



# 2023 Cornell Pest Management Guidelines for Berry Crops

Cornell Cooperative Extension

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*These guidelines are not a substitute for pesticide labeling. Always read and understand the product label before using any pesticide.*

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## Abbreviations and Symbols Used in This Publication

A ..... acre	IRAC .... Insecticide Resistance	WDG.... water-dispersible granules
AI ..... active ingredient	Action Committee: Mode of	WP ..... wettable powder
D ..... dust	Action Classification	WSP ..... water soluble packet
DF ..... dry flowable	L ..... liquid	WSSA.. Weed Science Society of
DG ..... dispersible granule	NA.....not available	America: Herbicide: Site of
E ..... emulsion, emulsifiable	OMRI ...Organic Materials Review	Action Classification List
EIQ..... Environmental Impact	Institute	* ..... Restricted-use pesticide;
Quotient	P ..... pellets	may be purchased and used
EC ..... emulsifiable concentrate	PHI ..... pre-harvest interval	only by certified applicators
F ..... flowable	REI ..... restricted-entry interval	† ..... Not for use in Nassau and
FRAC... Fungicide Resistance Action	S ..... soluble	Suffolk Counties
Committee: Code	SP ..... soluble powder	Δ ..... Rate and/or other application
G ..... granular	UDH.....up to day of harvest	restrictions apply. See label
	ULV ..... ultra-low volume	for more information.
	W ..... wettable	

Every effort has been made to provide correct, complete, and up-to-date pest management information for New York State at the time this publication was released for printing (January 2023). Changes in pesticide registrations, regulations, and guidelines occurring after publication are available in county Cornell Cooperative Extension offices or from the Cornell Cooperative Extension Pesticide Safety Education Program (CCE-PSEP) ([psep.cce.cornell.edu](http://psep.cce.cornell.edu)).

Trade names used in this publication are for convenience only. No endorsement of products is intended, nor is criticism of unnamed products implied.

**These guidelines are not a substitute for pesticide labeling. Always read and understand the product label before using any pesticide.**

The guidelines in this bulletin reflect the current (and past) authors' best effort to interpret a complex body of scientific research, and to translate this into practical management options. Following the guidance provided in this bulletin does not assure compliance with any applicable law, rule, regulation or standard, or the achievement of particular discharge levels from agricultural land.

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**Cover photo by:** Marvin Pritts, Section of Horticulture, School of Integrative Plant Sciences, Cornell University.

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# 1 Pesticide Information

## 1.1 Pesticide Classification and Certification

Pesticides can be classified as general-use or restricted-use. **General-use pesticides** may be purchased and used by anyone. **Restricted-use pesticides** can only be purchased and used by a certified applicator or used by someone under a certified applicator's supervision. In some cases, the pesticide label may limit use of a restricted-use pesticide to only a certified applicator.

**Private applicators** use or supervise the use of pesticides to produce agricultural commodities or forest crops on land owned or rented by the private applicator or their employer. If a private applicator wants to use or supervise the use of restricted-use pesticides, they need to be a **certified private applicator**. Certified private applicators are also allowed to purchase restricted-use pesticides. Certification is not needed if a private applicator uses general-use pesticides.

In New York State, a **certified commercial applicator**, **certified commercial technician**, or **commercial apprentice** working under the supervision of a certified commercial applicator is allowed to apply any type of pesticide on property that is not a private application (described above) or is a residential application. (A residential application is the use of general-use pesticides on property owned or rented by the applicator, excluding establishments selling or processing food and residential structures other than where the applicator lives.) Certified commercial applicators are allowed to purchase restricted-use pesticides.

Information on pesticide certification and classification is available from your Cornell Cooperative Extension office ([cce.cornell.edu/localoffices](http://cce.cornell.edu/localoffices)), regional NYSDEC pesticide specialist ([www.dec.ny.gov/about/558.html](http://www.dec.ny.gov/about/558.html)), the Pesticide Applicator Training Manuals ([www.cornellstore.com/books/cornell-cooperative-ext-pmep-manuals](http://www.cornellstore.com/books/cornell-cooperative-ext-pmep-manuals)), or the Cornell Cooperative Extension Pesticide Safety Education Program ([psep.cce.cornell.edu](http://psep.cce.cornell.edu)).

## 1.2 Use Pesticides Properly

Using pesticides requires the user to protect their health, the health of others, and the environment. Keep in mind “pesticide use” is more than just the application. It includes mixing, loading, transporting, storing, or handling pesticides after the manufacturer's seal is broken; cleaning pesticide application equipment; and preparing a container for disposal. These activities require thoughtful planning and preparation. They also require you to comply with state and federal laws and regulations intended to protect human health and the environment from the adverse effects pesticides may cause.

### 1.2.1 Plan Ahead

Many safety precautions should be taken *before* you begin using pesticides. Most pesticide accidents can be prevented with informed and careful practices. **Always read the label on the pesticide container before using the pesticide.** Make sure you understand and can follow all label directions and precautions. Be prepared to handle an emergency exposure or spill. Know the first aid procedures for the pesticides you use.

### 1.2.2 Move Pesticides Safely

Transporting pesticides carelessly can result in broken containers, spills, and contamination of people and the environment. Accidents can occur even when transporting pesticides a short distance. You are responsible for a pesticide accident so take every effort to transport pesticides safely. Be prepared for an emergency.

### 1.2.3 Personal Protective Equipment and Engineering Controls

**Personal protective equipment (PPE)** needs depend on the pesticide being handled. **Required PPE are listed on pesticide labels.** Any required PPE is based on the pesticide's toxicity, route(s) of exposure, and formulation. Label-listed PPE are the minimum that must be worn when using a pesticide. You can always use more than what's listed!

The type of PPE used depends on the type and duration of the activity, where pesticides are being used, and the user's exposure. For example, mixing/loading procedures often require more PPE than when applying a pesticide. Studies show you are at a greater risk of accidental poisoning when handling pesticide concentrates. Pouring pesticide concentrates is the most hazardous activity.

**Engineering controls** are devices that help reduce a pesticide user's exposure. An example is a closed transfer system that reduces the exposure risk when dispensing pesticide concentrates. Consult the product label for more information on using engineering controls in place of PPE.

### 1.2.4 Avoid Drift, Runoff, and Spills

Pesticides that move out of the target area can injure people, damage non-target areas, and harm the environment. Choose weather conditions, pesticides, application equipment, pressure, droplet size, formulations, and adjuvants to minimize drift and runoff potential. Product labels may have specific application and/or equipment requirements to reduce issues with drift and runoff.

