



This is a section from the

2020/2021

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: <http://njaes.rutgers.edu/pubs/publication.asp?pid=E001>.

This manual will be revised biennially. In January 2021, a **critical update** with important updates to the 2020/2021 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.

Cooperating Agencies: Rutgers, The State University of New Jersey, U.S. Department of Agriculture, and County Boards of Chosen Freeholders. Rutgers Cooperative Extension, a unit of the Rutgers New Jersey Agricultural Experiment Station, is an equal opportunity program provider and employer.

F. Commodity Recommendations

Pesticide Use Disclaimer

THE LABEL IS THE LAW

Before using a pesticide, check the label for up to date rates and restrictions.

Labels can be downloaded from: <http://www.cdms.net/>, <https://www.greenbook.net/> or <http://www.agrian.com/labelcenter/results.cfm>

For more information on Pesticide Safety and the Pesticide Label see chapter D.

Guide to the Recommended Pesticide Tables in the Following Crop Sections:

1. Pesticides are listed by group or code number based on chemical structure and mechanism of action, as classified by the Weed Science Society of America (WSSA) for herbicides, the Insecticide Resistance Action Committee (IRAC) for insecticides, and the Fungicide Resistance Action Committee (FRAC) for fungicides.

If the number is in bold font, the product may have resistance concerns.

2. For restricted use pesticides, the restricted active ingredients are labeled with a *. (See section D 3.2.1 “Restricted Use Classification Statement” for more information).

3. In addition to the pesticides listed below, other formulations or brands with the same active ingredient(s) may be available. ALWAYS CHECK THE LABEL:

- a) to ensure a pesticide is labeled for the same use,**
- b) to ensure the pesticide is labeled for the desired crop, and**
- c) for additional restrictions.**

4. All pesticide recommendations are made for spraying a broadcast area of 1 acre (43,560 square feet). **Adjust the rate for banded applications** (for more information, see section E 1.3 Calibrating Granular Applicators).

5. Check the label for the maximum amount of pesticide per application and the maximum number of applications per year.

6. Bee Toxicity Rating (Bee TR): N=nontoxic; L=minimum impact on bees; M=moderately toxic, can be used if dosage, timing and method of application are correct, but should NOT be applied directly to the crop if bees are present; H=highly toxic, severe losses expected, -- = data not available.

Spinach

Recommended Varieties¹

| | |
|--------------------------------|----------------------------------------------------------------|
| Fall (Summer Planted) | Carmel* (Semi-savoy; DM races 1-11, 13) |
| | Kolibri* (Semi-savoy; DM races 1-9, 12-15, tolerance to 10-11) |
| | Kookaburra* (Savoy; DM races 1-13) |
| | Reflect* (Smooth; DM races 1-11, 13, 15, 16) |
| Summer (Spring Planted) | Carmel* (Semi-savoy; DM races 1-11, 13) |
| | Corvair* (DM races 1-11) |
| | Emperor* (Semi-savoy; DM races 1-10) |
| | Kookaburra* (Semi-savoy; DM races 1-13) |
| | Marabu* (Smooth; DM races 1-10,15) |
| | SV2157VB* (Savoy; DM races 1-13) |
| “Baby” Leaf Type | Carmel* (Semi-savoy; DM races 1-11, 13) |
| | Marabu* (Smooth; DM races 1-10,15) |
| | Seaside* (Smooth; DM races 1-11) |

¹Listed alphabetically within type. *F1 hybrid variety. Disease resistance/tolerances (according to vendors) and specialty characters in parentheses: CMV=cucumber mosaic virus, DM=downy mildew. PM=powdery mildew, WRR=white rust resistant. Processors generally specify preferred varieties for contracted plantings.

