



Small Fruit Fact Sheet

04-1

Prepared by the University of Massachusetts Fruit Team

Small Fruit Pest Control Recommendations Update to 2003-2004 Guide

Sonia Schloemann, UMass Extension Small Fruit Specialist

The New England Small Fruit Pest Management Guide is published every other year, and so, in between publications, there are often changes to labeled materials for the crops that are covered by the guide. These changes may be in the form of label deletions, label changes (e.g., rates, phi's , rei's, etc.), or new materials that have been registered since the printing of the guide. The list below is not exhaustive, but covers most of the updates. To obtain full labels of any of these or other materials, go to the CDMS website at <http://www.cdms.net/manuf/manuf.asp>.

Below are tables that summarize label changes (additions, deletion, alterations) that have come up recently. Some of these changes are already incorporated in the Guide, but are worth reiterating here because they are relatively new. Some do not appear in the guide because they are too new.

The tables include reference to Pesticide Groups[‡], a new designation that helps identify which materials have similar chemistry and modes of action. By choosing materials from different Groups, it will help growers avoid the development of resistance by alternating between different Groups. To delay the buildup of resistance to a particular chemical, it should be alternated or combined with a material with a different mode of action (one that falls in a different activity group).

If you have questions about what is presented here, please contact Sonia Schloemann at 413-545-4347 or via email at sgs@umext.umass.edu. The updates are arranged by types starting with fungicides, then insecticides, then herbicides. As always, use this document as a reference only. Rely on the label language as the definitive source for how a material is to be used. The label is the law.

New Fungicides in 2003 & 2004

Material/Group [‡]	Strawberry	Bushberry Group*	Caneberry Group**	Grapes
Cabrio® 11	Anthracnose Leaf spot Powdery mildew Suppression of: Botrytis	Alternaria Anthracnose Leaf spot Phomopsis twig blight Powdery mildew Rust Suppression of: Botrytis Mummyberry	Powdery mildew Rust Spur blight Leaf spot Suppression of: Botrytis	
Captevate™ 68 WDG 17&M	Botrytis gray mold Anthracnose	Botritis blossom blight Anthracnose Mummyberry		
Elevate® 17	Botrytis gray mold	Botrytis blossom blight	Botrytis fruit rot and cane blight	Botrytis bunch rot
Endura® 7				Botrytis bunch rot Powdery mildew
ProPhyt™				Downy mildew
Pristine® 7&11	Anthracnose Botrytis Leaf spot Powdery mildew	Alternaria Anthracnose Botrytis Mummyberry Phomopsis Powdery Mildew	Botrytis Leaf spot Rust Spur blight Powdery Mildew	Angular leaf spot Anthracnose Black rot Bunch rot complex Downey mildew Phomopsis Powdery mildew Ripe rot

Quintec™ 13				Powdery mildew
Switch™ 62.5 WG and supplemental label 9&12	Botrytis gray mold	Mummy Berry Anthracnose Alternaria fruit rot Phomopsis twig blight	Botrytis fruit rot	
Fungicide label deletions in 2003 & 2004				
Material/Group [‡]	Strawberry	Bushberry Group	Caneberry Group	Grapes
Benlate	Registration cancelled	Registration cancelled	Registration cancelled	Registration cancelled
Rovral®		No longer labeled on highbush blueberry due to phytotoxicity problems in '03. Still retains all other labeled uses		
Fungicide label changes in 2003 & 2004				
Material/Group [‡]	Strawberry	Bushberry Group	Caneberry Group***	Grapes
Captan 80WDG (changes to this formulation only)	REI reduced to 24 hrs.		Botrytis fruit rot Anthracnose Spurblight	REI reduced to 24 hrs.
Nova	Leaf Spot			

* busberry group: blueberry, currants, gooseberry, huckleberry, juneberry, elderberry and others

** caneberry groups: raspberry, blackberry, loganberry, boysenberry, etc.

*** captan not previously labeled for the caneberry group.

Notes

Cabrio (pyraclostrobin), a strobilurin fungicide, received a label for blueberries, strawberries, raspberries, blackberries, gooseberries, and currants last year. See label for restrictions. **REI= 24 hrs for berries, PHI=0 days.**

Captan 80 WDG: Several changes and additions have occurred on the Captan 80 WDG label and **only** on this formulation.

