

Vineyard Pesticide Application Basics

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What is PSEP?

- Pesticide Safety Education Program
- UNL Extension Teaches = Certification
- NDA Regulates = Licensing, enforcement



PSEP Audiences

- Private and Commercial pesticide applicators
- PSEP doesn't have regular contact with:
 - General-use pesticide (GUP) applicators ... not regulated
 - General public
- Do you need a license? RUP
- Sharing services



All RUP & GUP Users

- All users must read, understand, and follow instructions found on product labels.
 - “It is a violation of federal law to use this product in a manner inconsistent with its labeling.”



All RUP & GUP Users

- “Use” means handling, mixing, loading, storing, transporting, and disposing.
 - Covers from purchase to container disposal
- Labels have information about use, PPE, environmental precautions, and storage and disposal.



PERSONAL PROTECTIVE EQUIPMENT (PPE):

Some materials that are chemical-resistant to this product are listed below. If you want more options, follow the instructions for category G on an EPA chemical-resistance category selection chart.

Applicators and other handlers must wear: long-sleeved shirt and long pants, chemical-resistant gloves, such as Barrier Laminate or Viton \geq 14 mils, shoes plus socks and protective eyewear.

All RUP & GUP Users

- **Mandatory vs. Optional**
 - Terms such as “must,” “shall,” “do not,” and “shall not” are mandatory
 - Terms such as “suggest,” “recommend,” and “may” are optional



What does UNL PSEP do?

- Teach safe use of pesticides since 1970's
- Impact approximately 10,000 pesticide applicators each year
- Teach on-going awareness of drift; drift prevention; and protection of vulnerable crops, water, and other non-target sites
- Promote driftwatch

Sensitive crop awareness

- **Instructions to applicators**
 - **Check Driftwatch Site**
 - **If sensitive crop is near application site --- take additional actions to prevent drift**



Driftwatch -

<https://ne.driftwatch.org/>



Map My Specialty Crops

[Click here to sign up as a commercial crop producer.](#)



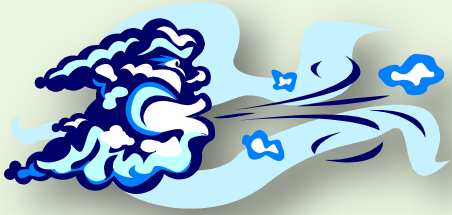
Map My Apiaries

[Click here to sign up if you only keep bees.](#)



Applicator Registration

[Click here to sign up if you are a licensed applicator.](#)



---Sample Slide---

Prevent drift...

- Recognize influence of wind direction & velocity on drift
- Timing, allow drying time
- Drift of spray droplets
 - Fine droplets will drift
 - Medium to coarse droplets resist drift
 - Potential lowest at 3-10 mph wind
- Notify/talk to neighbors

Driftwatch Survey

- Surveyed private and commercial over 3-yr
- Asked if they were aware of driftwatch prior to attending the training session:
 - 20% Private said YES
 - 23% Commercial said YES
- About **80%** didn't know about the site



What has UNL PSEP learned?

- Magnitude of herbicide drift impact on grape growers is significant
- Grape varieties can respond differently to herbicide drift



What has UNL PSEP learned?

- Herbicide injury to grapes is a growing problem in Nebraska
- Many grape growers didn't know about PSEP or what we do



What are we doing?

- Increased level of teaching about drift and drift prevention
- Continue to promote use of *driftwatch*
- Distribute and promote NebGuide: *Protecting Pesticide Sensitive Crops*

NebGuide
University of Nebraska–Lincoln Extension, Institute of Agriculture and Natural Resources
Know how. Know **now.**

G2179

Protecting Pesticide Sensitive Crops

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This NebGuide examines how to protect sensitive crops, such as those found on organic and traditional commercial farms or in vineyards, from pesticide injury.




Figure 1. Fruit crops such as grapes contribute to Nebraska's agricultural economic diversity (Janice Fox, Kansas Department of Agriculture).

