RUTGERS UNIVERSITY
Cooperative Extension
New Jersey Agricultural Experiment Station

This is a section from the

2026/2027
Mid-Atlantic Commercial Vegetable Production Recommendations

The recommendations are **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 at: *https://njaes.rutgers.edu/pubs/publication.php?pid=e001*.

This manual will be revised biennially. **In January 2027, a Critical Update** with important updates to the 2026/2027 manual will be communicated through local Extension Agents and Vegetable Specialists.

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.

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If you are having a medical emergency after using pesticides, always call 911 immediately.

POISON Help®

1-800-222-1222

In Case of an Accident

- Remove the person from exposure
- Get away from the treated or contaminated area immediately
- Remove contaminated clothing
- Wash with soap and clean water
- Call a physician and/or the National Poison Control Center (1-800-222-1222).
  Your call will be routed to your State Poison Control Center.
- Have the pesticide label with you!
- Be prepared to give the EPA registration number to the responding center/agency

Garlic

Recommended Varieties

Obtain the best strains of Italian or German "Rocambole" garlic (late or pink-skinned type), Polish softneck types that will braid (no hard seed stalk), or Elephant types from a reputable agriculture products vendor or a local grower who has had success with fall-planted garlic. A locally grown strain will be hardy and may overwinter better than many commercially available strains. Avoid Creole garlics (also called Early, Louisiana, White Mexican, etc.), since they are not very winter-hardy and do not keep well.

Bulbs of both Creole and Italian garlic have a white outer skin, but the Italian type has a pink skin around each clove. Elephant garlic (*Allium ampeloprasum*) is a type of leek that produces bulbils, is milder than regular garlic, and up to four times larger. However, Elephant garlic may not yield well when fall-planted in areas with severe cold or extensive freezing and thawing cycles, which cause heaving. The Italian and Elephant types take about 220 days to mature.

Many of the most productive Italian garlic strains will produce seed stalks prior to harvest. Snap these seed stalks just as they begin to coil for the best yields. "Rocambole" types have coiled seed stalks that are perfectly normal and not the result of any poor cultural practice or herbicide contamination.

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 Chapter B Soil and Nutrient Management. Your state's soil test report recommendations and/or your farm's nutrient management plan supersede the recommendations found below.

		Soil Phosphorus Level				Soil Potassium Level				
		Low	Med	High (Opt)	Very High	Low	Med	High (Opt)	Very High	
Garlic[1]	**N (lb/A)**	**P_2O_5 (lb/A)**				**K_2O (lb/A)**				**Nutrient Timing and Method**
	125	150	150	150	0	150	150	150	0	Total nutrient recommended
	75	150	150	150	0	150	150	150	0	Broadcast and disk-in
	25[2]	0	0	0	0	0	0	0	0	Topdress[2] when 6 inches tall (March 15)
	25[2]	0	0	0	0	0	0	0	0	Topdress[2] 6 weeks after first split (May 1)

[1]Apply a total of 25-30 lb/A of sulfur (S) for most soils.

[2]Apply all topdressing at mid-day when plants are dry to reduce the chance of burn. Use ammonium sulfate for the second topdressing to help with pungency.

Planting

Garlic cloves should be planted in mid-October in central PA. They could be planted up to 10 days earlier in cool, short-season areas and up to 3 weeks later in warm, long-season areas. Growers should plant as late as possible to escape damage from the fall generation of the allium leafminer if present in the growing area (See "Allium Leafminers" in Insect Control section.) Yield tends to increase with the size of the mother bulb. Do **not** use the following for planting: long, slender cloves in the center of the bulb, cloves weighing less than 1 gram, or bulbs with side growths and very poor skin covering of cloves.

Garlic must be exposed to temperatures between 32-50°F (0-10°C) for about 2 months prior to the long day-length periods that induce bulbing. Fall-planted garlic establishes an excellent root system and receives a natural cold treatment that produces the highest possible garlic yields. Spring-planted garlic (*e.g.*, Elephant type) may be successful where it can be planted by early March.

Spacing

Cloves should be planted 4 by 4 inches apart in triple rows or multiple beds 16-18 inches apart. Between-row spacing depends on the equipment available. Clove tops should be covered with 1-1½ inches of soil. Cloves must not be so deep that the soil will interfere with the growth of the bulbs, nor so shallow that rain, heaving from alternate freezing and thawing, and birds may dislodge them. Cloves placed with the root end down give optimum results. Cloves dropped into furrows will be in various positions and may produce plants with crooked necks.