The Re-entry Interval (REI) has been reduced from 4 days to 24 hours on strawberries, apples, apricots, cherries, nectarines, plums/fresh prunes, and peaches. This is a significant change for growers wishing to use Captan, but having problems with the 4 day REI. The REI for blueberries, grapes, raspberries, blackberries, and dewberries is 72 hours. **Blackberries, raspberries and dewberries have been added to the label.**

Captevate 68WDG: (fenhexamid and captan) Approved for use on strawberries and blueberries for control of gray mold and anthracnose; and control of mummyberry on blueberry. **REI = 24 hours, PHI= 0 days.**

Elevate (fenhexamid) is labeled for control of Botrytis cinerea in bushberries, caneberries, strawberries and grapes. See label for restrictions. **REI = 12 hours, PHI = 0 days.**

Endura (boscalid) is related to Pristine fungicide above and has protectant and eradicant activity against Botrytis bunch rot and powdery mildew of grapes. **PHI is 14 days and REI is 12 hours.**

Pristine (pyraclostrobin and boscalid) is approved for use in crops in the berry crop grouping (blueberries, currants, gooseberries, currants, huckleberries, blackberries or raspberries, and their hybrids) and strawberries. Pristine is a mixture of two active ingredients. One is *boscalid*, which is also found in Endura, recently labeled for grapes and other crops, while the other is *pyraclostrobin*, the active ingredient also found in Cabrio. **REI = 24 hours** on caneberries and bushberries, and **12 hours on strawberries, PHI = 0 days.**

ProPhyt (potassium phosphite), a formulation of phosphorous acid, is a systemic fungicide for the control of downy mildew on grapes. It does not control any other major grape disease. **REI = 4 hours, PHI = 0 days.**

Switch 62.5% WDG: (cyprodinil and fludioxonil) Recently registered for use on several berry crops either via a full Section 3 label or via a supplemental label. Uses under the supplemental label include all berries except strawberries and therefore require possession of the supplemental label at the time of application. **REI=12 hours, PHI = 0 days on all crops.**

New Insecticides in 2003 & 2004				
Material/Group [‡]	Strawberry	Bushberry Group*	Caneberry Group**	Grapes
Admire® 2F & supplemental label 4	Whitefly Aphids White grub complex	Oriental beetle Japanese beetle		
Assail®™ WSB 4				leafhoppers, glassywinged sharpshooter, aphids
Capture® 2EC 3			Leafrollers Orange tortrix moth Root weevils Mites	
Confirm™ 2F 18		Cranberry fruitworm Cherry fruitworm Leafrollers Spanworms Gypsy moth	Leafrollers Gypsy moth	

Entrust™ 5 <i>Organic</i>	Armyworms Leafrollers Thrips	Fruitworms Currant fruitfly Leafrollers Loopers Thrips		
Esteem® 35WP Supplemental label		Cranberry fruitworm Cherry fruitworm Lecanium scale		
Provado® 4	Aphid Whitefly Spittlebug	Aphids Leafhoppers Thrips Japanese beetle		Leafhoppers Mealybugs
SpinTor 2C 5	Armyworms Leafrollers Thrips	Fruitworms Currant fruitfly Leafrollers Loopers Thrips	Leafrollers Raspberry fruitworm Green fruitworm	Grape berry moth Redbanded leafroller Thrips
Surround WP <i>Organic</i>		Japanese beetle Plum curculio Rose chafer	Blackberry psyllid Japanese beetle Leaf hoppers Rose chafer	Japanese beetle Rose chafer Grape leaf skeletonizer leafhoppers
Thionex 50WSB 2A	Tarnished plant bug Spittlebug Aphid Whitefly Cyclamen mite	Blueberry bud mite		Grape leafhopper Grape phylloxera Rose chafer
Insecticide label deletions in 2003 & 2004				
Material	Strawberry	Bushberry Group	Caneberry Group	Grapes
Guthion™ Solupak	Deleted	Blueberries deleted for New England States	No longer labeled for aphids; only labeled for crown borer	Deleted

* busberry group: blueberry, currants, gooseberry, huckleberry, juneberry, elderberry and others

** caneberry groups: raspberry, blackberry, loganberry, boysenberry, etc.

Notes:

Admire® 2F (imidacloprid): In strawberries Admire® 2F may not be applied both in the spring and post-harvest during renovation. Admire® 2F must be incorporated into the soil with at least 0.25 inches of irrigation or rainfall within two hours of application. Admire is a ground applied formulation of imidacloprid. Regardless of formulation or application type (soil or foliar), do not apply more than a total of 0.5 lb of active ingredient per acre Admire® or Provado® or a combination of Admire® and Provado® per season. Do not apply more than a total of 40 fl. oz/acre (0.5 lb a.i./acre) per season of Provado (foliar application). **PHI = 14 days in strawberry and 7 days in bushberries; REI = 12 hours.**

