpkins ONLY. Plasticulture: row middles application only. Bareground: apply as an inter-row or inter-hill spray, leaving 1 ft of untreated area over the row. Do not use as an over the top application. Do not soil incorporate. -Suppresses or controls annual grasses, yellow nutsedge, and certain annual broadleaf weeds including nightshade species. -Dual Magnum will not control emerged weeds. Cultivate and/or hoe or tank-mix with Gramoxone 2SL to control emerged weeds before treatment. -Use the lower rate on fields with coarse-textured soils low in organic matter. Use the higher rates on fields with fine-textured soil and those with high organic matter. Maximum applications per season: not specified.</p>						

2. Postemergence

Group	Product Name	Product Rate	Active Ingredient (*=Restricted Use)	Active Ingredient Rate	PHI (d)	REI (h)
1	Select 2EC	6 to 8 fl oz/A	clethodim	0.094 to 0.13 lb/A	14	24
	Select Max 0.97EC	12 to 16 fl oz/A				
	Poast 1.5EC	1 to 1.5 pt/A	sethoxydim	0.19 to 0.28 lb/A	14	12
<p>-Select 2EC: use crop oil concentrate (COC) at 1% v/v (1 gal/100 gal of spray solution). Select Max: use nonionic surfactant (NIS) at 0.25% v/v (1 qt/100 gal of spray solution). Poast: use COC at 1.0% v/v. -The use of COC may increase the risk of crop injury when hot or humid conditions prevail. To reduce the risk of crop injury, omit additives or switch to NIS when grasses are small and soil moisture is adequate. -Use lower labeled rates for annual grass control and higher labeled rates for perennial grass control. -Yellow nutsedge, wild onion, wild garlic, and broadleaf weeds will not be controlled. -Controls many annual and certain perennial grasses, including annual bluegrass, but Poast is preferred for goosegrass control. For best results, treat annual grasses when they are actively growing and before tillers are present. Control may be reduced if grasses are large or under hot or dry weather conditions. -Repeated applications may be necessary to control certain perennial grasses. If repeat applications are necessary, allow 14 days between applications. Rainfastness is 1 hr. -Do not tank-mix with or apply within 2 to 3 days of any other pesticide, unless labeled, as this may increase the risk of crop injury or reduce the control of grasses. Do not apply more than 8 fl oz of Select 2EC in a single application and do not exceed 32 fl oz/A for the season; do not apply more than 16 fl oz of Select Max in a single application and do not exceed 64 fl oz/A for the season. -Do not apply more than 1.5 pt/A Poast in single application and do not exceed 3 pt/A for the season.</p>						

2. Postemergence - continued on next page

F Pumpkins and Winter Squash

2. Postemergence - continued

2	Sandea 75DF	0.5 to 1 oz/A	halosulfuron	0.023 to 0.047 lb/A	30	12
<p>-Plasticulture: row middles application only.</p> <p>-Bareground: broadcast for bareground. Apply Sandea after the crop has at least 3 to 5 true leaves but before first female flowers appear and no sooner than 14 days after transplanting. If weeds have emerged, use a non-ionic surfactant at 0.25% v/v (1 qt/100 gal).</p> <p>-Suppresses or controls yellow nutsedge and certain broadleaf; control of weeds taller than 3 inches may not be adequate. Sandea will not control common lambsquarters or eastern black nightshade if applied postemergence; for row middle application, tankmix with a non-selective herbicide to increase spectrum of control.</p> <p>-Sandea provides both residual and postemergence control of susceptible weed species.</p> <p>-Sandea is an ALS inhibiting herbicide and resistant weed populations are common in the region. Do not use Group 2 herbicides repeatedly in the same field.</p> <p>-Do not apply Sandea to crops treated with a soil applied organophosphate insecticide, or use a foliar applied organophosphate insecticide within 21 days before or 7 days after a Sandea application.</p> <p>-Rainfastness is 4 hrs. Maximum number of Sandea applications per year is 2 and do not exceed 2 oz/A during the crop season</p>						
22	Gramoxone 2SL	1.95 pt/A	paraquat*	0.49 lb/A	14	24
<p>-A Supplemental Label has been approved for the use of Gramoxone 2SL for postemergence weed control in DE, MD, NJ, PA, and VA.</p> <p>-Row middles as a shielded application. Apply as a directed spray in a minimum of 20 gal spray mix/A to control emerged weeds between the rows after crop establishment. Include a nonionic surfactant at 0.25% v/v.</p> <p>-Use shields or hoods to prevent spray contact with the crop and low spray pressure (maximum of 30 psi) to reduce small droplets that are prone to drift. See the label for additional information and warnings.</p> <p>-Rainfastness is 30 minutes. A maximum of 3 applications per year are allowed.</p>						

3. Postharvest

Group	Product Name	Product Rate	Active Ingredient (*=Restricted Use)	Active Ingredient Rate	PHI (d)	REI (h)
22	Gramoxone SL 2.0	2.25 to 3 pt/A	paraquat*	0.56 to 0.75 lb/A	--	24
<p>-A Special Local-Needs 24c label has been approved in VA (expires 12/31/2022) and a Supplemental Label in DE for the use of Gramoxone SL 2.0 for postharvest application to desiccate the crop.</p> <p>-Apply after the last harvest for bareground or plasticulture.</p> <p>-Always include an adjuvant. Spray coverage is essential for optimum effectiveness.</p> <p>-See the label for additional information and warnings.</p> <p>-Rainfastness 30 minutes. A maximum of 2 applications for crop dessication are allowed.</p>						

4. Other Labeled Herbicides

These products are labeled but limited local data are available; and/or are labeled but not recommended in our region due to potential crop injury concerns.

