This is a section from the

2016

Mid-Atlantic

Commercial Vegetable Production

Recommendations

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

The full manual, containing recommendations specific to New Jersey, can be found on the Rutgers NJAES website in the Publications section njaes.rutgers.edu

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.
tebuconazole--4.0 to 6.0 fl oz 3.6F/A or OLF
Omega--1.0 pt 500F/A (also for Botrytis leaf blight and
downy mildew)

Do not make more than one consecutive application of
Pristine, azoxystrobin (both FRAC code 11) or, Endura
(FRAC code 7) before switching to a fungicide with a
different mode of action (i.e., FRAC code).

Thoroughly disc or plow under plant debris after harvest.

**Downy Mildew (Peronospora destructor)**
Tank mix chlorothalonil--1.0 to 3.0 pt 6F/A or OLF
with one of the following fungicides:
Reason--5.5 fl oz 50SC/A
Zampro--14.0 fl oz 525SC/A
Forum--6.0 fl oz 4.18SC/A
Cabrio--12.0 oz 20EG/A
azoxystrobin--9.0 to 15.5 fl oz 2.08F/A or OLF
Quilt Xcel--17.5 to 26.0 fl oz 2.2SE/A
Omega--1.0 pt 500F/A (also for Botrytis leaf blight and
purple blotch)

**Fusarium Basal Rot (Fusarium spp.)**
The fungus infects and causes decay of the stem 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 four-year crop rotation with non-
hosts is the most effective management strategy.

**Bloat Nematode (Ditylenchus dipsaci)**
Infected garlic appears bloated and twisted, with
swollen leaves and distorted and cracked bulbs. Secondary
infection by *Fusarium* sp.is common. Plant only clean seed.
Avoid planting bulbs that are split, have damaged basal
plates or are desiccated. Plant only clean seed.

Avoid planting bulb

1. Use CG=Cooked Green, S = Salad green for salad mixes.
2. Recommended growing season for full size harvest to avoid bolting.
Greens may be planted throughout the year for harvest in the baby stage.
Recommended Nutrients Based on Soil Tests

Before using the table below, refer to important notes in the Soil and Nutrient Management chapter in Section B and your soil test report. These notes and soil test reports provide additional suggestions to adjust rate, timing, and placement of nutrients. Your state’s soil test report recommendations and/or your farm’s nutrient management plan supersede recommendations found below.

<table>
<thead>
<tr>
<th>Soil Phosphorus Level</th>
<th>Soil Potassium Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Greens</td>
<td>Pounds N per Acre</td>
</tr>
<tr>
<td>50-110</td>
<td>150 100 50 0</td>
</tr>
<tr>
<td>50</td>
<td>150 100 50 0</td>
</tr>
<tr>
<td>25-60</td>
<td>0 0 0 0</td>
</tr>
</tbody>
</table>

Seeding

Seed in early- to mid-August for fall harvest. Mustards and turnip greens planted in the spring are susceptible to bolting if exposed to cold temperatures for prolonged periods, and only bolt-resistant varieties such as Savanna mustard and Alamo turnip should be grown. Later spring plantings (April) have lower risk of bolting. For all plantings, sow 3 to 4 pounds of seed per acre in rows 12 to 24 inches apart.

A wide variety of mustards are available for incorporating into salad mixes for microgreens or baby salad mixes. These are sown in beds or trays as a broadcast or in narrow rows. They can be seeded from late winter through late fall in high tunnels for successive harvests.

Harvest

Greens may be harvested by cutting off entire plants near ground level and then bunching (once over harvest) or by cutting 2-6 inches above the ground to allow for regrowth. For processing, greens are machine cut 4-6 inches from the ground when full tonnage has been achieved but before petioles and midribs have become too large. Multiple harvests may be possible. Greens for baby salad mix are cut at the ground level for once over harvest or 1-2 inches above ground level for multiple cuts. Greens for processing should be transported as quickly as possible to the processing plant.