Assail® WSB (acetamiprid): Labeled in grapes for control of leafhoppers and glassy winged sharpshooters (vectors of Pierce's Disease). **PHI = 7 days, REI = 12 hours.**

Capture™ 2EC (bifenthrin): Restricted Use Material. Same active ingredient as Brigade® which is labeled for use in strawberries. Very toxic to mite predators. **PHI = 3 days, REI = 12 hours.**

Confirm™ 2F (tebufenozide): Labeled for bushberries and caneberries against various Lepidopterous pests. **PHI = 14 days; REI = 4 hours.**

Entrust™ (spinosad) Entrust™ is an organic (OMRI) approved formulation of SpinTor 2C. Registration expanded on blueberry to include blueberry maggot in addition to the cranberry/cherry fruitworm complex. **PHI = 3 days, REI = 4 hours.**

Esteem 35WP (pyriproxyfen): An insect growth regulator labeled for several Lepidopterous pests in bushberries. Only effective on non-adult life stages. Only labeled under a supplemental label for bushberries which requires the applicator to have a copy in hand when applying this material. Read label for use instructions. **PHI = 7 days, REI = 12 hours.**

Guthion™ Solupak (azinphos methyl); Restricted use material. EPA announced the new label for Guthion, effective August 21, 2003. Grapes and strawberries are now deleted from the label. Guthion remains available for

caneberries, nectarines and peaches until 2005. Guthion use in blueberries retained in some states, but not in New England. Guthion Solupak will be the only formulation available. **PHI = 7 days; 30 days for PYO, REI = 7 days**

Provado® 1.6 F (imidacloprid): Regardless of formulation or application type (soil or foliar), do not apply more than a total of 0.5 lb of active ingredient per acre Admire® or Provado® or a combination of Admire® and Provado® per season. Do not apply more than a total of 32 fl. oz/acre (0.5 lb a.i./acre) per season of Admire® (soil application). No more than one application of Admire® can be made per season. **PHI = 7 days in strawberry and 3 days in bushberries; REI = 12 hours.**

SpinTor™ 2C (spinosad): Label has been expanded on blueberry, now to include blueberry maggot in addition to the cranberry/cherry fruitworm complex. **PHI = 3 days, REI = 4 hours**

Surround™ WP (kaolin): Generally labeled for suppression only. Supplemental measures may be needed for control. See label for special instructions when applying to grapes. **PHI = 0, REI = 4 hours.**

Thionex™ 50WSB (endosulfan): A new formulation of endosulfan (also the a.i. in Thiodan) for use in grapes, blueberries and strawberries. May only be used on dormant blueberry plants. Phytotoxic on several grape varieties. Other severe restrictions apply, so read label carefully. **PHI = 4 days in strawberry, 7 days in grape, REI = 24 hours.**

Herbicide Label Changes for Small Fruit

Strawberries:

2,4-D Formulation Change: Amine 4 is the new formulation of 2,4-D amine (salt) available for use in strawberry. Formula 40 will no longer be available. There are many ester and low-volatile ester formulations on the market for other uses of 2,4-D. Be certain to NEVER use ester or low-volatile ester formulation of 2,4-D on vegetable or fruit crops. Both ester and low-volatile ester formulations of 2,4-D can move from the target area after application under warm weather or low humidity conditions. They have the potential to damage crop far from the site of application and their movement is unpredictable.

Gramoxone (paraquat) Formulation Change: Gramoxone Max 3S has replaced Gramoxone Extra for all uses. Label rates are generally lower than the old formulation since Gramoxone Max contains more active ingredient per gallon. As with the old formulation, the use of a non-ionic surfactant is still required. With Gramoxone, always remember that better weed coverage through the use of more water per acre will result in better weed kill.

Dacthal 75WP (DCPA): Dacthal herbicide was back on the market during 2002 and 2003 with all the previous labeling. The price of this product has more than doubled, however, rising to approximately \$14 per pound. One critical uses of this product is on newly transplanted strawberry. The revised Sinbar label, described below, has somewhat lessened the need for Dacthal for broadleaf weed control but does not replace Dacthal for control of annual grasses. Because of the expense of this product, it will not be commonly used.

