



This is a section from the

2018

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:

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

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/>, <http://www.greenbook.net/> or <http://www.agrian.com/labelcenter/results.cfm>

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

1. Pesticides are listed by **group or code number based on chemical structure and mode 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 the Pesticide Safety chapter 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 the Pest Management chapter, Calibrating Granular Applicators section).
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 crop if bees are present; H=highly toxic, severe losses expected, -- = data not available.

Strawberries

Note: “The Mid-Atlantic Berry Guide for Commercial Growers”, a cooperative publication for PA, MD, NJ, DE, WV and VA, provides additional information.

Annual Production System on Plastic Mulch (“Plasticulture”)

This system is recommended for DE, MD, NJ, VA, southeastern PA, and for trial in other areas of PA.

Recommended Varieties

Early	Midseason	Late	Everbearer
Sweet Charlie ¹	Chandler	AC Valley Sunset	Albion ³
AC Wendy	Camarosa ² (shipping only)		San Andreas ³
	Flavorfest		Seascape

¹Matures 7-10 days earlier than Chandler; recommended for trial in southern regions of MD. Plant only in areas with low risk of frost; may require overhead sprinkler for additional frost protection during bloom. ²Must be fully red-ripe for flavor development. ³Produces light yields throughout the spring summer and fall resulting in moderate total yields for the season.

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 the Soil and Nutrient Management chapter. Your state’s soil test report recommendations and/or your farm’s nutrient management plan supersede recommendations found below.

Annual System ¹ Strawberry	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	
	90-120	100	70	40	0-30 ²	165	115	65	0	Total nutrient recommended
	60-75	100	70	40	0-30 ²	165	115	65	0	Broadcast and disk-in
	15-25	0	0	0	0	0	0	0	0	Inject through drip at first flowering in spring
	15-25	0	0	0	0	0	0	0	0	Inject through drip at fruit enlargement, about 2 weeks after first flowering

¹For plasticulture, fertility rates are based on 5 ft row spacing. Apply 1-2 lb/A of boron with broadcast fertilizer; see also Table B-7 in the Soil and Nutrient Management chapter. ²Replacement value of 30 lb/A of P₂O₅ is recommended in MD, DE and VA on Very High P soils.

Background

The annual plasticulture system has the potential for a higher profit than the conventional matted-row system. Establishment costs are higher, but production is earlier (when crop value is highest) and berries are usually larger. Start with small acreage and increase acreage as knowledge and experience with the system is gained. This is an integrated system and all of the following components are important for maximizing production and efficiency.

Site Selection

Plasticulture’s highest yields are achieved at locations with a long growing season. Select fields with good surface and internal drainage, a southern exposure, and protection from westerly winds. If you are planning a Pick-Your-Own-Operation, take into account that customers prefer plasticulture over matted rows.

Plant Bed Preparation, Fumigation and Fertilization

Use soil test results to determine specific nutritional needs. Apply 50-75 lb/A actual N, and P₂O₅ and K₂O as indicated by soil test results. Apply 1-2 lb/A of boron unless soil test results indicate above-normal levels, and work into beds. Base additional P, K and B application rates on soil test results. It is particularly important to adjust the soil pH to the 6-6.5 range, see the “Liming Soils” section in the Soil and Nutrient Management chapter.

Prepare raised beds: 30-40 inches wide and 6-8 inches high on 5-5½-ft row centers. Beds should be center-crowned and firm. Depending on soil type, plant vigor, and plant tissue test results, inject an additional 30-40 lb/A of N through the drip system in the spring.

F Strawberries

Fumigation is essential to control weeds because labeled residual herbicides cannot be used over the top of the plastic. For additional control of weeds that grow around plant holes, and for banded treatments between the mulched beds, see Weed Control below.

Choose from the following options for bed preparation, fumigation and fertilization:

1. Prepare soil, apply fertilizer, then apply fumigant. See the Soil Fumigation section in the Pest Management chapter for materials, rates and precautions. Wait 20 days to allow the fumigant to act and disperse. Then prepare raised beds as described above and apply 4.0 to 6.0 lb/A of Devrinol DF-XT to the surface of the bed and the area between beds. Lay drip irrigation and plastic mulch.
2. Apply fertilizer, prepare raised beds, and inject metam-sodium (Vapam HL) at 56.0 to 75.0 gal/A or 37.0 gal/mulched A. Immediately reshape beds (if necessary to form a firm, crowned bed) and apply 4.0 to 6.0 lb/A of Devrinol DF-XT to the surface of the bed and the area between beds, and lay drip irrigation and plastic mulch. Wait 20 days between fumigation and planting to allow the fumigant to act and to disperse.
3. Apply fertilizer and prepare raised beds as described above. Apply 4.0 to 6.0 lb/A of Devrinol DF-XT to the surface of the bed. Apply drip irrigation and plastic mulch. Inject metam-sodium (Vapam HL) through the drip system at 37 gal/mulched A. Wait 20 days between fumigation and planting to allow the fumigant to act and to disperse.

Plants and Planting

Use transplant "plugs" propagated from actively growing runner tips. Plugs can be purchased or produced. To produce plugs from runner tips, use a well-drained artificial mix containing 50% peatmoss and 50% horticultural vermiculite or 50% perlite. A poorly drained growing medium promotes root diseases. Consult your Extension office for a list of nurseries that supply plugs and runner tips and/or directions for propagating from tips.

Plugs can easily be planted mechanically with a waterwheel-type planter. Plant the crown of the transplant at soil level, as deep planting can promote decay and shallow planting can cause desiccation of the plant. Space plants 12 inches apart in each of the double rows in a staggered pattern. If using double rows, space rows 12-18 inches apart; this requires a 36- to 40-inch wide bed. The 18-inch between-row spacing has produced high yields. In southern NJ, DE, MD and VA, plant in late August to early September for highest first-year yields. In northern NJ and PA, plant in mid to late August. The latest recommended planting date is mid-September.

Alternatively, dormant plants may be planted directly in the field with a tool that allows the roots to be inserted into the soil without digging a hole. Planting time varies from mid-June to mid-July. The roots of dormant plants may also be trimmed to allow planting in 32-cell trays, followed by growing the plants in the trays until planting at the usual time for plug plants.

Irrigation

At planting, overhead irrigation is essential to cool plants and plastic in warm weather and improve establishment. In the fall, irrigation may promote plant growth before row covers are applied. In the spring, overhead mist irrigation may be required for frost and freeze protection. Maintain adequate soil moisture via frequent drip irrigation in the growing season as this is effective in increasing fruit size without wetting the fruit and increasing rots.

Row Covers

Floating row covers (FRC) are an essential part of plasticulture to reduce the desiccating effects of winter winds, for frost and freeze protection, and for early fruiting. Ultraviolet light resistant covers, 1-1.4 oz/sq yd and 60-70% light transmission have been effective. Apply FRC between October 15 and November 15, depending on location and planting date, for maximum fall growth and yields. FRC can be applied in early December for protection over the winter. Remove the FRC at the first signs of flower bud emergence. Leaving the covers on too long may reduce fruit size. Leave the covers at the edge of the field so plants can be quickly covered if there is a frost warning.

