

Cabrio--8.0-12.0 oz 20EG/A (Downy mildew-suppression only), or
 Pristine--18.5 oz 38WG/A (Downy mildew-suppression only), or
 Endura--6.8 oz 70WG/A, (Purple blotch only), or
 chlorothalonil--1.5-3.0 pt 6F/A or OLF (Downy mildew-suppression only)

Do not make more than 2 consecutive applications of either Cabrio, Endura, Forum, Pristine or Quadris before switching to a fungicide with a different mode of action.

Harvesting and Storage

Fall-planted garlic in central Pennsylvania is ready to harvest about the second week in July. When a few tops fall over, push all of them down and pull a sample. There are only about 10 days to 2 weeks for optimum garlic harvest. Before then, the garlic is unsegmented like an onion; much after that period, the cloves can separate so widely that the outer sheath often splits and exposes part of the naked clove. Picked at the proper time, each clove should be fully segmented and yet fully covered by a tight outer skin.

Run a cutter bar under the bulbs to cut the extensive root system and partially lift them. The bulbs are usually pulled and gathered into windrows. Tops are placed uppermost in the windrow to protect bulbs from the sun, and the 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. The bulbs must be thoroughly dried before being shipped or stored.

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

When properly cured, garlic keeps well under a wide range of temperatures. Storage in open-mesh sacks in a dry, well-ventilated storage room at 60° to 90°F (15.6° to 32.2°C) is satisfactory. However, garlic is best stored under temperature and humidity conditions required for onions (32° to 35°F [0° to 1.67°C] and 65 percent relative humidity). Garlic cloves sprout quickly after bulbs have been stored at temperatures near 40°F (4.4°C), so avoid pro-longed storage at this temperature. Garlic stored at above 70 percent relative humidity at any temperature not only molds but also begins to develop roots.

Marketing

New growers should develop a local retail market (roadside stands, night markets, gourmet restaurants), wholesale shipper, or processing market before planting. The demand for garlic is increasing due to recent reports about the health and medical benefits of garlic. The main markets are New York; Philadelphia; Pittsburgh; Washington, DC; Chicago; and St. Louis.

The markets of the northern and eastern United States will take the bulbs trimmed like dry onions and known as "loose garlic." Frequently, 30 to 50 bulbs are tied in bunches. Bulbs should be graded into three sizes--large, medium, and small. Each string or bunch should contain bulbs of uniform size and of the same variety.

First-class garlic bulbs must be clean and have unbroken outer sheaths. Many of the larger vegetable markets, such as the big chain stores, could retail garlic in the form of clean, uniform cloves, two dozen to a mesh bag. Processors are not

particular about having the cloves enclosed in a neat sheath and occasionally accept sprouted bulbs.

Garlic growing can be very profitable when freshness is stressed and if the tops are braided, tied together, or placed into long, narrow, plastic mesh bags so they can be effectively displayed at roadside or night-market stands.

**GREENS
(MUSTARD, TURNIP)**

Varieties

Varieties¹

Mustard Greens

- Tendergreen (Fall only)
- Savanna*
- Florida Broadleaf
- Green Wave (Fall only)
- Southern Giant Curled (Fall only)

These varieties are Recommended for DE, MD, NJ, PA, VA, WV

Turnip Greens

- All Top (Fall processing)
- Alamo* (processing)
- Top Star* (Fall) (trial)
- Shogoin (Fall only)(DMR,MR)
- Topper* (Fall)

¹ Varieties listed by maturity, earliest first.

* Indicates hybrid variety

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.

Greens, (Mustard, Turnip)	Nitrogen (N) Pounds per Acre	Soil Phosphorus Level			Soil Potassium Level		
		Low	Med	Opt.	Low	Med	Opt.
		Pounds P ₂ O ₅ per Acre			Pounds K ₂ O per Acre		
	50-80 ¹	150 ¹	100 ¹	50 ¹	150 ¹	100 ¹	50 ¹
	50 ²	150 ²	100 ²	50 ²	150 ²	100 ²	50 ²
	25-30 ³	0	0	0	0	0	0

¹ Total amount nutrient recommended

² Broadcast and disk-in

³ Sidedress if needed

Seeding

Seed in early- to mid-August. In Pennsylvania and other cool areas, the Savanna variety can be seeded March 15 to April 20. Sow 3 to 4 pounds of seed per acre in rows 16 to 24 inches apart.

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 types and percent organic matter in each field.

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

Preplant Incorporated

Trifluralin--0.5-0.75 lb/A (processing turnip greens only and all mustard greens). Apply and incorporate Treflan 4EC before planting at a broadcast rate of 1 pint per acre on coarse and medium soils and 1.5 pints per acre on fine soils. Incorporate within 8 hours into top 2 to 3 inches of soil.

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.

DCPA--6-10.5 lb/A. Apply 8 to 14 pints per acre of Dacthal 6F as a preemergence treatment at seeding.

Postemergence

Clethodim--0.094-0.125 lb/A. Apply 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. 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.