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 recommendations found below.

| Spinach | N (lb/A) | Soil Phosphorus Level | | | | Soil Potassium Level | | | | Nutrient Timing and Method |
|-----------------------|----------|--------------------------------------|-----|------------|----------------|-------------------------|-----|------------|----------------|----------------------------------------------------|
| | | Low | Med | High (Opt) | Very High | Low | Med | High (Opt) | Very High | |
| | | P ₂ O ₅ (lb/A) | | | | K ₂ O (lb/A) | | | | |
| Spring or Fall | 100-230 | 200 | 150 | 100 | 0 ¹ | 200 | 150 | 100 | 0 ¹ | Total nutrient recommended |
| | 50-75 | 200 | 150 | 100 | 0 ¹ | 200 | 150 | 100 | 0 ¹ | Broadcast and disk-in |
| | 25-40 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | Sidedress or topdress |
| | 40-60 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | Topdress after each cutting |
| Overwinter | 100-190 | 200 | 150 | 100 | 0 ¹ | 200 | 150 | 100 | 0 ¹ | Total nutrient recommended |
| | 20-30 | 200 | 150 | 100 | 0 ¹ | 200 | 150 | 100 | 0 ¹ | Broadcast and disk-in at fall planting |
| | 50-80 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | Topdress in late February when crop begins to grow |
| | 30-40 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | Topdress in March |
| | 40-60 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | Topdress for second cutting |

¹In VA, crop replacement values of 50 lb/A of P₂O₅ and 50 lb/A of K₂O are recommended on soils testing Very High.

Seed Treatment

Use treated seed. See Disease Control below for more information.

Seeding

Dates: *Spring:* March 12 to April 20 (harvest May 20 to June 7). *Fall:* August 10-31 (harvest September 25 to October 10). *Overwinter:* October 1-15 (harvest in the spring).

Rates: *Not clipped:* 10-14 lb/A. *Clipped:* 18-25 lb/A.

Spacing: *Processing:* rows on 12-inch centers. *Market:* rows on 12-inch centers. Planted on 6- and 8-row beds.

Preharvest

FOR FALL HARVEST ONLY. Apply 6.0 to 8.0 g/A (active ingredient) gibberellic acid to improve harvesting efficiency of semi-upright varieties and to increase yield under cool growing conditions. For best response, apply when daytime temperatures are 40-70°F (4-21°C) and when early morning dew is present on the crop. Apply by ground equipment in 20-50 gal of water/A, 12-18 days before each harvest. Wait until some regrowth has occurred before applying gibberellic acid to promote growth of a second or third cutting.

Harvest and Post Harvest Considerations

For processing spinach, harvest plants before they are too large (or begin to bolt in spring plantings), usually when 16-17 inches tall. A second cut is made often in summer planted for fall harvest after suitable regrowth. The first cut is made 6-7 inches above the ground to eliminate as much stem, petiole and older leaves as possible for the whole leaf pack. Prior to the second cutting, small disks can be used to cut away yellow or old leaves and to remove some soil away from the crown to facilitate harvest. Depending on temperature and plant density, 3-4 weeks between the first and second cutting are needed to obtain adequate regrowth.

For fresh market spinach, plants should be dry prior to harvest to prevent petiole breakage. When harvesting by hand, cut leaves above the crown or soil line and bunch. Exclude yellow leaves and leaves that are dirty with soil. Bunched spinach must be handled very carefully to avoid breakage of plants or bunches during bunching, washing and packaging. Spinach for bag mixes are usually hand harvested, but mechanical harvesters for this purpose are now available. Walk-behind harvesters are also available for smaller acreage growers.

Store spinach at 32°F (0°C) and 95-100% relative humidity. Spinach is very perishable and can be stored for only 10-14 days. Crushed ice should be used for rapid cooling and for removing the heat of respiration. Top ice, hydro-cooling and vacuum cooling are other satisfactory cooling methods.

Most spinach for fresh market is prepackaged in perforated plastic bags to reduce moisture loss and physical injury. Controlled atmospheres with 10-40% carbon dioxide and 10% oxygen retard yellowing and extend shelf life. Special guidance for handling cut spinach, particularly for the bagged salad market, has been developed due to elevated food safety concerns. Check <http://www.caleafygreens.ca.gov/food-safety-practices> for more information.