Pesticide sensitive crops, such as grapes in vineyards or fruit, vegetable, and ornamental crops grown on organic or traditional commercial farms, are becoming more common in the landscape. Consumer demand has created markets for these products, and sales of these crops have contributed to the state's agricultural economic diversity. Even though any agricultural crop can be damaged by pesticide drift, these crops are especially sensitive to injury by pesticides; the potential for economic loss is significant. For example, grapes have an annual fruit value of \$4,000 to \$3,000 per acre and the processed value can be up to 10 times higher (Figure 1).

Use Pesticides Carefully

Pesticides include herbicides, insecticides, and fungicides. When applying pesticides, take extra precautions to avoid damaging sensitive crops. Many plants and animals are sensitive to pesticides and may be harmed by particle spray drift, vapor drift, or pesticides that run off the target area. This NebGuide focuses on herbicides that are especially prone to drift, and have high risk of causing damage when they move off-target. Reducing the potential for off-site movement onto sensitive sites is particularly important when applying these herbicides.

Since the introduction of Roundup Ready® crops in 1996, glyphosate has been used extensively for weed management in the Midwest. Glyphosate drift can damage many different crops. Plants including grapes, tomatoes, potatoes, soybeans, and fruit and nut trees, are very sensitive to spray drift from horizontal-type herbicides such as dicamba, picloram, MCPA, metolachlor, fluroxypyr, mesosoprop, and 2,4-D. These herbicides can affect plants, especially sensitive crops, near the application site.

Be Proactive

The Nebraska Department of Agriculture (NDA) and Purdue University have arranged for a Web-based locator for sensitive commercial crops and bee hives called Driftwatch™ (Figure 2). Commercial growers of sensitive crops and bee keepers




Figure 2. Nebraska Driftwatch encourages commercial producers to register locations of sensitive crops and bee hives.

WPS Impact on Grape Growers

- Worker Protection Standard has changed
- Impact on worker activities and pesticide applications



WPS Impact on Grape Growers

- **Protects applicators and workers two ways:**
 - 1. REI; Restricted Entry Intervals**
 - 2. PPE; Personal Protective Equipment (provided by employer)**

AGRICULTURAL USE REQUIREMENTS

Use this product only in accordance with its labeling and with the Worker Protection Standard, 40 CFR part 170. This Standard contains requirements for the protection of agricultural workers on farms, forests, nurseries, and greenhouses, and handlers of agricultural pesticides. It contains requirements for training, decontamination, notification, and emergency assistance. It also contains specific instructions and exceptions pertaining to the statements on this label about personal protective equipment (PPE), and restricted-entry interval. The requirements in this box only apply to uses of this product that are covered by the Worker Protection Standard.

Do not enter or allow worker entry into treated areas during the restricted-entry interval (REI) of 24 hours.

PPE required for early entry to treated areas that is permitted under the Worker Protection Standard and that involves contact with anything that has been treated, such as plants, soil, or water, is: coveralls, chemical-resistant gloves, such as Barrier Laminate or Viton \geq 14 mils, shoes plus socks and protective eyewear.

WPS Impact on Grape Growers

- Minimum handler/early entry age 18
- Required training **EVERY** year
- Training required before working (no grace period)
- Records of training kept for 2 years
- Changes to training requirements

