

when there is a less of a chance for downy mildew in the region. If basil downy mildew appears in early spring on your farm then seed may have been infested. It is thought that basil downy mildew spores are carried into the region on same weather systems that bring cucurbit downy mildew up from southern region of US each year. As long as seed is not infested, basil downy mildew should move into the region during the summer months or later. Follow local and regional Extension reports for progress in US.

Apply a phosphorous acid fungicide (FRAC code 33) such as K-phite, ProPhyt, Rampart or OLF at the highest labeled rate on a weekly basis as a foliar spray right after emergence or prior to the arrival of the pathogen in the region. Research has shown that weekly foliar applications work better than weekly drip applications of FRAC code 33 fungicides.

Tank mix and rotate a FRAC code 33 fungicide at the highest labeled rate with one of the following fungicides on a weekly basis:

Ranman--2.75 to 3.0 fl oz 400SC/A (0-day PHI) (12 hr REI)

Revus--8.0 fl oz 2.08/A (1-day PHI) (4 hr REI)

Ranman can be applied in a greenhouse (see below)

Damping-off (caused by *Pythium* spp.)

Apply 1.0 to 2.0 pt Ridomil Gold 4SL/A as a banded spray or through drip irrigation at emergence or right after transplanting (21-day PHI) (48 hr REI)

Ridomil Gold SL at seeding will also help suppress basil downy mildew.

Greenhouse use:

Subdue Maxx--3.75 fl oz/5000 ft² (32.0 oz/A) as a soil

surface spray to plug production trays after seeding and before seedling emergence (21 day PHI)- see Section 24(c) special local needs label to see if available in your state for use; and for specifics and restrictions.

Phosphite fungicides (FRAC group 33) such as K-phite, ProPhyt, Rampart or OLF at the highest labeled rate (0 day PHI (4 hr REI)

Ranman--2.75 to 3.0 fl oz 400SC/A (0 day PHI) (12 hr REI)

Heritage--0.9 oz (8.0 oz/A) to plants following transplant of plugs trays, pots, or containers in which plants are grown to finish (0 day PHI) (4 hr REI) see Section 24(c) special local needs label to see if available in your state for use; and for specifics and restrictions.

Mesclun

California is the center of mesclun production and they've been growing under hoop houses for years. I'm not sure if anyone is using _heated_ raised beds, but it should work. You'll just need to be on top of water management since the heated beds will dry out faster, and baby veg. don't take water stress too well.

The major pests I would expect to encounter in greens grown at high density in high humidity would be slugs, white flies, and botrytis. Slugs can be trapped (the old stale beer in a pan trick) and there are parasites for white flies now. Botrytis needs plenty of air movement and ventilation. You also need to be careful not to drop cut leaves if you will be making multiple harvests because botrytis gets started on injured tissue (bacterial soft rot does also).

Mesclun is still in high demand in many metropolitan areas.

SPINACH

Varieties¹

Fall (summer planted)

Renegade* (Semi-savoy; DM races 1 – 7)
 Carmel* (Semi-savoy; DM races 1 – 11, 13)
 Ragoon* (DM races 1 – 10, 12)
 Interceptor* (DM races 1 – 7, 9, 11)
 Python* (DM races 1 – 7, 9, 11)
 Tyee (Semi-savoy; DM races 1 – 3)
 Emu* (Slow bolting; DM races 1 – 10)
 Melody* (Savoy; DM races 1 – 2, CMV)
 Regal* (Semi-savoy; DM races 1 – 7, WRR)
 Space* (Semi-savoy; DM races 1 – 3)
 Sardinia (Semi-savoy; DM races 1 – 7)
 Samish* (Semi-savoy; DM races 1 – 4)
 Unipack 12* (Slow bolting; DM races 1 – 4)
 Unipack 151 (Semi-savoy; frost/heat tolerant; DM races 1 – 4)
 Rushmore* (Smooth, slow-bolting, DM races 1-5, 8, 9, 11, 12, 14)
 Palco* (Savoy; DM races 1-5, 8, 9, 11)
 Space* (Smooth; DM races 1-3)

Summer (spring planted)

Donkey* (Semi-savoy; DM races 1 – 11)
 Renegade* (Semi-savoy; DM races 1 – 7)
 Carmel* (Semi-savoy; DM races 1 – 11, 13)
 Regiment* (Semi-savoy; DM races 1 – 7)
 Tyee (Semi-savoy; DM races 1 – 3)
 Corvair* (DM races 1 – 11)
 Olympia* (DM races 1 – 3)
 Emporer* (Savoy; DM races 1-10)