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-2) in chapter E Pest Management.
2. Minimize herbicide resistance development. Identify the herbicide site 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 | | | | | | |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|---------------------|--------------------------------------------------|------------------------|------------|------------|
| Group | Product Name | Product Rate | Active Ingredient (*= Restricted Use) | Active Ingredient Rate | PHI (d) | REI (h) |
| 8 | Ro-Neet 6E | 4.0 pt/A | cyloate | 3.0 lb/A | -- | 48 |
| -Preplant incorporated treatments; apply before seeding and incorporate into soil 2-3 inches, and incorporation should occur within a few hours of application. Delay planting 7-10 days may help reduce potential injury. -Labeled for only specific states including DE, MD, NJ, PA, and VA (WV not included on label) -Ro-Neet provides residual control for a short period of time (about 3 weeks). Only 1 application is allowed per crop cycle | | | | | | |
| 15 | Dual Magnum 7.62E | 0.33 to 0.67 pt/A | s-metolachlor | 0.32 to 0.63 lb/A | 50 | 24 |
| -A Special Local Needs Label 24(c) has been approved for the use of Dual Magnum 7.62E to control weeds in spinach in DE, NJ, and PA (expires DE 10/25/2020; NJ 1/30/2022; PA 4/28/2023). The use of Dual Magnum 7.62E is legal ONLY if a waiver of liability has been completed (see www.syngenta-us.com/labels/indemnified-label-login). -Apply as a preemergence treatment, do not incorporate. -Primarily controls annual grasses and certain broadleaf weeds. Dual will not control emerged weeds. -Note that the Dual rate labeled for spinach is lower than other crops; Dual will only provide a few weeks of control for select species at this low rate. Ratings in Table E-2 are based on higher use rates. -Apply to spinach accurately with a well calibrated sprayer. The margin of crop safety for Dual Magnum on spinach is narrow; rates higher than recommended for the soil type may result in crop injury. -Only 1 application per same season is allowed. | | | | | | |
| 2. Postemergence | | | | | | |
| Group | Product Name | Product Rate | Active Ingredient (*= Restricted Use) | Active Ingredient Rate | PHI (d) | REI (h) |
| 1 | Select 2EC | 6 to 8 fl oz/A | clethodim | 0.07 to 0.12 lb/A | 14 | 24 |
| | Select Max 0.97EC | 9.0 to 16.0 fl oz/A | | | | |
| | Poast 1.5EC | 1.0 to 1.5 pt/A | sethoxydim | 0.2 to 0.3 lb/A | 15 | 12 |

2. Postemergence, Select, Poast - continued on next page

2. Postemergence, Select, Poast - continued

| | | | | | | |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|------------------|----------------------|-------------------|----|----|
| <p>Select 2EC: use crop oil concentrate (COC) at 1% v/v (1 gal/100 gal of spray solution). Select Max: use nonionic surfactant (NIS) at 0.25% v/v (1 qt/100 gal of spray solution). Poast: use COC at 1.0% v/v.</p> <p>The use of COC 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 NIS when grasses are small and soil moisture is adequate.</p> <p>-Use lower labeled rates for annual grass control and higher labeled rates for perennial grass control.</p> <p>-Yellow nutsedge, wild onion, wild garlic, and broadleaf weeds will not be controlled.</p> <p>-Controls many annual and certain perennial grasses, including annual bluegrass, but Poast is preferred for goosegrass control. For best results, treat annual grasses when they are actively growing and before tillers are present. Control may be reduced if grasses are large or under hot or dry weather conditions.</p> <p>-Repeated applications may be necessary to control certain perennial grasses. If repeat applications are necessary, allow 14 days between applications.</p> <p>Do not tank-mix with or apply within 2 to 3 days of any other pesticide, unless labeled, as this may increase the risk of crop injury or reduce the control of grasses.</p> <p>-Rainfastness is 1 h.</p> <p>Do not apply more than 8 fl oz of Select 2EC in a single application and do not exceed 2 pt/A for the season; do not apply more than 16 fl oz of Select Max in a single application and do not exceed 4 pt/A for the season.</p> <p>Do not apply more than 1.5 pt/A Poast in single application and do not exceed 3.5 pt/A for the season.</p> | | | | | | |
| 4 | Stinger 3A / Spur 3A | 1/6 to 0.33 pt/A | clopyralid | 0.06 to 0.12 lb/A | 21 | 12 |
| <p>-Apply to spinach in the 2 to 5-leaf stage</p> <p>-Stinger will control common cocklebur, groundsel, jimsonweed, prickly lettuce, pineappleweed, common ragweed, and legumes.</p> <p>-Some leaf curling may occur; as well as noticeably more upright leaf development, but does not affect yield or maturity</p> <p>-Use 2.0 to 4.0 fl oz/A to control annual weeds less than 2 inches tall; increase the rate to 4.0 to 8.0 fl oz/A to control larger annual weeds.</p> <p>-Spray additives are not needed or required by the label, and are not recommended.</p> <p>-Observe crop rotation restrictions or injury may occur from herbicide carryover.</p> <p>-Rainfastness is 6 h. Maximum use rate is 0.5 pt/A per season.</p> | | | | | | |
| 5 | Spin-Aid 1.3EC | 3 to 6 pt/A | phenmedipham* | 0.5 to 1 lb/A | 21 | 12 |
| <p>Labeled for processing spinach only.</p> <p>-Apply to spinach at the 4-true leaf stage or larger; spinach plants less than 4 to 6 true leaf may be injured from Spin-Aid</p> <p>Do not apply if temperatures are over 75 F in order to reduce risk of crop injury. Do not spray if dew is present on leaves.</p> <p>-For best results spray when weeds are at the 2 true leaf stage. The use of an 8002 flat fan nozzle or a comparable nozzle is suggested.</p> <p>-Rainfastness is 6 h. Split applications of Spin-Aid is allowed, but total rate of Spin-Aid rate is 6 pt/A per season.</p> | | | | | | |