Pest Control

Use an effective disease control program. If there is a known risk for *Phytophthora* crown rot caused by *Phytophthora cactorum* on the newly set transplants, apply Ridomil Gold 4SL 1.0 pt/A through the trickle irrigation system 10 days after transplanting. During late summer and fall, insecticides and miticides should be applied to prevent aphids and mites from reaching damaging levels in the spring. After plants are established and just before covering plants with the floating row in the fall, apply a fungicide to control leaf spots. After covers are removed

in the spring, maintain a good pest control program. Bloom sprays are important for control of *Botrytis* gray mold. See the "Disease Control" and "Insect Control" sections below for materials and rates.

Harvesting

The harvest season lasts about 3 weeks. For local markets, harvest when tips are red. The Chandler variety grown with the annual system ripens about 1 week earlier than standard varieties grown in matted rows.

Renovation

Strawberries grown on plasticulture can be renovated in July and carried over for a second harvest year. For most varieties, mow tops with a rotary mower, leaving several leaves on the plant. For vigorous varieties and plantings that have thick foliage and numerous crowns (*e.g.*, Sonata), mowing, followed by crown thinning using an asparagus knife to cut away part of the plant or "breaking out" half of the plant by hand may be the most effective technique. After renovation, maintain adequate soil moisture, and insect and disease control. In early September, apply 60 lb/mulched A of N, P₂O₅, and K₂O via drip irrigation and follow the same cultural practices as for a new planting.

Berry size is usually smaller than in the first harvest season. With careful management, marketable yields of renovated beds can be equal to or greater than yields in the first harvest season. Renovation is especially useful if the planting will be harvested as a Pick-Your-Own.

Matted Row Culture

Recommended Varieties¹

Early	Midseason	Late
Earliglow (RSR)	Darselect	Jewel
	Allstar (VR, RSR)	
	Honeoye ²	

¹Letters in parentheses: RSR=red stele resistant; VR=verticillium wilt resistant. ²Becomes dark and soft under hot conditions.

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 the Soil and Nutrient Management chapter. Your state's soil test report recommendations and/or your farm's nutrient management plan supersede recommendations found below.

Matted Row Strawberry		Soil Phosphorus Level				Soil Potassium Level				
		Low	Med	High (Opt)	Very High	Low	Med	High (Opt)	Very High	
	N (lb/A)	P ₂ O ₅ (lb/A)				K ₂ O (lb/A)				Nutrient Timing and Method
New Plantings ¹	110-150 ²	100	70	40		165	115	65	0	Total amount of nutrients recommended
	30	100	70	40		165	115	65	0	Broadcast and disk-in deep
	20-30	0	0	0		0	0	0	0	Sidedress 2 weeks after planting
	20-30	0	0	0		0	0	0	0	Sidedress when first runners start
	30-40	0	0	0		0	0	0	0	Topdress in mid-August
	10-20 ³	0	0	0		0	0	0	0	Topdress in spring when plants begin to grow
Established Plantings	30	100	70	40		165	115	65	0	Topdress at renovation
	20-30	100	70	40		165	115	65	0	Topdress in Mid-August
	20-30	0	0	0		0	0	0	0	Topdress in spring when plants begin to grow

¹For new plantings, apply 1-2 lb/A of boron (B) with broadcast fertilizer; see Table B-7 for more specific recommendations. ²Rates are appropriate for lighter soils and should be reduced by about 25% for heavier soils in northern locations. ³On heavier soils in northern locations, omit this application unless rainfall has been excessive.

Plants and Spacing

Use certified dormant plants packed dry in polyliners. Plant virus-free plants as early in the spring as possible. Plant in rows approximately 4 ft apart with plants 18-30 inches apart in the row. Distance will depend on variety and soil type. The approximate number of plants needed at these spacings is between 4,400 and 7,300/A.

Renovation

Strawberry plantings must be renovated annually (immediately after harvest) to thin the plants, retain vigor, and maintain berry size in subsequent years. Follow the steps below:

1. Apply 2,4-D herbicide for broadleaf weed control. Wait 7-8 days for weeds to absorb the herbicide.
2. Mow off the leaves as close to the ground as possible without damaging the crowns.
3. Narrow row widths to 12 inches using a cultivator or rototiller. Allow ½-1 inch of soil to cover the crown.
4. Apply topdressing with N, P and K (preferably based on soil test results, or as indicated in the Recommended Nutrients table above).
5. Apply preemergent herbicides and irrigate to incorporate fertilizer and herbicide.

Pollination

Honeybees and wild bees are important for proper pollination and fruit set. Avoid applying insecticides to flowers or weeds in bloom, as pollinators may be adversely affected. If an insecticide must be applied during bloom, observe the precautions for use (see also the Pollination section in the General Production Recommendations chapter). Bee toxicity ratings for pesticides are available in the Pesticide Safety chapter and in the pesticide tables below.

Weed Control

THE LABEL IS THE LAW - See the Pesticide Use Disclaimer on page F 1.

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 the Pest Management chapter.
2. Minimize herbicide resistance development. Identify the herbicide site mode of action group and follow recommended good management practices. Include non-chemical weed control whenever possible.

1.A. New Planting: Soil-Applied (Preplant Incorporated or Preemergence)						
Group	Product Name	Product Rate	Active Ingredient (* = Restricted Use)	Active Ingredient Rate	PHI (d)	REI (h)
3	Dacthal 6F Dacthal W-75	8 to 12 pt/A 6.0 to 14 lb/A	DCPA	6 to 9 lb/A	--	12
-Apply preplant incorporated with shallow cultivation before transplanting, or apply any time after transplanting to weed-free soil. -Primarily controls annual grasses and certain small-seeded broadleaf weeds. Maximum applications per season: not specified						
5	Sinbar 80WDG	2 to 3 oz/A	terbacil	0.1 to 0.15 lb/A	110	12
-Apply after transplanting but before new runner plants start to root. If transplants are allowed to develop new foliage prior to application, the spray must be followed immediately by 0.5-1.0” of irrigation or rainfall to rinse the foliage, or unacceptable crop injury may result. -Controls many annual broadleaf weeds, but may be weak on pigweed species. -Use the lower rate on coarse-textured soils low in organic matter and higher rates on fine-textured soils and on soils with high organic matter. Do not apply Sinbar to soils with less than 0.5% organic matter. - Do not add surfactant, oil concentrate, or any other spray additive, or tank-mix with any other pesticide unless the mixture is approved on the Sinbar label. -Data have shown that more consistent weed control and less crop injury occurs when 0.05 lb/A terbacil (1.0 oz/A Sinbar) is applied at 3 week intervals. Begin applications 3-6 weeks after transplanting, when the strawberries have 3 new full size trifoliolate leaves, but before weeds exceed 1 inch in height. Maximum Sinbar application per season: 8.0 oz/A, unless otherwise directed on the label.						
15	Devrinol 2-XT 2EC Devrinol DF-XT 50DF	2 to 4 qt/A 2 to 4 lb/A	napropamide	1 to 2 lb/A	--	24
-Labeled for preplant incorporated application with plastic mulch production; apply and uniformly incorporate to a depth of 2 inches. - Bareground production: apply to weed-free soil immediately after transplanting. Activate with ½ inch sprinkler irrigation within 24hr after application. Irrigation moves the herbicide into the soil and prevents breakdown of napropamide by the sun. - Do not apply from bloom through harvest. Primarily controls annual grasses and suppresses or controls certain annual broadleaf weeds. -Maximum for Devrinol 2-XT 2EC: 8 qt/A per season. Maximum Devrinol DF-XT 50DF: 8 fl oz/A per season.						

