Viruses

Tobacco mosaic virus (TMV): TMV is transmitted mechanically. Use resistant varieties to control TMV.

Aphid-transmitted viruses (PVX, CMV, TEV, PVY, and AMV): CMV has caused problems in peppers in the mid-Atlantic region the past few growing seasons. Infected fruit may develop small, irregular brown spots. Young developing leaves may develop mosaic symptoms. The positive identification of pepper viruses with laboratory tests can be difficult. Importantly, these viruses of pepper cannot adequately be controlled with insecticide applications, but symptom expression can be delayed through their use. Since aphids transmit the virus, growers may wish to use yellow trap pans containing water to determine when mass flights of winged aphids occur. Repeated applications of a contact aphicide at those times are most beneficial.

Thrips-transmitted virus (Tomato Spotted Wilt Virus, TSWV, and Impatiens Necrotic Spot Virus, INSV): Resistant varieties are available. TSWV can be severe on peppers during both greenhouse transplant and field production of the crop. INSV causes similar symptoms on peppers as TSWV; however, the virus is not as severe and does not limit production to the same extent as TSWV. Both viruses are transmitted by a number of thrips (Western flower thrips most notably) in a persistent manner (ie. thrips can transmit the virus during their entire life cycle). During transplant production, thrips can transmit the virus from infected ornamental plants (flowers). DO NOT GROW any ornamental bedding plants in the same greenhouse as pepper transplants. **Monitor greenhouses and scout fields regularly for thrips populations.** Begin an insecticide program once thrips are observed. When thrips are observed in the field, treat with an insecticide and rogue out any plant showing TSWV symptoms.

Skin separation or 'silvering' of bell pepper fruit

Skin separation or 'silvering' in bell pepper fruit reduces aesthetic fruit quality. Research in New Jersey has shown that phytophthora-tolerant bell pepper cultivars (such as 'Paladin' and 'Aristotle') are more prone to the development of skin separation or 'silvering' in fruit compared to phytophthora-susceptible varieties such as 'Alliance' or 'Camelot'.

PUMPKINS AND WINTER SQUASH

Varieties

Varieties[1]	DE	MD	NJ	PA	VA
Pumpkins (less than 1 pound)					
Apprentice*					
Munchkin					
Wee-B-Little*					
Baby Boo					
Pumpkins (1 to 5 pounds)					
Baby Pam	These pumpkins varieties are recommended for DE, MD, NJ,PA, VA, WV				
Ironsides*					
Baby Bear*					
Touch of Autumn*					
Pik A Pie*					

(table continued)

Varieties *(continued)*

Varieties[1]	DE	MD	NJ	PA	VA
Pumpkins (1 to 5 pounds)					
Snackjack* (edible seeds)					
Cannonball* (FM)					
Iron Man *					
Pumpkins (5 to 10 pounds)					
Small Sugar (BRT)					
Casper (white)	These pumpkins varieties are recommended for DE, MD, NJ, PA,VA, WV				
Mystic Plus* (PMT)					
Hybrid Pam*					
Pumpkins (10 to 20 pounds)					
Magic Lantern* (PMT)					
Sorcerer*					
Charisma* (PM)					
Magician* (PMR, ZYMV)					
Gold Boullion*					
Pumpkins (more than 20 pounds)					
Pro Gold 510					
Howden Biggie	These pumpkins varieties are recommended for DE, MD, NJ, PA,VA, WV				
Gladiator* (PM)					
Atlantic Giant					
Prize Winner					
Aladdin (PM)					
Gold Medal					
Winter Squash (Acorn Type)					
Table Ace*					
Tay Belle* (semi bush, PM)					
Table Gold					
Table Queen					
Autumn Queen					
Royal Ace (bush PM)					
Winter Squash (Butternut Type)					
Puritan Butternut					
Bugle* (bush, PMT)					
Waltham Butternut					
Early Butternut					
Harris Butternut					
Winter Squash (Buttercup Type)					
Sunshine* (trial)					
Ambercup*	These winter squash varieties are recommended for DE, MD, NJ, PA, VA, WV				
Buttercup					
Sweet Mama					
Winter Squash (Delicious Type)					
Golden Delicious					
Winter Squash (Hubbard Type)					
Hubbard Types					
Boston Marrow					
Spaghetti Squash					
Orangetti	These squash varieties are recommended for DE, MD, NJ, PA, VA, WV				
Stripetti					
Vegetable Spaghetti					
Processing					
Golden Delicious					
Neck Pumpkin Types					
Hercules & Other Butternut Types					

[1] Varieties are listed by maturity within each type, earliest first.

* Indicates hybrid varieties

Letters in parentheses indicate disease resistance possessed by varieties. See the "Abbreviations" section in front portion of this publication.

Recommended Nutrients Based on Soil Tests

Before using the table below, refer to important notes in Plant Nutrient Recommendations in Section B, Soil And Nutrient Information. These notes provide additional suggestions to adjust rate, timing and placement of nutrients depending on soil type cation exchange capacity and existing fertility levels.

Crop	Nitrogen (N) Pounds per Acre	Soil Phosphorus Level			Soil Potassium Level		
		Low	Med	Opt.	Low	Med	Opt.
		Pounds $P_2 0_5$ per Acre			Pounds $K_2 0$ per Acre		
Pumpkins and	50-100[1]	150[1]	100[1]	50[1]	200[1]	150[1]	100[1]
Squash	25-50[2]	150[2]	100[2]	50[2]	200[2]	150[2]	100[2]
(Winter)	25-50[3]	0	0	0	0	0	0

[1] Total amount nutrient recommended
[2] Broadcast and disk-in
[3] Sidedress when vines start to run

Seed Treatment

Check with seedsman to determine if seed has been treated with an insecticide and fungicide. If it has not been treated, use a mixture of thiram 75WP (½ teaspoon per pound or 3 ounces per 100 pounds) and an approved commercially available insecticide.

Seeding and Spacing

Seed in the field between June 15 and July 5 in cooler areas, and between June 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.

Large vine with fruit over 30 pounds: Rows 10 to 12 feet apart with 5 to 6 feet between plants in the row.

Large vine with fruit 12 to 25 pounds: Rows 7.5 to 9 feet apart with 4 feet between plants in the row.

