

GREENS (MUSTARD, TURNIP)

Varieties

Varieties ¹	
Mustard Greens	
Tendergreen (Fall only)	These varieties are recommended for DE, MD, NJ, PA, VA, WV
Savanna*	
Florida Broadleaf	
Green Wave (Fall only)	
Southern Giant Curled (Fall only)	
Turnip Greens	
All Top (Fall processing)	These varieties are recommended for DE, MD, NJ, PA, VA, WV
Alamo* (processing)	
Top Star* (Fall)	
Shogin* (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)	Pounds N 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

¹Total amount nutrient recommended; growers producing vegetables on soils with high clay contents should reduce the recommended nitrogen and potassium rates by 20% and increase the phosphorus rate by 25%.

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.

Find the herbicides you plan to use in the Herbicide Resistance Action Committee's (HRAC) **Herbicide Site of Action Table E-7** and follow the recommended good management practices to minimize the risk of herbicide resistance development by weeds in your fields.

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 lambsquarters, 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 or OLF for postharvest desiccation of the crop in Delaware, New Jersey and Virginia.** Apply 2.4 pints per acre Gramoxone Inteon 2SC or OLF 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

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

NOTE – not all materials listed are labeled on all types of greens. Please refer to labels for crops and insects labeled as well as use directions.

Aphids

acetamiprid (**mustard, rape greens only**) (Assail 30SG or OLF)
 bifenthrin + imidacloprid (**mustard, rape greens only**) (Brigadier, Swagger or OLF)
 endosulfan (**mustards only**) (Thionex 3EC or OLF)
Chenopodium extract (Requiem)
 flonicamid (Beleaf 50SG)
 imidacloprid (**mustard, rape greens only**) (soil–Admire PRO; foliar–Nuprid 1.6F, Provado 1.6F or OLF)
 imidacloprid + cyfluthrin (Leverage 2.7)
 thiamethoxam (Actara 25WDG)

Leafhoppers

beta-cyfluthrin (Baythroid XL)#
 bifenthrin + imidacloprid (**mustard, rape greens only**) (Brigadier, Swagger or OLF)
 carbaryl (Sevin 80S)
 dimethoate (Dimate 4EC or OLF)
 imidacloprid + cyfluthrin (Leverage 2.7)

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)
 imidacloprid + cyfluthrin (Leverage 2.7)
 thiamethoxam (Actara 25WDG)

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

Beet Armyworm

bifenthrin + imidacloprid (Brigadier)
 chlorantraniliprole (**mustard, rape greens only**) (soil, drip, foliar–Coragen)
 emamectin benzoate (Proclaim 5SG)
 flubendiamide (**mustard, rape greens only**) (Synapse)
 indoxacarb (Avaunt 25WDG)
 methomyl (Lannate LV or OLF)
 spinetoram (Radiant 2SC)
 spinosad (Entrust 80W, SpinTor 2SC or OLF)
 tebufenozide (**mustards only**) (Confirm 2F)
 thiamethoxam + chlorantraniliprole (**mustard, rape greens only**) (soil or drip–Durivo; foliar–Voliam flexi)

Cabbage Looper (CL), Imported Cabbageworm (ICW)

Bacillus thuringiensis (Biobit, Dipel, Dipel 2X, Javelin, XenTari or OLF)
 beta-cyfluthrin (Baythroid XL)
 bifenthrin + imidacloprid (**mustard, rape greens only**) (Brigadier, Swagger or OLF)
 chlorantraniliprole (**mustard, rape greens only**) (soil, drip, foliar–Coragen)
 flubendiamide (**mustard, rape greens only**) (Synapse)
 indoxacarb (Avaunt 25WDG or OLF)
 methoxyfenozide (Intrepid 2F)
 methomyl (Lannate LV or OLF)
 spinetoram (Radiant 2SC)
 spinosad (Entrust 80W, SpinTor 2SC or OLF)
 thiamethoxam + chlorantraniliprole (**mustard, rape greens only**) (soil or drip–Durivo; foliar–Voliam flexi)