1.B. New Planting: 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	0.094 to 0.13 lb/A	4	24
	Select Max 0.97EC	12 to 16 fl oz/A				
	Poast 1.5EC	1 to 2 pt/A	sethoxydim	0.19 to 0.38 lb/A	7	12
<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: Apply with 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 nonionic surfactant 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 will not consistently control goosegrass. Control may be reduced if grasses are large or under hot or dry weather conditions.</p> <p>-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 1 hr.</p> <p>-Do not apply more than 8 fl oz of Select 2EC in a single application and do not exceed 32 fl oz/A for the season; do not apply more than 16 fl oz of Select Max in a single application and do not exceed 64 fl oz/A for the season.</p> <p>-Do not apply more than 2.5 pt/A Poast in single application and do not exceed 2.5 pt/A for the season.</p>						
5	Sinbar 80WDG	2 to 6 oz/A	terbacil	0.1 to 0.3 lb/A	110	12
<p>-Apply in late summer or early fall to control winter annual broadleaf weeds. If the crop is not dormant at the time of application, the spray must be followed immediately by 0.5-1.0 inches of irrigation or rainfall to rinse the strawberry foliage, or unacceptable crop injury may result. Controls many annual broadleaf weeds, but may be weak on pigweed species.</p> <p>-Use the lower rate on coarse-textured soils low in organic matter and higher rates on fine-textured soils and on soils with high organic matter. Do not apply Sinbar to soils with less than 0.5% organic matter.</p> <p>-Do not add surfactant, oil concentrate, or any other spray additive, or tank-mix with any other pesticide unless the mixture is approved on the Sinbar label.</p> <p>-Maximum Sinbar application per season: 8.0 oz/A, unless otherwise directed on the label.</p>						

1.C. New Planting: Late Fall Dormant						
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	0.094 to 0.13 lb/A	4	24
	Select Max 0.97EC	12 to 16 fl oz/A				
	Poast 1.5EC	1 to 2 pt/A	sethoxydim	0.19 to 0.38 lb/A	7	12
-See Select 2EC / Select Max 0.97EC / Poast 1.5EC in listing under "New Planting-Postemergence"						
3	Dacthal 6F Dacthal W-75	8 to 12 pt/A 6.0 to 14 lb/A	DCPA	6 to 9 lb/A	--	12
<p>-Apply to weed-free soil in the fall and repeat in early spring.</p> <p>-Primarily controls annual grasses and certain small-seeded broadleaf weeds.</p> <p>-Maximum applications per season: not specified</p>						
5	Sinbar 80WDG	2 to 4 oz/A	terbacil	0.1 to 0.2 lb/A	110	12
<p>-Apply just prior to mulching in late fall to extend weed control through harvest the following spring.</p> <p>-Controls many annual broadleaf weeds, but may be weak on pigweed species.</p> <p>-Use the lower rate on coarse-textured soils low in organic matter and higher rates on fine-textured soils and on soils with high organic matter. Do not apply Sinbar to soils with less than 0.5% organic matter.</p> <p>-Do not add surfactant, oil concentrate, or any other spray additive, or tank-mix with any other pesticide unless the mixture is approved on the Sinbar label.</p> <p>-Maximum Sinbar application per season: 8.0 oz/A, unless otherwise directed on the label.</p>						
15	Devrinol 2-XT 2EC Devrinol DF-XT 50DF	4 to 6 qt/A 4 to 6 lb/A	napropamide	2 to 3 lb/A	--	24
<p>-Apply in late fall through early winter (not on frozen ground) or in early spring. Activate with ½ inch sprinkler irrigation within 24hr after application. Irrigation moves the herbicide into the soil and prevents breakdown of napropamide by the sun.</p> <p>-Primarily controls annual grasses and suppresses or controls certain annual broadleaf weeds.</p> <p>-Maximum for Devrinol 2-XT 2EC: 8 qt/A per season. Maximum Devrinol DF-XT 50DF: 8 fl oz/A per season.</p>						