Large/medium vine with fruit 8 to 15 pounds: Rows 6 to 7.5 feet apart with 3 to 4 feet between plants in the row.

Small vine/bush with fruit less than 8 pounds: Rows 5 to 6 feet apart with 2 feet between plants in the row.

Weed Control

Identify the weeds in each field and select recommended herbicides that control those weeds. See Tables E-2 and E-3.

Match preplant incorporated and preemergence herbicide rates to soil type and percent organic matter in each field.

Apply postemergence herbicides when crop and weeds are within the recommended size and/or leaf stage.

For Weed Control Under Plastic Mulch

Black plastic mulch effectively controls most annual weeds by preventing light from reaching the germinated seedling. Herbicides are used under plastic mulch to control weeds around the planting hole, and under the mulch when clear plastic is used. Trickle irrigation tube left on the soil surface may cause weed problems by leaching herbicide away at the emitters. The problem is most serious when clear plastic mulch is used. Bury the trickle tube several inches deep in the bed to reduce this problem.

1. Complete soil tillage, and form raised beds, if desired, prior to applying herbicide(s). Do not apply residual herbicides before forming beds, or herbicide rate and depth of incorporation may be increased, raising the risk of crop injury. When beds are formed and plastic mulch laid in a single pass, the herbicide should be applied after the bed is formed, as a part of the same operation.
2. Apply herbicide(s) recommended for use under plastic mulch in a band as wide as the mulch. Condensation that forms on the underside of the mulch will activate the herbicide. Use the trickle irrigation to provide moisture if the soil is too dry for condensation to form on the underside of the mulch.
3. Complete by laying the plastic mulch and trickle irrigation tubing, if used, immediately after the herbicide application. Delay punching the planting holes until seeding or transplanting.

Bensulide--5-6 lb/A. Apply 5 to 6 quarts per acre Prefar 4E preemergence in a band under the plastic, immediately before laying the mulch. Condensation that forms on the underside of the mulch will activate the herbicide. Annual grasses and certain annual broadleaf weeds will be suppressed or controlled under the mulch and around the plant hole. Use the maximum recommended rate to improve control of annual broadleaf weeds including common lambsquarter, smooth pigweed, and common purslane.

Note. All herbicide rate recommendations are made for spraying a broadcast acre (43,560 ft^2).

For Soil Strips Between Rows of Plastic Mulch (Directed and Shielded Band Applications)

Use the following land preparation, treatment, planting sequences, and herbicides labeled for the crop to treat **Soil Strips Between Rows of Plastic Mulch**, or crop injury and/or poor weed control may result.

1. Complete soil preparation, apply herbicide(s) under the mulch (see above), and lay plastic and trickle irrigation (optional) before herbicide application between the rows.
2. Spray preemergence herbicide(s) registered and recommended for use on the crop in bands onto the soil and the shoulders of the plastic mulch before planting and weeds germinate, **OR** apply after planting as a shielded spray combined with a postemergence herbicide to control emerged weeds. **DO NOT broadcast spray over the plastic mulch at any time!**
3. Incorporate preemergence herbicide into the soil with ½ to 1 inch of rainfall or overhead irrigation within 48 hours of application.
4. Apply Gramoxone in bands to the soil strips between the plastic mulch before the crop emerges or is transplanted, **AND/OR** as a shielded spray postemergence to control emerged weeds. Use in combination with residual herbicides that are registered for use.

Note. All herbicide rate recommendations are made for spraying a broadcast acre (43,560 ft^2).

Preemergence

Bensulide--5-6 lb/A. Apply 5 to 6 quarts per acre Prefar 4E as a banded directed shielded spray preemergence to the weeds and activate with one-half inch of sprinkler irrigation within 36 hours to control most annual grasses. Use the maximum recommended rate preemergence followed by irrigation to suppress certain annual broadleaf weeds including common lambsquarter, smooth pigweed, and common purslane.

Ethalfluralin--0.38-0.75 lb/A. Apply 1 to 2 pints per acre Curbit 3E as a banded directed shielded spray preemergence to control annual grasses and certain annual broadleaf weeds, including carpetweed and pigweed sp. Control of many other broadleaf weeds, including common lambsquarter, jimsonweed, morningglory sp., ragweed sp., mustard sp., and others may not be acceptable. Dry weather following application may reduce weed control. Cultivate to control emerged weeds if rainfall or irrigation does not occur prior to weed emergence. DO NOT preplant incorporate. DO NOT apply under plastic mulch or tunnels. DO NOT use when soils are cold or wet. Crop injury may result!

Ethalfluralin *plus* Clomazone (jug-mix)--0.394-1.575 lb/A. Apply 1.5 to 6 pints per acre of Strategy 2.1SC as a banded directed shielded spray preemergence to control annual grasses and many annual broadleaf weeds. Use the lowest recommended rates on coarse-textured sandy soils low in organic matter. Higher rates should only be used on medium- and fine-textured soils and sites that have been heavily manured.

Strategy is a **jug-mix** of ethalfluralin (Curbit 3E) and clomazone (Command 3ME). Refer to the chart below to determine the amount of each herbicide at commonly used rates:

Curbit and Command Active Ingredients (ai) in Commonly Used Strategy Rates

Strategy pints/A	Ethalfluralin (Curbit) lb ai/A	Clomazone (Command) lb ai/A
1.5	0.3	0.094
2	0.4	0.125
3	0.6	0.188
4	0.8	0.25
5	1.0	0.312
6	1.2	0.375

Labeled for use in all the mid-Atlantic states. Read and follow all the recommendations and warnings (above) for ethalfluralin (Curbit) and clomazone (Command).