“Baby” leaf type

Carmel* (Semi-savoy; DM races 1 – 11, 13)
 Scarlet* (Red vein; DM races 1 – 3)
 Swan* (DM races 1 – 10)
 Avon* (Semi-savoy; slow-bolting; PM races 1-2)
 Edna* (Semi-savoy; DM races 1-10)
 Riverside* (Smooth; DM races 1-11)
 Imperial* (Asian; DM races 1-7, 9, 11, 13)

¹ Processors generally specify preferred varieties for contracted plantings;

Disease resistance/tolerances (according to vendors) and specialty characters in parentheses (); DM = downy mildew.

Varieties listed according to days to maturity according to vendors (25 to 55 days).

*F₁ hybrid variety

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 supercede recommendations found below.

Spinach	Pounds N per Acre	Soil Phosphorus Level				Soil Potassium Level				Nutrient Timing and Method
		Low	Med	High	Very	Low	Med	High	Very	
				(Opt.)	High			(Opt.)	High	
		Pounds P ₂ O ₅ per Acre				Pounds K ₂ O per Acre				
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 Virginia, crop replacement values of 50 lbs. P₂O₅ and 50 lbs. K₂O per acre are recommended on soils testing Very High.

Seed Treatment

Use seed that has been treated. For more information see the Disease section to prevent disease.

Seeding

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

Seeding Rates. *Not clipped:* 10.0 to 14.0 pounds per acre. *Clipped:* 18 to 25 pounds per acre.

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 grams (active ingredient) gibberellic acid per acre to improve harvesting efficiency of semi-upright varieties and to increase yield of spinach under cool growing conditions. For best response, apply when daytime temperatures are 40° to 70°F (4.4° to 21.1°C) and when early morning dew is present on the crop. Make one application in 20 to 50 gallons of water per acre by ground equipment 12 to 18 days before each harvest. When applying gibberellic acid to promote growth of a second or third cutting, wait until some regrowth has occurred before making application.

Harvest and Post Harvest Considerations

For processing, harvest before plants are too large (or begin to bolt in spring plantings), usually when 16 inches to 17 inches tall. A second cut is made often in summer planted for fall harvest after suitable regrowth has developed. At harvest, the first cut is made 6-7 inches above the ground to eliminate as much stem and 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 are needed between the first and second cutting to obtain adequate regrowth.

For fresh market harvests, plants prior to harvest should be dry to prevent petiole breakage. When harvesting by hand, cut leaves above the crown or soil line and bunch. Care should be taken to exclude leaves that are dirty with soil or are yellow. Bunched spinach must be handled very carefully to reduce 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.

Special guidances for handling cut spinach, particularly for the bagged salad market, have been developed due to elevated food safety concerns. See this website for more information: <http://www.caleafygreens.ca.gov/food-safety-practices>.

Store spinach at 32°F and 95 to 100% relative humidity. Spinach is very perishable; hence, it can be stored for only 10 to 14 days. The storage temperature should be as close to 32°F as possible. Crushed ice should be used for rapid cooling and for removing the heat of respiration. Top ice is also beneficial. Hydro-cooling and vacuum cooling are other satisfactory cooling methods for spinach.

Most spinach for fresh market is prepackaged in perforated plastic bags to reduce moisture loss and physical injury. Controlled atmospheres with 10 to 40% carbon dioxide and 10% oxygen have been found to be beneficial in retarding yellowing and extending shelf life.

Weed Control

Section 18 Emergency Label requests may be submitted to supplement weed control recommendations in spinach.

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 type and percent organic matter in each field.

Apply postemergence herbicides when crop and weeds are within the 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

Cycloate--2.5 to 3.0 lb/A. Apply 3.0 to 4.0 pints per acre Ro-Neet. Apply before seeding and incorporate into soil 2 to 4 inches with disk. Delay of planting for 7 to 10 days may help reduce potential injury.

