Spray Mgt. & Use

11:00 – 11:30 a.m.
Friday March 8th, 2019
Show-Me Grape & Wine Conference

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A Example Year in a MO Vineyard

Approximately 150-200 hrs./ac./yr.

Feb/March	- Prune - spray cuts
	- clean up & remove prunings
March/April	- Lime Sulfur application
April	- 1x mow
	- 2x spray fungicide
	- 1x spray herbicide
	- shoot thinning
May	- 1x spray insecticide
	- 2x spray fungicide
	- 2x mow - 1x foliar fertilizer
June	- 1x spray insecticide
	- 3x spray fungicide
	- 2x mow
	- canopy manage
	- leaf pulling
July	- 2x spray fungicide
	- petiole testing for fertility
	- 1x spray post herbicide
	- 1x mow
	- 1x spray insecticide
	- canopy management
August	- 2x spray fungicide
	- 1x spray insecticide
	- Brix/TA/pH tests
	- Begin Harvest
	- 1x mow
September	- continue harvesting
	- Brix/TA/pH testing
	- clean & maintain vineyard equipment

Commercial Guide

Apple, Pear, Cherry, Peach, Plum, Grape, Blueberry, Raspberry,

Fungicide, Insecticide, Herbicide, Miticide and Growth Regulator recommendations.

Hort 3035 166 pp.

Free Online
$15 hardcopy

https://store.extension.iastate.edu/Product/14488

Grape Spray Schedule

Note on Disease Control Recommendations

The following information is intended to provide general guidelines for use in developing a fungicide spray program for grapes in the Midwest. This spray schedule presents various fungicide options that growers can consider.

The major grape diseases that generally require at least some fungicide application for control on an annual basis include black rot, powdery mildew, downy mildew, and Phomopsis cane and leaf spot. Several recommendations in this guide include tank mixes of different fungicides that are intended to provide a program that will control all of these diseases simultaneously. In some cases, recommendations for a single disease alone are provided as well.

Growers who wish to make a fungicide application intended to control only one specific disease, can refer to Table 1, Effectiveness of Fungicides for the Control of Grape Diseases on page 33 of this guide.

Please pay special attention to the notes and comments.

Dormant

Apply before buds swell.

Pest/Problem	Material	Rate/Acre	Comments
Anthracnose	**Fungicide Resistance Alert:** See note on page 32 on fungicide resistance development in powdery and downy mildew.		
	Lime sulfur solution *or*	10 gal	This dormant application is aimed at reducing overwintering inoculum on canes. See pages 28-29 for more information on anthracnose.
	Sulforix	1 gal	

Bud Swell

Apply just before buds show green.

Pest/Problem	Material	Rate/Acre	Comments
European red mite and/or scale insects	Superior oil (70-sec.)	4 gal	
Grape scale	Lorsban Advanced	1 qt	
Flea beetle adults	Scout at least weekly as bud swell occurs.		
	Baythroid XL (1EC)	2.4-3.2 fl oz	
	Danitol 2.4EC	5.3-10.7 fl oz	
	Renounce 20WP	3-4 oz	
	Scorpion 35SL	2-5 fl oz; 9-10.5 fl oz	Use the low rate for foliar application; use the high rate for soil application.
	Sevin XLR Plus (4F)	2 qt	Other formulations may be available.
Climbing cutworms	Scout at least weekly as bud swell occurs.		
	Same as for flea beetles above, or		
	Altacor 35WDG	3-4.5 oz	
	Baythroid XL 1EC	2.4-3.2 fl oz	
	Belt 4SC	3-4 fl oz	
	Danitol 2.4EC	10.7-21.3 fl oz	
	Delegate 25WG	3-5 oz	
	Lorsban 4E or Lorsban Advanced	1 qt	Apply as a spray drench ground application. Do not use now if Lorsban will be used later for root borer.