## 2 General Information

### 2.1 Introduction

Cornell's 2023 Pest Management Guidelines for Berry Crops is intended to provide growers with general nutrient guidelines and information to aid with insect, mite, disease, and weed management decisions. Cultural, biological, and chemical management tools are identified whenever available.

In-depth information on commercial berry crop production may be found in the resources listed in Table 2.15.

Guidelines provided in this guide are consistent with label guidelines formulated for large-scale operations. Smaller scale producers may use the same guidelines by converting them to the appropriate unit (Table 2.1.1).

### 2.2 Site Selection and Preparation

Preparations for a berry planting must begin one to two years in advance. Select a site with good air and water drainage and have a preplant soil and a nematode analysis performed on representative soil samples. *Growers may wish to select a more broad-spectrum approach to preplant soil analysis at this time by opting for a comprehensive Cornell soil health assessment.*

#### 2.2.1 Basic Soil Test

Agro-One provides soil and nutrient testing services previously available through the Cornell Nutrient Analysis Laboratory along with additional analytical services. Key input regarding analytical methods and quality control is provided by Cornell, and Cornell nutrient management guidelines are provided by Cornell through DairyOne.

**Table 2.1.1. Conversion factors to convert from one unit to another.**

To convert from	To	Multiply by
lb/A	lb/100 sq ft	<b>0.0023</b>
tn/A	lb/100 sq ft	<b>4.6</b>
lb/A	kg/ha	<b>1.12</b>
kg/ha	lb/A	<b>0.893</b>
lb	oz	<b>16</b>
qt of fruit	lb of fruit	<b>1.5</b>
qt	pt	<b>2.0</b>
pt	qt	<b>0.5</b>
gal of liquid	lb of liquid	<b>8.3</b>
<b>Strawberries</b>		
lb/A	lb/100 ft of row	<b>0.008</b>
Yield in lb/100 ft of row	lb/A	<b>125</b>
Yield in qt/100 ft of row	lb/A	<b>188</b>
<b>Raspberries and Blackberries</b>		
lb/A	lb/100 ft of row	<b>0.0184</b>
lb/A	oz/plant	<b>0.009</b>
Yield in lb/100 ft of row	lb/A	<b>55</b>
Yield in pt/100 ft of row	lb/A	<b>73</b>
<b>Blueberries</b>		
lb/A	oz/plant	<b>0.015</b>
Yield in lb/100 ft of row	lb/A	<b>44</b>
Yield in pt/100 ft of row	lb/A	<b>58</b>
<b>Currants and Gooseberries</b>		
lb/A	oz/plant	<b>0.012</b>
lb/A	lb/100 ft of row	<b>0.0184</b>
Yield in lb/100 ft of row	lb/A	<b>55</b>
Yield in pt/100 ft of row	lb/A	<b>73</b>

**Table 2.5.3. Nitrogen guidelines for berry crops.**

Crop	Age of planting	Amount/timings (actual N)	N source	Comments
<b>Elderberries (continued)</b>				
	1+	Apply 1/8 pound of ammonium nitrate for each year of the plant's age, up to one pound per plant. or Apply 0.5 lbs. 10-10-10 per 100 ft of row for each year of the plant's age up to 4 lbs. 10-10-10.	ammonium nitrate or 10-10-10	In spring, spread fertilizer with a spreader in bands one foot wide along both sides of the rows.
<b>Cranberries</b>				
All varieties	0	50 lb/A	Alternate N-only products with N-P-K products with a 1:1:1 ratio	Use frequent applications (every 2-3 weeks) of 5-10 lb/A until late summer to promote good runner growth.
Small-fruited varieties (i.e. 'Early Black', 'Howes')	1+	20-30 lb/A*, split between roughneck (20-25%), bloom (30-35%), and fruit set (30-35%) growth stages	ammonium nitrate	Wait to make first split application until soil temperatures are between 50 to 70°F**
Large-fruited varieties (i.e. 'Stevens')	1+	30-60 lb/A*, split between roughneck (20-25%), bloom (30-35%), and fruit set (30-35%) growth stages	ammonium nitrate	Wait to make first split application until soil temperatures are between 50 to 70°F**
<b>Juneberries</b>				
	0	25 lb/A, 4 weeks after planting	calcium nitrate	Avoid touching plants with fertilizers after planting.
	1	50-80 lb/A, split between May and June	urea or ammonium nitrate	Use higher amount on sandier soils or if irrigation is used.
	2+	70-100 lb/A, split between May and June	urea or ammonium nitrate	Use higher amount on sandier soils or if irrigation is used. Adjust with leaf analysis.

\*Rates > 40 lb/A actual N should be used with caution to prevent vine overgrowth and reduced fruit set. Rates may need to be adjusted based on soil type and temperature, soil and tissue analysis results, and observations of plant growth and appearance.

\*\*If soil temperatures exceed 70°F and air temperatures exceed 70°F, reduce, delay, or omit N applications.

For more information on cranberry fertilization or other aspects of cranberry production consult: "Cranberry Production A Guide for Massachusetts", available from the UMASS Cranberry Station, College of Natural Resources and the Environment, East Wareham, MA.

## 2.5.2 Potassium, Phosphorus, Magnesium and Boron

If preplant recommendations are followed, additional P and K likely will not be required unless the soil is very sandy. In the event that potassium is required, the maximum amount of K that one should apply in any one year in an established planting is 250 lb/A. At these high rates, potassium sulfate (50% K<sub>2</sub>O) is a better choice than muriate of potash (60% K<sub>2</sub>O), which contains chlorides.

Phosphorus requirements in berry crops are relatively low, and phosphorus is usually not required in established plantings. Follow the recommendations of the soil test when preparing a site for planting. There are at least 5

different soil extraction methods (Mehlich 1 & 3, Bray, Morgan and modified- Morgan) used by commercial labs. P is most affected by the extractant type. Mehlich-3 and Bray are similar in value; Mehlich P values are somewhat lower for low pH soils. Modified Morgan values are much lower than all three and are used by Cornell, Penn State and other mid-Atlantic universities use Mehlich-3. Most New England states use modified Morgan. If interpreting your own soil tests, it is important to know the P extraction method used by your analytical lab in order to get a proper recommendation.

Cranberries are the one berry crop shown to benefit from regular phosphorus applications. Low pH and high iron content of many cranberry soils lead to P being tightly

## 3. Sprayer Technology

### 3.1 Introduction

The average berry planting in New York State is less than 5 acres. Selecting sprayers for small-size plantings can be challenging because it may not be possible to justify the expense of a full-sized sprayer. Larger growers may also use their sprayer for multiple crops, thereby justifying the expense. Sprayers for the small berry crop planting are discussed in sections 3.2 and 3.3.