Preemergence

S-metolachlor--0.32 to 0.63 lb/A. **A Special Local-Needs Label 24(c) has been approved for the use of Dual Magnum 7.62E to control weeds in spinach in Delaware, New Jersey, Pennsylvania, and Virginia. The use of this product is legal ONLY if a waiver of liability has been completed. The waiver of liability can be completed on the Syngenta website, "farmassist.com". Go to the website "farmassist.com" and register (or sign in if previously registered), then under "products" on the toolbar, click on indemnified labels and follow the instructions.** Apply 0.33 to 0.67 pints per acre Dual Magnum 7.62E to control annual grasses, galinsoga, and certain other broadleaf weeds. Use as a surface-applied preemergence spray. **DO NOT** preplant-incorporate Dual Magnum into the soil. Use the lower rate on fields with coarse-textured soils low in organic matter. Use the higher rates on fields with fine-textured soil and those with high organic matter. Apply Dual Magnum 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.

Other generic versions of metolachlor and s-metolachlor may be available, and may or may not be labeled for use in the crop. Observe a minimum preharvest interval of 50 days.

Postemergence

Clethodim--0.094 to 0.125 lb/A. Apply 6.0 to 8.0 fluid ounces per acre Select 2EC with oil concentrate to be 1 percent of the spray solution (1 gallon per 100 gallons of spray solution) or 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. The use of oil concentrate with Select 2EC 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 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 a single application to control certain annual and perennial broadleaf weeds. 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. Application of higher recommended rates, 0.094 to 0.188 lb/A (4.0 to 8.0 fluid ounces), may cause a crop response that appears as a more upright leaf development. Yield and maturity are not affected. Observe a minimum preharvest interval (PHI) of 21 days. Stinger or OLF is a postemergence herbicide with residual soil activity. Observe follow-crop restrictions, or injury may occur from herbicide carryover.

Phenmedipham--0.33 to 0.67 lb/A. Apply 2.0 to 4.0 pints per acre Spin-aid 1.3E. For use on spinach for processing only. Controls seedling broadleaf weeds. Only chickweed less than three inches long or tall can be controlled consistently. Scout fields regularly and reapply if weeds germinate after the initial application, but do NOT exceed 6.0 pints per acre per year and maintain a 40-day preharvest interval. Apply only during the fall months to spinach with a minimum of four to six true leaves. Apply in a spray volume of 10.0 to 18.0 gallons of water per acre. The use of an 8002 flat fan nozzle or a comparable nozzle is suggested. See label for application restrictions, mixing instructions, and weather restrictions to prevent crop injury or herbicide failure.

Sethoxydim--0.2 to 0.3 lb/A. Apply 1.0 to 1.5 pints per acre Poast 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. Choose Poast 1.5EC to control large crabgrass. **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. Annual blue-grass, 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 15 days and apply no more than 3 pints per acre in one season.

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 4.0 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
 cyantraniliprole--**foliar** 13.5 to 20.5 fl oz/A Exirel (Green peach aphid only)
 flonicamid--2.0 to 2.8 oz/A Beleaf 50SG
 flupyradifurone--**foliar** 10.50 to 12.00 fl oz Sivanto 200SL
 imidacloprid--**soil** 4.4 to 10.5 fl oz/A Admire PRO (or OLF), **foliar** 1.3 fl oz/A Admire PRO (or OLF) (or labeled mixtures containing imidacloprid like Leverage 360)
 pymetrozine--2.75 oz/A Fulfill 50WDG
 spirotetramat--4.0 to 5.0 fl oz/A Movento
 thiamethoxam--**soil** 1.66 to 3.67 oz/A Platinum 75SG; **foliar** 1.5 to 3.0 oz/A Actara 25WDG (or labeled mixtures containing thiamethoxam like Durivo and Voliam Flexi).

Cabbage Looper (CL), Beet Armyworm (BAW)

Apply one of the following formulations:

Bacillus thuringiensis (CL only)--0.5 to 2.0 lb/A DiPel DF (or OLF)
 beta-cyfluthrin (CL only)--1.6 to 2.4 fl oz/A Baythroid XL or labeled mixtures containing beta-cyfluthrin like Leverage 360
 chlorantraniliprole--**soil/foliar** 3.5 to 5.0 fl oz/A Coragen 1.67SC (or labeled mixtures containing chlorantraniliprole like Durivo or Voliam Flexi)
 cyantraniliprole--**foliar** 10.0 to 17.0 fl oz/A Exirel; **soil** 6.75 to 13.5 fl oz/A Verimark
 cyfluthrin (CL only)--1.6 to 2.4 fl oz/A Tombstone (or OLF)
 emamectin benzoate--3.2 to 4.8 oz/A Proclaim 5SG
 flubendiamide (BAW only)--1.5 fl oz/A Belt SC (or other labeled mixtures containing flubendiamide like Vetica)
 indoxacarb--3.5 oz/A Avaunt 30WDG
 methomyl--1.5 to 3.0 pts/A Lannate LV
Note: Continuous use of methomyl may result in leafminer outbreaks. DO NOT apply methomyl when minimum daily temperature is 32°F (0°C) or lower. DO NOT apply to spinach seedlings less than 3 inches in diameter.
 methoxyfenozide (early season)--4.0 to 8.0 fl oz/A Intrepid 2F; (late season)--8.0 to 10.0 fl oz/A Intrepid 2F
 spinetoram--5.0 to 10.0 fl oz/A Radiant SC
 spinosad--4.0 to 8.0 fl oz/A Entrust SC **OMRI-listed**