Group	Product Name	Active Ingredient (*=Restricted Use)
14	Aim	carfentrazone

Insect Control

THE LABEL IS THE LAW - See the Pesticide Use Disclaimer on the first page of section F.
Recommended Insecticides

Seed Corn Maggots

The use of neonicotinoid insecticides (Group 4A) at planting may help reduce seed corn maggot populations. See also the Pest Management chapter (Insect Management section).

Aphids

Aphids transmit mosaic virus.

Apply one of the following formulations: Note: Thorough spray coverage beneath leaves is important. Treat seedlings every 5-7 days, or as needed.						
Group	Product Name	Product Rate	Active Ingredient(s) (*=Restricted Use)	PHI (d)	REI (h)	Bee TR
4A	Neonicotinoid insecticides registered for use on Pumpkins and Winter Squash: see table at the end of Insect Control.					
4D	Sivanto 200SL	7.0 to 12.0 fl oz/A	flupyradifurone - foliar	1	4	M
4D	Sivanto 200SL	21.0 to 28.0 fl oz/A	flupyradifurone - soil/drip	21	4	M

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Aphids - continued

9B	Fulfill 50WDG	2.75 oz/A	pymetrozine	7	12	L
9D	Sefina	3.0 fl oz/A	afidopyropen	0	12	L
21A	Torac	17.0 to 21.0 fl oz/A	tolfenpyrad	1	12	H
28	Harvanta 50SL	10.9 to 16.4 fl oz/A	cyclanilprole	1	4	H
28 + 6	Minecto Pro	10.0 fl oz/A	cyantranilprole + abamectin*	7	12	H
29	Beleaf 50SG	2.0 to 2.8 oz/A	flonicamid	0	12	L

Cabbage Loopers

Apply one of the following formulations:						
Group	Product Name	Product Rate	Active Ingredient(s) (* = Restricted Use)	PHI (d)	REI (h)	Bee TR
3A	Pyrethroid insecticides registered for use on Pumpkins and Winter Squash: see table at the end of Insect Control.					
5	Entrust SC (OMRI)	4.0 to 8.0 fl oz/A	spinosad	3	4	M
5	Radiant SC	5.0 to 10.0 fl oz/A	spinetoram	3	4	H
11A	Dipel, others (OMRI)	0.5 to 2.0 lb/A	<i>Bacillus thuringiensis kurstaki</i>	0	4	N
18	Intrepid 2F	4.0 to 10.0 fl oz/A	methoxyfenozide	3	4	L
22	Avaunt 30WDG, Avaunt eVo	2.5 to 6.0 oz/A	indoxacarb	3	12	H
28	Coragen 1.67SC	3.5 to 7.5 fl oz/A	chlorantranilprole - soil/drip/foliar	1	4	L
28	Harvanta 50SL	10.9 to 16.4 fl oz/A	cyclanilprole	1	4	H
3A + 4A	Endigo ZC	4.0 to 4.5 fl oz/A	lambda-cyhalothrin* + thiamethoxam	1	24	H
28 + 4A	Voliam Flexi	4.0 to 7.0 oz/A	thiamethoxam + chlorantranilprole - foliar	1	12	H
28 + 6	Minecto Pro	7.5 to 10.0 fl oz/A	cyantranilprole + abamectin*	7	12	H

Cucumber Beetles

Young plants need to be protected from cucumber beetle feeding as the beetles can transmit the causal agent of bacterial wilt. Cucumber beetles also cause direct damage to pumpkin and winter squash rinds. Management of adult cucumber beetles early in the season may help reduce damage to rinds later in the season. Seeds pretreated with a neonicotinoid seed treatment such as Farmore DI400 should provide up to 14 days of control of cucumber beetle. Otherwise, apply one of the following formulations:

Group	Product Name	Product Rate	Active Ingredient(s) (* = Restricted Use)	PHI (d)	REI (h)	Bee TR
1A	Sevin XLR Plus	1.0 qt/A	carbaryl	3	12	H
3A	Pyrethroid insecticides registered for use on Pumpkins and Winter Squash: see table at the end of Insect Control.					
4A	Neonicotinoid insecticides registered for use on Pumpkins and Winter Squash: see table at the end of Insect Control.					
28	Harvanta 50SL	10.9 to 16.4 fl oz/A	cyclanilprole	1	4	H

Cutworms - See also the Pest Management chapter, Insect Management section.