Sprayers for larger plantings or multiple crops are discussed in sections 3.8 through 3.11.

Regardless of sprayer size, information presented on nozzles (sections 3.5, 3.6 and 3.9), drift reduction (sections 3.3 and 3.7), and solutions for safer spraying (section 3.13) is relevant for all types of sprayers.

### 3.2 Selecting a Small Sprayer for the Small Berry Crop Planting

There are many important points to consider before purchasing a sprayer, not the least of which is the area to spray, the proximity of the local supplier, standard of manufacture, etc. There are many growers with small plantings who need spraying equipment ranging from backpack sprayers to small truck- or ATV-mounted machines.

#### 3.2.1 Canopy Sprayers

##### 3.2.1.1 Backpack Sprayers

Small capacity (4-5 gallon) sprayers will produce up to approximately 100 psi pressure. Weight is an important consideration and growers should select a sprayer with good, wide, padded straps to ease the load on your shoulders. Correct nozzle selection according to the target is very important to ensure even coverage. A good-sized filling hole at the top is also important.

There are three factors affecting application rate – forward speed, pressure, and nozzle tip size. Unfortunately, most inexpensive backpack sprayers have no pressure gauge. Pay more money and purchase a backpack sprayer with a pressure gauge or, better still, purchase a spray management valve as standard or as an option. Normally output increases or decreases according to the pressure in the system, (which is dependent upon how vigorous you are in pumping the handle up and down). A spray management valve, such as a CF valve, will ensure a constant output irrespective of hand pump action. The CF valve evens out fluctuations in pressure, e.g. will only allow a maximum and minimum pressure thus ensuring even flow. The Fountainhead Group ([www.thefountainheadgroup.com](http://www.thefountainheadgroup.com)) sells a backpack sprayer with a simple valve which ensures the correct pressure is not exceeded.

An alternative to the hand-operated backpack sprayer is an electrically-operated backpack sprayer, which utilizes a small rechargeable battery. Maximum pressure is relatively low and it is easier than using a traditional hand pump system, particularly if you have many rows of plants to spray. Similarly a small back pack sprayer fitted with a small gas engine is available. The electric version is quieter to use, but you must remember to recharge the batteries otherwise spraying will be delayed.

##### 3.2.1.2 Portable Mist and Air Blower Backpacks

These are ideal for plantings where canopy penetration is required, e.g. denser, vigorous plantings. A small gas engine drives a fan blower which creates an airstream which passes along a hand-held tube (similar to a leaf blower). The tube has a nozzle situated at the end so that liquid spray can be squirted into the airstream. The operator directs the spray cloud towards the canopy by pointing the hand-held tube. It is preferable to point the tube backwards to avoid walking into the spray cloud. Engine speed can be reduced which enables a slower airspeed to match a smaller canopy in early season. They are very good at rustling the canopy and getting good penetration and deposition. They are heavy! Noise is a problem, so ear protection must be worn.

##### 3.2.1.3 Portable Gas Engine-driven Sprayers

If weight is a problem, and ground conditions are relatively smooth, a number of manufacturers offer a sprayer with a small gas engine and a 10 to 12 gallon tank. Larger capacity tanks (14 to 100 gallons) are often trailed and can be pulled by a lawn tractor, ATV, Gator, or small tractor.

##### 3.2.1.4 Small, Mounted Sprayers

Ideal for mounting onto the carrier rack of an ATV, 15 to 25 gallons, they use a small electric pump to provide up to 70 psi. When used with a hand wand and a hose, they can be used to spray short length rows. The same system is ideal for weed control and spot spraying of weeds.

##### 3.2.1.5 Large, Skid Mounted Sprayers

Ideal for fitting into the back of a pick-up truck, these sprayers have a tank capacity of 35 to 200 gallons, and an electric-start gas engine.

##### 3.2.1.6 Small, Trailed Airblast Sprayers

Very small airblast sprayers, with tank capacities up to 110 gallons and a 5.5 to 20 hp gas engine, can be towed by an ATV or a small tractor. Larger tank capacities up to 300 gallons are also available but require larger tractors with weights and brakes for safe operation. Remember, the larger the gas engine, the more important it is to buy an

There's also an online or downloadable app to assist with nozzle selection and calibration.

<https://greenleaftech.com/>

This web page contains product information on nozzles for turf, vegetables and other crops. The featured products are the Turbodrop, Spraymax, and Airmix nozzles. There is a nozzle guide to assist you in locating a nozzle for your application. There are educational materials such as droplet size data, independent test data and news articles you can look through.

[www.wilger.net](http://www.wilger.net)

This web page contains product information on various sprayer parts and nozzles. Some of their featured products include tips, caps, strainers, nozzle bodies and flow indicators. Also available is a nozzle selection calculator called Tip Wizard which helps you locate the correct nozzle for your application. Tipology is another resource which explains considerations for spraying.

### 3.9 Selecting Nozzles from the Nozzle Catalogue – Airblast Sprayers

We need to select hollow cone discs with a core or whirl plate.

Nozzle output is based upon gallons/acre required above.

$$\text{GPM} = \frac{\text{GPA} \times \text{MPH} \times \text{row width}}{495}$$

Where:

*GPM* = total sprayer output in gallons/minute

*mph* = travel speed in miles per hour

*row width* = width between rows of vines in feet

495 = a mathematical constant to correct units of measurement

#### Example 1

We wish to apply a 50 gallons/acre. We have an airblast sprayer with 5 nozzles each side and a comfortable forward speed for our ground conditions is 3.5 mph. Rows are 9 feet apart.

$$\text{GPM} = \frac{\text{GPA} \times \text{MPH} \times \text{row width}}{495}$$

$$\text{GPM} = \frac{50 \times 3.5 \times 9}{495} = \frac{1575}{495} = 3.18$$

$$\text{GPM} = \frac{3.18}{2} = 1.59 \text{ per side}$$

GPM per nozzle = 1.59 divided by 5 nozzles = 0.318

Using the disc-core hollow cone nozzle table in the Spraying Systems catalogue (see Figure 3.9.1):

1. Read along the pressure row at the top of the table.
2. Read down the column for 100 psi until you read 0.32 gpm, look across to the left, you will see we can choose a D6 disc with a DC 23 whirl plate or core.
3. Alternatively you may read further down the column for 100 psi until you read 0.32 gpm, look across to the left and you will see we can choose a D2 disc with a DC45 whirl plate or core.
4. Alternatively you may read down the column for 200 psi until you read 0.32 gpm, look across to the left and you will see we can choose a D4 disc with a DC23 whirl plate or core.