F Strawberries

2.A. Bearing Year: Late Winter or Early Spring						
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	0.094 to 0.125 lb/A	4	24
	Select Max 0.97EC	12 to 16 fl oz/A				
	Poast 1.5EC	1 to 2 pt/A	sethoxydim	0.2 to 0.4 lb/A	7	12
-See Select 2EC / Select Max 0.97EC / Poast 1.5EC in listing under "New Planting - Postemergence"						
3	Dacthal 6F	8 to 12 pt/A	DCPA	6 to 9 lb/A	--	12
	Dacthal W-75	6.0 to 14 lb/A				
-Apply anytime to weed-free soil in the early spring. Do not apply after first bloom through harvest. -Primarily controls annual grasses and certain small-seeded broadleaf weeds. Maximum applications per season: not specified						
4	2,4-D amine 4SL Formula 40 or Weedar	1 to 1.5 qt/A	2,4-D	1 to 1.5 lb/A	--	48
-Apply to established stands in late winter or early spring when the strawberries are dormant. - Do not apply 2,4-D between mid-August and winter dormancy, as it may affect flower bud formation, resulting in distorted berries. - Do not apply unless possible injury to the crop is acceptable. Controls many broadleaf weeds. Rainfastness is 6 to 8 hrs. -Maximum number of Formula 40 4 SL applications per year is 1 and do not exceed 1.5 qt/A per application.						
4	Stinger 3A	2 to 10.5 fl oz/A	clpyralid	0.047 to 0.25 lb/A	30	12
-A Special Local-Needs Label 24(c) has been approved for the use of Stinger 3A to control broadleaf weeds in strawberries in NJ, MD, PA and VA. The legal use of this product may require a waiver of liability signed by the grower, and returned to Dow AgroSciences. Apply in 1 or 2 applications. When 2 applications are used to control susceptible hard-to-kill perennial weeds, spray the first application at least 30 days before harvest and the second application at renovation, after harvest -Controls weeds in the Composite and Legume families, including annuals (galinsoga, ragweed species, common cocklebur, groundsel, pineappleweed, clover, and vetch) and perennials (Canada thistle, goldenrod species, aster species, and mugwort). -Use 2 to 4 fl oz/A to control annual weeds less than 2 inches tall. Increase the rate to 4 to 8 fl oz/A to control larger annual weeds. Apply the maximum rate of 10.5 fl oz/A (in 1 or split into 2 applications) to suppress or control perennial weeds. - Do not tank-mix Stinger with other herbicides registered for use in strawberries. Do not use Stinger with surfactants. -Stinger is a postemergence herbicide with residual soil activity. Observe crop restrictions or injury may occur from carryover. -Rainfastness is 6 hrs. Maximum Stinger application per year: 10.5 fl oz/A.						
14	Chateau 51WDG	3 oz/A	flumioxazin	0.096 lb/A	--	12
-Apply to established stands of matted row strawberries in late winter or early spring when strawberries are dormant, or as a hooded or shielded spray between the rows of strawberries on plastic mulch before fruit set. -Controls many annual broadleaf weeds, and suppresses or controls wild pansy. -Tank-mix with 2,4-D to improve the spectrum of weeds controlled when treating dormant matted row strawberries, or tank-mix with Gramoxone when applying a hooded or shielded spray between the rows of strawberries grown on plastic mulch. Oil concentrate at 1% v/v or nonionic surfactant at 0.25% v/v may be added to improve the control of emerged weeds, but may also increase the risk of crop injury. Maximum for Chateau: 3 oz/A per application, 3 oz/A per season.						
15	Devrinol 2-XT	4 to 6 qt/A	napropamide	2 to 3 lb/A	--	24
	Devrinol DF-XT 50DF	4 to 6 lb/A				
-Apply in late fall through early winter (not on frozen ground) or in early spring. Do not apply from bloom through harvest Activate with ½ inch sprinkler irrigation within 24 hr after application. Irrigation moves the herbicide into the soil and prevents breakdown of napropamide by the sun. Primarily controls annual grasses and suppresses or controls certain annual broadleaf weeds; will not control emerged weeds. Maximum for Devrinol 2-XT 2EC: 8 qt/A per season. Maximum Devrinol DF-XT 50DF: 8 fl oz/A per season.						

2.B. Bearing Year: Renovation-Summer						
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	0.094 to 0.125 lb/A	4	24
	Select Max 0.97EC	12 to 16 fl oz/A				
	Poast 1.5EC	1 to 2 pt/A	sethoxydim	0.2 to 0.4 lb/A	7	12
-See Select 2EC / Select Max 0.97EC / Poast 1.5EC in listing under "New Planting - Postemergence"						
3	Dacthal 6F	8 to 12 pt/A	DCPA	6 to 9 lb/A	--	12
	Dacthal W-75	6.0 to 14 lb/A				
-Apply any time after harvest to weed-free soil. Primarily controls annual grasses and certain broadleaf weeds. -Maximum applications per season: not specified						
4	2,4-D amine 4SL Formula 40 or Weedar	1 to 1.5 qt/A	2,4-D	1.0 to 1.5 lb/A	--	48
- Do not apply 2,4-D between mid-August and winter dormancy, as it may affect flower bud formation, resulting in distorted berries. Do not apply unless possible injury to the crop is acceptable. Controls many broadleaf weeds. Rainfastness is 6 to 8 hrs. -Maximum number of Formula 40 4 SL applications per year is 1 and do not exceed 1.5 qt/A per application.						

2.B. Bearing Year: Renovation-Summer continued on next page

2.B. Bearing Year: Renovation-Summer - continued

4	Stinger 3A	2 to 10.5 fl oz/A	clopyralid	0.047 to 0.25 lb/A	30	12
<p>-A Special Local-Needs Label 24(c) has been approved for the use of Stinger 3A to control broadleaf weeds in strawberries in NJ, MD, PA and VA. The legal use of this product may require a waiver of Liability signed by the grower, and returned to Dow AgroSciences.</p> <p>-Apply in 1 or 2 applications. When 2 applications are used to control susceptible hard-to-kill perennial weeds, spray the first application at least 30 days before harvest and the second application at renovation, after harvest</p> <p>-Controls weeds in the Composite and Legume families, including annuals (galinsoga, ragweed species, common cocklebur, groundsel, pineappleweed, clover, and vetch) and perennials (Canada thistle, goldenrod species, aster species, and mugwort).</p> <p>-Use 2 to 4 fl oz/A to control annual weeds less than 2 inches tall. Increase the rate to 4 to 8 fl oz/A to control larger annual weeds. Apply the maximum rate of 10.5 fl oz/A (in 1 or split into 2 applications) to suppress or control perennial weeds.</p> <p>-Do not tank-mix Stinger with other herbicides registered for use in strawberries.</p> <p>-Do not use Stinger with surfactants.</p> <p>-Stinger is a postemergence herbicide with residual soil activity. Observe crop restrictions or injury may occur from carryover.</p> <p>-Rainfastness is 6 hrs. Maximum Stinger application per year: 10.5 fl oz/A.</p>						
5	Sinbar 80WDG	4 to 8 oz/A	terbacil	0.2 to 0.4 lb/A	110	12
<p>-Apply at postharvest renovation after old leaves have been removed but before new growth begins.</p> <p>-Controls many annual broadleaf weeds, but may be weak on pigweed species.</p> <p>-Use the lower rate on coarse-textured soils low in organic matter and higher rates on fine-textured soils and on soils with high organic matter. Do not apply Sinbar to soils with less than 0.5% organic matter.</p> <p>-Do not add surfactant, oil concentrate, or any other spray additive, or tank-mix with any other pesticide unless the mixture is approved on the Sinbar label.</p> <p>-Maximum Sinbar application per season: 8.0 oz/A, unless otherwise directed on the label.</p>						
22	Gramoxone 2SL	2 pt/A	paraquat	0.5 lb/A	21	24
<p>-Apply as a directed shielded spray to control emerged weeds between the rows after crop establishment. Add nonionic surfactant to be 0.25% of the spray solution (1.0 qt/100 gal of spray solution). Do not allow spray or spray drift to contact the crop (use shields) or injury may result. Do not exceed a spray pressure of 30 psi. See the label for additional information and warnings.</p> <p>-Rainfastness 30 minutes. A maximum of 3 application per year are allowed.</p>						