Harvest and Post-Harvest Considerations

Fall-planted garlic is ready for harvesting about the second week in July when 40-60% of the leaves have yellowed (garlic generally has 6 leaves). When plants reach this stage pull a sample. There are only about 10-14 days for optimum harvest, when each clove is fully segmented and yet fully covered by a tight outer skin. Before the optimum harvest time, garlic is unsegmented like an onion. After the optimum time, cloves may have separated, the outer sheath split, and part of the naked cloves may be exposed.

Run a cutter bar under the bulbs to cut the extensive root system and partially lift the bulbs. Bulbs can be pulled and gathered into windrows. Tops are placed uppermost in the windrow to protect bulbs from the sun. Garlic is left in the field for a week or more to dry or cure thoroughly. Curing can also be accomplished in a well-ventilated shed or barn. Use this option when rain is forecast. Bulbs must be thoroughly dried before being shipped or stored.

After curing, remove the outer loose portions of the sheath, and trim the roots close to the bulbs. Braid or bunch the tops together or cut off the tops and bag the bulbs like dry onions. Discard diseased and damaged bulbs.

When properly cured, garlic keeps well under a wide range of temperatures. Temporary storage in open-mesh sacks in a dry, well-ventilated storage room at 60-90°F is acceptable. However, storage at 32-35°F and 65% relative humidity (the same conditions as required for onions) is best. Avoid prolonged storage near 40°F to prevent sprouting of cloves. and avoid a relative humidity above 70% to prevent sprouting and development of mold. Do not store bulbs for planting next fall below 50°F to prevent vernalization of the cloves.

If dry bulb mites have been a problem, garlic bulbs should be handled as follows: after a brief period of field drying, move the crop into a high tunnel for 7 to 14 days to complete drying. Use shade cloth to keep the bulbs from getting too hot and the bulbs should be cut from the stems before drying. When drying is done, move the bulbs indoors and store at 70°F and 70% relative humidity. Avoid temperatures above 80°F. For direct marketing the bulbs can be stored below 40°F and removed from cold storage just before selling.

Marketing

New growers should develop a local retail market (roadside stands, night markets, and gourmet restaurants), wholesale shipper, or processing market before planting. The demand for garlic is increasing due to recent reports about its health and medical benefits.

Weed Control

THE LABEL IS THE LAW-see the Pesticide Use Disclaimer on the first page of Chapter 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-3) in Chapter E Pest Management.

2. Minimize herbicide resistance development. Identify the herbicide mode 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.

1. Soil-Applied (Preplant Incorporated or Preemergence)

Group	Product Name (*=Restricted Use)	Product Rate	Active Ingredient	Active Ingredient Rate	PHI (d)	REI (h)
8	Prefar 4E	5 to 6 qt/A	**bensulide**	5 to 6 lb/A	--	12
-Labeled for preplant incorporated or preemergence applications; **do not** incorporate more than 2 inches deep (1 inch is optimum). -If applied preemergence, irrigate within 36 h of application with ½ inch of water; if not incorporated with irrigation or rainfall within 36 h, weed control maybe reduced. -Provides control/suppression of some annual grass weeds and some broadleaves including pigweeds, purslane, and lambsquarters. -**Do not** apply more than 6 lb ai/A per season.						
27	Optogen 1.67	2.6 to 3.5 fl oz/A	**bicyclopyrone**	0.034 to 0.046 lb/A	45	24
-Labeled for transplants only. DO NOT USE ON MINERAL SOILS. -Apply prior to transplanting and avoid moving treated soil during transplanting. -No local experience with Optogen as a soil-applied herbicide. -Do not make more than one application per year.						