S-metolachlor--0.95-1.27 lb/A. Apply 1 to 1.33 pints of Dual Magnum 7.62E per acre as a directed and shielded spray between the rows of plastic mulch in pumpkins to suppress or control annual grasses, yellow nutsedge, and certain annual broadleaf weeds including nightshade species. Leave 1 foot (12 inches) of untreated area between the spray and any emerged pumpkin foliage. Do NOT apply Dual Magnum under the plastic or spray the plastic mulch. Tank-mix with other herbicides to improve the number of annual broadleaf weeds controlled. Dual Magnum will not control emerged weeds. Tank-mix with Gramoxone Inteon and apply as a directed shielded spray if weeds have emerged. Use the lowest recommended rates on coarse-textured sandy soils low in organic matter. Higher rates should only be used on medium-and fine-textured soils and sites that have been heavily manured. **Dual magnum is labeled for use ONLY in pumpkins. Dual Magnum is NOT Labeled and should NOT be used on winter squash.**

Postemergence

Carfentrazone--0.008-0.031 lb/A. Apply 0.5 to 2 fluid ounces of Aim 2EC or Aim 1.9EW as a banded directed shielded spray between the rows of plastic mulch to suppress or control broadleaf weeds including morninglory species, pigweed species, common lambsquarter, and nightshade species when the crop has 2 to 5 true leaves but has not yet begun to bloom or run. Aim, applied postemergence, will not control annual or perennial grasses. Add nonionic surfactant to be 0.25 percent of the spray solution (1 quart per 100 gallons of spray solution), or oil concentrate or methylated seed oil to be 1-2% percent of the spray solution (1-2 gallons per 100 gallons of spray solution). **The shielded (hooded) sprayer must be designed to prevent spray or drift from contacting the stems, leaves, flowers or fruit of the crop, or severe injury may occur.**

Halosulfuron--0.023-0.031 lb/A. Apply 0.5 to 0.66 dry ounce Sandea 75WG as a banded directed shielded spray between the rows of plastic mulch to suppress or control yellow nutsedge and broadleaf weeds including common cocklebur, redroot pigweed, smooth pigweed, ragweed species, and galinsoga when the crop has 2 to 5 true leaves but has not yet begun to bloom or run. Sandea applied postemergence will not control common lambsquarter or eastern black nightshade. Add nonionic surfactant to be 0.25 percent of the spray solution (1 quart per 100 gallons of spray solution). Do NOT use oil concentrate. Susceptible broadleaf weeds usually exhibit injury symptoms within 1 to 2 weeks of treatment. Typical symptoms begin as yellowing in the growing point that spreads to the entire plant and is followed by death of the weed. Injury symptoms are similar when yellow nutsedge is treated but may require 2 to 3 weeks to become evident and up to a month for the weed to die. Occasionally, slight yellowing of the crop may be observed within a week of Sandea application. When observed, recovery is rapid with no effect on yield or maturity. Sandea is an ALS inhibitor. Herbicides with this mode of action have a single site of activity in susceptible weeds. The risk of the development of resistant weed populations is high when herbicides with this mode of action are used continuously and exclusively to control a weed species for several years or in consecutive crops in a rotation. Integrate mechanical methods of control and use herbicides with a different mode of action to control the target broadleaf weeds when growing other crops in the rotation. DO NOT apply Sandea to crops treated with a soil applied organophosphate (OP) insecticide, or use a foliar applied organophosphate (OP) insecticide within 21 days before or 7 days after a Sandea application. **Do NOT exceed total of 0.047 pounds per acre, equal to 1 dry ounce of Sandea, applied postemergence, per crop-cycle. DO NOT exceed a total of 0.094 pound per acre, equal to 2 dry ounces of Sandea applied to multiple crops in one year.**

Paraquat--0.6 lb/A. **A Special Local-Needs 24(c) label has been approved for the use of or Gramoxone Inteon 2SC postemergence as a banded directed shielded spray between the rows of plastic mulch in Delaware, Maryland, New Jersey, Pennsylvania, and Virginia.** Apply 2.4 pints per acre Gramoxone Inteon 2SC as a banded directed shielded spray to control emerged weeds between the rows after crop establishment. Add nonionic surfactant according to the labeled instructions. Do not allow spray or spray drift to contact the crop or injury may result. Use shields to prevent spray contact with the crop plants. Do not exceed a spray pressure of 30 psi. See the label for additional information and warnings.

Clethodim--0.094-0.125 lb/A. Apply 6 to 8 fluid ounces per acre Select 2EC with oil concentrate to be 1 percent of the spray solution (1 gallon per 100 gallons of spray solution) or 12 to 16 fluid ounces of Select Max 0.97EC with nonionic surfactant to be 0.25% of the spray solution (1 quart per 100 gallons of spray solution) postemergence to control many annual and certain perennial grasses, including annual bluegrass. Select will not consistently control goosegrass. The use of oil concentrate with Select 2EC 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 nonionic surfactant when grasses are small and soil moisture is adequate. Control may be reduced if grasses are large or if hot, dry weather or drought conditions occur. For best results, treat annual grasses when they are actively growing and before tillers are present. Repeated applications may be needed to control certain perennial grasses. Yellow nutsedge, wild onion, or broadleaf weeds will not be controlled. Do not tank-mix with or apply within 2 to 3 days of any other pesticide unless labeled, as the risk of crop injury may be increased, or reduced control of grasses may result. Observe a minimum preharvest interval of 14 days.

Sethoxydim--0.2-0.3 lb/A. Apply 1 to 1.5 pints per acre Poast 1.5EC with oil concentrate to be 1 percent of the spray solution (1 gallon per 100 gallons of spray solution) postemergence as a banded directed shielded spray to control annual grasses and certain perennial grasses. **The use of oil concentrate 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 nonionic surfactant when grasses are small and soil moisture is adequate. Control may be reduced if grasses are large or if hot, dry weather or drought conditions occur. For best results, treat annual grasses when they are actively growing and before tillers are present. Repeated applications may be needed to control certain perennial grasses. Yellow nutsedge, wild onion, or broadleaf weeds will not be controlled. Do not tank-mix with or apply within 2 to 3 days of any other pesticide unless labeled, as the risk of crop injury may be increased, or reduced control of grasses may result. Observe a minimum preharvest interval of 14 days and apply no more than 3 pints per acre in one season.

For Seeding Into Soil Without Plastic Mulch (Broadcast Applicatons)

Use the following land preparation, treatment, planting sequences, and herbicides labeled for the crop when **Seeding into Soil Without Plastic Mulch**, or crop injury and/or poor weed control may result.