2.C. Established Planting: Late Fall Dormant

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	0.094 to 0.125 lb/A	4	24
	Select Max 0.97EC	12 to 16 fl oz/A				
	Poast 1.5EC	1 to 2 pt/A	sethoxydim	0.2 to 0.4 lb/A	7	12
-See Select 2EC / Select Max 0.97EC / Poast 1.5EC in listing under "New Planting - Postemergence"						
3	Dacthal 6F	8 to 12 pt/A	DCPA	6 to 9 lb/A	--	12
	Dacthal W-75	6.0 to 14 lb/A				
<p>-Apply to weed-free soil in the fall and repeat in early spring. Do not apply after first bloom through harvest.</p> <p>-Primarily controls annual grasses and certain small-seeded broadleaf weeds. Maximum applications per season: not specified</p>						
5	Sinbar 80WDG	4 to 8 oz/A	terbacil	0.2 to 0.4 lb/A	110	12
<p>-Apply just prior to mulching in late fall to extend weed control through harvest the following spring. Controls many annual broadleaf weeds, but may be weak on pigweed species. Use the lower rate on coarse-textured soils low in organic matter and higher rates on fine-textured soils and on soils with high organic matter. Do not apply Sinbar to soils with less than 0.5% organic matter.</p> <p>-Do not add surfactant, oil concentrate, or any other spray additive, or tank-mix with any other pesticide unless the mixture is approved on the Sinbar label. Maximum Sinbar application per season: 8.0 oz/A, unless otherwise directed on the label.</p>						
15	Devrinol 2-XT	4 to 6 qt/A	napropamide	2 to 3 lb/A	--	24
	Devrinol DF-XT 50DF	4 to 6 lb/A				
<p>-Apply in late fall through early winter (not on frozen ground) or in early spring. Do not apply from bloom through harvest</p> <p>-Activate with ½ inch sprinkler irrigation within 24 hr after application. Irrigation moves the herbicide into the soil and prevents breakdown of napropamide by the sun. Primarily controls annual grasses and suppresses or controls certain annual broadleaf weeds.</p> <p>-Maximum for Devrinol 2-XT 2EC: 8 qt/A per season. Maximum Devrinol DF-XT 50DF: 8 fl oz/A per season.</p>						

3. Other Labeled Herbicides These products are labeled but limited local data are available; and/or are labeled but not recommended in our region due to potential crop injury concerns.

Group	Product Name	Active Ingredient (* = Restricted Use)
3	Prowl H2O	pendimethalin
9	Roundup (various)	glyphosate
14	Ultra Blazer	acifluorfen
14	Goal (VA only)	oxyfluorfen
14	Aim	carfentrazone
14	Spartan	sulfentrazone

Insect Control

THE LABEL IS THE LAW - See the Pesticide Use Disclaimer on page F 1.
Recommended Insecticides

Aphids, Spittlebugs Aphids can vector viruses into a planting, thus tolerance for this pest is low. Spittlebugs are primarily a nuisance for harvesters.

Apply one of the following formulations 10 days after new growth begins:						
Group	Product Name	Product Rate	Active Ingredient(s) (*=Restricted Use)	PHI (d)	REI (h)	Bee TR
1B	Diazinon AG500 (aphids)	1.0 pt/A	diazinon*	5	36	H
1B	Malathion 57EC	1.5 to 3.0 pt/A	malathion	3	12	H
3A	Brigade WSB	6.4 to 32 oz/A	bifenthrin*	0	12	H
3A	Danitol2.4EC (spittlebugs)	10.67 fl oz/A	fenpropathrin*	2	24	H
4A	Actara 25WDG (aphids)	1.5-3.0 oz/A	thiamethoxam - foliar	3	12	H
4A	Admire Pro (aphids)	10.5-14 fl oz/A	imidacloprid - soil	14	12	H
4A	Admire Pro (aphids and spittlebugs)	1.3 fl oz/A	imidacloprid - foliar	5	12	H
4A	Assail 30SG	1.9-4.0 oz/A	acetamiprid	1	12	M
4A+28	Voliam Flexi (aphids)	2.0 to 4.0 oz/A	thiamethoxam+chlorantraniliprole- foliar	3	12	H
9C	Beleaf 50SG (aphids)	2.8 oz/A	flonicamid	0	12	L
n/a	Ecotec (OMRI)	1.0 to 4.0 pt/A	rosemary oil + peppermint oil	0	0	--
n/a	Ecozin Plus 1.2% ME (OMRI)	15.0 to 30.0 fl oz/A	azadirachtin	see label	4	N
n/a	Trilogy (aphids) (OMRI)	0.5 to 1.0% solution	neem extract	0	4	H

Leafrollers Leafrollers are a sporadic pest in most of the region. Treatment is usually not required.

The following formulations are available. Apply one spray 10 days after full bloom:						
Group	Product Name	Product Rate	Active Ingredient(s) (*=Restricted Use)	PHI (d)	REI (h)	Bee TR
1B	Diazinon AG500	1.0 pt/A	diazinon*	5	36	H
3A	Brigade WSB	6.4 to 32.0 oz/A	bifenthrin*	0	12	H
3A	PyGanic EC 5.0 II	4.5 to 18.0 fl oz/A	pyrethrins	0	12	M
4A	Assail 30SG	4.0 to 6.9 oz/A	acetamiprid	1	12	M
5	Entrust SC (OMRI)	4.0 to 6.0 fl oz/A	spinosad	1	4	M
5	Radiant SC	6.0 to 10.0 fl oz/A	spinetoram	1	4	H
n/a	Ecozin Plus 1.2% ME (OMRI)	15.0 to 30.0 oz/A	azadirachtin	see label	4	N

Potato Leafhoppers

Potato leafhoppers cause leaf yellowing and distortion. There are no effective cultural controls, though damage may be worse after neighboring fields or weedy patches are mowed as leafhoppers will move to strawberry plants.

Apply one of the following formulations:						
Group	Product Name	Product Rate	Active Ingredient(s) (*=Restricted Use)	PHI (d)	REI (h)	Bee TR
1B	Malathion 57EC	1.5 to 3.0 pt/A	malathion	3	12	H
3A	PyGanic EC 5.0 II	4.5 to 18.0 fl oz/A	pyrethrins	0	12	M
4A	Actara 25WDG	1.5 to 3.0 oz/A	thiamethoxam	3	12	H
4A	Assail 30SG	1.9 to 4.0 oz/A	acetamiprid	1	12	M
4A + 28	Voliam Flexi	2.0 to 4.0 oz/A	thiamethoxam + chlorantraniliprole	3	12	H
n/a	Ecozin Plus 1.2% ME (OMRI)	15.0 to 30.0 oz/A	azadirachtin	see label	4	N

Root Weevils

Several species can damage strawberry plants; damage is often worst near wooded field edges. Watch for characteristic leaf notching as a sign of active adults. Larvae should be targeted starting in mid-summer.