3. Postharvest

| Group | Product Name | Product Rate | Active Ingredient (* = Restricted Use) | Active Ingredient Rate | PHI (d) | REI (h) |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|----------------|-------------------------------------------|------------------------|------------|------------|
| 22 | Gramoxone SL 2.0 | 2.25 to 3 pt/A | paraquat* | 0.56 to 0.75 lb/A | -- | 24 |
| <p>A Supplemental Label in DE for the use of Gramoxone SL 2.0 for postharvest application to desiccate the crop.</p> <p>-Apply after the last harvest. Always include an adjuvant.</p> <p>-Spray coverage is essential for optimum effectiveness. See the label for additional information and warnings.</p> <p>-Rainfastness 30 min. A maximum of 2 applications for crop desiccation are allowed.</p> <p>Restricted-use pesticide. Only certified applicators, who successfully complete the paraquat-specific training, can mix, load or apply paraquat. Application of paraquat "under the direct supervision" of a certified applicator is no longer allowed. Required training link (http://usparaquattraining.com); certified applicators must repeat training every three years.</p> | | | | | | |

Insect Control

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

Aphids

Green peach aphid is the most common aphid on spinach. Populations can remain on spinach throughout the winter and their presence can be a contamination concern for leafy crops. Females fly to plants and produce numerous pale yellow or pink-colored young (nymphs). Large numbers of aphids can build up on the undersides of leaves, often following pyrethroid insecticide applications. Aphids are sucking insects and excrete a sugary, sticky substance (honeydew). Preserve natural enemies by using selective insecticides whenever possible. Spray coverage to the underside of the leaf is important; add a spreader-sticker to foliar sprays.