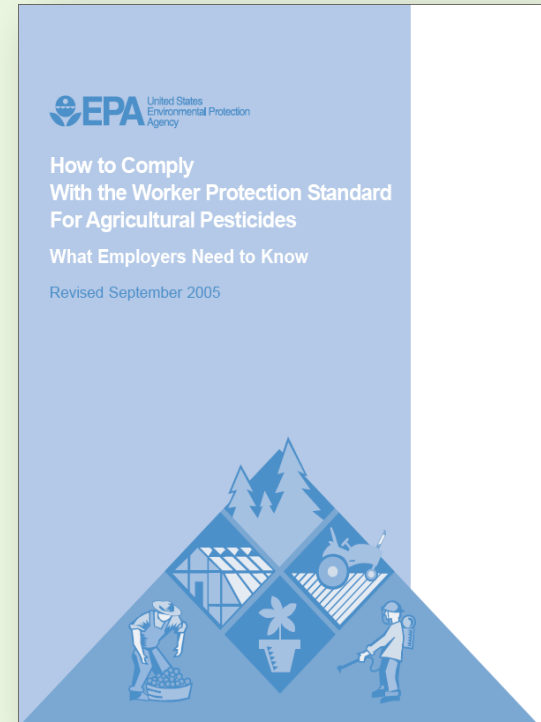
WPS Impact on Grape Growers

- **Application Suspension**
 - **Old:**
 - Must apply pesticides so as to not contact workers or others
 - No specific regulations
 - **New:**
 - Must apply pesticides so as to not contact workers or others
 - Must suspend application if a person is present in an area up to 100 ft. around the application



WPS Reference

- “How To Comply” manual
- Search for it online
- Available online via pested.unl.edu
 - Under “Certification and Licensing”



PHI & REI Impact on Grape Growers

- Pre-harvest and Restricted Entry Intervals
- Impact on timing of pesticide applications and maintenance activities



Grape Spray Guide

- **University of Nebraska — Lincoln**
 - Paul Read, Horticulture
 - Fred Baxendale, Entomology
 - Amy Timmerman/Gerard Adams, Plant Path
 - Amit Jhala, Weed Science
- **Search for title**
- **URL:**

<https://ag.purdue.edu/hla/Hort/Documents/ID-465.pdf>



Impact on Grape Growers

- Pre-harvest and Restricted Entry Intervals

- Fungicide Pre-harvest Intervals and Restricted Entry Intervals (REI) for Small Fruit^a

See Generic Fungicides, page 133. Consult product labels for complete restrictions and limitations.

Trade Name	Common Name	Pre-harvest Intervals (days) (Maximum amount/acre/season) ^b				FRAC ^c Code	REI ^d (hours)
		Grape	Blueberry	Brambles	Strawberry		
Abound	azoxystrobin	14*	0	0	0	11	12
Adament	tebuconazole + trifloxystrobin	14*	—	—	—	11 3	24
Aftershock	fluoxystrobin	—	—	—	1	11	12
Aliette	fosetyl-AL	15*	0*	60	0 (30 lbs.)	33	12
Basic copper sulfate	copper sulfate	0	—	0	0	M	24
Bayleton	triadimefon	14 (18 oz.)	—	—	—	3	12
Cabrio	pyraclostrobin	—	0 (56 oz.)	0 (56 oz.)	0 (56 oz.)	11	24
Captan	captan	0 (24 lbs.)	0 (70 lbs.)	3 ^e	0 (48 lbs.)	M	^f
CaptEvate	captan + fenhexamid	—	0 (21 lbs.)	0 (21 lbs.)	0 (21 lbs.)	M 17	24/72 ^f

Grape Spray Guide

- **Spray Schedule**
 - Summarizes label instructions and recommendations



Grape Spray Schedules

■ Grape Pre-bloom through Bloom

Apply from just before bloom through the bloom period.

Critical Period for Disease Control: The period from immediate pre-bloom through four or five weeks after bloom is the most critical period to control fruit infections by the black rot, powdery mildew, and downy mildew pathogens. Fungicide protection during this period is critical. Research in New York has shown that the fruit of most varieties is resistant to all three of these diseases by four weeks after bloom. Beyond four to five weeks after bloom, black rot should no longer be a problem. Although fruit becomes resistant to powdery and downy mildews, the rachises (cluster stems) and leaves remain susceptible. Therefore, fungicide protection against powdery and downy mildews may be required throughout the growing season.