1. Complete soil tillage, apply preplant incorporated herbicide(s), and incorporate. Use a finishing disk or field cultivator that sweeps at least 100% of the soil surface twice, at right angles, operated at a minimum of 7 miles per hour (mph), OR a PTO driven implement once, operated at less than 2 miles per hour (mph).
2. Seed and apply preemergence herbicide(s) immediately after completing soil tillage, and mechanical incorporation of preplant herbicides. Irrigate if rainfall does not occur, to move the herbicide into the soil and improve availability to germinating weed seeds within 2 days of when the field was last tilled, or plan to control escaped weeds by other methods.

Note. All herbicide rate recommendations are made for spraying a broadcast acre (43,560 ft^2).

Preplant Incorporated

Clomazone--0.25-0.5 lb/A. **For pumpkins ONLY**, apply 0.5 to 1 pint per acre Command 4EC preplant. Incorporate immediately after application. For best results, use equipment that will provide shallow, thorough incorporation. Poor incorporation technique may result in excessive crop injury in streaks throughout the field. Use lower rates on fields with coarse-textured soils that are low in organic matter and when planting short-season varieties. Use higher rates when planting full-season varieties in fine-textured soils and those with high organic matter. Expect some temporary injury, seen as a partial whitening of leaf and/or stem of the crop, that becomes apparent after seedling emergence. Complete recovery from early injury will occur without affecting yield or delaying maturity. Command is an excellent broad-spectrum herbicide that will control annual grasses and most broadleaf weeds, except pigweed sp., carpetweed, morningglory sp., and yellow nutsedge.

WARNING: Command spray *or* vapor drift may injure sensitive crops and other vegetation up to several hundred yards from the point of application. Immediate incorporation will reduce or eliminate vapor drift. Do not apply when wind or weather conditions favor herbi-cide drift. Do not apply to fields adjacent to horticultural, fruit, vegetable, or other sensitive crops (see label). Drift injury from offsite Command movement is extremely apparent; therefore, do not use Command on fields near sensitive locations.

Herbicide residues may limit subsequent cropping options when Command is used. See planting restrictions on the label or consult your local Cooperative Extension office for information regarding subsequent cropping options when Command is used for weed control.

Preplant Incorporated or Preemergence

Bensulide--5-6 lb/A. Apply 5 to 6 quarts per acre Prefar 4E before planting and incorporate 1 to 2 inches deep with power-driven rotary cultivators, or apply preemergence and activate with one-half inch of sprinkler irrigation within 36 hours to control most annual grasses. Use the maximum recommended rate preemergence followed by irrigation to suppress certain annual broadleaf weeds including common lambsquarter, smooth pigweed, and common purslane.

Preemergence

Clomazone--0.25-0.5 lb/A. **For winter squash ONLY,** apply 0.66 to 1.3 pints per acre Command 3ME preemergence to control annual grasses and many annual

broadleaf weeds, except pigweed sp., carpetweed, annual morningglory sp., and yellow nutsedge. Some temporary injury, seen as a partial whitening of leaf and/or stem of the crop, may be observed after seedling emergence. Complete recovery from early injury will occur without affecting yield or delaying maturity.

WARNING: 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 when wind or weather conditions favor spray drift. Preemergence applications are restricted to after June 15 in Maryland to reduce the risk of drift injury to rapidly growing sensitive spring foliage. Avoid preemergence applications when fields are adjacent to horticultural fruit, vegetable, or other sensitive crops (see label). Drift injury from off-site Command movement is extremely apparent; therefore, do not use Command on fields near sensitive locations. Follow all label restrictions that require buffer zones between treated fields and sensitive crops.

Herbicide residues may limit subsequent cropping options when Command is used for weed control. See planting restrictions on the label or consult your local Cooperative Extension office for information regarding subsequent cropping options when Command has been used.

Ethalfluralin--0.56-0.75 lb/A. **A Special Local Needs Label 24(c) has been approved for the use of Curbit 3E on winter squash and pumpkins in Delaware, Maryland, Pennsylvania, and Virginia.** Apply 1.5 to 2 pints per acre Curbit 3E preemergence to control annual grasses and certain annual broadleaf weeds, including carpet-weed and pigweed sp. Control of many other broadleaf weeds, including common lambsquarter, jimsonweed, morningglory sp., ragweed sp., mustard sp., and others, may not be acceptable. Dry weather following application may reduce weed control. Cultivate to control emerged weeds if rainfall or irrigation does not occur prior to weed emergence. DO NOT preplant incorporate. DO NOT apply under plastic mulch or tunnels. DO NOT use on transplanted pumpkin or winter squash. DO NOT use when soils are cold or wet. Crop injury may result!

Ethalfluralin *plus* Clomazone (jug-mix)--0.394-1.575 lb/A. Apply 1.5 to 6 pints per acre of Strategy 2.1SC preemergence to control annual grasses and many annual broadleaf weeds. Use the 2 pint rate on coarse-textured sandy soils low in organic matter. Higher rates should only be used on medium- and fine-textured soils and sites that have been heavily manured.

Strategy is a **jug-mix** of ethalfluralin (Curbit 3E) and clomazone (Command 3ME). Refer to the chart under Ethalfuralin *plus* clomazone (jug-mix) in the section **For Soil Strips Between Rows of Plastic Mulch** to determine the amount of each herbicide at commonly used rates.

Read and follow all the recommendations and warnings (above) for ethalfluralin (Curbit) and clomazone (Command).

S-metolachlor—0.95-1.27 lb/A. Apply 1 to 1.33 pints of Dual Magnum 7.62E per acre as an inter-row or inter-hill spray in pumpkins to suppress or control annual grasses, yellow nutsedge, and certain annual broadleaf weeds including nightshade species. **Do NOT apply Dual Magnum over the pumpkin row or hill!** Leave 1 foot (12inches) of untreated area over the row or hill (six inches on each side) and between the spray and any emerged pumpkin foliage. Dual Magnum application over the row may result in moderate to severe injury when seeding and application is followed by rainfall or irrigation before crop emergence. Dual Magnum injury appears as dark green healthy looking foliage on emerged seedlings that are stunted and recover only slowly. Injury may result in reduced yield and/or delayed maturity. Tank-mix with other herbicides to improve the number of annual broadleaf weeds controlled. Dual Magnum will not control emerged weeds. Tank-mix with Gamoxone Inteon and apply as a directed shielded spray if weeds have emerged. Use the lowest recommended rates on coarse-textured sandy soils low in organic matter. Higher rates should only be used on medium- and fine-textured soils and sites that have been heavily manured. **Dual magnum is labeled for use ONLY in pumpkins. Dual Magnum is NOT Labeled and should not be used on winter squash.**

Postemergence

Paraquat--0.6 lb/A. **A Special Local-Needs 24(c) label has been approved for the use of Gramoxone Inteon 2SC postemergence as a directed shielded spray in Delaware, Maryland, New Jersey, Pennsylvania, and Virginia.** Apply 2.4 pints per acre Gramoxone Inteon 2SC as a directed spray to control emerged weeds between the rows after crop establishment. Add nonionic surfactant according to the labeled instructions. Do not allow spray or spray drift to contact the crop or injury may result. Use shields to prevent spray contact with the crop plants. Do not exceed a spray pressure of 30 psi. See the label for additional information and warnings.