Aphids - continued on next page

F Spinach

Aphids - continued

| Apply one of the following formulations: | | | | | | |
|------------------------------------------|------------------------|----------------------|-----------------------------------------------------|------------|------------|-----------|
| Group | Product Name | Product Rate | Active Ingredient(s) (*= Restricted Use) | PHI (d) | REI (h) | Bee TR |
| 1A | Lannate LV | 1.5 to 3.0 pt/A | methomyl* | see label | 48 | H |
| 4A | Admire Pro | 4.4 to 10.5 fl oz/A | imidacloprid - soil | 21 | 12 | H |
| 4A | Admire Pro | 1.3 fl oz/A | imidacloprid - foliar | 7 | 12 | H |
| 4A | Assail 30SG | 2.0 to 4.0 oz/A | acetamiprid | 7 | 12 | M |
| 4A | Belay 2.13SC | 9.0 to 12.0 fl oz/A | clothianidin - soil | 21 | 12 | H |
| 4A | Belay 2.13SC | 3.0 to 4.0 fl oz/A | clothianidin - foliar | 7 | 12 | H |
| 4A | Actara 25WDG | 1.5 to 3.0 oz/A | thiamethoxam | 7 | 12 | H |
| 4A | Platinum 75SG | 1.66 to 3.67 oz/A | thiamethoxam | 30 | 12 | H |
| 4C | Closer SC | 1.5 to 2.0 fl oz/A | sulfoxaflor | 3 | 12 | H |
| 4D | Sivanto Prime or 200SL | 21 to 28 fl oz/A | flupyradifurone - soil | 21 | 4 | M |
| 4D | Sivanto Prime or 200SL | 7 to 14 fl oz/A | flupyradifurone - foliar | 1 | 4 | M |
| 9B | Fulfill 50WDG | 2.75 oz/A | pymetrozine | 7 | 12 | L |
| 9B | PQZ | 2.4 to 3.2 fl oz/A | pyrifluquinazon | 1 | 12 | L |
| 9D | Versys | 1.5 fl oz/A | afidopyropen | 0 | 12 | L |
| 23 | Movento | 4.0 to 5.0 fl oz/A | spirotetramat | 3 | 24 | L |
| 28 | Exirel | 13.5 to 20.5 fl oz/A | cyantraniliprole | 1 | 12 | H |
| 28 | Verimark | 6.75 to 13.5 fl oz/A | cyantraniliprole | n/a | 4 | H |
| 28 | Harvanta 50SL | 10.9 to 16.4 fl oz/A | cyclaniliprole | 1 | 4 | H |
| 29 | Beleaf 50SG | 2.0 to 2.8 oz/A | flonicamid | 0 | 12 | L |

Cutworms See also section E 3.1. Soil Pests - Detection and Control.

| Apply one of the following formulations: | | | | | | |
|------------------------------------------|-------------------|----------------------|-----------------------------------------------------|------------|------------|-----------|
| Group | Product Name | Product Rate | Active Ingredient(s) (*= Restricted Use) | PHI (d) | REI (h) | Bee TR |
| 3A | Baythroid XL | 0.8 to 1.6 fl oz/A | beta-cyfluthrin* | 0 | 12 | H |
| 3A | Mustang Maxx | 2.24 to 4.00 fl oz/A | zeta-cypermethrin* | 1 | 12 | H |
| 3A | Tombstone, others | 0.8 to 1.6 fl oz/A | cyfluthrin* | 0 | 12 | H |

Leafminers Serpentine leafminers can cause direct damage to spinach leaves affecting marketability.

| Apply one of the following formulations: | | | | | | |
|------------------------------------------|-------------------|----------------------|-----------------------------------------------------|------------|------------|-----------|
| Group | Product Name | Product Rate | Active Ingredient(s) (*= Restricted Use) | PHI (d) | REI (h) | Bee TR |
| 4A | Scorpion 35SL | 9.0 to 10.5 fl oz/A | dinotefuran - soil | 21 | 12 | H |
| 4A | Scorpion 35SL | 2.00 to 5.25 fl.oz/A | dinotefuran - foliar | 7 | 12 | H |
| 4A | Venom 70SG | 5.0 to 6.0 oz/A | dinotefuran - soil | 21 | 12 | H |
| 4A | Venom 70SG | 1.0 to 3.0 oz/A | dinotefuran - foliar | 7 | 12 | H |
| 4A | Actara 25WDG | 1.5 to 3.0 oz/A | thiamethoxam | 7 | 12 | H |
| 4A | Platinum 75SG | 1.66 to 3.67 oz/A | thiamethoxam | 30 | 12 | H |
| 5 | Entrust SC (OMRI) | 6.0 to 10.0 fl oz/A | spinosad | 1 | 4 | M |
| 5 | Radiant SC | 6.0 to 10.0 fl oz/A | spinetoram | 1 | 4 | M |
| 6 | Agri-Mek SC | 1.75 to 3.5 fl oz/A | abamectin* | 7 | 12 | H |
| 17 | Trigard 75WSP | 2.66 oz/A | cyromazine | 7 | 12 | H |
| 28 | Coragen 1.67SC | 3.5 to 7.5 fl oz/A | chlorantraniliprole - soil | 1 | 4 | L |
| 28 | Coragen 1.67SC | 5.0 to 7.5 fl oz/A | chlorantraniliprole - foliar | 1 | 4 | L |
| 28 | Exirel | 13.5 to 20.5 fl oz/A | cyantraniliprole | 1 | 12 | H |
| 28 | Verimark | 6.75 to 13.5 fl oz/A | cyantraniliprole | n/a | 4 | H |
| 28 | Harvanta 50SL | 10.9 to 16.4 fl oz/A | cyclaniliprole | 1 | 4 | H |