Apply one of the following formulations:						
Group	Product Name	Product Rate	Active Ingredient(s) (* = Restricted Use)	PHI (d)	REI (h)	Bee TR
3A	Pyrethroid insecticides registered for use on Pumpkins and Winter Squash: see table at the end of Insect Control.					

Leafminers

Apply one of the following formulations:						
Group	Product Name	Product Rate	Active Ingredient(s) (* = Restricted Use)	PHI (d)	REI (h)	Bee TR
3A	Pyrethroid insecticides registered for use on Pumpkins and Winter Squash: see table at the end of Insect Control.					
4A	Neonicotinoid insecticides registered for use on Pumpkins and Winter Squash: see table at the end of Insect Control.					
5	Entrust SC (OMRI)	6.0 to 8.0 fl oz/A	spinosad	3	4	M
5	Radiant SC	6.0 to 10.0 fl oz/A	spinetoram	3	4	H
6	Agri-Mek 0.7SC	1.75 to 3.5 fl oz/A	abamectin*	7	12	H
17	Trigard 75WSP	2.66 oz/A	cyromazine	0	12	H
28	Coragen 1.67SC	5.0 to 7.5 fl oz/A	chlorantranilprole - soil/drip/foliar	1	4	L
28	Harvanta 50SL	10.9 to 16.4 fl oz/A	cyclanilprole	1	4	H
28 + 6	Minecto Pro	5.5 to 10.0 fl oz/A	cyantranilprole + abamectin*	7	12	H

F Pumpkins and Winter Squash

Melonworms and Pickleworms

When using foliar materials make one treatment prior to fruit set, and then treat weekly. For soil or drip applications check the label for instructions on treatment frequency.

Apply one of the following formulations:						
Group	Product Name	Product Rate	Active Ingredient(s) (*= Restricted Use)	PHI (d)	REI (h)	Bee TR
1A	Sevin XLR Plus	0.5 to 1.0 qt/A	carbaryl	3	12	H
3A	Pyrethroid insecticides registered for use on Pumpkins and Winter Squash: see table at the end of Insect Control.					
3A + 4A	Endigo ZC	4.0 to 4.5 fl oz/A	lambda-cyhalothrin* + thiamethoxam	1	24	H
5	Entrust SC (OMRI)	4.0 to 8.0 fl oz/A	spinosad	3	4	M
5	Radiant SC	5.0 to 10.0 fl oz/A	spinetoram	3	4	H
18	Intrepid 2F	4.0 to 10.0 fl oz/A	methoxyfenozide	3	4	L
22	Avaunt 30WDG, Avaunt eVo	2.5 to 6.0 oz/A	indoxacarb	3	12	H
28	Coragen 1.67SC (melonworm)	2.0 to 3.5 fl oz/A	chlordaniliprole - drip/foliar	1	4	L
28	Coragen 1.67SC (pickleworm)	3.5 to 7.5 fl oz/A	chlordaniliprole - drip/foliar	1	4	L
28	Harvanta 50SL	10.9 to 16.4 fl oz/A	cyclaniliprole	1	4	H
28 + 4A	Durivo	10.0 to 13.0 fl oz/A	thiamethoxam + chlordaniliprole - soil/drip	30	12	H
28 + 4A	Voliam Flexi	4.0 to 7.0 oz/A	thiamethoxam + chlordaniliprole - foliar	1	12	H
28 + 6	Minecto Pro	5.5 to 10.0 fl oz/A	cyantraniliprole + abamectin*	7	12	H

Mites

Mite infestations generally begin around field margins and grassy areas. **DO NOT** mow or maintain these areas after midsummer to prevent mites from moving into the crop. Localized infestations can be spot-treated. Begin treatment when 10-15% of the crown leaves are infested early in the season.

Apply one of the following formulations. Note: Continuous use of carbaryl or pyrethroids may result in mite outbreaks. Addition of crop oils or organosilicon spray additives will increase miticide effectiveness.						
Group	Product Name	Product Rate	Active Ingredient(s) (*= Restricted Use)	PHI (d)	REI (h)	Bee TR
3A	Pyrethroid insecticides registered for use on Pumpkins and Winter Squash: see table at the end of Insect Control.					
6	Agri-Mek 0.7SC	1.75 to 3.5 fl oz/A	abamectin*	7	12	H
10B	Zeal Miticide	2.0 to 3.0 oz/A	etoxazole	7	12	L
20B	Kanemite 15SC	31.0 fl oz/A	acequinocyl	1	12	L
23	Oberon 2SC	7.0 to 8.5 fl oz/A	spiromesifen	7	12	M
28 + 6	Minecto Pro	5.5 to 10.0 fl oz/A	cyantraniliprole + abamectin*	7	12	H
20D	Acramite 50WS	0.75 to 1.00 lb/A	bifenazate	3	12	M

Rindworms

For Lepidopteran rindworms, apply one of the following formulations:						
Group	Product Name	Product Rate	Active Ingredient(s) (*= Restricted Use)	PHI (d)	REI (h)	Bee TR
3A	Pyrethroid insecticides registered for use on Pumpkins and Winter Squash: see table at the end of Insect Control.					
4A	Neonicotinoid insecticides registered for use on Pumpkins and Winter Squash: see table at the end of Insect Control.					
5	Entrust SC (OMRI)	4.0 to 8.0 fl oz/A	spinosad	3	4	M
5	Radiant SC	5.0 to 10.0 fl oz/A	spinetoram	3	4	H
18	Intrepid 2F	4.0 to 10.0 fl oz/A	methoxyfenozide	3	4	L

Squash Bugs

Begin treatments if more than one egg mass per plant is present. Sprays should target nymphal stages.