Apply one of the following formulations (note: foliar sprays target adults, soil applications target larvae):						
Group	Product Name	Product Rate	Active Ingredient(s) (*=Restricted Use)	PHI (d)	REI (h)	Bee TR
n/a	Entomopathogenic nematodes ¹	see footnote	see footnote	--	--	--

Root weevils continued on next page

Root weevils - continued

1B	Malathion 57EC	1.5 to 3.0 pt/A	malathion	3	12	H
3A	Brigade WSB	8.0 to 32.0 oz/A	bifenthrin*	0	12	H
4A	Platinum 75SG	1.70 to 4.01 oz/A	thiamethoxam - soil	75	12	L
4A	Actara 25WDG	4.0 oz/A	thiamethoxam - foliar	3	12	H

¹Entomopathogenic nematodes (use *Heterorhabditis bacteriophora*). Apply 1-2 billion/A during evening or early morning when soil temperatures are at or above 60°F (16°C), then irrigate them into the soil.

Sap Beetles

Sap beetles are attracted to ripe, decaying fruit and bore into berries. They are a nuisance, especially in Pick-Your-Own fields with rotting, over-ripe berries abound. Preventing the accumulation of decaying fruit on or between beds is one way of avoiding beetle buildup. Sprays may not reach adults which are protected under the berries. Sprays that target larvae should be applied when adults are first noticed.

Apply one of the following formulations:						
Group	Product Name	Product Rate	Active Ingredient(s) (*= Restricted Use)	PHI (d)	REI (h)	Bee TR
3A	Brigade WSB	6.4 to 32.0 oz/A	bifenthrin*	0	12	H
3A	Danitol 2.4 EC	16.0 to 21.3 fl oz/A	fenpropathrin*	2	24	H
4A	Assail 30SG	4.0 to 6.9 oz/A	acetamiprid	1	12	M
15	Rimon 0.83EC (only affects larvae)	12.0 fl oz/A	novaluron	1	12	H
n/a	Ecozin Plus 1.2% ME (OMRI)	15.0 to 30.0 oz/A	azadirachtin	see label	4	N

Slugs

Slugs prefer a cool, wet, dark environment, and mulch, weeds, and other plant trash in beds during a wet spring provide the perfect setting. Mulch removal and adequate weed control help reduce the slug population.

Apply one of the following formulations:						
Group	Product Name	Product Rate	Active Ingredient(s) (*= Restricted Use)	PHI (d)	REI (h)	Bee TR
n/a	Sluggo (OMRI)	20.0 to 44.0 lb/A	iron phosphate	0	0	--
n/a	Deadline Bullets	see labels for rates	metaldehyde	---	12	--

Spittlebugs See Aphids, Spittlebugs above.

Spotted Wing Drosophila

Sporadically problematic on day-neutral strawberries during late summer and fall, but not earlier in the season.

Apply one of the following formulations:						
Group	Product Name	Product Rate	Active Ingredient(s) (*= Restricted Use)	PHI (d)	REI (h)	Bee TR
3A	Danitol 2.4 EC	16.0 to 21.3 fl oz/A	fenpropathrin*	2	24	H
5	Radiant SC	6-10 fl oz/A	spinetoram	1	4	H
15	Rimon 0.83EC	12.0 fl oz/A	novaluron (affects larvae only)	1	12	H
n/a + 3A	Azera (OMRI)	2.0 to 3.0 pt/A	azadirachtin + pyrethrins	see label	12	M
3A	PyGanic EC 5.0 II (OMRI)	4.5 to 18.0 fl oz/A	pyrethrins	0	12	M
5	Entrust SC (OMRI)	4.0 to 6.0 fl oz/A	spinosad	1	4	M

Strawberry Rootworms Use of broad-spectrum insecticides for other pests will aid in controlling rootworms.

Strawberry Weevils (Strawberry Clippers)

Apply one of the following formulations after new growth starts and before fruit buds are visible. Repeat 10 days later:						
Group	Product Name	Product Rate	Active Ingredient(s) (*= Restricted Use)	PHI (d)	REI (h)	Bee TR
1A	Sevin XLR	1.0 to 2.0 qt/A	carbaryl	7	12	H
1B	Lorsban Advanced	1.0 qt/A	chlorpyrifos* - prebloom only	21	24	H
3A	Brigade WSB	6.4 to 32 oz/A	bifenthrin*	0	12	H
3A	Danitol 2.4 EC	16.0 to 21.3 fl oz/A	fenpropathrin	2	24	H
n/a	Ecozin Plus 1.2% ME (OMRI)	15.0 to 30.0 oz/A	azadirachtin	see label	4	N

Tarnished Plant Bugs

Apply one of the following formulations:						
Group	Product Name	Product Rate	Active Ingredient(s) (*=Restricted Use)	PHI (d)	REI (h)	Bee TR
3A	Brigade WSB	6.4 to 32.0 oz/A	bifenthrin*	0	12	H
3A	Danitol 2.4EC	10.67 fl oz/A	fenpropathrin	2	24	H
4A	Assail 30SG	4.0 to 6.9 oz/A	acetamiprid	1	12	M
9C	Beleaf 50SG	2.8 oz/A	flonicamid	0	12	L
1B	Malathion 57EC	1.5-3.0 pt/a	malathion	3	12	H
3A	PyGanic EC 5.0 II (OMRI)	4.5 to 18.0 fl oz/A	pyrethrins	0	12	M
n/a	Ecozin Plus 1.2% ME (OMRI)	15.0 to 30.0 oz/A	azadirachtin	see label	4	N
n/a	Ecotec (OMRI)	1.0 to 4.0 pt/A	rosemary oil + peppermint oil	0	0	--

Thrips

Apply one of the following formulations:						
Group	Product Name	Product Rate	Active Ingredient(s) (*=Restricted Use)	PHI (d)	REI (h)	Bee TR
4A	Assail 30SG	4.0 to 6.9 oz/A	acetamiprid	1	12	M
5	Radiant SC	6.0 to 10.0 fl oz/A	spinetoram	1	4	H
3A	PyGanic EC 5.0 II (OMRI)	4.5 to 18.0 fl oz/A	pyrethrins	0	12	M
5	Entrust SC (OMRI)	4.0 to 6.0 fl oz/A	spinosad	1	4	M
n/a	Ecozin Plus 1.2% ME (OMRI)	15.0 to 30.0 oz/A	azadirachtin	see label	4	N
n/a	Trilogy (OMRI)	0.5 to 1.0% solution	neem extract	0	4	H
n/a	Ecotec (OMRI)	1.0 to 4.0 pt/A	rosemary oil + peppermint oil	0	0	--

Two-Spotted Spider Mites (TSSM)

For best results, control TSSM early in the spring before eggs are laid. Thorough underleaf spray coverage is necessary. For resistance management, alternate materials with different modes of action.