#### Example 2

We wish to apply a 100 gallons/acre. We have an airblast sprayer with 5 nozzles each side and a comfortable forward speed for our ground conditions is 3.5 mph. Rows are 9 feet apart.

$$\text{GPM} = \frac{\text{GPA} \times \text{MPH} \times \text{row width}}{495}$$

$$\text{GPM} = \frac{100 \times 3.5 \times 9}{495} = \frac{3150}{495} = 6.36$$

$$\text{GPM} = \frac{6.36}{2} = 3.18 \text{ per side}$$

GPM per nozzle = 3.18 divided by 5 nozzles = 0.636

Using the disc-core hollow cone nozzle table in the Spraying Systems catalogue (See Figure 3.9.1):

1. Read along the pressure row at the top of the table.
2. Read down the column for 80 psi until you read 0.64 gpm, look across to the left, you will see we can choose a D5 disc with a DC 45 whirl plate or core.
3. Sometimes it is difficult to find the exact flow rate, so a close alternative maybe chosen.
4. Alternatively you may read down the column for 150psi until you read 0.65 gpm, look across to the left and you will see we can choose a D5 disc with a DC25 whirl plate or core.
5. Alternatively you may read down the column for 200 psi until you read 0.62 gpm, look across to the left and you will see we can choose a D4 disc with a DC25 whirl plate or core.

A better alternative to consider would be to use a one-piece hollow cone nozzle tip. These one-piece tips are easier to fit into the cap and are much easier to remove for cleaning, changing tips etc.

## 4 Emerging Pests

### 4.1 Introduction

Pests affecting a particular crop or group of crops is dynamic by nature. New pests (invasive species) are occasionally introduced into our country, state, or region from abroad. In addition, native species, perhaps previously considered minor pests of a berry crop, may become more prevalent or pervasive if their natural enemies are somehow impacted by their own set of pests. Environmental conditions during a particular season or successive seasons may be conducive for buildup and explosion of a previously minor pest or disease, causing a high level of economic impact.

This chapter is designed to provide commercial berry growers with information and resources on how to recognize new and/or emerging pest issues in berry crops through pest alert pages for each pest or disease as they appear. Each pest alert page contains information on identification, monitoring, management strategies and resources for the particular pest or disease.

For assistance with diagnosing berry problems use the Berry Diagnostic Tool at <https://blogs.cornell.edu/berrytool/>

or contact your Cornell Cooperative Extension Office for assistance.

To submit samples for disease diagnosis, contact Plant Disease Clinic, Cornell University, Plant Pathology section, SIPS, 334 Plant Science Building, Ithaca, NY 14853-4203, (607) 255-7850, [plantclinic.cornell.edu](http://plantclinic.cornell.edu).

To submit samples for insect diagnosis or for phone consultations, contact Insect Diagnostic Laboratory, Cornell University, Department of Entomology, 4140 Comstock Hall, Ithaca, NY 14853-2601, (607) 255-3250, [idl.entomology.cornell.edu](http://idl.entomology.cornell.edu).

The following resources are suggested to help with weed identification. If you are unable to identify your problem weed with the resources listed below please contact your Cornell Cooperative Extension Office for assistance.

1. Uva, R.H., Neal, J.C. and DiTomaso, J.M. 1997. Weeds of the Northeast. Cornell University Press, Ithaca, NY. 397 pgs.
2. Royer, F. and Dickinson, R. 1999. Weeds of Canada and the Northeastern United States. Lone Pine Publishing/University of Alberta Press. 434 pgs.

**Table 4.1.1. Emerging berry crop pests**

Emerging pest	Berry crops potentially affected:	See section:
<i>Arthropod Pests</i>		
Spotted Wing Drosophila	blueberries, brambles, day neutral strawberries, elderberries	4.2
Brown Marmorated Stinkbug	blueberries, brambles, possibly others	4.3
<i>Diseases</i>		
Blueberry Scorch Virus	blueberries	4.4
Blueberry Shock Virus	blueberries	4.5
Currant Cane Blight	currants	4.6
White Pine Blister Rust	currants	4.7
<i>Weeds</i>		
Wild Parsnip	all	4.8
Giant Hogweed	all	4.9
Herbicide-Resistant Weeds	all	4.10

### 4.2 Spotted Wing Drosophila

<b>Genus species:</b>	<i>Drosophila suzukii</i>
<b>Common name:</b>	Spotted wing drosophila
<b>Distribution:</b>	Becoming established throughout Northeast; first detected in NY in 2011
<b>Background:</b>	Originally from Asia, spotted wing drosophila (SWD) first showed up in California in about 2008 and has spread north into Oregon, Washington, and western Canada, south into Florida and now has been found in much of the USA. SWD was first reported throughout the Northeast in the late summer of 2011. In 2012, adult SWD first appeared in late June/early July and caused wide-spread injury to some berry crops.

## 5 Highbush Blueberries

### 5.1 Introduction

Numerous pests affect highbush blueberries, although the pest complex is much narrower than with many other fruit crops. For photographs of these pests and for detailed information on blueberry culture, obtain a copy of the Highbush Blueberry Production Guide (NRAES-55) from your Cornell Cooperative Extension Office or download a free fair use pdf copy (23.0 MB) of this publication at: <http://www.hort.cornell.edu/fruit/berry-guides/blueberry.pdf>. For approaches to organic pest management, download the 2021 Organic Production and IPM Guide for Blueberries at <https://ecommons.cornell.edu/handle/1813/42887.2> For assistance with diagnosing highbush blueberry problems, use the online Berry Diagnostic Tool at: <https://blogs.cornell.edu/berrytool/> or contact your Cornell Cooperative Extension Office for assistance.

To submit samples for disease diagnosis, contact Plant

Disease Clinic, Cornell University, Plant Pathology section, SIPS, 334 Plant Science Building, Ithaca, NY 14853-4203, (607) 255-7850, online at: [plantclinic.cornell.edu](http://plantclinic.cornell.edu). To submit samples for insect diagnosis or for phone consultations, contact Insect Diagnostic Laboratory, Cornell University, Department of Entomology, 4140 Comstock Hall, Ithaca, NY 14853-2601, (607) 255-3250, online at: [idl.entomology.cornell.edu](http://idl.entomology.cornell.edu).