Apply one of the following formulations: Note: Under-leaf spray coverage is essential.						
Group	Product Name	Product Rate	Active Ingredient(s) (*= Restricted Use)	PHI (d)	REI (h)	Bee TR
1A	Sevin XLR Plus	1.0 qt/A	carbaryl	3	12	H
3A	Pyrethroid insecticides registered for use on Pumpkins and Winter Squash: see table at the end of Insect Control.					
4A	Neonicotinoid insecticides registered for use on Pumpkins and Winter Squash: see table at the end of Insect Control.					
4D	Sivanto 200SL	10.5 to 14.0 fl oz/A	flupyradifurone - foliar	1	4	M

Squash Vine Borers

When vines begin to run, apply to bases of plants 4 times at 7-day intervals. Pheromone traps for squash vine borer are commercially available. These traps can be used to indicate when moth activity begins. Note: Use of spinosad or spinetoram for Cabbage Looper control will reduce squash vine borer populations.

Apply one of the following formulations:						
Group	Product Name	Product Rate	Active Ingredient(s) (*=Restricted Use)	PHI (d)	REI (h)	Bee TR
3A	Pyrethroid insecticides registered for use on Pumpkins and Winter Squash: see table at the end of Insect Control.					

Thrips

Apply one of the following formulations:						
Group	Product Name	Product Rate	Active Ingredient(s) (*=Restricted Use)	PHI (d)	REI (h)	Bee TR
3A	Pyrethroid insecticides registered for use on Pumpkins and Winter Squash: see table at the end of Insect Control.					
4A	Neonicotinoid insecticides registered for use on Pumpkins and Winter Squash: see table at the end of Insect Control.					
5	Entrust SC (OMRI)	6.0 to 8.0 fl oz/A	spinosad	3	4	M
5	Radiant SC	6.0 to 10.0 fl oz/A	spinetoram	3	4	H
21A	Torac	21.0 fl oz/A	tolfenpyrad	1	12	H
28	Harvanta 50SL	10.9 to 16.4 fl oz/A	cyclaniliprole	1	4	H

Whiteflies

Apply one of the following formulations:						
Group	Product Name	Product Rate	Active Ingredient(s) (*=Restricted Use)	PHI (d)	REI (h)	Bee TR
3A	Pyrethroid insecticides registered for use on Pumpkins and Winter Squash: see table at the end of Insect Control.					
4A	Neonicotinoid insecticides registered for use on Pumpkins and Winter Squash: see table at the end of Insect Control.					
4D	Sivanto 200SL	10.5 to 14.0 fl oz/A	flupyradifurone - foliar	1	4	M
4D	Sivanto 200SL	21.0 to 28.0 fl oz/A	flupyradifurone - soil/drip	21	4	M
7C	Knack	8.0 to 10.0 fl oz/A	pyriproxyfen	7	12	L
9B	Fulfill 50WDG	2.75 oz/A	pymetrozine	7	12	L
9D	Sefina	14.0 fl oz/A	afidopyropen	0	12	L
23	Oberon 2SC	7.0 to 8.5 fl oz/A	spiromesifen	7	12	M
28 + 6	Minecto Pro	10.0 fl oz/A	cyantraniliprole + abamectin*	7	12	H
29	Beleaf 50SG	2.8 oz/A	fonicamid	0	12	L

Group 3A Pyrethroid Insecticides Registered for Use on Pumpkins and Winter Squash						
Apply one of the following formulations (please check if the product label lists the insect you intend to spray; the label is the law):						
Product Name	Product Rate	Active Ingredient(s) (*=Restricted Use)	PHI (d)	REI (h)	Bee TR	
Asana XL	5.8 to 9.6 fl oz/A	esfenvalerate*	3	12	H	
Baythroid XL	0.8 to 2.8 fl oz/A	beta-cyfluthrin*	0	12	H	
Bifenthrin 2EC, others	2.6 to 6.4 fl oz/A	bifenthrin*	3	12	H	
Danitol 2.4EC	10.67 to 16.0 fl oz/A	fenpropathrin*	7	24	H	
Hero EC	4.0 to 10.3 fl oz/A	zeta-cypermethrin* + bifenthrin*	3	12	H	
Lambda-Cy 1EC, others	2.56 to 3.84 fl oz/A	lambda-cyhalothrin*	1	24	H	
Mustang Maxx	1.28 to 4.0 fl oz/A	zeta-cypermethrin*	1	12	H	
Permethrin 3.2EC, others	4.0 to 8.0 fl oz/A	permethrin*	0	12	H	
Tombstone, others	0.8 to 2.8 fl oz/A	cyfluthrin*	0	12	H	
Warrior II	1.28 to 1.92 fl oz/A	lambda-cyhalothrin*	1	24	H	
Combo products containing a pyrethroid						
Endigo ZC	4.0 to 4.5 fl oz/A	lambda-cyhalothrin* + thiamethoxam (Group 4A)	1	24	H	
Gladiator	19.0 fl oz/A	zeta-cypermethrin* + abamectin (Group 6)	7	12	H	
Voliam Xpress	6.0 to 9.0 fl oz/A	lambda-cyhalothrin* + chlorantraniliprole (Group 28)	1	24	H	