2. Postemergence

Group	Product Name (*=Restricted Use)	Product Rate	Active Ingredient	Active Ingredient Rate	PHI (d)	REI (h)
1	Shadow 3EC Select 2EC Select Max 0.97EC	4 to 5.33 fl oz/A 6 to 8 fl oz/A 9 to 32 fl oz/A	**clethodim**	0.07 to 0.125 lb/A 0.07 to 0.125 lb/A 0.07 to 0.25 lb/A	45	24
	Fusilade DX 2EC	8 to 24 fl oz/A	**fluazifop**	0.125 to 0.375 lb/A	45	12
	Poast 1.5EC	1 to 1.5 pt/A	**sethoxydim**	0.2 to 0.3 lb/A	30	12

-**Select 2EC**: use crop oil concentrate (COC) at 1% v/v (1 gal/100 gal of spray solution).
-**Select Max 0.97EC**: use nonionic surfactant (NIS) at 0.25% v/v (1 qt/100 gal of spray solution).
-**Fusilade DX 2EC:** use COC at 1.0% v/v or NIS at 0.25% v/v.
-**Shadow 3EC**: use crop oil concentrate (COC) at 1% v/v (1 gal/100 gal of spray solution) for large or stressed grasses; use nonionic surfactant (NIS) at 0.25% v/v (1 qt/100 gal of spray solution) when crop safety is a concern.
-**Poast 1.5EC**: use COC at 1.0% v/v.
-**General comments:**
-The use of COC may increase the risk of crop injury when hot or humid conditions prevail. To reduce the risk of crop injury, 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. For best results, treat annual grasses when they are actively growing and before tillers are present. -Yellow nutsedge, wild onion, wild garlic, and broadleaf weeds will **not** be controlled with these herbicides. -These herbicides control many annual and certain perennial grasses. Clethodim is best on annual bluegrass; while Poast is preferred for goosegrass control. -Repeated applications may be necessary to control certain perennial grasses. If repeat applications are necessary, allow 14 days between applications.
-Rainfastness is 1 h.
-**Do not** apply more than 8 fl oz/A of Select 2EC in a single application and **do not** exceed 2 applications per season; **do not** apply more than 32 fl oz/A of Select Max in a single application and **do not** exceed 4 pt/A for the season.
-**Do not** apply more than 5.33 fl oz/A of Shadow 3EC in a single application and **do not** exceed 21.33 fl oz/A for the season.
-**Do not** apply more than 24 fl oz/A of Fusilade DX in a single application and **do not** exceed 3 pt/A for the season.
-**Do not** apply more than 1.5 pt/A of Poast in a single application and **do not exceed** 4.5 pt/A for the season.

6	Maestro 2E	1.5 to 2 pt/A	**bromoxynil**	0.38 to 0.5 lb/A	60/112*	24

-Apply after garlic emergence but before 12 inches in height.
-Apply in a minimum of 20 gal/A. No surfactant or adjuvant is recommended due to risk of crop injury.
-Apply to small broadleaf weeds (up to 4-leaf stage, 2 inches in height or 1 inch diameter).
-Rainfastness 1 h. **Do not** apply more than 2 pt/A during the season.
-**Do not** harvest for 112 days after application on mineral soils or 60 days on muck soils grown in the northeastern US.

27	Optogen 1.67	3.5 fl oz/A	**bicyclopyrone**	0.046 lb/A	45	24

-For use with transplanted garlic only.
-Use nonionic surfactant (NIS) at 0.25% v/v (1qt/100 gal of spray solution) or crop oil concentrate (COC) at 1% v/v (1 gal/100 gal of spray solution).
Ammonium sulfate (AMS) at 8.5 to 17 lb/100 gal spray solution may be added for improved control of emerged weeds
-Apply after transplanting as either row middle treatment or as a directed spray. Hooded or shielded sprayers will reduce the risk of injury for row middle or directed sprays.
-Contact with foliage will cause injury.
-Apply to small weeds (less than 2" tall).
Optogen provides control for only a few weed species, should be used in combination with other herbicides.
-Rainfastness is not specified on the label.
-Do not make more than one application per year.

3. 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 (*=Restricted Use)	Active Ingredient
3	Prowl H20 / Prowl 3.3EC	**pendimethalin**
14	Aim (hooded or directed application only)	**carfentrazone**
14	Chateau	**flumioxazin**
14	Goal or GoalTender	**oxyfluorfen**
15	Outlook	**dimethenamid**

Insect Control

THE LABEL IS THE LAW-see the Pesticide Use Disclaimer on the first page of Chapter F.

Recommended Insecticides

Note: For **premixes**, the group number (representing the mode of action) and active ingredient that contributes the most to control is generally listed first. In some cases, only one ingredient in a premix provides control.