Greens for fresh market, because of their perishability, should be held as close to 32°F as possible. At this temperature, they can be held for 10 to 14 days. Relative humidity of at least 95% is desirable to prevent wilting. Air circulation should be adequate to remove heat of respiration, but rapid air circulation will speed transpiration and wilting. Satisfactory precooling is accomplished by vacuum cooling or hydrocooling.

Greens are commonly shipped with package and top ice to maintain freshness. Research has shown that greens packed in polyethylene-lined crates and protected by crushed ice keeps in excellent condition if kept near 32°F but deteriorates rapidly at higher temperatures.

Weed Control

Identify the weeds in each field and select recommended herbicides that control those weeds. See Tables E-3 and E-4.

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.

Determine the preharvest interval (PHI) for the crop. See Table E-4 and consult the herbicide label. Find the herbicides you plan to use in the Herbicide Resistance Action Committee’s (HRAC) Herbicide Site of Action Table E-8 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 to 0.75 lb/A (processing turnip greens only and all mustard greens). Apply and incorporate Treflan 4EC before planting at a broadcast rate of 1.0 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—5.0 to 6.0 lb/A. Apply 5.0 to 6.0 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—6.0 to 10.5 lb/A. Apply 8.0 to 14.0 pints per acre of Daclath 6F as a preemergence treatment at seeding.

Postemergence

Clethodim—0.094 to 0.125 lb/A. Apply 12.0 to 16.0 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 to 0.188 lb/A. Apply 2.0 to 8.0 fluid ounces of Stinger 3A or OLF per acre in one (turnip greens) or two (mustard greens) applications to control certain annual and perennial broadleaf weeds. Do not exceed 8.0 fluid
ounces in one year. Stinger or OLF 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 or OLF 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 2.0 to 4.0 fluid ounces to control annual weeds less than 2 inches tall. Increase the rate to 4.0 to 8.0 fluid ounces to control larger annual weeds. Apply the maximum rate of 8.0 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 or OLF is a postemergence herbicide with residual soil activity. Observe crop restrictions or injury may occur from herbicide carryover.

Sethoxydim—0.2 to 0.3 lb/A. Apply 1.0 to 1.5 pints per acre Post 1.5EC with oil concentrate to be 1 percent of the spray solution (1.0 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 3.0 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 SL 2.0 or OLF for postharvest desiccation of the crop in Delaware, New Jersey and Virginia. Apply 2.4 pints per acre Gramoxone SL 2.0 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**
THE LABEL IS THE LAW. PLEASE REFER TO THE LABEL FOR UP TO DATE RATES AND RESTRICTIONS.
NOTE: Copies of specific insecticide product labels can be downloaded by visiting the websites www.CDMS.net or www.greenbook.net. Also, specific labels can be obtained via web search engines.

Aphids
Apply one of the following formulations:
acetamiprid—2.0 to 5.3 oz/A Assail 30SG (or OLF)
clothianidin—soil 9.0 to 12.0 fl oz/A Belay 2.13SC, foliar 3.0 to 4.0 fl oz/A Belay 2.13SC
dimethoate—0.5 pt/A Dimethoate 400 (or OLF)
flocamid—2.0 to 2.8 oz/A Beleaf 30SG
imidacloprid—soil 4.4 to 10.5 fl oz/A Admire Pro (or OLF),
foliar (mustard greens only) 1.3 fl oz/A Admire PRO (or OLF)
imidacloprid + beta-cyfluthrin—3.0 fl oz/A Leverage 360 pymetrozine—2.75 oz/A Fulfill 50WDG
thiamethoxam—(mustard greens only) soil 1.66 to 3.67 Platinum 75SG; foliar 1.5 to 3.0 oz/A Actara 25WDG