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Group 4A Neonicotinoids Registered for Use on Pumpkins and Winter Squash					
Apply one of the following formulations (please check if the product label lists the insect you intend to spray; the label is the law):					
Product Name	Product Rate	Active Ingredient(s) (*=Restricted Use)	PHI (d)	REI (h)	Bee TR
Admire Pro	7.0 to 10.5 fl oz/A	imidacloprid – soil only	21	12	H
Assail 30SG	2.5 to 5.3 oz/A	acetamiprid	0	12	M
Belay 2.13SC	9.0 to 12.0 fl oz/A	clothianidin – soil/drip	21	12	H
Belay 2.13SC	3.0 to 4.0 fl oz/A	clothianidin – foliar (note: PHI: do not make application after 4 th true leaf has unfolded)	see note	12	H
Platinum 75SG	1.66 to 3.67 oz/A	thiamethoxam – soil/drip	30	12	H
Actara 25WDG	1.5 to 5.5 oz/A	thiamethoxam - foliar	0	12	H
Scorpion 35SL	9.0 to 10.5 fl oz/A	dinotefuran – soil/drip	21	12	H
Scorpion 35SL	2.0 to 7.0 fl oz/A	dinotefuran - foliar	1	12	H
Venom 70SG	5.0 to 7.5 oz/A	dinotefuran – soil/drip	21	12	H
Venom 70SG	1.0 to 7.0 oz/A	dinotefuran - foliar	1	12	H
Combo products containing a neonicotinoid					
Durivo	10.0 to 13.0 fl oz/A	thiamethoxam + chlorantraniliprole (Group 28) – soil/drip	30	12	H
Voliam Flexi	4.0 to 7.0 oz/A	thiamethoxam + chlorantraniliprole (Group 28) - foliar	1	12	H
Endigo ZC	4.0 to 4.5 fl oz/A	thiamethoxam + lambda-cyhalothrin* (Group 3A)	1	24	H

Disease Control

THE LABEL IS THE LAW - See the Pesticide Use Disclaimer on the first page of section F. Recommended Fungicides

Nematodes - See also the Soil Fumigation and Nematodes sections in the Pest Management chapter. Use fumigants listed in the Pest Management chapter, or nematicides listed below. Consult the label.

Code	Product Name	Product Rate	Active Ingredient(s) (*=Restricted Use)	PHI (d)	REI (h)	Bee TR
1A	Vydate L	0.5 to 1.0 gal/A incorporate into top 2-4 inches of soil, <i>OR</i> 2.0 to 4.0 pt/A apply 2 w after planting and repeat 2-3 w later.	oxamyl*	1	48	H
7	Velum Prime	6.5 to 6.84 fl oz/A	fluopyram	0	12	--
--	Nimitz 4EC	3.5 to 5.0 pt/A Incorporate or drip-apply 7 d before planting	fluensulfone	n/a	12	N

Seed Treatment

Check with your seed company if seed has been treated with an insecticide and fungicide. If it has not been treated, use a mixture of thiram 480DP (4.5 fl oz/100 lb seed) and an approved commercially available insecticide.

Damping-Off caused by Phytophthora, Pythium, and Rhizoctonia

Code	Product Name	Product Rate	Active Ingredient(s) (*=Restricted Use)	PHI (d)	REI (h)	Bee TR
Apply one of the following at-planting (see label for application timing, methods, and restrictions):						
Phytophthora and Pythium root rot						
4	Ridomil Gold 4SL ¹	0.5 to 1.0 pt/A	mefenoxam	AP	48	N
4	Ultra Flourish 2E ¹	2.0 to 4.0 pt/A	mefenoxam	AP	48	N
4	MetaStar 2E AG ¹	4.0 to 8.0 pt/A	metalaxyl	AP	48	N
Phytophthora, Pythium, and Rhizoctonia root rot						
4 + 11	Uniform 3.66SE	0.34 fl oz/1000 ft row. Avoid direct seed contact, which may cause delayed emergence.	mefenoxam + azoxystrobin	AP	0	N
Rhizoctonia root rot						
11	azoxystrobin 2.08F	0.40 to 0.80 fl oz/1000 ft row	azoxystrobin	AP	4	N
Pythium root rot only						
28	Previcur Flex 6F	1.2 pt/A in transplant water, drip irrigation, or direct spray at base of plant and soil	propamocarb HCl	2	12	N

¹To determine the amount of Ridomil Gold, Ultra Flourish, or MetaStar needed per acre, use the following calibration formula for changing from broadcast to band application: [Band width (ft) / row spacing (ft)] x broadcast rate (lb/A) = Amount needed lb/A. ²Applied at planting.