Allium Leafminers

This new pest to the Mid-Atlantic area is a grey-black fly with a distinctive yellow or orange patch on its head, yellow sides and "knees" (femur-tibia junction), and white halteres (knobs in place of 2nd pair of wings). The larvae are a typical whitish maggot. Leek (*A. porrum*) and scallions (green onions) tends to be the most damaged Allium species or cultivars. Adult females repeatedly puncture leaves with their ovipositors, resulting in a line of small white dots. Leaves can be wavy, curled, and distorted. Larvae mine leaves and move towards and into bulbs and leaf sheathes where they pupate. Covering plants in April-May, or September-October, during adult flight, can exclude the pest. Other suggested methods include avoiding the adult oviposition period by delaying planting in the spring. Systemic and contact insecticides can be effective, however soil applied Group 4A and Group 28 products are not effective and are best used as a foliar spray.

Apply one of the following formulations:						
Group	**Product Name (*=Restricted Use)**	**Product Rate**	**Active Ingredient(s)**	**PHI (d)**	**REI (h)**	**Bee TR**
3A	Mustang Maxx*	2.24 to 4.0 fl oz/A	zeta-cypermethrin	7	12	H
3A	Warrior II*	0.96 to 1.60 fl oz/A	lambda-cyhalothrin	14	24	H
4A	Scorpion 35 SL	5.25 to 7.0 fl oz/A	dinotefuran - **foliar**	1	12	H
4A	Venom 70SG	3.0 to 4.0 oz/A	dinotefuran - **foliar**	1	12	H
5	Entrust SC (OMRI)	3.0 to 6.0 fl oz/A	spinosad	1	4	H
5	Radiant SC	6.0 to 10.0 fl oz/A	spinetoram	1	4	H
17	Trigard 75WSP	2.66 oz/A	cyromazine	7	12	H
28	Exirel	13.5 to 20.5 fl oz/A	cyantraniliprole	1	12	H
28 + 6	Minecto Pro*[1]	7.0 to 10.0 fl oz/A	cyantraniliprole + abamectin	30	12	H
30	Vertento	1.1 to 2.0 fl oz/A	isocycloseram	7	12	H

[1]Use of a non-sticker adjuvant is required.

Beet Armyworms (BAW)

Beet armyworm comes into our area from the South usually in early to mid-July. Female moths lay egg masses on the underside of leaves that are covered in scales with a fuzzy appearance. Young larvae are greyish or dark green with distinct dark heads. Most larvae have a distinct black spot on the second abdominal segment. BAW damage is characterized by leaf skeletonization. One of the best scouting methods is to examine nearby pigweed or lambsquarters weeds, as BAW typically infests those plants first. **BAW control can be challenging as they are resistant to pyrethroids (Group 3A) and there are resistance concerns with diamides (Group 28).**

Apply one of the following formulations:						
Group	**Product Name (*=Restricted Use)**	**Product Rate**	**Active Ingredient(s)**	**PHI (d)**	**REI (h)**	**Bee TR**
1A	Lannate LV*	1.5 pt/A	methomyl	7	48	H
5	Entrust SC (OMRI)	3.0 to 6.0 fl oz/A	spinosad	1	4	H
5	Radiant SC	5.0 to 10.0 fl oz/A	spinetoram	1	4	H
11A	XenTari (OMRI)	0.5 to 2.0 lb/A	*Bacillus thuringiensis aizawai*	0	4	N
28[1]	Coragen 1.67SC Coragen eVo, Vantacor	3.5 to 7.5 fl oz/A 1.2 to 2.5 fl oz/A	chlorantraniliprole	1	4	L

[1]Resistance concerns with BAW.

Dry Bulb Mite and Bulb Mite

Bulb mites from two different families can infest garlic. Dry bulb mite is a pest of stored garlic that, while not a problem every growing season, has been reported more often in recent years. Dry bulb mite is an Eriophyid mite that cannot be seen without magnification. Dry bulb mites multiply in storage and feed on the surface of stored cloves causing drying and shriveling. There are currently no chemical treatments available for dry bulb mite management (researchers in New York state showed that some previously listed chemical control methods are

ineffective). Heat treatment of cloves for planting can be effective but temperature control is critical and reduced germination has been observed. Proper handling and storage procedures for harvested bulbs is currently the only option available to manage these mites. See information in the Harvest and Post-Harvest Considerations section above.