Sinbar 80 WP (terbacil): The supplemental label for strawberries has been revised to allow use during the transplant year as well as on soils with between 0.5% and 2% organic matter. During the planting year, Sinbar may be applied at 2 to 3 ounces per acre after transplanting but before new runners start to root. If strawberry plants have developed any new foliage prior to application, irrigation or rainfall (0.5 to 1 inch) is required to wash the Sinbar off the strawberry plants. In late summer or early fall, a second application may be applied at 2 to 6 ounces per acre to control winter annual weeds. This application must also be followed by 0.5 to 1 inch of irrigation or rainfall to wash the Sinbar off the plants. A third application of 2 to 4 ounces per acre can be applied, as usual, after the strawberry plants are dormant and just prior to mulching. For soils with at least 2% organic matter, there is no maximum amount per application; however, no more than 8 ounces of Sinbar can be applied per year. For soils with between 1 and 2% organic matter, a maximum of 4 ounces of Sinbar can be applied at any one time with an annual maximum of 8 ounces per acre. For soils with between 0.5 and 1% organic matter, a maximum of 3 ounces of Sinbar can be applied at any one time with an annual maximum of 6 ounces per acre.

Following the establishment year, applications can only be made just after renovation and just prior to mulching. Applications are now allowed, however, on soils with between 0.5% and 2% organic matter using the same guidelines for rates as above. As always, be careful with Sinbar in strawberries, especially with potential overlap of sprayer passes which will double the rate and increase the potential for injury in some varieties. Please consult the new supplemental label for addition information, rates, precautions, etc.

Blueberries:

Velpar DF Herbicide Registered for Highbush Blueberries

Velpar DF herbicide has been registered for use in New England for control of certain herbaceous and woody weeds in established highbush blueberries. Velpar has been registered in certain states for both highbush and lowbush use since 1982. This is a supplemental label, issued during 2002, that is available through dealers. Apply 1.3 to 2.6 pounds (20 to 40 ounces) of Velpar DF per treated acre to pruned blueberry fields in the spring BEFORE blueberry

leaf emergence. Velpar DF should be applied as a directed spray to contact the soil and weeds. When used according to the label, Velpar DF controls many herbaceous and woody weeds including barnyardgrass, wild cherry, gold-enrod, quackgrass, sheep sorrel, red sorrel, witch grass, dog fennel, and fall panicum. It will also suppress briars (blackberry and raspberry) and broomsedge. Using properly calibrated ground equipment, make applications in sufficient water to provide thorough and uniform coverage of the treated area (Usually 20-40 gallons per treated acre). Spray booms must be shut off while starting, slowing or stopping, or turning, as injury to the crop may result from over application.

Since the effects of Velpar DF on blueberries vary with soil, plant vigor, uniformity of application, and amount of rainfall, it is suggested that growers limit their first use to small areas. Most blueberries are resistant to Velpar DF, but some clones are susceptible to injury. Application to blueberry plants after leaf emergence will result in crop injury. Use lower rates on soil that are heavily mulched and on poorly drained soils, but do not use if there is standing water. Do not use on sands, loamy sands, or sandy loam soils. Do not apply to frozen or snow-covered ground. Treat only plantings ESTABLISHED 3 YEARS OR MORE. See the label for further details. Do not use other formulations of Velpar herbicide.

[‡]Pesticide Groups for Small Fruit

This information was developed from an article by Kathy Demchak, Penn State University, "The Vegetable and Small Fruit Gazette, Vol. 7, No. 1, 2 & 3 and from "Pesticide Registration (PR) Notice 2001-5, Guidelines for Pesticide Registrants on Pesticide Resistance Management Labeling" on EPA's Web site (<http://www.epa.gov>).