Non-Lepidopteran Chewing Pests Including: Flea Beetles and Grasshoppers

| Apply one of the following formulations: | | | | | | |
|------------------------------------------|-------------------|--------------------|-----------------------------------------------------|------------|------------|-----------|
| Group | Product Name | Product Rate | Active Ingredient(s) (*= Restricted Use) | PHI (d) | REI (h) | Bee TR |
| 1A | Sevin XLR Plus | 0.5 to 1.0 qt/A | carbaryl | 21 | 12 | H |
| 3A | Baythroid XL | 1.6 to 2.4 fl oz/A | beta-cyfluthrin* | 0 | 12 | H |
| 3A | Mustang Maxx | 2.2 to 4.0 fl oz/A | zeta-cypermethrin* | 1 | 12 | H |
| 3A | Tombstone, others | 1.6 to 2.4 fl oz/A | cyfluthrin* | 0 | 12 | H |

Non-Lepidopteran Chewing Pests Including: Flea Beetles and Grasshoppers - continued on next page

Non-Lepidopteran Chewing Pests Including: Flea Beetles and Grasshoppers - continued

| | | | | | | |
|---------|---------------|----------------------|---------------------------------|----|----|---|
| 3A + 4A | Leverage 360 | 3.0 fl oz/A | imidacloprid + beta-cyfluthrin* | 7 | 12 | H |
| 4A | Admire Pro | 1.3 fl oz/A | imidacloprid - foliar | 7 | 12 | H |
| 4A | Belay 2.13SC | 9.0 to 12.0 fl oz/A | clothianidin - soil | 21 | 12 | H |
| 4A | Belay 2.13SC | 3.0 to 4.0 fl oz/A | clothianidin - foliar | 7 | 12 | H |
| 4A | Scorpion 35SL | 9.0 to 10.5 fl oz/A | dinotefuran - soil | 21 | 12 | H |
| 4A | Scorpion 35SL | 2.00 to 5.25 fl.oz/A | dinotefuran - foliar | 7 | 12 | H |
| 4A | Venom 70SG | 1.0 to 3.0 oz/A | dinotefuran - foliar | 7 | 12 | H |
| 4A | Actara 25WDG | 1.5 to 3.0 oz/A | thiamethoxam | 7 | 12 | H |
| 4A | Platinum 75SG | 1.66 to 3.67 oz/A | thiamethoxam | 30 | 12 | H |

"Worm Pests" Including: Beet Armyworms (BAW), Cabbage Loopers (CL), and Webworm Caterpillars can cause direct feeding damage thus there is low tolerance for their presence. **Note:** pyrethroid insecticides (Group 3A, in bold-face type) are not recommended for control of BAW due to resistance issues.