Diamondback Moth Caterpillar

Bacillus thuringiensis (Biobit, Dipel, Dipel 2X, Javelin, XenTari or OLF)
 chlorantraniliprole (**mustard, rape greens only**) (soil, drip, foliar–Coragen)
 emamectin benzoate (Proclaim 5SG)
 flubendiamide (**mustard, rape greens only**) (Synapse)
 indoxacarb (Avaunt 25WDG or OLF)
 methomyl (Lannate LV or OLF)
 spinetoram (Radiant 2SC)
 spinosad (Entrust 80W, SpinTor 2SC or OLF)
 thiamethoxam + chlorantraniliprole (**mustard, rape greens only**) (soil or drip–Durivo; foliar–Voliam flexi)

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
bifenthrin + imidacloprid	R	12	7
carbaryl	G	12	14
<i>Chenopodium</i> extract	G	4	0
chlorantraniliprole (soil or drip/foliar)	G	4	10/3
dimethoate	R	48	14
emamectin benzoate	R	48	14
endosulfan	R	24	21
flonicamid	G	12	0
flubendiamide	G	12	1
imidacloprid (soil/foliar)	G	12	21/7
imidacloprid + cyfluthrin	R	12	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
thiamethoxam + chlorantraniliprole (soil or drip/foliar)	G	12	30/7
FUNGICIDE (FRAC code)			
Aliette (Group 33)	G	12,24	3
Cabrio (Group 11)	G	12	0
copper, fixed (Group M1)	G	24	0
Folicur (Group 3)	G	12	7
Forum (Group 40)	G	12	0
Quadris (Group 11)	G	4	0
Ridomil Gold (Group 4)	G	12	0
Switch (Group 9 + 12)	G	12	7

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 4SL/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.

Forum--6.0 fl oz 4.18SC/A plus fixed copper, or Aliette--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

with

Folicur--3.0-4.0 fl oz 3.6F/A or OLF, or

with

Switch--11.0-14.0 oz 62.5WG/A or copper, fixed--0.75-1.5 lb 53.8DF/A or OLF

HORSERADISH

Horseradish is a hardy perennial belonging to the mustard family. The fleshy, white root roughly resembles the parsnip in shape. Use local selected strains that are adapted to the area.

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.

Horseradish	Soil Phosphorus			Soil Potassium			
	Pounds N	Level Low	Level Med	Level Opt.	Level Low	Level Med	Level Opt.
	per Acre	Pounds P ₂ O ₅ per Acre	Pounds P ₂ O ₅ per Acre	Pounds P ₂ O ₅ per Acre	Pounds K ₂ O per Acre	Pounds K ₂ O per Acre	Pounds K ₂ O per Acre
Loamy sands and Sandy loams	150-200 ¹ 50 ²	200 ¹ 200 ²	150 ¹ 150 ²	100 ¹ 100 ²	200 ¹ 200 ²	150 ¹ 150 ²	100 ¹ 100 ²
Loams and silt loams	50-100 ³ 50 ⁴	0 ³ 0 ⁴	0 ³ 0 ⁴	0 ³ 0 ⁴	0 ³ 0 ⁴	0 ³ 0 ⁴	0 ³ 0 ⁴
	100-150 ¹ 100 ² 50 ⁵	200 ¹ 200 ² 0 ⁵	150 ¹ 150 ² 0 ⁵	100 ¹ 100 ² 0 ⁵	200 ¹ 200 ² 0 ⁵	150 ¹ 150 ² 0 ⁵	100 ¹ 100 ² 0 ⁵

Apply 1 - 2 pounds of boron (B) per acre with broadcast fertilizer. See Table B-10 for more specific boron recommendations.

¹Total amount nutrient recommended; growers producing vegetables on soils with high clay contents should reduce the recommended nitrogen and potassium rates by 20% and increase the phosphorus rate by 25%.

²Suggested method of application broadcast and disk-in

³Sidedress 3-5 weeks after planting

⁴Sidedress later in season if needed

⁵Sidedress 4-6 weeks after planting if needed

Sets for Planting

Sets are selected roots from the previous crop. They should be 10 to 12 inches long and 1/4 to 5/8 inch in diameter. To ensure proper orientation of roots at planting, make a square cut at the end of the root nearest the main root, and at the other end make a slanting cut.

Planting and Spacing

Plant in late April to early May. Place sets at an angle in a furrow so the top end will be 1 inch deep and the bottom 2 inches deep. Sets should point in the same direction that the cultivator will go, e.g., for two-row cultivator, two rows in one direction and the next two rows in the opposite direction. Space rows 34 to 36 inches apart with 18 inches between sets in the row.