Bacterial and Fungal Diseases

Angular Leaf Spot/Bacterial Leaf Spot

Both diseases can produce foliar symptoms that are often overlooked. Early detection is important, since control of the foliar phase can reduce infections in developing fruit. Infected fruit will become unmarketable. Both diseases are seedborne and can survive on infested debris for at least one year or until the debris decomposes. Rotate away from fields with a history of bacterial problems. Incorporate the following into a standard disease management program when leaf spot is first detected, and repeat every 7 to 10 days: fixed copper at labeled rates plus mancozeb.

Anthracnose - see Gummy Stem Blight (Black Rot) and Anthracnose below.

Bacterial Wilt

Controlling striped and spotted cucumber beetles is essential for preventing bacterial wilt. See "Cucumber Beetles" in the Cucumber Insect Control section for specific recommendations. Insecticide applications made at planting may not prevent beetle damage season-long; additional foliar insecticide applications may be necessary.

Choanophora fruit rot

This disease occurs during warm wet weather and develops predominantly on flowers or fruit near the ground. Management is difficult because disease development is rapid and weather dependent. Fungicide sprays are not effective because flowers, which open daily, must be protected immediately. Practices that reduce soil moisture or reduce flower-soil contact, such as raised beds and plastic mulch, may be beneficial.

Downy Mildew

Scout fields for disease incidence on a regular basis. Begin targeted sprays when downy mildew is predicted for the region. For current status of the disease, check the Cucurbit Downy Mildew forecasting website at <http://cdm.ipmpipe.org/>. Preventative applications are much more effective than applications made after disease is detected. Materials with different modes of action (FRAC codes) should always be alternated to reduce the chances for fungicide resistance development.

Code	Product Name	Product Rate	Active Ingredient(s) (*=Restricted Use)	PHI (d)	REI (h)	Bee TR
Sprays should be applied on a 7-d schedule when disease is forecast or present in the region. Under severe disease conditions and conducive weather, spray interval may be reduced IF the label allows. TANK-MIX one of these products WITH a protectant fungicide such as chlorothalonil 6F or Gavel 75DF:						
49 + 40	Orondis Ultra	5.5 to 8.0 fl oz/A	oxathiapiprolin + mandipropamid	0	4	--
21	Ranman 400SC	2.10 to 2.75 fl oz/A (plus a non-ionic or organosilicon surfactant; do not apply with copper; see label)	cyazofamid	0	12	L
Other materials for use in rotations as tank mix partners with a protectant:						
43	Presidio 4SC	3.0 to 4.0 fl oz/A	fluopicolide	1	12	L
28	Previcur Flex 6F	1.2 pt/A	propamocarb HCl	2	12	N
40 + 45	Zampro 525SC	14.0 fl oz/A	dimethomorph + acetochradin	0	12	--
M3 + 22	Gavel 75DF contains protectant	1.5 to 2.0 lb/A	mancozeb + zoxamide	5	48	--
M5 + 22	Zing! 4.9SC contains protectant	36 fl oz/A	chlorothalonil + zoxamide	0	12	N
M5 + 27	Ariston 42SC contains protectant	3.0 pt/A	chlorothalonil + cymoxanil	3	12	--
11 + 27	Tanos 50DF	8.0 oz/A	famoxadone + cymoxanil	3	12	--
27	Curzate 60DF	3.2 oz/A	cymoxanil	3	12	N
40	Forum 4.17SC	6.0 fl oz/A	dimethomorph	0	12	N

Fusarium Fruit Rot

This disease is especially destructive in fields where pumpkins are grown every year. Once the pathogen is established in a field, loss can be significant. Fruit rot is caused by several *Fusarium* spp., and fungicide applications are not effective. Hard rind cultivars are less susceptible to *Fusarium* fruit rot than other cultivars. Production of pumpkin on a no-till cover crop mulch layer such as winter rye plus hairy vetch has been shown to help reduce disease incidence. Greater disease reductions will occur when the mulch layer is thicker.

F Pumpkins and Winter Squash

Gummy Stem Blight (Black Rot) and Anthracnose

Rotate crops to allow at least 2 years between cucurbit plantings. Pumpkin cv. ‘Small Sugar’ appears to be the least affected by Black Rot.