| Apply one of the following formulations: | | | | | | |
|------------------------------------------|-----------------------------|----------------------|--------------------------------------------------------------|------------|------------|-----------|
| Group | Product Name | Product Rate | Active Ingredient(s) (*=Restricted Use) | PHI (d) | REI (h) | Bee TR |
| 1A | Lannate LV | 1.5 to 3 pt/A | methomyl* - see label for PHI | label | 48 | H |
| 3A | Baythroid XL (CL only) | 1.6 to 2.4 fl oz/A | beta-cyfluthrin* - not recommended for BAW. | 0 | 12 | H |
| 3A | Tombstone, others (CL only) | 1.6 to 2.4 fl oz/A | cyfluthrin* - not recommended for BAW. | 0 | 12 | H |
| 5 | Entrust SC (OMRI) | 4.0 to 8.0 fl oz/A | spinosad | 1 | 4 | M |
| 5 | Radiant SC | 5.0 to 10.0 fl oz/A | spinetoram | 1 | 4 | M |
| 6 | Proclaim 5SG | 3.2 to 4.8 oz/A | emamectin benzoate* | 7 | 12 | H |
| 11A | Dipel DF, others (OMRI) | 0.5 to 2.0 lb/A | <i>Bacillus thuringiensis kurstaki</i> | 0 | 4 | N |
| 11A | XenTari (OMRI) | 0.5 to 1.5 lb/A | <i>Bacillus thuringiensis aizawai</i> | 0 | 4 | N |
| 18 | Intrepid 2F | 4.0 to 10.0 fl oz/A | methoxyfenozide | 1 | 4 | L |
| 22 | Avaunt 30WDG, Avaunt eVo | 3.5 oz/A | indoxacarb | 3 | 12 | H |
| 28 | Coragen 1.67SC | 3.5 to 7.5 fl oz/A | chlorantraniliprole - soil | 1 | 4 | L |
| 28 | Coragen 1.67SC | 3.5 to 5.0 fl oz/A | chlorantraniliprole - foliar | 1 | 4 | L |
| 28 | Exirel | 10.0 to 17.0 fl oz/A | cyantraniliprole | 1 | 12 | H |
| 28 | Verimark | 6.75 to 13.5 fl oz/A | cyantraniliprole | n/a | 4 | H |
| 28 | Harvanta 50SL | 10.9 to 16.4 fl oz/A | cyfluaniliprole | 1 | 4 | H |

Disease Control

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

Seed Treatment

| Code | Product Name | Product Rate | Active Ingredient(s) (*=Restricted Use) | PHI (d) | REI (h) | Bee TR |
|----------------------------------------------|--------------|--------------------------------|--------------------------------------------|------------|------------|-----------|
| For Rhizoctonia and Fusarium Control: | | | | | | |
| 12 | Maxim 4FS | 0.08 to 0.16 fl oz/100 lb seed | fludioxonil | n/a | n/a | L |
| For Pythium Control: | | | | | | |
| 4 | Apron XL LS | 0.16 to 0.64 fl oz/100 lb seed | mefenoxam | n/a | n/a | N |

Damping-Off caused *Pythium* and *Rhizoctonia*

| Code | Product Name | Product Rate | Active Ingredient(s) (*=Restricted Use) | PHI (d) | REI (h) | Bee TR |
|--------------------------------------------------------------------------------------------------------------------------------|---------------------|------------------------|--------------------------------------------|------------|------------|-----------|
| Apply one of the following preplant incorporated or as a soil surface spray after planting: | | | | | | |
| For Pythium root rot control | | | | | | |
| 4 | Ridomil Gold 4SL | 1.0 to 2.0 pt/A | mefenoxam | 21 | 48 | N |
| 4 | Ultra Flourish 2E | 2.0 to 4.0 pt/A | mefenoxam | 21 | 48 | N |
| 4 | MetaStar 2E AG | 4.0 to 8.0 pt/A | metalaxyl | 21 | 48 | N |
| 49 + 4 | Orondis Gold 1.67SC | 4.8 to 9.6 fl oz/A | oxathiapiprolin + mefenoxam | 1 | 4 | -- |
| For Pythium and Rhizoctonia root rot control | | | | | | |
| 4 + 11 | Uniform 3.66SE | 0.34 fl oz/1000 ft row | mefenoxam + azoxystrobin | -- | 0 | N |
| Application of mefenoxam or metalaxyl at planting will also help control early-season white rust infections in spinach. | | | | | | |

F Spinach

Downy Mildew (Blue Mold) and White Rust

Use resistant varieties (see Recommended Varieties Table). Rotate away from spinach for at least 2 years. Do not plant spring crop near overwintered fields. The use of mefenoxam or metalaxyl at planting for damping-off control will provide early season control. Fungicides containing copper may cause phytotoxicity.

Shank application: mefenoxam (0.25 pt/A Ridomil Gold 4SL or 0.5 pt/A Ultra Flourish 2E) or metalaxyl (1.0 pt/A MetaStar 2E AG) may be shanked in 21 days after planting or after first cutting. A second shanked application may be made 21 days later or after the second cutting.