Fungicides			
Group	Target site of action	Chemical Family	Active Ingredient (Trade Name)
Group 1	Inhibition of tubulin formation	Benzimidazoles	benomyl (Benlate) and thiophanate-methyl (Topsin M)
Group 2	Affect cell division, DNA and RNA synthesis, and metabolism	Dicarboximides	iprodione (Rovral) and vinclozolin (Ronilan)
Group 3	Demethylation inhibitor	Triazoles	myclobutanil (Nova), fenbuconazole (Indar) propiconazole (Orbit), section 18's only
Group 4	Affects RNA syntesis	Acylamines	metalaxyl (Ridomil),
Group 9	Anilinopyrimidine	Anilinopyrimidine	cyprodinil (one of the active ingredients in Switch)
Group 11	Quinone outside inhibitors	Strobilurins	azoxystrobin (Quadris and Abound) and pyraclostrobin (Cabrio)
Group 12	Phenylpyrroles	Phenylpyrroles	fludioxinil (the other active ingredient in Switch)
Group 17	Hydroxylanilide	Hydroxylanilide	fenhexamid (Elevate)
Group M	multisite activity	Phosphates Inorganics Dithiocarbamates Chloroalkythios Chloronitriles Guanidines	fosetyl-Al (Aliette), fungicides containing copper or sulfur as the active ingredient, thiram (Thiram), ziram (Ziram), captan (Captan or Captec), and dodine (Syllit)
Insecticides and Miticides			
Group	Target site of action	Chemical Family	Active Ingredient (Trade Name)
Group 1A*	The acteylcholine esterase inhibitors, (interrupt the transmission of nerve impulses).	Carbamates	carbaryl (Sevin), methomyl (Lannate)
Group 1B		Organophosphates	azinphos-methyl (Guthion), chlorpyrifos (Lorsban), diazinon, malathion, naled (Dibrom), and phosmet (Imidan)
Group 2A	GABA-gated chloride channel antagonists (cause repetitive nervous discharges).	Chorinated cyclodiones	endosulfan (Thiodan, Phaser) methoxychlor
Group 3	Sodium channel modulators, which also results in repetitive nervous discharges,	Synthetic pyrethroids Pyrethrins	fenpropathrin (Danitol), bifenthrin (Brigade), esfenvalerate (Asana) and one of the active ingredients in Pyrellin.

	leading to paralysis.		
Group 5	acetylcholine receptor modulator	Spinosyns	spinosyns (Success, SpinTor)
Group 6	Chloride channel activators (interfere with insect nerve receptors)	Avermectins	abamectin (Agri-Mek)
Group 10	Mite growth inhibitors with unknown or non-specific target sites of action		hexythiazox (Savey)
Group 11	Microbial disruptors of insect midgut membranes.	Bt microbials with various subgroups depending on the strain	Bt (Dipel, others)
Group 12	Inhibition of oxidative phosphorylation	Organotin miticides	fenbutatin oxide, aka hexakis (Vendex)
Group 18	Ecdysone agonist disruptor (disrupts insect molting)	Benzoic acid hydrazide	tebufenozide (Confirm)
Group 20	Site II electron transport inhibitors		dicofol (Dicofol and Kelthane)
Group 21	Site I electron transport inhibitors	Botanical	rotenone (the other ingredient in Pyrellin)
Herbicides			
Group	Target site of action	Chemical Family	Active Ingredient (Trade Name)
Group 1	Inhibitors of acetyl CoA carboxylase	Aryloxyphenoxy propionates Cyclohexanediones	fluazifop-P-butyl (Fusilade), clethodim (Select), and sethoxydim (Poast)
Group 3	Microtubule assembly inhibitors	Dinitroanilines Benzoic acid	oryzalin (Surflan), DCPA (Dacthal) and trifluralin (one of the active ingredients in Snapshot)
Group 4	Synthetic auxins	Phenoxy carboxylic acids Benzoic acids	synthetic auxins and contains 2,4-D (Formula 40) and clopyralid (Stinger), which isn't labeled for strawberries YET.
Group 5	Inhibitors of photosynthesis at photosystem II Site A	Triazines Uracils	simazine (Princep) and terbacil (Sinbar)
Group 9	Inhibitors of EPSP synthase	Glycines	glyphosate (Roundup) and sulfosate (Touchdown 5)
Group 12	Bleaching: Inhibitors of catotenoid biosynthesis	pyridazinone	norflurazon (Solicam)
Group 14	Inhibitors of protoporphyrinogen oxidase	Diphenylethers Triazolone	oxyfluorfen (Goal) and sulfentrazone (Spartan), Section 18's only.
Group 15	Inhibition of cell division	Acetamides Chloroacetamides	napropamide (Devrinol) and pronamide (Kerb)
Group 20	inhibits cell wall synthesis at site A	Nitrile	diclobenil (Casoron)
Group 21	inhibits cell wall synthesis at site B	Benzamide	isoxaben (Gallery, and one of the active ingredients in Snapshot)
Group 22	Photosystem I electron diverters	Bipyridyliums	paraquat (Gramoxone).

**Where subgroups are listed, compounds between subgroups can generally be alternated with each other for resistance management.*

This information is up-to-date at the time of writing, but may change as time goes on. As always, read the label of any crop protection material before using. The label is the law. Any mention of specific products should not be considered an endorsement over similar products. This may not be a complete list.