Based on Plant Growth Stages

Dormant
Bud Swell
Bud Break to Bloom
10” Inch Shoots
Pre-Bloom
Bloom
Shatter
First Cover to Veraison
Verasion to Harvest
Post Harvest

Pest Material Rate/Ac Comments

52\ Fungicides
47 Insecticides
23 Herbicides
Pre-harvest Interval
Re-Entry Interval
Toxicity
Mode of Action
Resistance Mgt.
Respray Interval
Tank Mixing
Brand Name
Chemical Name
Manufacturer
EPA Number
$ / Acre
Rates / Acre
Efficacy / Pest
Min. Gallons / Acre
Personal Protective
Equipment (PPE)

2019/20 Guide is $39, New Guides are $64

Vineyard Restricted Use Pesticides

Fungicides: None

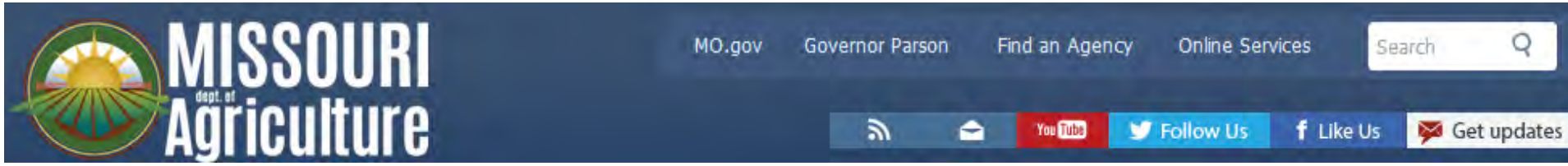
Herbicides: Kerb, Gramoxone (paraquat)

Insecticides: Agri-mek, Baythroid, Brigade, Danitol, Lorsban EC, Mustang Maxx, Vendex

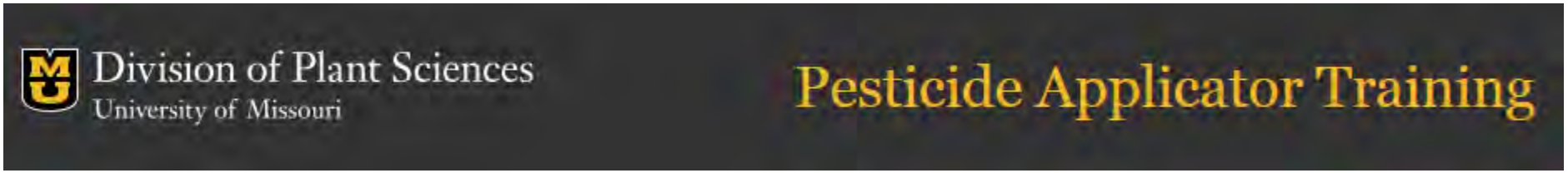
General Use Pesticides

Everything Else

Missouri Private Pesticide Applicator License



https://agriculture.mo.gov/plants/pesticides/



http://pat.missouri.edu/

Private Pesticide Applicator Reference Manual, 135 pp $12
https://extension2.missouri.edu/MP731

Worker Protection Standard (WPS)

Worker Pesticide Safety Training

Central Pesticide Information, Application and Safety Posted Area

Decontamination Sites within ¼ mile of the site
(water, soap and towels)

Pesticide Personal Protective Equipment (PPE)
(Label - Agriculture Use Requirements)

Ability to Provide Timely Emergency Assistance

Pesticide Application Signs posted 24 hours Prior to Application and up Until 3 Days After the Restricted Entry Interval (REI) at Field Entry Areas

Vineyard Owners and Their Immediate Families are Exempt from Most of these rules.

EPA WPS Resources

EPA WPS Manual:
https://www.epa.gov/pesticide-worker-safety/pesticide-worker-protection-standard-how-comply-manual

MO Dept Worker Protection
https://agriculture.mo.gov/plants/pesticides/workerprotect.php

National Online Train the Trainer WPS Course required prior to training workers. $35
http://pesticideresources.org/wps/ttt/course/index.html

Online Worker & Handler Pesticide Training Video FREE
https://vimeo.com/215241678

Pesticide Signal Words

Signal Word	Toxicity	Oral Lethal Dose (150 lb person)
Danger	High	Few drops to a teaspoon
Warning	Moderate	teaspoon to a tablespoon
Caution	Low	1 oz. to a pint

Table 8. Fungicide Harvest Restrictions and Restricted-Entry Intervals (REI)