Foliage Application: Beginning 2-3 weeks after emergence (or prior to symptom development), rotate one of the following fungicides on a 7 to 10-day schedule (do not apply if temperature is 90°F/32°C or above):

| Code | Product Name | Product Rate | Active Ingredient(s) (*=Restricted Use) | PHI (d) | REI (h) | Bee TR |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|--------------------|--------------------------------------------|------------|------------|-----------|
| Beginning 2-3 weeks after emergence (or prior to symptom development), rotate the following fungicide on a 7 to 10-day schedule as long as weather conditions favor disease development: | | | | | | |
| 4 + M01 | Ridomil Gold Copper 65WP | 2.5 lb/A | mefenoxam + copper | 21 | 48 | N |
| With one of the following FRAC code 11 fungicides¹: | | | | | | |
| 11 | Reason 500SC | 5.5 to 8.2 fl oz/A | fenamidone | 2 | 12 | -- |
| 11 + 27 | Tanos 50DF | 8.0 to 10.0 oz/A | famoxadone + cymoxanil | 1 | 12 | -- |
| Or with one of the following fungicides: | | | | | | |
| 21 | Ranman 400SC | 2.75 fl oz/A | cyazofamid | 0 | 12 | L |
| 40 | Revus 2.08F | 8.0 fl oz/A | mandipropamid | 1 | 4 | -- |
| 43 | Presidio 4SC | 4.0 fl oz/A | fluopicolide | 2 | 12 | L |
| 45 + 40 | Zampro 525SC | 14.0 fl oz/A | ametoctradin + dimethomorph | 0 | 12 | -- |
| P07 | Aliette 80WDG | 3.0 lb/A | fosetyl-Al | 3 | 12 | N |

¹FRAC code 11 fungicides such as Reason and Tanos should not be applied more than twice before switching to a fungicide with a different mode of action.

Leaf Spots and Anthracnose

These diseases can be prevalent in overwintered spinach and during periods between second and third cuttings. Apply one of the following as soon as symptoms appear in the spring or shortly after cutting and repeat every 7 to 10 days as long as conditions favor disease development.

| Recommended Fungicides | | | | | | |
|------------------------------------------------------------------------------------------|-----------------------------|---------------------|--------------------------------------------|------------|------------|-----------|
| Code | Product Name | Product Rate | Active Ingredient(s) (*=Restricted Use) | PHI (d) | REI (h) | Bee TR |
| Alternate one of the following fungicides if more than one application is needed: | | | | | | |
| 7 | Fontelis 1.67SC | 24.0 fl oz/A | penthiopyrad | 3 | 12 | L |
| 11 | Cabrio 20EG | 12.0 to 16.0 oz/A | pyraclostrobin | 0 | 12 | N |
| Apply the following if only one application is needed: | | | | | | |
| 7 + 11 | Merivon 2.09SC | 4.0 to 11.0 fl oz/A | fluxapyroxad + pyraclostrobin | 1 | 12 | N |
| 7 + 12 | Miravis Prime 3.34SC 2.09SC | 9.2 to 13.4 fl oz/A | pydiflumetofen + fludioxonil | 0 | 12 | -- |
| 9 + 12 | Switch 62.5WG | 11.0 to 14.0 oz/A | cyprodinil + fludioxonil | 0 | 12 | L |

Cucumber Mosaic Virus

Use resistant varieties. See Recommended Varieties Table above.

For Immediate Medical Attention

Call 911

For a Pesticide Exposure Poisoning

Emergency Call



For All States

This number will automatically connect you to the poison center nearest to you.

Anyone with a poisoning emergency can call the toll-free telephone number for help.

Personnel at the Center will give you first-aid information and direct you to local treatment centers if necessary.

For Pesticide Spills

Small Spills: See the product label for cleanup advice.

Large spills: Call the National Response Center at 1-800-424-8802 or CHEMTREC at 800-424-9300 (24 hours) - Industry assistance with emergency response cleanup procedures for large, dangerous spills.

Be aware of your responsibility to report spills to the proper state agency.