Apply one of the following formulations:						
Group	Product Name	Product Rate	Active Ingredient(s) (*=Restricted Use)	PHI (d)	REI (h)	Bee TR
6	Agri-mek 0.15 EC	16.0 fl oz/A	abamectin*	3	12	H
20B	Kanemite 15SC	21.0 to 31.0 fl oz/A	acequinocyl	1	12	L
21A	Portal	2.0 pt/A	fenpyroximate	1	12	N
23	Oberon 2SC	12.0 to 16.0 fl oz/A	spiromesifen	3	12	M
25	Nealta	13.7 fl oz/A	cyflumetofen	1	12	--
12B	Vendex 50WP	1.5 to 2.0 lb/A	fenbutatin-oxide*	1	48	N
20D	Acramite 50WS	0.75 to 1.00 lb/A	bifenazate	1	12	M
10B	Zeal Miticide ¹	2.0 to 3.0 oz/A	etoxazole	1	12	N
10A	Savey 50DF	6.0 oz/A	hexythiazox	3	12	N
n/a	Trilogy (OMRI)	0.5 to 2.0% solution	neem extract	0	4	H
n/a	Ecotec (OMRI)	1.0 to 4.0 pt/A	rosemary oil + peppermint oil	0	0	--

Disease Control

THE LABEL IS THE LAW - See the Pesticide Use Disclaimer on page F 1.

Recommended Fungicides

Nematode Control See the Soil Fumigation and Nematodes sections in the Pest Management chapter.

Dip Treatments for Freshly Dug (Bare Root) Transplants

Use Abound or Switch for plants with a known Anthracnose crown rot problem. Dip entire plant 2-5 minutes, then plant as quickly as possible. Phosphite fungicides can be used to suppress Pythium or Phytophthora (check labels).

Code	Product Name	Product Rate	Active Ingredient(s) (*=Restricted Use)	PHI (d)	REI (h)	Bee TR
9 + 12	Switch	5.0 to 8.0 fl oz/100 gal water	cyprodinil + fludioxonil	0	12	N
11	Abound	5.0 to 8.0 fl oz/100 gal water	azoxystrobin	0	4	N

Bacterial and Fungal Diseases

Angular Leaf Spot

This disease may cause caps to turn brown or black resulting in unmarketable fruit. Planting disease-free plants is critical. If symptoms appear on established plants, applying fixed copper products can help, but not if weather conditions are highly favorable to the disease. Discontinue fixed copper applications if plant injury occurs, usually after 4-5 sprays. Overhead irrigation/frost protection will make angular leaf spot worse.

Anthracnose Crown Rot

This disease is caused by *Colletotrichum gloeosporioides* as opposed to *C. acutatum* that causes mostly fruit rot. The response to fungicides differs between these species and a product may not be effective against both diseases.

Group	Product Name	Product Rate	Active Ingredient(s) (*=Restricted Use)	PHI (d)	REI (h)	Bee TR
Do not apply Quadris Top more than twice before rotating with Captan or Switch on a 10-14 day schedule.						
M3	Thiram 480DP	4.4 lb/A	thiram	3	24	N
M4	Captan 80WDG	3.7 lb/A	captan	0	24	N
3 + 11	Quadris Top	12 to 14 fl oz/A	azoxystrobin + difenoconazole	0	12	--
9 + 12	Switch 62.5WG	11.0 to 14.0 oz /A	cyprodinil + fludioxonil	0	12	N

Anthracnose Fruit Rot (*Colletotrichum acutatum*)

Begin sprays prior to disease development or no later than at 10% bloom and continue on a 7-10 day interval. Use the higher rates and shorter intervals when disease pressure is high.

Except for Captan and Thiram, do not apply the same fungicides more than 2 times in a row; switch to a fungicide in a different FRAC code. Maintain continuous coverage of Captan and/or a FRAC code 11 fungicide, by applying the following combinations:

Group	Product Name	Product Rate	Active Ingredient(s) (*=Restricted Use)	PHI (d)	REI (h)	Bee TR
Apply one of the following PRIOR to disease development:						
M3	Thiram 75WDG	4.4 lb/A	thiram	3	24	N
M4	Captan 80WDG	3.7 lb/A	captan	0	24	N
and tank-mix one of the above with one of the following FRAC code 11 fungicides AFTER onset of disease:						
7 + 11	Merivon	5.5 to 8 fl oz	pyraclostrobin + fluxapyroxad	0	12	N
7 + 11	Pristine 38WG	18.5 to 23.0 oz/A	pyraclostrobin + boscalid	0	12	--
11	Cabrio 20EG	12.0 to 14.0 oz/A	pyraclostrobin	0	12	N
Rotate AND tank mix one of the following:						
M4	Captan 80WDG	3.7 lb/A	captan	0	24	N
M4 + 17	Captevate 68WDG ¹	3.5 to 5.25 lb/A	captan + fenhexamid	0	24	N
With one of the following as long as weather conditions favor disease development or disease is present.						
7 + 11	Pristine 38WG	18.5 to 23.0 oz/A	pyraclostrobin + boscalid	0	12	--
11	Cabrio 20EG	12.0 to 14.0 oz/A	pyraclostrobin	0	12	N
9 + 12	Switch 62.5WG	11.0 to 14.0 oz/A	cyprodinil + fludioxonil	0	12	N
17	Elevate 50WDG ¹	1.1 to 1.5 lb /A	fenhexamid	0	12	N

¹Do not tank mix Captivate with Elevate

Black Root Rot

This is a disease complex caused by cultural stresses coupled with many different fungi and by nematode feeding injury, and is the main reason for preplant fumigation of strawberry. The most prevalent fungi associated with the disease are *Rhizoctonia* and *Pythium*. Crop rotation of 4-5 years will reduce the incidence of black root rot. In fields with a high water table, the use of raised beds will provide some control. If rotation is not an option, preplant fumigation may be helpful. Fumigants are listed in the Soil Fumigation section in the Pest Management Chapter. Applying azoxystrobin may help suppress *Rhizoctonia* root rot. Also see Red stele and *Phytophthora* crown rot.

Fungal Leaf Blight, Leaf Scorch and Leaf Spot

In the fall or early spring, leaf diseases are not usually problematic in strawberries, but prolonged warm, wet weather favors the disease in the late spring and summer. Incidence may be associated with plant source.

Fungal Leaf Blight, Leaf Scorch and Leaf Spot continued on next page

F Strawberries

Fungal Leaf Blight, Leaf Scorch and Leaf Spot - continued

Group	Product Name	Product Rate	Active Ingredient(s) (*=Restricted Use)	PHI (d)	REI (h)	Bee TR
PRIOR TO THE ONSET OF DISEASE, TANK MIX one of the following fungicides:						
M1	Topsin-M 70WP	1.0 lb/A	thiophanate methyl	1	24	N
M4	Captan 80WDG	3.8 lb/A	captan	0	24	N
M4	Captec 4L	3.0 qt/A	captan	0	24	N
2	Rovral 4FL (prebloom only)	1.5 to 2.0 pt/A	iprodione	1	12	N
WITH one of the following fungicides (Do not apply FRAC code 11 fungicides (Cabrio or Pristine) more than twice in a row. Rotate to a product with a different mode of action to reduce the chance of fungicide resistance development):						
3	Rally 40WSP	2.5 to 5.0 oz/A	myclobutanil	0	24	N
7 + 11	Pristine 38WG	18.5 to 23.0 oz/A	pyraclostrobin + boscalid	0	12	--
11	Cabrio 20EG	12.0 to 14.0 oz/A	pyraclostrobin	0	12	N