Code	Product Name	Product Rate	Active Ingredient(s) (*=Restricted Use)	PHI (d)	REI (h)	Bee TR
Fungicides with a high-risk for resistance development, such as FRAC code 11 fungicides (Cabrio, Pristine and Quadris), should be tank-mixed with a protectant fungicide. Use at least the minimum labeled rate of each fungicide in the tank-mix. Do not apply FRAC code 11 fungicides more than 4 times total per season. If resistance to FRAC code 11 fungicides exists in the area, use fungicides from a different FRAC code. Begin the following fungicide program when fruit start to form:						
ALTERNATE:						
M5	chlorothalonil 6F	2.0 to 3.0 pt/A (use low rate early in season)	chlorothalonil	0	12	N
WITH one of the following:						
3	tebuconazole 3.6 F	8.0 fl oz/A	tebuconazole	7	12	N
3	Proline 480SC	5.7 fl oz/A	prothioconazole	7	12	--
3	Rhyme 2.08F	5.0 to 7.0 fl oz/A	flutriafol	0	12	--
3 + 9	Inspire Super 2.82EW	16.0 to 20.0 fl oz/A	difenoconazole + cyprodinil	0	12	--
3 + 7	Luna Experience 3.34SC	10.0 to 17.0 fl oz/A	tebuconazole + fluopyram	7	12	--
7	Fontelis 1.67SC	12.0 to 16.0 fl oz/A	penthiopyrad	1	12	L
9 + 12	Switch 62.5 WG	11.0 to 14.0 oz/A	cyprodinil + fludioxonil	1	12	L
3 + 7	Aprovia Top 1.62EC	10.5 to 13.5 fl oz/A	difenoconazole + benzovindiflupyr	0	12	--
7 + 11	Merivon 2.09SC	5.5 fl oz/A	fluxapyroxad + pyraclostrobin	7	12	N
7 + 11	Pristine 38WG	12.5 to 18.5 oz/A	boscalid + pyraclostrobin	0	12	--
M5	chlorothalonil 6F	2.0 to 3.0 pt/A	chlorothalonil	0	12	N
Maintain fungicide schedule until harvest (see “Harvesting and Postharvest Considerations” section). Fungicide application for Black Rot control will help maintain “handles” on the fruit. Harvest carefully because wounding can negate benefits from a season-long fungicide program.						

Phytophthora Crown and Fruit Rot

Multiple practices should be used to minimize the occurrence of this disease. Rotate away from susceptible crops (such as peppers, eggplants, tomatoes, lima and snap beans, and other cucurbits) for as long as possible. Preplant fumigants will also suppress disease. Fields should be adequately drained to ensure that water does not accumulate around the base of the plant. Once the canopy closes, subsoil between the rows to allow for faster drainage following rainfall. Materials with different modes of action (*i.e.*, FRAC codes) should always be alternated to reduce the chances for fungicide resistance development.

Code	Product Name	Product Rate	Active Ingredient(s) (*=Restricted Use)	PHI (d)	REI (h)	Bee TR
Apply one of the following formulations pre-plant for early season control:						
4	MetaStar 2E AG	4.0 to 8.0 pt/A	metalaxyl	AP ²	48	N
4	Ridomil Gold 4SL	4.0 to 8.0 pt/A	mefenoxam	5	48	N
4	Ultra Flourish 2E	2.0 to 4.0 pt/A	mefenoxam	5	48	N
4 + 11	Uniform 3.66SE	0.34 fl oz/100 ft row	mefenoxam + azoxystrobin	AP ²	0	N
28	Previcur Flex 6F	1.2 pt/A in transplant water, drip irrigation, or spray directed to the base of the plants and soil.	propamocarb HCl	2	12	N
49 + 4	Orondis Gold 1.67SC	4.8 to 9.6 flo z/A in furrow or by drip	oxathiapiprolin + mefenoxam	0	4	--
Apply one of the following fungicides and tank mix with fixed copper at labeled rates when conditions favor disease development (for suppression only):						
49 + 40	Orondis Ultra	5.5 to 8.0 fl oz/A	oxathiapiprolin + mandipropamid	0	4	--
21	Ranman 400SC	2.75 fl oz/A (plus a non-ionic or organosilicon surfactant; do not apply with copper, see label)	cyazofamid	0	12	L
40 + 45	Zampro 525SC	14.0 fl oz/A	dimethomorph + acetochradin	0	12	--
40	Revus 2.08F	8.0 fl oz/A	mandipropamid	0	4	--
11 + 27	Tanos 50DF	8.0 to 10.0 oz/A	famoxadone + cymoxanil	3	12	--
40	Forum 4.17SC	6.0 fl oz/A	dimethomorph	0	12	N
43	Presidio 4SC	4.0 fl oz/A	fluopicolide	2	12	L

¹Do not follow soil applications of Orondis Gold 1.67SC with foliar applications of oxathiapiprolin-containing products.

Plectosporium Blight (Microdochium blight)

Research has shown that no-till pumpkin production may reduce disease. Rotate with crops other than cucurbits. It is important to achieve maximum foliage coverage with each fungicide application. Scout fields regularly.