Cutworms (Also see Chapter E "Cutworms" section in "Soil Pests--Their Detection and Control".)

Apply one of the following formulations:

beta-cyfluthrin--0.8 to 1.6 fl oz/A Baythroid XL (or labeled mixtures containing beta-cyfluthrin like Leverage 360)
 cyfluthrin--0.8 to 1.6 fl oz/A Tombstone (or OLF)
 zeta-cypermethrin--2.24 to 4.00 fl oz/A Mustang Maxx (or OLF)

Flea Beetle

Apply one of the following formulations:

beta-cyfluthrin--2.4 to 3.2 fl oz/A Baythroid XL
 carbaryl--0.5 to 1.0 qt/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)
 dinotefuran--**soil** 9.0 to 10.5 fl oz/A Scorpion 35SL **foliar** 2.00 to 5.25 fl oz/A Scorpion 35SL, or 1.0 to 3.0 oz/A Venom 70SG
 imidacloprid--**foliar only** 1.3 fl oz/A Admire PRO (or OLF)
 imidacloprid+beta-cyfluthrin--3.0 fl oz/A Leverage 360
 thiamethoxam--**soil** 1.66 to 3.67 oz/A Platinum 75SG; **foliar** 1.5 to 3.0 oz/A Actara 25WDG (or labeled mixtures containing thiamethoxam like Durivo and Voliam Flexi).
 zeta-cypermethrin--2.24 to 4.00 fl oz/A Mustang Maxx (or OLF)

Grasshoppers

Apply one of the following formulations:

beta-cyfluthrin--2.4 to 3.2 fl oz/A Baythroid XL (or labeled mixtures containing beta-cyfluthrin like Leverage 360)
 carbaryl--0.5 to 1.5 qt/A Sevin XLR Plus (or OLF)
 cyfluthrin--2.4 to 3.2 fl oz/A Tombstone (or OLF)

Leafminers

Apply one of the following formulations:

abamectin--1.7 to 3.5 fl oz/A Agri-Mek 0.70 SC (or OLF)
 chlorantraniliprole--**soil/foliar** 5.0 to 7.5 fl oz/A Coragen 1.67SC
 cyromazine--2.66 oz/A Trigard 75WSP
 dinotefuran--**soil** 9.0 to 10.5 fl oz/A Scorpion 35SL or 5.0 to 6.0 oz/A Venom 70SG; **foliar** 2.00 to 5.25 fl oz/A Scorpion 35SL, or 1.0 to 3.0 oz/A Venom 70SG
 spinetoram--6.0 to 10.0 fl oz/A Radiant SC
 spinosad--6.0 to 10.0 fl oz/A Entrust SC **OMRI-listed**

Webworms

Apply one of the following formulations:

Note: Sprays must be applied before webbing occurs.

Bacillus thuringiensis--0.5 to 2.0 lb/A DiPel DF(or OLF)
 chlorantraniliprole (**Hawaiian beet webworm only**) **drip, foliar**--3.5 to 5.0 fl oz/A Coragen 1.67SC
 methoxyfenozide (**Garden webworm only**) (**early season**)--4.0 to 8.0 fl oz/A Intrepid 2F; (**late season**)--8.0 to 10.0 fl oz/A Intrepid 2F

Pesticide	Use Category ¹	Hours to Reentry	Days to Harvest
INSECTICIDE			
abamectin	R	12	7
acetamiprid	G	12	7
<i>Bacillus thuringiensis</i>	G	4	0
beta-cyfluthrin	R	12	0
carbaryl	G	12	14
chlorantraniliprole (soil/foliar)	G	4	1

(table continued next page)