Clethodim--0.094-0.125 lb/A. Apply 6 to 8 fluid ounces per acre Select 2EC with oil concentrate to be 1 percent of the spray solution (1 gallon per 100 gallons of spray solution) or 12 to 16 fluid ounces of Select Max 0.97EC with nonionic surfactant to be 0.25% of the spray solution (1 quart per 100 gallons of spray solution) postemergence to control many annual and certain perennial grasses, including annual bluegrass. Select will not consistently control goosegrass. The use of oil concentrate with Select 2EC 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 nonionic surfactant when grasses are small and soil moisture is adequate. Control may be reduced if grasses are large or if hot, dry weather or drought conditions occur. For best results, treat annual grasses when they are actively growing and before tillers are present. Repeated applications may be needed to control certain perennial grasses. Yellow nutsedge, wild onion, or broadleaf weeds will not be controlled. Do not tank-mix with or apply within 2 to 3 days of any other pesticide unless labeled, as the risk of crop injury may be increased, or reduced control of grasses may result. Observe a minimum preharvest interval of 14 days.

Halosulfuron--0.023-0.031 lb/A. Apply 0.5 to 0.66 dry ounces of Sandea 75WG to suppress or control yellow nutsedge and broadleaf weeds, including common cocklebur, redroot pigweed, smooth pigweed, ragweed species, and galinsoga when the crop has 2 to 5 true leaves, but has not yet begun to "run" or bloom. Sandea applied postemergence will not control common lambsquarter or eastern black nightshade. Add nonionic surfactant to be 0.25% of the spray solution (1 quart per 100 gallons of spray solution). Susceptible broadleaf weeds usually exhibit injury symptoms within 1 to 2 weeks of treatment. Typical symptoms begin as yellowing in the growing point that spreads to the entire plant, and is followed by death of the weed. Injury symptoms are similar when yellow nutsedge is treated, but may require 2 to 3 weeks to become evident, and up to a month for the weed to die. Occasionally slight yellowing of the crop may be observed within a week of Sandea application. When observed, recovery is rapid, with no effect on yield or maturity. Sandea is an ALS inhibitor. Herbicides with this mode of action have a single site of activity in susceptible weeds. The risk of the development of resistant weed populations is high when herbicides with this mode of action are used continuously and exclusively to control a weed species for several years or in consecutive crops in a rotation. Integrate mechanical methods of control and use herbicides with a different mode of action to control the target broadleaf weeds when growing other crops in the rotation. DO NOT apply Sandea to crops treated with a soil applied organophosphate (OP) insecticide, or use a foliar applied organophosphate (OP) insecticide within 21 days before or 7 days after a Sandea application. **DO NOT exceed total of 0.047 pounds per acre, equal to 1.0 dry ounce of Sandea, applied postemergence, per crop-cycle. DO NOT exceed a total of 0.094 pound per acre, equal to 2 dry ounces of Sandea applied to multiple crops in one year.**

Sethoxydim--0.2-0.3 lb/A. Apply 1 to 1.5 pints per acre Poast 1.5EC with oil concentrate to be 1 percent of the spray solution (1 gallon per 100 gallons of spray solution) postemergence to control annual grasses and certain perennial grasses. **The use of oil concentrate 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 nonionic surfactant when grasses are small and soil moisture is adequate. Control may be reduced if grasses are large or if hot, dry weather or drought conditions occur. For best results, treat annual grasses when they are actively growing and before tillers are present. Repeated applications may be needed to control certain perennial grasses. Yellow nutsedge, wild onion, or broadleaf weeds will not be controlled. Do not tank-mix with or apply within 2 to 3 days of any other pesticide unless labeled, as the risk of crop injury may be increased, or reduced control of grasses may result. Observe a minimum preharvest interval of 14 days and apply no more than 3 pints per acre in one season.

Postharvest
With or Without Plastic Mulch

Paraquat--0.6 lb/A. **A Special Local-Needs 24(c) label has been approved for the use of Gramoxone Inteon 2SC for postharvest desiccation of the crop in Delaware, New Jersey and Virginia.** Apply 2.4 pints per acre Gramoxone Inteon 2SC as a broadcast spray after the last harvest. Add nonionic surfactant according to the labeled instructions. Use to prepare plastic mulch for replanting, or to aid in the removal of the mulch. See the label for additional information and warnings.

Note. All herbicide rate recommendations are made for spraying a broadcast acre (43,560 ft^2).

No-Till Pumpkins

Seeded 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. Yellow nutsedge and certain "hard to control" broadleaf weeds may escape the preemergence residual herbicide applications. Since cultivation is usually not an option in no-till planting systems and post-emergence herbicides are not available to control escaped weeds, choose fields carefully for no-till pumpkin production. Avoid fields with heavy populations of yellow nutsedge or broadleaf weeds that may not be controlled by the residual herbicides available for use in pumpkins. Suggested cultural procedures are outlined below. **Not recommended in New Jersey**.

Cover Crop Establishment

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

Cover Crop and Weed Management

Soil Moisture. 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 to 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.

Contact Herbicides. To kill hairy vetch, apply Gramoxone Inteon 2SC (2.4 pints 2SC per acre) 10 to 14 days before planting, followed by a second application after seeding but before seedlings emerge or before transplanting. For sequential applications of Gramoxone Max 3SC or Gramoxone Inteon 2SC, the rates may be reduced slightly. Two applications, each at 1.1 pound of glyphosate acid equivalent per acre (3 pints per acre of Roundup Ultra, Glyphomax Plus, or Touchdown IQ, or 2.4 pints per acre of Roundup Ultra Max), are required for effective hairy vetch control. Glyphosate is required for control of some weeds such as horseweed and smartweed.