Clopyralid--0.047-0.188 lb/A. Apply 2 to 8 fluid ounces of Stinger 3A per acre in one (turnip greens) or two (mustard greens) applications to control certain annual and perennial broadleaf weeds. Do not exceed 8 fluid ounces in one year. Stinger controls weeds in the Composite and Legume plant families. Common annuals controlled include galinsoga, ragweed species, common cocklebur, groundsel, pineappleweed, clover, and vetch. Perennials controlled include Canada thistle, goldenrod species, aster species, and mugwort (wild chrysanthemum). Stinger is very effective on small seedling annual and emerging perennial weeds less than 2 to 4 inches tall, but is less effective and takes longer to work when weeds are larger. Use 2 to 4 fluid ounces to control annual weeds less than 2 inches tall. Increase the rate to 4 to 8 fluid ounces to control larger annual weeds. Apply the maximum rate of 8 fluid ounces to suppress or control perennial weeds. Spray additives are not needed or required by the label, and are not recommended. Observe a minimum preharvest interval (PHI) of 30 days. Stinger is a postemergence herbicide with residual soil activity. Observe follow crop restrictions or injury may occur from herbicide carryover.

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 30 days and apply no more than 3 pints per acre in one season. **Labeled for use in mustard greens only! Do not use for weed control in turnip greens.**

Postharvest

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. See the label for additional information and warnings.

Insect Control

Aphids

acetamiprid (**mustard and rape greens only**) (Assail 30SG or OLF)
 endosulfan (**mustards only**) (Thionex 3EC or OLF)
 fonicamid (Beleaf 50SG)
 imidacloprid (**mustard and rape greens only**) (soil--Admire 2F, Admire PRO; foliar--Nuprid 1.6F, Provado 1.6F or OLF)
 thiamethoxam (Actara 25WDG)

Leafhoppers

beta-cyfluthrin (Baythroid XL)
 carbaryl (Sevin 80S)
 dimethoate (Dimate 4EC or OLF)

Leafminers

dimethoate (Dimate 4EC or OLF)
 spinetoram (Radiant 2SC)
 spinosad (Entrust 80WP, SpinTor 2SC or OLF)

Flea Beetles

beta-cyfluthrin (Baythroid XL)
 carbaryl (Sevin 80S OLF)
 thiamethoxam (Actara 25WDG)

Note. Use of imidacloprid for aphids will reduce flea beetle populations.

Beet Armyworm

emamectin (Proclaim 5SG)
 indoxacarb (Avaunt 25WDG)
 methomyl (Lannate LV or OLF)
 spinetoram (Radiant 2SC)
 spinosad (Entrust 80W, SpinTor 2SC or OLF)
 tebufenozide (**mustards only**) (Confirm 2F)

**Cabbage Looper (CL),
Imported Cabbageworm (ICW)**

Bacillus thuringiensis (Biobit, Dipel, Dipel 2X, Javelin, XenTari or OLF)

beta-cyfluthrin (Baythroid XL)
indoxacarb (Avaunt 25WDG or OLF)
methoxyfenozide (Intrepid 2F)
methomyl (Lannate LV or OLF)
spinetoram (Radiant 2SC)
spinosad (Entrust 80W, SpinTor 2SC or OLF)

Diamondback Moth Caterpillar

Bacillus thuringiensis (Biobit, Dipel, Dipel 2X, Javelin, XenTari or OLF)

emamectin (Proclaim 5SG)
indoxacarb (Avaunt 25WDG or OLF)
methomyl (Lannate LV or OLF)
spinetoram (Radiant 2SC)
spinosad (Entrust 80W, SpinTor 2SC or OLF)

Forum--6.0 fl oz 4.18SC/A *plus* fixed copper, or
Alette--3.0 lb 80WDG/A (for mustard greens only)

Leaf Spot

Practice good crop rotation with crops other than crucifers. When conditions favor disease development, alternate the following every 7 to 10 days:

Quadris--6.0-15.5 oz 2.08SC/A, or
Cabrio--8.0-16.0 oz 20EG/A, or
copper, fixed--0.75-1.5 lb 53.8DF/A or OLF

Pesticide	Use Category ¹	Hours to Reentry ²	Days to Harvest
INSECTICIDE			
acetamiprid	G	12	7
<i>Bacillus thuringiensis</i>	G	4	0
beta-cyfluthrin	R	12	0
carbaryl	G	12	14
dimethoate	R	48	14
emamectin	R	48	14
endosulfan	R	24	21
flonicamid	G	12	0
imidacloprid (soil/foliar)	G	12	21/7
indoxacarb	G	12	3
methomyl	R	48	10
methoxyfenozide	G	4	1
spinetoram	G	4	1
spinosad	G	4	1
tebufenozide	G	4	7
thiamethoxam	G	12	7
FUNGICIDE (FRAC code)			
Alette (Group 33)	G	12,24	3
Cabrio (Group 11)	G	12	0
copper, fixed (Group M1)	G	24	0
Forum (Group 40)	G	12	0
Quadris (Group 11)	G	4	0
Ridomil Gold (Group 4)	G	12	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.

Disease Control

Damping-Off (caused by *Pythium Rhizoctonia* or *Phytophthora* spp.).

Apply the following preplant incorporated or as a soil-surface spray after planting:

Ridomil Gold--1.0-2.0 pt 4EC/A (turnip greens only), or
Quadris--0.40-0.80 fl oz 2.08SC/1,000 row ft.

Downy Mildew

Apply the following during periods of high moisture and moderate temperatures (for disease suppression) and continue every 14 days.