Another bulb mite pest is the larger and visible Acarid bulb mite, which can damage stored garlic bulbs but also growing plants in fields. Infested cloves exhibit poor root growth and increased incidence of fungal decay.

For both types of mites, do not plant new bulbs into previously infested fields and do not save bulbs from infested fields for replanting.

Thrips

Thrips have mouth parts that pierce plant tissue and remove plant liquids resulting in whitish or chlorotic streaks or blotches. During hot, dry weather, the population of thrips increases following harvest of adjacent alfalfa or grain fields; thrips could at this time pose the most serious insect problem on garlic.

Apply one of the following formulations (Note: The use of spinosad or methomyl for beet armyworm control will suppress thrips populations):						
Group	**Product Name (*=Restricted Use)**	**Product Rate**	**Active Ingredient(s)**	**PHI (d)**	**REI (h)**	**Bee TR**
1B	Malathion 57 EC	1.5 to 2.0 pt/A	malathion	3	24	H
3A[1]	Mustang Maxx*	2.88 to 4.0 fl oz/A	zeta-cypermethrin	7	12	H
3A[1]	Permethrin*, others	6.0 to 12.0 fl oz/A	permethrin	1	12	H
3A[1]	Proaxis*	2.56 to 3.84 fl oz/A	gamma-cyhalothrin	14	24	H
3A[1]	Warrior II*	1.28 to 1.92 fl oz/A	lambda-cyhalothrin	14	24	H
4A[2]	Assail 30SG	5.0 to 8.0 oz/A	acetamiprid	7	12	M
4A[2]	Assail 30SC	4.2 to 6.7 fl oz/A	acetamiprid	7	12	M
4A[2]	Scorpion 35 SL	8.75 to 10.5 fl oz/A	dinotefuran - **soil**	21	12	H
4A[2]	Scorpion 35 SL	5.25 to 7.0 fl oz/A	dinotefuran - **foliar**	1	12	H
4A[2]	Venom	5.0 to 6.0 oz/A	dinotefuran - **soil**	21	12	H
4A[2]	Venom	3.0 to 4.0 oz/A	dinotefuran - **foliar**	1	12	H
5	Entrust SC (OMRI)	4.0 to 8.0 fl oz/A	spinosad	1	4	H
5	Radiant SC	6.0 to 10.0 fl oz/A	spinetoram	1	4	H
21A	Torac	24.0 fl oz/A	tolfenpyrad	7	12	H
23	Boxadon 360	3.4 fl oz/A	spirotetramat	3	24	L
23	Movento	5.0 fl oz/A	spirotetramat - **larvae**	3	24	L
23+7C	Senstar	10.0 fl oz/A	spirotetramat + pyriproxyfen - **larvae**	3	24	L
28 + 6	Minecto Pro*[3]	7.0 to 10.0 fl oz/A	cyantraniliprole + abamectin	30	12	H
30	Vertento	1.1 to 2.0 fl oz/A	isocycloseram	7	12	H

[1]Resistance concerns with western flower thrips.
[2]Resistance concerns with tobacco thrips.
[3] Use of a non-sticker adjuvant is required.

Disease Control

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

Nematodes

Bloat Nematode (*Ditylenchus dipsaci*)

Infected garlic appears bloated and twisted, with swollen leaves and distorted and cracked bulbs. Secondary infection by *Fusarium* spp. is common. Currently there are no certification programs for garlic; make sure your supplier produces clean seed cloves. Avoid planting bulbs that are split, have damaged basal plates or are desiccated. Plant garlic in a location that has not been cropped to garlic or another *Allium* crop for at least 4 years. Following harvest, planting biofumigant cover crops may help reduce nematode levels. Keep soils moist since the bloat nematode cannot survive long periods in high moisture. Implement good sanitation practices and avoid dumping culls and other infested debris in the field.

Velum Prime 4.16SC can be used at 6.5 to 6.84 fl oz in-furrow at-planting in the following methods:

- Pre-plant banded or broadcast spray directed to the soil and incorporated into the planting bed during planting.

- In-furrow drench or spray during planting directed on or below seed.
- Chemigation into the root-zone through low-pressure drip, trickle, micro-sprinkler or equivalent equipment.
- Chemigation using overhead irrigation equipment.