Gray Mold (Botrytis Fruit Rot)

Start spraying at 5-10% bloom, because most fruit infections occur through the flower. Repeat every 7-10 days. Spray less frequently during prolonged dry periods, but spray every 5-7 days during very wet periods. For season-long control it is usually sufficient to spray once a week for 4 weeks. Tank-mix and rotate fungicides from different FRAC codes to reduce the chance of fungicide resistance development. **Note: If Pristine is included in the schedule for Anthracnose control, in most cases that may provide satisfactory Gray Mold control and separate application of specific products may not be necessary.**

Group	Product Name	Product Rate	Active Ingredient(s) (*=Restricted Use)	PHI (d)	REI (h)	Bee TR
Application #1, apply ONE of the following:						
M3	Thiram 480DP	4.4 lb/A	thiram	3	24	N
M4	Captan 80WDG	3.7 lb/A	captan	0	24	N
11	Switch 62.5WG	11.0 to 14.0 oz/A	cyprodinil + fludioxonil	0	12	N
Application #2, apply ONE of the following if resistance is NOT SUSPECTED on your farm:						
7	Fontelis 1.67SC (except Jewel, L'Amour and Clancy varieties) ¹	16.0 to 24.0 oz/A	penthiopyrad	0	12	L
17	Elevate 50WDG ¹	1.1 to 1.5 lb/A	fenhexamid	0	12	N
If testing, observation, or frequent prior use of the above materials indicates high resistance risk, apply ONE of the following:						
M3	Thiram 480DP	4.4 lb/A	thiram	3	24	N
M4	Captan 80WDG	3.7 lb/A	captan	0	24	N
M4 + 17	Captevate 68WDG	3.5 to 5.25 lb/A	captan + fenhexamid	0	24	N
Application #3: Same as Application #1						
Application #4. For subsequent applications, ROTATE BETWEEN the following fungicides with different modes of action.						
7	Fontelis 1.67SC (except Jewel, L'Amour and Clancy varieties) ¹	16.0 to 24.0 oz/A	penthiopyrad	0	12	L
11	Switch 62.5WG	11.0 to 14.0 oz/A	cyprodinil + fludioxonil	0	12	N
17	Elevate 50WDG ¹	1.1 to 1.5 lb/A	fenhexamid	0	12	N

¹ If fungicide resistance is suspected do not apply.

Powdery Mildew

Unless symptoms are severe, crop losses are rare in the fall and the disease may not reappear in the spring. Check both sides of leaves in the spring for disease pressure. Severe disease during spring may justify fungicide application on a 14-21 day interval. Do not apply FRAC code 11 fungicides (i.e., Cabrio or Pristine) more than twice in a row. Switch to another product to reduce the chance of fungicide resistance development.

Group	Product Name	Product Rate	Active Ingredient(s) (*=Restricted Use)	PHI (d)	REI (h)	Bee TR
Rotate between the following fungicides with different modes of action (FRAC code):						
U6	Torino 0.85SC	3.4 oz/A	cyflufenamid	0	4	--
3	Mettle 125ME	3.0 to 5.0 fl oz/A	tetraconazole	0	12	--
3	Procure 50WSP	4.0 to 8.0 oz/A	triflumizole	1	12	N
3	Rally 40WSP	2.5 to 5.0 oz/A	myclobutanil	0	24	N
3 + 9	Inspire Super 2.8F	16.0 to 20.0 fl oz/A	difenoconazole + cyprodinil	0	12	--
7 + 11	Pristine 38WG	18.5 to 23.0 oz/A	pyraclostrobin + boscalid	0	12	--
11	Cabrio 20EG	12.0 to 14.0 oz/A	pyraclostrobin	0	12	N
13	Quintec 2.08SC	4.0 to 6.0 fl oz/A	quinoxifen	1	12	--

Red Stele and Phytophthora Crown Rot

Prevent spread of the red stele pathogen via cultivation equipment and/or surface runoff water. Selecting fields with well-drained soils and planting on high, raised beds will help reduce disease. Crop rotation may be of little value, as the red stele pathogen persists in soil for many years, and persistence of the crown rot pathogen is unknown. However, disease is very unlikely when clean plants are introduced to soil with no history of strawberry production. If red stele is present in the soil, consider using varieties that are resistant to several races such as 'Allstar', 'Earliglow', 'Guardian' or 'Latestar'. For crown rot, resistant cultivars are not available.

The following fungicides can be applied as preplant dips (See note for: "Dip Treatments for Freshly Dug (Bare Root) Transplants" above), foliar sprays, or by drip irrigation for additional control.

NEW PLANTINGS						
Group	Product Name	Product Rate	Active Ingredient(s) (*=Restricted Use)	PHI (d)	REI (h)	Bee TR
Foliar sprays of phosphite products should begin 14 to 21 days after planting and continue on a 30 to 60 day interval as long as favorable disease conditions occur. These products include:						
33	Aliette 80WDG	2.5 to 5.0 lb/A	aluminium tris	0.5	12	N
33	Phosphite salts	1.0 to 3.0 qt/A	phosphite	0	4	N
Fungicides containing mefenoxam or metalaxyl can be applied as sprays or through drip irrigation.						
4	MetaStar 2E AG	2.0 qt/treated A	metalaxyl	0	48	N
4	Ridomil Gold 4SL	1.0 pt /treated A	mefenoxam	0	48	N
4	Ultra Flourish 2F	2.0 pt/treated A	mefenoxam	0	48	N

ESTABLISHED PLANTINGS						
Group	Product Name	Product Rate	Active Ingredient(s) (*=Restricted Use)	PHI (d)	REI (h)	Bee TR
Spring applications should begin when plants start active growth and before 1st bloom. Foliar sprays of phosphite products should be repeated every 30 to 60 days as long as weather conditions favor disease development. These products include:						
33	Aliette 80WDG	2.5 to 5.0 lb/A	aluminum tris	0.5	12	N
33	Phosphite salts	1.0 to 3.0 qt/A	phosphite	0	4	N
Fungicides containing mefenoxam or metalaxyl can be applied as sprays or through drip irrigation. The first spring application should be made when plants start active growth before 1st bloom. A second spring application may be made at fruit set when Ridomil Gold is used, but not Meta Star or Ultra Flourish. All 3 products may be applied to perennial plantings in the fall after harvest has been completed. These fungicides include (apply one of the following):						
4	Ridomil Gold 4SL	1.0 pt /treated A	mefenoxam	0	48	N
4	Ultra Flourish 2E	2.0 pt /treated A	mefenoxam	0	48	N
Calculate the correct fungicide rate for drip applications as for a banded spray, see the explanation under NEW PLANTINGS in the table above.						

Virus Diseases

Use certified, virus-free plants.

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 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.