Caution: glyphosate-resistant horseweed has been identified in numerous fields in Delaware, Maryland, and New Jersey. This weed may not be adequately controlled. Glyphosate has the potential to remain on foliage until washed off by rainfall or irrigation which could cause injury to germinating pumpkin seedlings or transplants. Allow at least 3 days between application and planting. Glyphosate or Gramoxone Max 3SC or Gramoxone Inteon 2SC may be applied singularly, sequentially, or alternately to control specific weeds and cover crops.

To kill standing small grains or weeds in small grain stubble, make one application of glyphosate. Glyphosate is preferred for the control of grasses. Gramoxone Max 3SC or Gramoxone Inteon 2SC is acceptable for small grasses and for morningglory control. (See glyphosate caution above.)

Residual Herbicides for Pumpkins. Prefar (bensulide), may be applied alone or in combination with the first application of either Gramoxone or glyphosate to control germinating weeds as the mulch cover dies. Curbit **(not labeled in all states; see Pumpkin Weed Control Sections above for details)** should not be applied until after seeding and it should not be used for transplanted pumpkins. Prefar can be applied to the soil surface before transplanting pumpkins.

Strategy (clomozone *plus* ethalfluralin) or Curbit (ethalfluralin), may be used alone or in combinations with Prefar (bensulide). **Curbit is not labeled in all states (see Pumpkin Weed Control "clomozone" and "ethalfluralin" sections above for details).** Strategy, Curbit and Prefar may allow late season grass escapes which can be controlled by Select (clethodim) or Poast (sethoxydim) postemergence. Certain broadleaf weeds and yellow nutsedge can be controlled with a postemergence application of Sandea (halosulfuron). Broadleaf weed escapes not controlled by preemergence or postemergence herbicides should be hand weeded before the canopy closes to reduce the weed seed load for following crops.

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 coulter on the seeding unit is essential to cut through the vetch or straw stems. Mount a 3-inch wide waffle coulter ahead of pot-transplanters to provide for effective penetration of the cover crop and plant placement.

Fertility

Hairy vetch will normally supply all the nitrogen requirements for pumpkins. However, if nitrogen deficiency symptoms appear before fruit production, topdress with 20 to 30 pounds nitrogen per acre. Phosphorus and potassium amendments can be applied (based on soil tests) to the soil surface before planting cover crop or before planting pumpkins. When planting pumpkins into nonlegume cover crops or grain stubble, apply the recommended nitrogen, phosphorus, and potassium (based on soil tests) before planting pumpkins.

Pollination

Honey bees 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 section on "Pollination" in the General Production Recommendations and/or Table D-6 for relative toxicity of various pesticides for hazard to bees.

Insect Control

NOTE: Copies of specific insecticide product labels can be downloaded by visiting websites www.CDMS.org or www.Greenbook.org. Also, specific labels can be obtained via web search engines.

Seed Corn Maggot

See Section E, "Maggots" section in Soil Pests--Their Detection and Control.

chlorpyrifos (seed treatment-Lorsban 50W or OLF)

Note: Use of imidacloprid at planting may reduce seed corn maggot populations.

Cucumber Beetle

Cucumber beetles cause direct damage to pumpkin and winter squash rinds. Fall treatments with foliar insecticides to prevent feeding damage may also reduce the incidence of black rot. When plants are young, they need to be protected from cucumber beetle feeding.

Note. Cucumber beetles cause direct damage to pumpkin rinds. Treatment to reduce feeding damage to rinds will prevent or reduce incidence of black rot.

acetamiprid (Assail 30SG or OLF)
beta-cyfluthrin (Baythroid XL)
bifenthrin (Brigade EC, Sniper, or OLF)
carbaryl (Sevin 80S or OLF)
endosulfan (Thionex 3EC or OLF)
esfenvalerate (Asana XL)
fenpropathrin (Danitol 2.4EC)
imidacloprid (at plant/chemigation/in-furrow/hill drench/postseeding – Admire 2F, Admire PRO or OLF)
lambda-cyhalothrin (Lambda-Cy, LambdaT, Silencer, Warrior, Warrior II, or OLF)
permethrin (Perm-Up, Pounce 3.2EC or OLF)
thiamethoxam (soil- Platinum 2SG or OLF; foliar- Actara 25WDG)

Squash Vine Borer

When vines begin to run, apply to bases of plants four 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 looper control will reduce squash vine borer populations.

acetamiprid (Assail 30SG or OLF)
bifenthrin (Brigade EC, Sniper, or OLF)
endosulfan (Thionex 3EC, or OLF)
esfenvalerate (Asana XL)
lambda-cyhalothrin (Lambda-Cy, LambdaT, Silencer, Warrior, Warrior II or OLF)

Cutworms (Also see the "Cutworms" section in Soil Pests--Their Detection and Control.)

beta-cyfluthrin (Baythroid XL)
bifenthrin (Brigade EC, Sniper, or OLF)
esfenvalerate (Asana XL)
permethrin (**pumpkins only**) (Perm-Up, Pounce 3.2EC, or OLF)

Pickleworm, Melonworm

Make one treatment prior to fruit set, and then treat weekly.

beta-cyfluthrin (Baythroid XL)
bifenthrin (Brigade EC, Sniper, or OLF)
carbaryl (Sevin 80S, or OLF)
chlorantraniliprole (Coragen 1.67SG)
endosulfan (Thionex 3EC, or OLF)
esfenvalerate (Asana XL) (**pickleworm only**)
flubendiamide (Synapse WG)
indoxacarb (Avaunt 30WDG)
lambda-cyhalothrin (Lambda-Cy, LambdaT, Silencer, Warrior, Warrior II, or OLF)
methoxyfenozide (Intrepid 2F)
permethrin (Perm-Up, Pounce 3.2EC, or OLF)
spinetoram (Radiant 2SC)
spinosad (Entrust 80W, SpinTor 2SC, or OLF)

Aphids

Note. Aphids transmit mosaic virus. Thorough spray coverage beneath leaves is important. Treat seedlings every 5 to 7 days or as needed. Also, mosaic-resistant winter squash cultivars are available.