Damping-off caused by *Pythium* and *Rhizoctonia*

Use clean pathogen-free seed that has been treated with a fungicide.

Code	Product Name (*=Restricted Use)	Product Rate	Active Ingredient(s)	PHI (d)	REI (h)	Bee TR
Apply one of the following at planting to help manage damping-off pathogens:						
For Pythium only:						
4	MetaStar 2E AG	2.0 to 4.0 pt/A	metalaxyl	AP	48	N
4	Ridomil Gold 4SL	0.5 to 1.0 pt/A	mefenoxam	7	12	N
4	Ultra Flourish 2E	1.0 to 2.0 pt/A	mefenoxam	AP	48	N
For Rhizoctonia only:						
11	azoxystrobin 2.08F	0.40 to 0.80 fl oz/1000 row ft	azoxystrobin	0	4	N
For Pythium and Rhizoctonia:						
4 + 11	Uniform 3.72SC	0.34 fl oz/1000 row ft in furrow, see label	mefenoxam + azoxystrobin	AP	0	N

Bacterial and Fungal Diseases

Botrytis Leaf Blight

Scout fields regularly. Cool summer temperatures (55 to 75°F) and long periods of leaf wetness provide optimum environmental conditions for rapid leaf blighting. Older plants are more susceptible to Botrytis infection than younger plants. Apply the following preventatively when weather conditions favor disease development and repeat at 7-10 day intervals. **Do not** make more than 2 consecutive applications of Endura or Pristine before switching to a fungicide with a different mode of action. Thoroughly disc or plow under plant debris after harvest.

Code	Product Name (*=Restricted Use)	Product Rate	Active Ingredient(s)	PHI (d)	REI (h)	Bee TR
Tank mix						
M05	chlorothalonil 6F	1.0 to 3.0 pt /A	chlorothalonil	7	12	M
With one of the following fungicides. Rotate between fungicides with different modes of action (FRAC codes):						
3 + 9	Inspire Super 2.82EW[1]	16.0 to 20.0 fl oz/A	difenoconazole + cyprodonil	7	12	--
3 + 11	Quilt Xcel 2.2SE[2]	17.5 to 26.0 fl oz/A	propiconazole + azoxystrobin	14	12	N
7	Endura 70WG[1]	6.8 oz/A	boscalid	7	12	--
7 + 3	Luna Experience 3.34SC	8.0 to12.0 fl oz/A	fluopyram + tebuconazole	7	12	--
7 + 9	Luna Tranquility 4.16SC	16.0 to 27.0 fl oz/A	fluopyram + pyimethanil	7	12	--
7 + 11	Merivon Xemium	8.0 to 11.0 fl oz/A	fluxapyroxad + pyraclostrobin	7	12	--
7 + 11	Pristine 38WG	14.5 to 18.5 oz/A	boscalid + pyraclostrobin	7	12	--
29	Omega 500F[1,2]	1.0 pt/A	fluazinam	7	12	N

[1]Also manages purple blotch. [2]Also manages downy mildew.

Downy Mildew (*Peronospora destructor*)

The pathogen can survive as oospores in the soil, or on bulbs, sets and seed. Downy mildew development is promoted by cool, moist conditions. Management begins with planting pathogen-free seed or sets and crop rotations of at least 3 years without related crops. Be sure to eliminate culls and volunteers from the field.

Code	Product Name (*=Restricted Use)	Product Rate	Active Ingredient(s)	PHI (d)	REI (h)	Bee TR
Tank mix chlorothalonil						
M05	chlorothalonil 6F	1.0 to 3.0 pt /A	chlorothalonil	7	12	M
With one of the following fungicides and rotate between fungicides with different modes of action (FRAC codes):						
21	Ranman 400SC	2.75 to 3.0 fl oz/A	cyazofamid	0	12	L
29	Omega 500F[1]	1.0 pt/A	fluazinam	7	12	N
40	Forum 4.17SC	6.0 fl oz/A	dimethomorph	0	12	N
40	Revus 2.08F	8.0 fl oz/A	mandipropamid	7	12	--
43	Presidio 4SC	3.0 to 4.0 fl oz/A	fluopicolide	2	12	L
40 + 45	Zampro 525SC	14.0 fl oz/A	dimethomorph + ametoctradin	0	12	--
40 + 49	Orondis Ultra 2.33SC	5.5 to 8.0 fl oz/A	mandipropamid + oxathiapiprolin	7	4	--

[1]Also manages Botrytis leaf blight and purple blotch.