The following information is provided for management of highbush blueberry pests. If a pesticide is used, it must be registered with the state and federal governments. Use Tables 5.1.2 (insecticides and miticides), 5.1.3 (fungicides), 5.1.4 (herbicides) and 5.1.5 (other highbush blueberry pest management products) to determine legal pesticides, their brand names, and any restrictions that may apply. Unless otherwise noted, use 100 gal water per acre. Always read the label before applying any pesticide.

**Table 5.1.1. Highbush blueberry pests and the associated stage of plant development.**

Stage of development	Scout for:	See section:
<b>Dormant</b>	Insect stem gall,	5.2.1.1
	Botrytis blossom and twig blight	5.2.1.2
	Cankers ( <i>Fusicoccum</i> and <i>Phomopsis</i> )	5.2.1.3 and 5.2.1.4
	Scale insects	5.2.1.5
<b>Green tip</b>	Mummyberry	5.2.2.1
	Botrytis blossom and twig blight	5.2.2.2
	Phomopsis canker	5.2.2.3
<b>Pink bud</b>	Mummyberry	5.2.3.1
	Botrytis blossom and twig blight	5.2.3.2
<b>Bloom</b>	Mummyberry	5.2.4.1
	Botrytis blossom and twig blight	5.2.4.2
	Anthrachnose fruit rot/blossom blight	5.2.4.3
	Blueberry leaf rust	5.2.4.4
	Powdery mildew	5.2.4.5
	Double spot	5.2.4.6
<b>Petal fall/Post bloom</b>	Cranberry fruitworm	5.2.5.1 and 5.2.6.1
	Cherry fruitworm	5.2.5.2 and 5.3.6.2
	Leafrollers	5.2.5.3 and 5.3.6.3
	Blueberry tip borer	5.2.5.4 and 5.2.6.4
	Plum curculio	5.2.5.5
<b>Summer preharvest</b>	Blueberry maggot	5.2.7.1
	Japanese beetle	5.2.7.2
	Anthrachnose fruit rot	5.2.7.3
	Blueberry stem borer	5.2.7.4
	Spotted wing drosophila	5.2.7.5
<b>Harvest</b>	Spotted wing drosophila	5.2.8.1
<b>Special pests</b>	Brown marmorated stink bug	5.2.9.1 and 4.3
	Ants	5.2.9.2
	Witches' broom	5.2.9.3



**Table 6.1.2. Selected insecticides and miticides registered for use on brambles (raspberries and blackberries).** (continued)

Active Ingredient	Trade Name	EPA Reg. Number	PHI (days)	REI (hrs)	IRAC Code
<b>mineral oil</b>	JMS Stylet-Oil	65564-1	0	4	
	SuffOil-X	48813-1-68539	UDH	4	
<b>pyrethrins</b>	PyGanic EC 1.4 II	1021-1771	Until Dry	12	3A
	PyGanic EC 5.0 II	1021-1772	Until Dry	12	3A
<b>spinetoram</b>	Delegate WG	62719-541	1	4	5
<b>spinosad</b>	Entrust	62719-282	1	4	5
	Entrust SC	62719-621	1	4	5
<b>thiamethoxam</b>	*†Actara	100-938	3	12	4A
<b>zeta-cypermethrin</b>	*Mustang MAXX	279-3426	1	12	3A

\* Restricted-use pesticide.

§ Potentially acceptable in certified organic production programs.

† Not for use in Nassau and Suffolk Counties.

Δ Rate and/or other application restrictions apply. See label for more information.

**Table 6.1.3. Selected fungicides registered for brambles (raspberries and blackberries).**

Active Ingredient	Trade Name	EPA Reg. Number	PHI (days)	REI (hrs)	FRAC Code
	§copper				
<b>azoxystrobin</b>	Abound 2.08F	100-1098	0	4	11
<b>azoxystrobin, propiconazole</b>	Quilt Xcel	100-1324	30	12	11
<b>Bacillus amyloliquefaciens str. D747</b>	Double Nickel 55	70051-108	0	4	BM 02
	Double Nickel LC	70051-107	0	4	BM 02
	Triathlon BA	70051-107-59807	0	4	BM 02
<b>Bacillus amyloliquefaciens ENV503</b>	Companion Maxx	94485-4	0	4	BM 02
	Biological Fungicide				
<b>Bacillus amyloliquefaciens str. MBI 600</b>	Serifel	71840-18	0	4	BM 02
<b>Bacillus mycooides isolate J*</b>	Lifeguard WG	70051-119	0	4	P6
<b>Bacillus subtilis str QST 713</b>	Serenade Opti	264-1160	0	4	BM 02
<b>basic copper sulfate</b>	Cuprofix Ultra 40 Disperss	70506-201	Refer to Label	48	M 01
	Basic Copper 53	45002-8	UDH	48	M 01
	Cuproxtat FL	55146-151	0	48	M 01
<b>calcium polysulfide</b>	*Miller Lime-Sulfur Solution	61842-30-90930	-	48	NC
	*Miller Sulforix	61842-31-90930	see label	48	NC
	*§Brandt Lime Sulfur	61842-30-48813	-	48	NC
<b>capric acid, caprylic acid</b>	Dart Fungicide EC				
<b>captan</b>	Captan Gold 80WDG	66222-58	3	72	M 04
	Captan 80 WDG	66222-58	3	72	M 04
<b>cinnamon oil</b>	Cinncerate	25(b)	0	-	NC
<b>copper hydroxide</b>	Champ Dry Prill	55146-57	0	48	M 01
	Champ WG	55146-1	-	48	M 01
	Kalmor	91411-11-59807	0	48	M 01
	Kentan DF	80289-2	-	48	M 01
	Kocide 2000-O	91411-10-70051	0	48	M 01
	Kocide 3000-O	91411-11-70051	0	48	M 01
	Nu-Cop 50 WP	45002-7	1	24	M 01

7.3.3.1 *Botrytis* Fruit Rot or Gray Mold (*Botrytis cinerea*) (continued)

Management Options	Guideline
Scouting/thresholds	None established.
Resistant cultivars	None known. Less severely impacted cultivars are ‘Earliglow’, ‘Jewel’ and ‘Clancy’. ‘Allstar’ and ‘Sable’ are very susceptible.
Cultural management	Disease control is greatly aided by controlling weeds and by using other practices that promote good air circulation and rapid drying of the fruit such as regulating plant density. Spring applications of nitrogen can dramatically increase the potential for infection.
Conventional and Organic products	Protection of blossoms is critical in gray mold management. Research in New York has consistently shown that excellent gray mold control can be obtained with just two fungicide sprays applied at early bloom and 10 days later. Continued protection of fruit prior to harvest may be necessary during prolonged periods of wet, foggy, or humid weather.