Pest/Problem	Material	Rate/Acre	Comments
black rot, Phomopsis cane and leaf spot, powdery mildew, downy mildew	Same as for Grape Bud Break to Pre-bloom, page 76. Very important sprays for controlling black rot, powdery mildew and downy mildew fruit infections. Pay attention to pre-harvest intervals, especially for products that contain mancozeb.		
flea beetle larvae, rose chafer, redbanded leafroller*, grape berry moth*	Same as for Grape 4- to 10-inch Shoots, page 78. *Pheromone traps for grape berry moth and redbanded leafroller will indicate if they are present and help determine the need for control.		
grape scale	Not a common pest in most of the Midwest. In southern areas, flag scale-infested vines during dormant pruning. In early May begin weekly inspections of flagged vines for scale crawlers. Lift live adult scale covers and look for yellow moving crawlers (use a hand lens with 10x magnification). Protect canes by applying sprays every 10 days as long as you see moving crawlers (2-3 week crawler emergence period).		
	Lorsban Advanced	1 qt.	
	Malathion 8F	1.88 pts.	
grape phylloxera (leaf form)	Control the root gall form of grape phylloxera by using rootstocks derived from American grapes. Native American grapes (Eastern U.S.) are highly resistant to this pest. Since bees do not pollinate grapes, there is no danger to bees at this time unless they are working on other blooming plants in the area being sprayed. Mow before spraying to eliminate blooms on weeds.		
	Assail 30SG	2.5-5.3 oz	Apply at pre-bloom and repeat 10-14 days later.
	Danitol 2.4EC	10.7-21.33 fl oz	Apply at pre-bloom and repeat 10-14 days later.
	Movento 25C	6-8 fl oz	See Movento label regarding adjuvants. Allow 30 days between applications.

Grape Spray Guide

- Spray schedule only part of the picture
- Effectiveness charts for all pesticide types
- REI and PHI for fungicides and insecticides



Spray Guide Effectiveness Charts

Effectiveness of Insecticides and Miticides for Grape^a

Trade Name	Common Name	IRAC	climbing cutworms	eight spotted forester	grape berry moth	grape cane girdler, grape cane gallmaker	grape flea beetle	grape phylloxera (foliar)	grape root borer	Japanese beetle	leafhoppers	multicolored Asian lady beetle	redbanded leafroller	rose chafer	spider mites	spotted wing Drosophila	PHI (days)	REI (hours)
Actara	thiamethoxam	4A									G						5	12
Admire	imidacloprid	4A						G		F	E	G		F		F	0/30*	12
Altacor	chlorantraniliprole	28			E								E				14	4
Applaud	buprofezin	16									G						7	12
Assail	acetamiprid	4A						G		G	E			E		F	7	12
Baythroid, Renounce	cyfluthrin	3A			E	G	G	G		E	G	G		E		E	3	12
Belay	clothianidin	4A			F					F	E	E					0/30*	12
Belt	flubendiamide	28			E								E				7	12
Brigade	bifenthrin	3A			G		G	G		G	G			G		E	30	12
Danitol	fenpropathrin	3A			E			E		E	G				G	E	21	24
Delegate	spinetoram	5			E								E			E	7	12
Dibrom	naled	1B															10	48

GUP

RUP

Grape Spray Guide

- Chemical weed control in grapes
 - Avoid injury to vines: age restrictions, non-bearing only, sucker control, dormant applications only