Caterpillar “worm” Pests including: Beet Armyworm (BAW), Cabbage Looper (CL), Diamondback moth (DBM), and Imported Cabbageworm (ICW)
Not all materials are labeled for all crops, insects or application methods; be sure to read the label for use directions. Due to resistance development, pyrethroid insecticides are not recommended for control of DBM or BAW. Other insecticides may no longer be effective in certain areas due to DBM resistance; consult your local county Extension office for most effective insecticides in your area. Rotation of insecticides with different modes of action is recommended to reduce the development of resistance.
Apply one of the following formulations:
*Bacillus thuringiensis*—0.5 to 1.5 lb/A Dipel (or OLF) OMRI listed
beta-cyfluthrin—1.6 to 2.4 fl oz/A Baythroid XL (Not recommended for DBM or BAW)
chlorantraniliprole soil, drip, foliar—3.5 to 5.0 oz/A Coragen (or other labeled mixtures containing chlorantraniliprole like Durivo and Voliam flexi)
cyrantraniliprole—(soil) 5 to 10 fl oz/A Verimark, (foliar) 7 to 13.5 fl oz/A Exirel
cyfluthrin—1.6 to 2.4 fl oz/A Tombstone (or OLF) (Not recommended for DBM or BAW)
emamectin benzoate—2.4 to 4.8 oz/A Proclaim 5SG flubendiamide—2.0 to 2.4 fl oz/A Belt SC (or other labeled mixtures containing flubendiamide like Vetica)
indoxacarb—3.5 oz/A Aventa 25WDG
methoxyfenozide—4.0 to 8.0 fl oz/A (early season) 8.0 to 10.0 fl oz/A (late season) Intrepid 2F
spinetoram—5.0 to 10.0 fl oz/A Radiant SC
spinosad—(mustard greens) 4.0 to 10.0 fl oz/A; (turnip greens) 4.0 to 8.0 fl oz/A. Entrust SC OMRI listed

**Flea Beetles**
Apply one of the following formulations:
beta-cyfluthrin—2.4 to 3.2 fl oz/A Baythroid XL
carbaryl—0.5 to 1.0 qts/A Sevin XLR Plus (or OLF)
clothianidin—soil 9.0 to 12.0 fl oz/A Belay 2.13SC, foliar 3.0 to 4.0 fl oz/A Belay 2.13SC
cyfluthrin—2.4 to 3.2 fl oz/A Tombstone (or OLF)
imidacloprid—soil—4.4 to 10.5 fl oz/A Admire Pro (or OLF),
foliar (mustard greens only)—1.3 fl oz/A Admire PRO (or OLF)
imidacloprid + beta-cyfluthrin—3.0 fl oz/A Leverage 360 thiamethoxam—(mustard greens only) soil 1.66 to 3.67 oz/A Platinum 75SG; foliar 1.5 to 3.0 oz/A Actara 25WDG
Hawaiian Beet Webworm
chlorantraniliprole—soil, drip, foliar 3.5 to 5.0 oz/A Coragen
(or other labeled mixtures containing chlorantraniliprole
like Durivo and Voliam flexi)
spinetoram—7.0 to 10.0 fl oz/A Radiant SC

Leafhoppers
Apply one of the following formulations:
beta-cyfluthrin—0.8 to 1.6 fl oz/A Baythroid XL
carbaryl—1.0 to 2.0 qt/A Sevin XR Plus (or OLF)
clothianidin—soil 9.0 to 12.0 fl oz/A Belay 2.13SC, foliar 3.0
to 4.0 fl oz/A Belay 2.13SC
cyfluthrin—0.8 to 1.6 fl oz/A Tombstone (or OLF)
dimethoate—0.5 pt/A Dimethoate 400 4EC (or OLF)
imidacloprid—soil 4.4 to 10.5 fl oz/A Admire Pro (or OLF),
foliar (mustard greens only)—1.3 fl oz/A Admire PRO (or OLF)
imidacloprid + beta-cyfluthrin—3.0 fl oz/A Belay 360

Leafminers
Apply one of the following formulations:
cyromazine—2.66 oz/A Trigard or OLF (mustard and
turnip greens — tops only)
dimethoate—0.5 pt/A Dimethoate 400 (or OLF)
spinetoram—6.0 to 10.0 fl oz/A Radiant SC
spinosad—(mustard greens) 4.0 to 10.0 fl oz/A Entrust SC;
turnip greens) 6.0 to 10.0 fl oz/A Entrust SC