7.3.3.1 *Botrytis* Fruit Rot or Gray Mold (*Botrytis cinerea*)

Pesticide Options	Active Ingredient	Trade Name	Product Rate	Field Use EIQ	Comments	
Conventional	captan	Captan Gold 80WDG	1 7/8-3 3/4 lb/acre	10.8 - 9.2		
	captan	Captan 50WP	3-6 lb/acre	23.1 - 46.3		
	captan	Captan 80 WDG	1 7/8-3 3/4 lb/acre	10.8 - 9.2		
	When plastic mulch is used, do not apply CaptEstate within 16 feet of naturally vegetated or aquatic areas.					
	ciprodinil, fludioxonil	†Switch 62.5WG		11-14 oz/acre	11 - 14	See comments below.
	Use of Switch in Nassau and Suffolk Counties limited to strawberries and onions.					
	difenoconazole, ciprodinil	Inspire Super		16-20 fl oz/acre	10.3 - 12.9	
	fenhexamid	Elevate 50WDG		1.5 lb/acre	9.3	Elevate is the most effective bloom spray.
	fenpyrazamine	Protexio		19 fl oz/acre	NA	
	fluxapyroxad	*†Tesaris		3.4 to 5.7 fl oz/acre	1.3 - 2.1	
	iprodione	Iprodione 4L AG		1.5-2 pts/acre	15.8 - 21	Do not apply after first fruiting flower.
	isofetamid	Kenja 400SC		15.5 fl oz/acre	NA	
	mandestrobin	*†Intuity		6 fl oz/acre	NA	
	Organic	polyoxin D zinc salt	OSO 5% SC Fungicide	6.5 - 13 fl oz/acre	0.5 - 1	
pyraclostrobin, boscalid		Pristine	18.5-23.0 oz/acre	11.7 - 14.5		
pyraclostrobin, fluxapyroxad		*†Merivon	11 fl oz/acre	7.3		
Bacillus amyloliquefaciens ENV503		Companion Maxx Biological Fungicide	32-96 fl oz/acre	NA		
Bacillus amyloliquefaciens str. D747		Double Nickel 55	0.25-3 lb/acre	0.6 - 7.7	Suppression only.	
Bacillus amyloliquefaciens str. D747		Double Nickel LC	0.5-6 qt/acre	10.6 - 126.8		
Bacillus amyloliquefaciens str. D747		Triathlon BA	0.5-6 qt/acre	10.6 - 126.8	Suppression only.	

**Table 8.3.1. Application details for herbicides labeled for use on Ribes in New York State.**

<b>Herbicide</b>	<b>Formulation</b>	<b>Amount of product per sprayed acre</b>	<b>lb active ingredient</b>
<b>dichlobenil</b>	Casoron 4G	100-150 lb/acre (annuals); 150 lb (perennials)	4-6 lbs/acre 6 lbs/ac (perennials)
<ul style="list-style-type: none"> <li>• Controls germinating seeds and seedlings of many annual broadleaf and grass weeds and may provide some control of select perennial species.</li> <li>• May be used on bearing, non-bearing and nursery stock. Do not apply until 4 weeks after transplanting. For a soil surface treatment, apply Casoron 4G from November 15 to February 15.</li> <li>• Do not make surface applications to areas which have been cultivated during the fall or summer prior to application. For incorporated treatments, apply and incorporate immediately from late fall to very early spring before May 1. Uniform application is essential – calibration of applicator designed for spreading granules is appropriate.</li> </ul>			
<b>flumioxazin</b>	Chateau SW	12 oz/acre	0.38 lbs/acre
<ul style="list-style-type: none"> <li>• Pre- and some post-emergence control of annual broadleaves and suppression of some annual grasses.</li> <li>• Pre-emergent applications should be made to a weed free soil surface prior to weed emergence. Moisture is necessary to activate Chateau SW on soil for residual weed control. Chateau SW should be tank mixed with a labeled burndown herbicide for post-emergence control.</li> <li>• Do not apply to bushberries established less than 2 years unless they are protected from spray by non-porous wrap, grow tubes or waxed containers. Do not allow spray to contact new or green bark or foliage. Do not apply more than 12 oz/A of Chateau SW during a single application or during a 12-month period. Allow 30 days between applications. Note: A maximum rate of 6 oz/A/application should be used on any soil with sand/gravel content over 80% if the bushes are less than 3 years of age; 2 applications of 6 oz/A in a 12-month period can still be made as long as there have been 60 days between applications. Dust created by mowing in treated areas can injure desirable vegetation; see label for details. Do not apply withing 300 yards of non-dormant pome or stone fruit.</li> </ul>			
<b>napropamide</b>	Devrinol 2-XT	2 gal/acre	4 lbs/acre
<ul style="list-style-type: none"> <li>• Pre-emergence control of annual grasses and some broadleaf weeds.</li> <li>• For use in newly planted or established crops. Apply fall through early spring but not to frozen ground. Devrinol is sensitive to photodegradation, see labels regarding incorporation depth and timing. Leaf litter or weedy vegetation can interfere with soil-herbicide contact, which may adversely affect weed control.</li> <li>• Devrinol is not recommended for use on soils containing more than 10% organic matter. Do not apply more than 2 gal/A Devrinol 2-XT per crop cycle. For use on both currants and gooseberries.</li> </ul>			
<b>napropamide</b>	Devrinol DF-XT	8 lb/acre	4 lbs/acre
<ul style="list-style-type: none"> <li>• Pre-emergence control of annual grasses and some broadleaf weeds.</li> <li>• For use in newly planted or established crops. Apply fall through early spring but not to frozen ground. Devrinol is sensitive to photodegradation, see labels regarding incorporation depth and timing. Leaf litter or weedy vegetation can interfere with soil-herbicide contact, which may adversely affect weed control.</li> <li>• Devrinol is not recommended for use on soils containing more than 10% organic matter. Do not apply more than 8 lb/A Devrinol DF-XT per crop cycle. For use on both currants and gooseberries.</li> </ul>			
<b>oryzalin</b>	Surflan A.S.	2-6 qt/acre	2-6 lbs/acre
<ul style="list-style-type: none"> <li>• Pre-emergence control of annual grasses and some broadleaf weeds.</li> <li>• For use in non-bearing and bearing crops. Apply directly to the soil surface, prior to weed emergence, that is free of leaf litter, standing vegetation and large soil clods. A single 0.5 to 1 inch of water is required to activate Surflan A.S.; 1 inch or more of water is needed on fine-textured, high organic matter soils. If weeds begin to emerge, a shallow cultivation to a depth of 1 to 2 inches will destroy existing weeds and place Surflan A.S. in the zone of weed germination.</li> <li>• Do not use on soils containing more than 5% organic matter. Do not apply more than 12 qt/A/year. To broaden spectrum of weed control Surflan A.S. may be applied in tank mix combination with labeled rates of other herbicides products; see label for details.</li> </ul>			
<b>POSTEMERGENT</b>			
<b>carfentrazone-ethyl</b>	Aim EC	1-2 fl oz/acre	0.016-0.031 lbs/acre
<ul style="list-style-type: none"> <li>• Post-emergence control of annual broadleaf weeds.</li> <li>• May be applied as broadcast application during dormant stage of crop; do not apply more than 2 fl oz/A during the dormant season. Can be used as a directed application for post-emergence weed control. Newly planted bush berries should only be treated with shielded sprayers or hooded sprayers.</li> <li>• Do not allow Aim to contact new, green or desirable tissues. Use lower rate for control of small weed seedlings (2-3 leaf stage); use higher rate for control of larger weeds (up to 6 leaf stage). Applications beyond 6 leaf stage may result in only partial control. Requires NIS, MSO, or COC. Do not exceed 6.1 fl oz A/season. See label regarding adjuvant requirements.</li> </ul>			