Code	Product Name	Product Rate	Active Ingredient(s) (*=Restricted Use)	PHI (d)	REI (h)	Bee TR
Once symptoms appear on petioles or as fruit begins to form, apply one of the following and repeat every 7-10 days:						
M5	chlorothalonil 6F	2.0 to 3.0 pt/A	chlorothalonil	0	12	N
3 + 11	Quadris Top 1.67SC	12.0 to 14.0 fl oz/A	difenoconazole + azoxystrobin	0	12	--
7 + 11	Pristine 38WG	18.5 oz/A	boscalid + pyraclostrobin	0	12	--
A spray schedule that alternates Cabrio or Flint with chlorothalonil will also provide control.						

Powdery Mildew

Some varieties have resistance or tolerance to powdery mildew and should be used if possible (see table Recommended Varieties above). The fungus that causes cucurbit powdery mildew has developed resistance to high-risk fungicides. In the Eastern US, resistance to strobilurin (FRAC code 11) and DMI (FRAC code 3) fungicides has been reported. Proper fungicide resistance management should be followed to help delay the development of resistance and minimize control failures.

Powdery mildew generally occurs from mid-July until the end of the season. Development on tolerant varieties will vary from year to year. Planting tolerant varieties will help delay the development of powdery mildew and improve the performance of fungicides. If powdery mildew has become well established in the mid- to late part of the season, only apply protectant fungicides such as chlorothalonil or sulfur. Make first application when powdery mildew is observed in the area or is detected by scouting (one lesion on the underside of 45 old leaves per acre).

Code	Product Name	Product Rate	Active Ingredient(s) (*=Restricted Use)	PHI (d)	REI (h)	Bee TR
TANK MIX one of these products with a protectant such as chlorothalonil 6F 2.0 to 3.0 pt/A:						
U06	Torino 0.85SC	3.4 fl oz/A	cyflufenamid	0	4	--
50	Vivando 2.5SC	15.4 fl oz/A	metrafenone	0	12	--
3 + 7	Luna Experience 3.34SC	10.0 to 17.0 fl oz/A	tebuconazole + fluopyram	7	12	--
13	Quintec 2.08SC	6.0 fl oz/A	quinoxifen	3	12	--
AND ALTERNATE with fungicides from different FRAC codes with a protectant such as chlorothalonil 6F 2.0 to 3.0 pt/A:						
3	tebuconazole 3.6F	4.0 to 6.0 fl oz/A	tebuconazole	7	12	N
3	Proline 480SC	4.0 to 8.0 fl oz/A	triflumizole	0	12	N
3	Proline 480SC	5.7 fl oz/A	prothioconazole	7	12	--
3	Rally 40WSP	5.0 oz/A	myclobutanil	0	24	N
3	Rhyme 2.08F	5.0 to 7.0 fl oz/A	flutriafol	0	12	--
3 + 9	Inspire Super 2.82EW	16.0 fl oz/A	difenoconazole + cyprodinil	0	12	--
3 + 7	Aprovia Top 1.62EC	10.5 to 13.5 fl oz/A	difenoconazole + benzovindiflupyr	0	12	--
7	Fontelis 1.67SC	12.0 to 16.0 fl oz/A	penthiopyrad	1	12	L
7 + 11	Pristine 38WG	12.5 to 18.5 oz/A	boscalid + pyraclostrobin	0	12	--
P5	Regalia	4.0 qt/A	Extract of <i>Reynoutria sachalinensis</i>	0	4	--
OR WITH (Note: Sulfur may injure plants, especially at high temperatures. Certain varieties can be more sensitive. Consult the label for precautions).						
M2	Micronized Wettable Sulfur 80W	4.0 lb/A	sulfur	--	24	N

Scab

Select scab-resistant varieties. The fungus that causes scab typically occurs during periods of cool, wet weather when temperatures are below normal. Rotate away from fields with a history of scab for at least 2 years.

Code	Product Name	Product Rate	Active Ingredient(s) (*=Restricted Use)	PHI (d)	REI (h)	Bee TR
Begin sprays as true leaves form and repeat every 5 to 7 days:						
M5	chlorothalonil 6F	2.0 to 3.0 pt/A	chlorothalonil	0	12	N

Viruses (WMV2, PRSV, ZYMV, and CMV)

The most prevalent virus in the mid-Atlantic region is WMV2, followed by PRSV, ZYMV, and CMV. An easy method for mitigating potential losses are to plant varieties with resistance packages to multiple viruses whenever possible. Plant fields as far away from existing cucurbit plantings as possible to help reduce aphid transmission of viruses.

**For Immediate Medical Attention
Call 911**

**For a Pesticide Exposure Poisoning Emergency
Call**



For All States

This number will automatically connect you to the poison center nearest you.

Anyone with a poisoning emergency can call the toll-free telephone number for help. Personnel at the Center will give you first-aid information and direct you to local treatment centers if necessary.

For Pesticide Spills

Small Spills: See the product label for cleanup advice.

Large spills: Call the National Response Center at 1-800-424-8802 or CHEMTREC at 800-424-9300 (24 hours) - Industry assistance with emergency response cleanup procedures for large, dangerous spills.

Be aware of your responsibility to report spills to the proper state agency.