■ Herbicide Recommendations for Grape

Weed Problem	Material & Rate per Acre	Notes and Comments
Pre-emergence		
annual and perennial grasses and broadleaves	Alion (indaziflam 19.05%) (1.67 lbs./gal.) at 5 fl. oz.	Only use in established vineyards at least 5 years after planting and on vines that exhibit normal growth and good vigor. Do not use on sandy soil or soils with 20% or more gravel content. Ensure that there is 12 inches of soil barrier between the surface and the major portion of the root system. Age Restriction: Do not apply to vines less than 5 years old.
annual and perennial grasses and broadleaves	Casoron CS (dichlobenil 15.3% a.i.) at 1.4-2.8 gals.	Apply from late fall through early spring. Applications should be made prior to weed emergence, or when emerged weeds are less than 2 inches tall. Use only on well established plants. Age Restriction: Do not apply to vines less than 1 year old.
annual broadleaves and suppression of grasses	Chateau SW (flumioxazin 51% a.i.) at 6-12 oz. in 10-30 gals. of water	Do not apply after bloom unless with a hooded or shielded application. Apply alone pre-emergence or tank mix with Roundup or Gramoxone post-emergence. Do not incorporate. Do not allow drift to contact foliage or green bark. Do not exceed 24 oz./season. Minimum 30 days between applications. Also has post-emergence activity. PHI=60 days. Age Restriction: Do not apply to vines established less than 2 years unless they are trellised at least 3 ft. from the ground or are protected by nonporous wraps, grow tubes, or waxed containers.

Spray Guide Effectiveness Charts

■ Relative Effectiveness of Herbicides for Small Fruit Crops¹

Herbicide	Grasses						Annual Broadleaves																Perennial Weeds				
	barnyardgrass	crabgrass	foxtails	goosegrass	panicum, fall	chickweed	cocklebur	galinsoga	groundsel, common	henbit	jimsonweed	lambquarters	maretail	morningglory, annual	mustards	nightshades	pigweed	purslane	ragweed	shepherdspurse	smartweeds	velvetleaf	violet, Field	dandelion	nutsedge, yellow	thistle, Canada	woodsorrel, yellow
Pre-emergence																											
Alion	G	G	G	G	G	G	N	N	G	F	N	F	G	F	G	N	G	G	F	G	G	G	N	G	N	N	F
Callisto	N	N	N	N	N	G	G	G	N	N	G	G	F	F	N	G	G	N	G	N	G	G	N	N	F	N	N
Post-emergence																											
2,4-D	N	N	N	N	N	F	F	N	G	N	F	F	G	G	G	F	N	G	G	F	F	N	G	N	F	N	
Aim	N	N	N	N	N	N	F	N	G	F	F	G	N	G	G	G	G	F	F	F	G	N	N	N	F	N	
Chateau	N	N	N	N	N	G	N	N	N	N	F	G	G	F	N	F	F	G	F	G	F	G	N	N	N	N	
Fusilade	G	G	G	G	G	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	
Goal	N	F	F	F	N	N	F	G	G	G	G	F	F	G	G	G	F	N	F	F	F	G	N	N	N	F	
Gramoxone	G	G	G	G	G	G	F	G	G	G	G	G	G	G	G	G	G	G	N	G	G	G	N	N	N	N	
Poast	G	G	G	G	G	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	
Rely	G	N	G	G	G	G	G	F	N	N	G	G	G	G	G	G	G	G	G	G	F	N	G	F	G	N	
Roundup	G	G	G	G	G	G	G	G	G	G	G	F	G	G	G	G	G	G	G	G	G	G	G	F	G	G	
Select	G	G	G	G	G	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	

Resistance Management

Effectiveness of Insecticides and Miticides for Grape^a

Trade Name	Common Name	IRAC	climbing cutworms	eight spotted forester	grape berry moth	grape cane girdler, grape cane gallmaker	grape flea beetle	grape phylloxera (foliar)	grape root borer	Japanese beetle	leafhoppers	multicolored Asian lady beetle	redbanded leafroller	rose chafer	spider mites	spotted wing Drosophila	PHI (days)	REI (hours)
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Belay	clothianidin	4A			F					F	E	E					0/30*	12
Belt	flubendiamide	28			E								E				7	12
Brigade	bifenthrin	3A			G		G	G		G	G			G		E	30	12
Danitol	fenpropathrin	3A			E			E		E	G				G	E	21	24
Delegate	spinetoram	5			E								E			E	7	12
Dibrom	naled	1B															10	48

Resistance Management

- **Resistance Action Committees**
 - IRAC code for Insecticides
 - FRAC code for Fungicides
 - HRAC code for Herbicides
- **Rotating pesticides helps avoid resistance**



Questions?

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