*Table continued on next page.*

## 9 Cranberries

### 9.1 Introduction

Both upland (dry) and bog cranberry production in NY are relatively new. For information on cranberry production, the following references are suggested:

*Cranberry Agriculture in Maine*, available online at: <http://umaine.edu/cranberries/>

*Cranberry Production - A Guide for Massachusetts*, available online from University of Massachusetts Press: [https://scholarworks.umass.edu/cranberry\\_prod\\_guide/](https://scholarworks.umass.edu/cranberry_prod_guide/)

For information of cranberry insect identification, monitoring and management see: *Cranberry Insects of the Northeast*, available on line at: [www.umass.edu/cranberry/downloads/Cranberry Insects of the NorthEast.Averill.Sylvia.Franklin.2000.pdf](http://www.umass.edu/cranberry/downloads/Cranberry%20Insects%20of%20the%20NorthEast.Averill.Sylvia.Franklin.2000.pdf).

To submit samples for disease diagnosis, contact Plant Disease Clinic, Cornell University, Plant Pathology section, SIPS, 334 Plant Science Building, Ithaca, NY 14853-4203, (607) 255-7850, online at: [plantclinic.cornell.edu](http://plantclinic.cornell.edu).

To submit samples for insect diagnosis or for phone consultations, contact Insect Diagnostic Laboratory, Cornell University, Department of Entomology, 4140 Comstock Hall, Ithaca, NY 14853-2601, (607) 255-3250, online at: [idl.entomology.cornell.edu](http://idl.entomology.cornell.edu).

Pesticides used for cranberries must be registered with the state and federal governments. Use Tables 9.1.2 (insecticides and miticides), 9.1.3 (fungicides), 9.1.4 (herbicides), and 9.1.5 (other pest management products for cranberries) to determine legal pesticides, their brand names, and any restrictions that may apply. Products listed in this table include only those labeled for pests of concern in New York State.

**Table 9.1.1. Cranberry pests and the associated stage of plant development.**

Stage of development:	Scout for:	See section:
<b>Dormant</b>	Red Leaf Spot and Red Shoot Disease	9.2.1.1
<b>Bud break</b>	Cottonball	9.2.2.1
	Red gall	9.2.2.2
<b>Bloom</b>	Upright Dieback and Viscid Rot	9.2.3.1
	Early Fruit Rot	9.2.3.2
<b>Harvest to Post Harvest</b>	End Rot	9.2.4.1

**NOTE:** For purposes of slowing resistance development in pest populations growers should alternate use of products with different modes of action (indicated by number/letter codes in the last column of the following table) whenever possible. Product trade names are provided but other products with the same active ingredient may be labeled for the same purposes. Note: With most pesticides, reentry is not allowed until spray material has dried. Read the label.

**Table 9.1.2. Selected insecticides and miticides registered for use on cranberries.**

Active Ingredient	Trade Name	EPA Reg. No.	PHI (days)	REI (hrs)	IRAC Code
<b>acephate</b>	*Orthene 97	5481-8978	90	24	1B
<b>acetamiprid</b>	*Assail 30SG	8033-36-70506	1	12	4A
<b>azadirachtin</b>	*AzaSol	81899-4-74578	0	4	UN
	Molt-X	68539-11	0	4	
<b>Bacillus thuringiensis subsp. kurstaki</b>	Dipel DF	73049-39	0	4	11
<b>Beauveria bassiana GH4</b>	Mycotrol ESO	82074-1	0	4	
<b>buprofezin</b>	*†Courier	71711-20	3	12	16
<b>carbaryl</b>	Sevin XLR Plus	61842-37	7	12	1A
<b>Chromobacterium subsugae</b>	Grandevo WDG	84059-27	0	4	
<b>diazinon</b>	*Diazinon Ag500	66222-9	7	5 days	1B
	*Diazinon AG600 WBC	66222-103-34704	7	5 days	
	*Diazinon 50W	66222-10	7	5 days	
<b>flonicamid</b>	Beleaf	71512-10-279	0	12	9C

# 10 Elderberries

## 10.1 Introduction

Small commercial plantings of elderberry exist in NYS. For information on cultural practices for elderberries, the following references are suggested:

*Growing and Marketing Elderberries*

<http://www.centerforagroforestry.org/pubs/2014GrowingElderberryGuide.pdf>

*Elderberry Culture in New York State*, available online from: <https://ecommons.cornell.edu/handle/1813/5098>

*Growing Currants, Gooseberries, and Elderberries in Wisconsin*, available online at <https://learningstore.extension.wisc.edu/products/growing-currants-gooseberries-and-elderberries-in-wisconsin-p752>

*Cornell Guide to Growing Fruit at Home* (IB-156) available from your local Cornell Cooperative Extension Office or online at <https://ecommons.cornell.edu/handle/1813/67>

To submit samples for disease diagnosis, contact Plant Disease Clinic, Cornell University, Plant Pathology section, SIPS, 334 Plant Science Building, Ithaca, NY 14853-4203, (607) 255-7850, online at: [plantclinic.cornell.edu](http://plantclinic.cornell.edu)

To submit samples for insect diagnosis or for phone consultations, contact Insect Diagnostic Laboratory, Cornell University, Department of Entomology, 4140 Comstock Hall, Ithaca, NY 14853-2601, (607) 255-3250, online at: [idl.entomology.cornell.edu](http://idl.entomology.cornell.edu).