endosulfan (Thionex 3EC or OLF)
flonicamid (Beleaf 50SG)
imidacloprid (at-plant/chemigation/in-furrow/hill drench/post-seeding- Admire 2F, Admire PRO or OLF)
oxydemeton-methyl (Metasystox-R 2SC)
pymetrozine (Fulfill 50WDG)
thiamethoxam (soil-Platinum 2SG or OLF; foliar-Actara 25WDG)

Thrips

dinotefuran (soil or foliar- Venom 70SG)
lambda-cyhalothrin (Lambda-Cy, LambdaT, Silencer, Warrior, Warrior II or, OLF)
oxamyl (Vydate L)
spinetoram (Radiant 2SC)
spinosad (Entrust 80W, SpinTor 2SC or OLF)

Squash Bug

Begin treatments if greater than one egg mass per plant is present. Sprays should target nymphal stages. For best squash bug control, under leaf spray coverage is essential. **Note:** Use of oxydemeton-methyl for aphid control will reduce squash bug populations.

acetamiprid (Assail 30SG or OLF)
azadirachtin (Azatin, Ecozin, Neemix) Apply when pests first appear and are in their early nymphal stages.
bifenthrin (Brigade EC, Sniper, or OLF)
carbaryl (Sevin 80S or OLF)
endosulfan (Thionex 3EC)
lambda-cyhalothrin (Lambda-Cy, LambdaT, Silencer, Warrior, Warrior II or OLF)
esfenvalerate (Asana XL)
permethrin (Perm-Up, Pounce 3.2EC or OLF)

Leafminers

abamectin (Agri-Mek EC, Abba EC, Temprano, or OLF)
cyromazine (Trigard 75WSP)
dinotefuran (soil or foliar- Venom 70SG)
oxamyl (Vydate L)
permethrin (Perm-Up, Pounce 3.2EC or OLF)
spinosad (Entrust 80W, SpinTor 2SC or OLF)

Rindworms

Damage to the rinds may result from a complex of insect pests including cucumber beetle, wireworms, and a number of "worm" species, (beet army worm, etc). Management of adult cucumber beetles early in the season may help reduce damage. See cucumber beetle section for labeled products.

Cabbage Looper

Bacillus thuringiensis (Biobit, Dipel, Dipel 2X, Javelin, XenTari or OLF)
beta-cyfluthrin (Baythroid XL)
bifenthrin (Brigade EC, Sniper, or OLF)
chlorantraniliprole (chemigation/foliar- Coragen 1.67SC)
esfenvalerate (Asana XL)
fenpropathrin (Danitol EC)
flubendiamide (Synapse WG)
indoxacarb (Avaunt 30WDG)
lambda-cyhalothrin (Lambda-Cy, LambdaT, Silencer, Warrior, Warrior II, or OLF)
spinetoram (Radiant 2SC)
spinosad (Entrust 80W, SpinTor 2SC, or OLF)

Mites

Mite infestations generally begin around field margins and grassy areas. **CAUTION:** DO NOT mow or maintain these areas after midsummer since this forces mites into the crop. Localized infestations can be spot-treated. Begin treatment when 10 to 15 percent of the crown leaves are infested early in the season, or when 50 percent of the terminal leaves are infested later in the season.

Note. Continuous use of carbaryl, or the pyrethroids may result in mite outbreaks.

abamectin **(pumpkins only)** (Agri-Mek EC, Abba EC, Temprano, or OLF)
bifenthrin (Brigade EC, Sniper, or OLF)
bifenzate (Acramite 50 WS)
fenpropathrin (Danitol 2.4EC)
spiromesifen (Oberon 2SC)

Note. The addition of crop oils or organosilicon spray additives will increase miticide effectiveness.

Whiteflies

bifenthrin (Brigade EC, Sniper, or OLF)
dinotefuran (soil/foliar-Venom 70SG)
endosulfan (Thionex 3EC or OLF)
spiromesifen (Oberon 2SC)
thiamethoxam (Actara 25WDG)

Pesticide	Use Category[1]	Hours to Reentry[2]	Days to Harvest[3]
INSECTICIDE			
abamectin	R	12	7
azadirachtin	G	4	0
Bacillus thuringiensis	G	4	0
beta-cyfluthrin	R	12	0
bifenthrin	R	12	3
bifenzate	G	12	3
carbaryl	G	12	3
carbofuran	R	48	AP
cyromazine	G	12	0
dinotefuran (soil/foliar)	G	12	21/1
endosulfan (squash/pumpkins)	R	24	2/1
esfenvalerate	R	12	3
fenpropathrin	R	24	7
flonicamid	G	12	0
imidacloprid	G	12	21
indoxacarb	G	12	3
lambda-cyhalothrin	R	24	1
methoxyfenozide	G	4	3
oxamyl	R	48	1
oxydemeton-methyl	R	48	14
permethrin	R	12	0
pymetrozine	G	12	0
spinetoram	G	4	3
spinosad	G	4	3
spiromesifen	G	12	7
thiamethoxam (soil/foliar)	G	12	30/0
FUNGICIDE (FRAC code)			
Cabrio (Group 11)	G	12	0
chlorothalonil (Group M5)	G	12	0
copper, fixed (Group M1)	G	24	0
Curzate (Group 27)	G	12	3
Flint (Group 11)	G	12	3
Flouronil (Group 4 + M5)	G	48	14
Forum (Group 40)	G	12	0
maneb (Group M3)	G	24	5
MetaStar (Group 4)	G	48	AP
Presidio (Group 43)	G	12	2
Previcur Flex (Group 28)	G	12	2
Procure (Group 3)	G	12	0
Pristine (Groups 11 + 7)	G	12	0
Quadris (Group 11)	G	4	1
Rally (Group 3)	G	24	0
Ranman (Group 21)	G	12	0
Ridomil Gold (Group 4)	G	48	0
Sulfur Micronized Wettable (Group M2)	G	24	-
Tanos (Groups 11 and 27)	G	12	
Ultra Flourish (Group 4)	G	48	0

See Table D-6.

[1] G = general, R = restricted

[2] Chemicals with multiple designations are based on product and/or formulation differences. CONSULT LABEL.