Thrips
Apply one of the following formulations:
imidacloprid + beta-cyfluthrin—3.0 fl oz/A Belay 360
spinetoram—6.0 to 10.0 fl oz/A Radiant SC
spinosad—(mustard greens) 4.0 to 10.0 fl oz/A Entrust SC;
turnip greens) 6.0 to 10.0 fl oz/A Entrust SC
thiamethoxam (mustard greens only)—soil 1.66 to 3.67
oz/A Platinum 75SG; foliar 3.0 to 5.5 oz/A Actara
25WDG

Pesticide | Use Category | Hours to Reentry | Days to Harvest
--- | --- | --- | ---
acariprid | G | 12 | 3
Bacillus thuringiensis | G | 4 | 0
beta-cyfluthrin | R | 12 | 14
carbaryl | G | 12 | 4
chlorantraniliprole
(mustard/turnip) | G | 4 | 3/1
clothianidin (soil/foliar) | G | 12 | 21/7
cyantraniliprole (soil/foliar) | G | 4/12 | AP/1
cyfluthrin | R | 12 | 0
cyromazine | G | 12 | 7
dimethoate | R | 48 | 14
eemancon benzoate (tops only) | R | 12 | 7
flonicamid | G | 12 | 0
flubendiamide | G | 12 | 8
flubendiamide + buprofezin | G | 12 | 1
imidacloprid (soil/foliar) | G | 12 | 21/7
imidacloprid + beta-cyfluthrin | R | 12 | 7
indoxacarb (tops only) | G | 12 | 3
methomyl | R | 48 | 10
methoxyfenozide | G | 4 | 1
pymetrozine | G | 12 | 7
spinetoram | G | 4 | 3
spinosad | G | 4 | 3
thiamethoxam (soil/foliar) | G | 12 | 30/7

Use Table D-6.
1 G = general, R = restricted, AP = At planting
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 one of the following preplant incorporated or as a
soil-surface spray after planting:
Ridomil Gold—1.0 to 2.0 pt 4SL/A (turnip greens only)
azoxystrobin—0.40 to 0.80 fl oz 2.08F/1000 row ft or OLF
Uniform—0.34 fl oz 3.66SE/1000 row ft

Downy Mildew
Scout on a regular basis. Apply the following during
periods of high moisture and moderate temperatures and
continue every 14 days.
Presidio—4.0 fl oz 4SC/A
Ramman—2.75 fl oz 3.33SC/A
Revus—8 fl oz 2.08SC/A
Zampro—14 fl oz 4.38SC/A
Forum—6.0 fl oz 4.18SC/A plus fixed copper
Alette—3.0 lb 80WDG/A (for mustard greens only)
azoxystrobin—6.0 to 15.5 oz 2.08F/A or OLF
Cabrio—8.0 to 16.0 oz 20EG/A

Leaf Spot (caused by Alternaria, Cercospora)
Practice good crop rotation with crops other than
crucifers. When conditions favor disease development, utilize
one of the below and alternate mode of actions (FRAC
groups) every 7 to 10 days:
azoxystrobin—6.0 to 15.5 oz 2.08F/A or OLF
Cabrio—8.0 to 16.0 oz 20EG/A
Endura—14.0 oz 70WG/A
Folicur—3.0 to 4.0 fl oz 3.6F/A or OLF
Fontelis—14.0 to 30.0 fl oz 1.67SC/A
Inspire Super—16.0 to 20.0 fl oz 2.82SC/A
Quadris Top—12.0 to 14.0 fl oz 2.72SC/A
Priaxor—6.0 to 8.2 fl oz 4.17SC/A
Switch—11.0 to 14.0 oz 62.5WG/A
copper, fixed—0.75 to 1.5 lb 53.8DF/A or OLF