Pesticide	Use Category ¹	Hours to Reentry	Days to Harvest ²
INSECTICIDE (<i>continued</i>)			
clothianidin (soil/foliar)	G	12	21/7
cyantraniliprole (soil/foliar)	G	4/12	NA/ 1
cyfluthrin	R	12	0
cyromazine	G	12	7
dinotefuran (soil/foliar)	G	12	21/7
emamectin benzoate	R	12	7
flonicamid	G	12	0
flubendiamide	G	12	1
flubendiamide+buprofezin	G	12	7
flupyradifurone	G	4	1
imidacloprid (soil/foliar)	G	12	21/7
imidacloprid + beta-cyfluthrin	R	12	7
indoxacarb	G	12	3
methomyl	R	48	7
methoxyfenozide	G	4	1
pymetrozine	G	12	7
spinetoram	G	4	1
spinosad	G	4	1
spirotetramat	G	24	3
thiamethoxam (soil/foliar)	G	12	30/7
zeta-cypermethrin	R	12	1
FUNGICIDE (FRAC code)			
Actigard (Group P)	G	12	7
Aliette (Group 33)	G	12	3
azoxystrobin (Group 11)	G	4	0
Cabrio (Group 11)	G	12	0
coppers, fixed (Group M1)	G	see label	0
Fontelis (Group 7)	G	12	3
Merivon (Groups 7 + 11)	G	12	1
MetaStar (Group 4)	G	48	21
Presidio (Group 43)	G	12	2
Ranman (Group 21)	G	12	0
Reason (Group 11)	G	12	2
Revus (Group 40)	G	4	1
Ridomil Gold (Group 4)	G	48	21
Ridomil Gold Copper (Groups 4 + M1)	G	48	21
Tanos (Groups 11 + 27)	G	12	1
Ultra Flourish (Group 4)	G	48	21
Uniform (Groups 4 + 11)	G	0	AP

See Table D-6.

¹ G = general, R = restricted,² AP -At plant

Disease Control

Seed Treatment

Use seed treated with Maxim 4FS (0.08 to 0.16 fl oz/100 lb seed) for *Rhizoctonia* and *Fusarium* control and Apron XL LS (0.16 to 0.64 fl oz./100 lb seed) for *Pythium* control.

Damping-Off

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

mefenoxam (Ridomil Gold)--1.0 to 2.0 pt 4SL/A or 2.0 to 4.0 pt Ultra Flourish 2E/A)
 metalaxyl (MetaStar)--4.0 to 8.0 pt 2E
 Uniform (mefenoxam + azoxystrobin)--0.34 fl oz 3.66SE/1000 ft row

At planting application of mefenoxam or metalaxyl will also help control early-season white rust infections in spinach.

Downy Mildew (Blue Mold) and White Rust

Rotate away from spinach for at least 2 years. Use resistant varieties where possible. 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.

Foliage Application: Beginning 2 to 3 weeks after emergence (or prior to symptom development), apply one of the following fungicides on a 7 to 10-day schedule (do not apply if temperature is 90°F [32.2°C] or above):

Cabrio--12.0 to 16.0 oz 20EG/A (white rust only use 8.0 to 12.0 oz.)

Presidio--4.0 fl oz 4SC/A

Ranman--2.75 fl oz 400F/A (plus an organosilicone or nonionic surfactant, see label for details, do not apply with copper)

Other control options include:

Reason--5.5 to 8.2 fl oz 500SC/A

Tanos--8.0 to 10.0 oz 50W/A

Aliette--3.0 lb 80WDG/A

Actigard--0.5 to 0.75 oz 50WG/A

Ridomil Gold Copper--2.5 lb 65WP/A (14-day schedule)

Fixed copper (see labels for rates and details)

FRAC code 11 fungicides, such as Cabrio, Reason and Tanos should not be applied more than twice before switching to a fungicide with a different mode of action. **Shanked application:** mefenoxan--0.25 pt Ridomil Gold 4SL/A, 0.5 pt Ultra Flourish 2E/A or 1.0 pt MetaStar 2E/A 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.

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. If more than 2 applications are needed, apply a fungicide with a different mode of action prior to making a third application of either FRAC code 11 fungicide:

Alternate one of the following FRAC code 11 fungicides:

Cabrio--12.0 to 16.0 oz 20EG/A

Pristine--18.5 oz 38.55EG/A

with one of the following:

Merivon--4.0 to 11.0 fl oz 2.09SC/A

Fontelis--24.0 fl oz 1.67SC/A

Cucumber Mosaic Virus

Use resistant (MR and MMR) varieties. See table.