Fusarium Basal Rot (*Fusarium* spp.)

The fungus infects and causes decay of the basal plate. During the growing season, leaves can turn yellow and then brown. This disease is favored by very warm soil temperatures, so symptoms are most frequently observed in mid- to late summer. A 4-year crop rotation with non-hosts is the most effective management strategy. There are currently no fungicides registered for the management of this disease. Hot water treating cloves may reduce disease in low disease pressure environments.

Purple Blotch (*Alternaria porri*)

Scout fields regularly. Purple blotch development increases with high humidity, rain and persistent dews with an optimum 71 to 85°F temperature range. Apply one of the following preventatively when weather conditions favor disease development and repeat at 7 to10-day intervals. **Do not** apply Pristine, azoxystrobin (both FRAC code 11) or Endura (FRAC code 7) more than once before switching to a fungicide with a different mode of action (FRAC code). Thoroughly disc or plow under plant debris after harvest.

Code	Product Name (*=Restricted Use)	Product Rate	Active Ingredient(s)	PHI (d)	REI (h)	Bee TR
Tank mix or rotate						
M05	chlorothalonil 6F	1.0 to 3.0 pt /A	chlorothalonil	7	12	M
With one of the following fungicides and rotate between fungicides with different modes of action:						
3	tebuconazole 3.6F	4.0 to 6.0 fl oz/A	tebuconazole	7	12	N
3 + 9	Inspire Super 2.82EW[1]	16.0 to 20.0 fl oz/A	difenoconazole + cyprodonil	7	12	--
3 + 11	Quilt Xcel 2.2SE	17.5 to 26.0 fl oz/A	propiconazole + azoxystrobin	14	12	N
7	Endura 70WG	6.8 oz/A	boscalid	7	12	--
7	Fontelis 1.67SC	16.0 to 24.0 fl oz/A	penthiopyrad	3	12	L
7 + 3	Aprovia Top 1.62EC	10.5 fl oz/A	benzovindiflupyr + difenoconazole	7	12	--
11	azoxystrobin 2.08F	9.0 to 15.5 fl oz/A	azoxystrobin	0	4	N
11	Cabrio 20EG	8.0 to 12.0 oz/A	pyraclostrobin	7	12	N
29	Omega 500F [1,2]	1.0 pt/A	fluazinam	7	12	N

[1]Also labeled for Botrytis leaf blight. [2]Also labeled for Downy mildew.

White Rot (*Sclerotium cepivorum*)

Disease development is favored by cool, moist soil conditions. Infection occurs at soil temperatures ranging from 50 to 75°F, with the optimum at 60 to 65°F. The disease is greatly inhibited at soil temperatures above 78°F. Sclerotia can survive for over 20 yr, even in the absence of a host plant. Soil moisture conditions that are favorable for onion and garlic growth are also ideal for white rot development. Rotate between crops for as many years as possible.

Code	Product Name (*=Restricted Use)	Product Rate	Active Ingredient(s)	PHI (d)	REI (h)	Bee TR
At planting, apply an in-furrow treatment of one of the following:						
2	iprodione 4F (spray both the cloves and the covering soil used to fill furrow; maximum application: 1 per year)	4.0 pt in 20 gal of water minimum based on a 38- to 40-inch row spacing	iprodione	AP	24	N
3	tebuconazole 3.6F (immediately after seeding; can also be applied via drip irrigation)	20.5 fl oz/A in a 4 to 6-inch band over the top or in-furrow	tebuconazole	7	12	N
12	Cannonball WG (prior to seed placement)	0.5 oz/1000 ft row in-furrow	fludioxonil	7	12	L
Two additional foliar applications of tebuconazole may be applied:						
3	tebuconazole 3.6F	4.0 to 6.0 fl oz/A	tebuconazole	7	12	N
Note: In treated fields, do not grow crops other than garlic and leafy vegetables during the harvest year, and do not grow garlic, leafy vegetables, tomatoes, root crops, cereal grains, or soybeans during the following year.						