Pesticides used for elderberries must be registered with the state and federal governments. Use Tables 10.1.2 (insecticides and miticides), 10.1.3 (fungicides), 10.1.4 (herbicides), and 10.1.5 (other pest management products for elderberries) to determine legal pesticides, their brand names, and any restrictions that may apply. Products listed in this table include only those labeled for pests of concern in New York State.

**Table 10.1.1. Elderberry pests and the associated stage of plant development.**

Stage of development:	Scout for:	See section:
<b>Bloom</b>	Powdery Mildew	10.2.1.1
<b>Fruit ripening through Harvest</b>	Spotted Wing Drosophila	10.2.2.1
<b>Special Pests</b>	Verticillium Wilt	10.2.3.1
	Elder shoot borer	10.2.3.2
	Other Insect Damage	10.2.3.3

**NOTE:** For purposes of slowing resistance development in pest populations growers should alternate use of products with different modes of action (indicated by number/letter codes in the last column of the following table) whenever possible. Product trade names are provided but other products with the same active ingredient may be labeled for the same purposes. Note: With most pesticides, reentry is not allowed until spray material has dried. Read the label.

**Table 10.1.2. Selected insecticides and miticides registered for use on elderberries.**

Active Ingredient	Trade Name	EPA Reg. Number	PHI (days)	REI (hrs)	IRAC Code
<b>acetamiprid</b>	*Assail 30SG	8033-36-70506	1	12	4A
<b>azadirachtin</b>	*AzaSol	81899-4-74578	0	4	UN
	Molt-X	68539-11	0	4	UN
<b>bifenthrin</b>	*Bifenture 10DF	70506-227	1	12	3A
	*Brigade WSB	279-3108	1	12	3A
<b>cyantraniliprole</b>	*†Exirel	279-9615	3	12	28
<b>fenpropathrin</b>	*ΔDanitol 2.4EC	59639-35	3	24	3A
<b>spinetoram</b>	Delegate WG	62719-541	1 or 3 (see label)	4	5
<b>spinosad</b>	Entrust	62719-282	3	4	5
	Entrust SC	62719-621	1	4	5
<b>zeta-cypermethrin</b>	*Mustang MAXX	279-3426	1	12	3A

\* Restricted-use pesticide.

§ Potentially acceptable in certified organic production programs.

† Not for use in Nassau and Suffolk Counties.

Δ Rate and/or other application restrictions apply. See label for more information.

# 11 Juneberries/Saskatoons

## 11.1 Introduction

Many small commercial plantings of Juneberries (known in Canada and the Midwest as “saskatoons”) are established in New York State. Juneberries (*Amelanchier alnifolia*) are pome fruits in the family Rosaceae, which includes apples and roses and so they are likely to show similar pest and disease susceptibility. Observations from Canada and Michigan show that diseases are most often fungal (e.g. Entomosporium spot) or bacterial (e.g. fireblight) rather than viral.

For information on cultural practices for Juneberries, the following references are suggested:

*Saskatoon Berry Production Manual*, published by the Alberta, Canada provincial government  
[http://www1.agric.gov.ab.ca/\\$department/deptdocs.nsf/all/agdex14362](http://www1.agric.gov.ab.ca/$department/deptdocs.nsf/all/agdex14362)

*Growing Saskatoons* available online at:  
<https://www.extension.uidaho.edu/publishing/pdf/BUL/BUL0866.pdf>

Juneberries require good air circulation, moderate soil fertility, full sun exposure, and supplemental irrigation to reduce stress.

Insect pests of commercial Juneberries in New York are uncommon, since crop prevalence is very low. As more berries are planted, pest and disease pressure will increase. Growers must plan for a pest management program that includes cultural controls as well as the application of fungicides and insecticides.

New York has a widespread population of a closely-related

native plant species in the *Amelanchier* genus. Pests and diseases that affect *Amelanchier* spp. may also infect *Amelanchier alnifolia*.

In Juneberry production areas of North America, the following pests and diseases have been observed:

1. Saskatoon sawfly (*Hoplocampa montanicola*),
2. Saskatoon budmoth (*Epinota bicordana*)
3. Woolly elm aphid (*Eriosoma americanum*)
4. Entomosporium spot (*Argyrotaenia quadrifasciana*)
5. Saskatoon juniper rust (*Gymnosporangium* spp.)
6. Powdery mildew (*Podosphaera clandestina*)
7. Fire blight (*Erwinia amylovora*)

To submit samples for disease diagnosis, contact Plant Disease Clinic, Cornell University, Department of Plant Pathology, 334 Plant Science Building, Ithaca, NY 14853-4203, (607) 255-7850, online at: [plantclinic.cornell.edu](http://plantclinic.cornell.edu).

To submit samples for insect diagnosis or for phone consultations, contact Insect Diagnostic Laboratory, Cornell University, Department of Entomology, 4140 Comstock Hall, Ithaca, NY 14853-2601, (607) 255-3250, online at: [idl.entomology.cornell.edu](http://idl.entomology.cornell.edu).

Pesticides used for Juneberries must be registered with the state and federal governments. Use Tables 11.1.2 (insecticides and miticides), 11.1.3 (fungicides), 11.1.4 (herbicides) and 11.1.5 (other pest management products for Juneberries) to determine legal pesticides, their brand names, and any restrictions that may apply. Products listed in this table include only those labeled for pests of concern in New York State.

**Table 11.1.1. Juneberry pests and the associated stage of plant development.**

Information taken from production regions with 5 or more years of Juneberry cropping. These pests have not necessarily been observed on Juneberry plantings in NYS.

Month	Stage of development:	Scout for:	See section:
Late April / May	Flower bud break	Entomosporium spot	11.2.1
		Saskatoon juniper rust	11.2.2
		Powdery mildew	11.2.3
May	White tip/Balloon/Bloom	Entomosporium spot	11.2.1
		Saskatoon juniper rust	11.2.2
		Saskatoon sawfly	11.3.1
May / June	Petal drop/fruit set	Entomosporium spot	11.2.1
		Saskatoon juniper rust	11.2.2
		Fireblight	11.2.4
		Saskatoon sawfly	11.3.1