[3] AP=At Plant

Nematode Control

See "Nematodes" section of Soil Pests--Their Detection and Control. Use fumigants listed in the "Soil Fumigation" section.

Vydate L--1.0-2.0 gal 2L/A. Incorporate into the top 2 to 4 inches of soil or 2 to 4 pints 2L per acre applied 2 weeks after planting and repeat 2 to 3 weeks later.

Disease Control

Damping-Off

Apply the following in a 7-inch band after seeding. Use formula in the "Calibration for Changing from Broadcast to Band Application" section of Calibrating Granular Application Equipment to determine amount of Ridomil Gold or Ultra Flourish needed per acre.

mefenoxam (Ridomil Gold--1.0-2.0 pt 4EC/A or 2.0-4.0 pt Ultra Flourish 2E/A), or
metalaxyl (MetaStar)--4.0-8.0 pt 2E

Viruses (CMV, WMV2, PRSV, ZYMV)

Plant resistant varieties when possible. 'Magician' is resistant to ZYMV. Plant fields as far away from existing cucurbit plantings as possible to prevent aphid transmission of viruses from existing fields to new fields.

Angular Leaf Spot/Bacterial Leaf Spot

Both diseases can produce foliar symptoms that are often over-looked. 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 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:

copper, fixed--at labeled rates or OLF

Bacterial Wilt

Controlling striped and spotted cucumber beetles is essential for preventing bacterial wilt. See preceding "Cucumber Beetle" section under Insect Control for specific recommendations. Insecticide applications made at planting may not prevent beetle damage season long, therefore, additional foliar insecticide applications may be neccessary.

Powdery Mildew

The fungus that causes cucurbit powdery mildew can develop resistance to high-risk fungicides. Resistance to strobilurin (FRAC code 11) and DMI (FRAC code 3) fungicides have been reported in the Eastern US. Proper fungicide resistance management should be followed.

Powdery mildew generally occurs from mid-July until the end of the season. **Plant tolerant varieties, when possible**. Powdery mildew development on tolerant varieties will vary from year to year. Planting tolerant varieties will help delay the development of powdery mildew. 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).

Alternate:

Rally--5.0 oz 40WSP/A *plus* chlorothalonil--2.0-3.0 pt 6F/A, or
Procure--4.0-8.0 oz 50WS/A *plus* chlorothalonil--2.0-3.0 pt 6F/A

With:

Micronized Wettable Sulfur--4.0 lb 80W/A. Sulfur may injure plants, especially at high temperatures. Certain varieties can be more sensitive. Consult label for precautions, or

With a tank-mix containing:

Pristine--12.5-18.5 oz 38WG/A *plus* chlorothalonil--2.0-3.0 pts 6F/A

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.

Downy Mildew

Scout fields for disease incidence early in the growing season. Begin sprays when vines run or if downy mildew is predicted for the region. For current status of the disease, refer to the Cucurbit Downy Mildew forecasting website www.ces.ncsu.edu/depts/pp/cucurbit/. **Preventative applications are much more effective than applications made post infection**. The following are the most effective materials: Tank-mix one of the following products with a protectant such as chlorothalonil--1.5-3 pt 6F/A or maneb (Manex)--1.2–1.6 pt 4F/A, or OLF and alternate between different modes of action (FRAC codes):

Ranman--2.1-2.75 fl. oz 400 SC/A, or
Presidio--3.0-4.0 fl oz 4SC/A, or
Previcur Flex--1.2 pt 6F/A, or
Tanos--8.0 oz 50WDG/A , or
Curzate--3.2 oz 60DF/A

Materials with different modes of action (FRAC codes) should always be alternated to reduce the chances for fungicide resistance development.

Sprays should be applied on a 7-day schedule. Under severe disease conditions spray interval may be reduced if label allows.

Plectosporium Blight (Microdochium blight)

Research studies have shown that no-till pumpkin production may result in less disease development. Rotate with crops other than cucurbits. It is important to achieve maximum foliage coverage with each fungicide application. Scout fields on a regular basis. Once symptoms appear on petioles or as fruit begins to form, apply the following and repeat every 7-10 days:

chlorothalonil--2.0-3.0 pt 6F/A or OLF, or
maneb (Manex)--1.2-1.6 pt 4F/A or OLF

A spray schedule that alternates Cabrio or Flint with chlorothalonil will also provide control.

Scab

Use resistant varieties when possible. Scab develops during cool periods. Begin sprays as true leaves form and repeat every 5 to 7 days.

chlorothalonil--2.0-3.0 pt 6F/A or OLF

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. 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. When tank-mixing, 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, do not apply them. Use fungicides from a different FRAC code.

Begin the following fungicide program when fruit start to form:

Alternate:

chlorothalonil--2.0-3.0 pt 6F/A or OLF,
(use low rate early in season)

With:

Pristine--12.5-18.5 oz 38WG/A *plus* chlorothalonil--2.0-3.0 pt 6F/A

Maintain fungicide schedule until harvest. See the "Harvesting and Storage" 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 Blight

Rotate with crops other than peppers, eggplants, tomatoes, lima and snap beans, and other cucurbits. Fields should be adequately drained to ensure that water does not accumulate around the base of the plant. Mefenoxam (Ridomil Gold or Ultra Flourish) should be applied pre-plant for early season control. Once the canopy closes, subsoil between the rows to allow for faster drainage following rainfall. When conditions favor disease development, apply one of the the following for suppression only, and always tank mix with fixed copper:

Forum--6.0 fl oz 4.18SC/A (must be tank-mixed with another fungicide active against Phytophthora blight on pumpkins and winter squash such as fixed copper), or
Ranman--2.75 fl oz 400 SC/A (*plus* an adjuvant), or
Tanos--8.0-10.0 oz 50 WDG/A

Harvesting and Storage

Begin with disease-free fruit by following a regular fungicide program during crop production. Harvest as soon as 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 after harvest at temperatures between 80° to 85°F (26.7° to 29.40°C) with a relative humidity of 75 to 80 percent for 10 days.

Temperatures below 50°F (10°C) cause chilling injury. The hard-shelled varieties, such as Butternut, Delicious, and the Hubbard strains, can be stored. Store at 55°F (12.8°C) and 55 percent relative humidity.