Trade name	Common name	Harvest restrictions Days before harvest and limitations (Maximum amount/ acre/season)*				REI[b]	FRAC[c] Code
		Grape	Blueberry	Brambles	Strawberry		
Abound	azoxystrobin	14*	0	0	0	12 hr	11
Aliette	fosetyl-AL	15*	0*	60	0 (30 lb)	12 hr	33
Basic copper sulfate	copper sulfate	0	—	0	0	24 hr	M
Bayleton	triadimefon	14 (18 oz)	—	—	—	12 hr	3
Cabrio	pyraclostrobin	—	0 (56 oz)	0 (56 oz)	0 (56 oz)	24 hr	11
Captan	captan	0 (24 lb)	0 (70 lb)	3[d]	0 (48 lb)	see note*	M
CaptEvate	captan plus fenhexamid	—	0 (21 lb)	0 (21 lb)	0 (21 lb)	24/72 hr*	M 17
Dithane M-45, others	mancozeb	66*	—	—	—	24 hr	M
Elevate	fenhexamid	0*	0	0	0*	12 hr	17
Elite	tebuconazole	14	—	—	—	12 hr	3
Endura	boscalid	14*	—	—	—	12 hr	7
Ferbam	carbamate	7	—	—	—	24 hr	M
Flint	trifloxystrobin	14*	—	—	—	12 hr	11

Table 9. Insecticide and Miticide Harvest Restrictions and Restricted-Entry Intervals

Consult product label for complete restrictions and limitations.

Trade Name	Common name	Harvest Restrictions: Days before harvest and limitations				REI*	IRAC*
		Grape	Blueberry	Brambles	Strawberry		
Acramite	bifenazate	14	—	—	1	12hr/5days	25
Actara	thiamethoxam	—	3	—	3	12 hr	4A
Admire	imidacloprid	—	7	—	14	12 hr	4A
Agri-mek (RUP)	abamectin	28	—	—	3	12 hr	6
Applaud	buprofezin	30	—	—	—	12 hr	16
Asana (RUP)	esfenvalerate	—	14	7	—	12 hr	3
Assail	acetamiprid	7	—	—	—	12 hr	4A
Baythroid	cyfluthrin	3	—	—	—	12 hr	3
Brigade (RUP)	bifenthrin	—	—	3	0	12 hr	3
Capture (RUP)	bifenthrin	30	—	3	—	12 hr	3
Confirm	tebufenozide	—	14	14	—	4 hr	18A
Danitol (RUP)	fenpropathrin	21	3	—	2	24 hr	3
Deadline	metaldehyde	0	0	0	0	12 hr	-
Diazinon (RUP)	diazinon	28	7	—	5*	24 hr	1B
Dibrom	naled	3	—	—	1	48/72 hr	1B

PHI = Pre-Harvest Interval

&

REI = Re-Entry Interval

Pesticide Resistance Management

a. Avoiding repetitive use or sole use of one chemical.
b. Tank mix with different modes of action. (Example FRAC mode of action #'s)
c. Alternate applications with products of different modes of action.
d. Limit the number of treatments – apply only when necessary.
e. Integrate with non-chemical fungicide methods.
f. Apply labeled rates.

Pesticide Resistance Action Groups:
http://www.clemson.edu/extension/pest_ed/issues/resistan.html

Integrated Pest Management

Integrated practices involving the entire crop management system utilized to keep pest damage below the economic threshold level and keep adverse impacts to humans, wildlife, and the environment to a minimum.

Examples are:

-biological control **-proper crop scouting**

-spot applications vs broadcast applications

-sanitary vineyard practices

Know Your Weeds

Summer Annual – germinate in spring and produce seed before fall.

Winter Annual – germinate in late summer or fall and produce seed the next spring or early summer.

Biennial – germinates in fall or spring, vegetative stage first years and reproductive stage 2nd year.

Simple Perennial – Survives several years and reproduces primarily from seed.

Creeping Perennial – Survives several years and reproduces by underground roots or stems and by seed.

Know Your Insects

Grape Berry Moth

Source: http://news.cahnrs.wsu.edu/

Climbing Cutworm

Grape Flea Beetle

Japanese Beetles

Multicolored Asian Lady Beetles

Phylloxera

Know Your Diseases

Anthracnose

Downy Mildew

Black Rot

Powdery Mildew

Phomopsis

Know Your Spray Adjuvants

Spreader/Sticker, ie…. Non-ionic surfactant.

Spreader/Sticker/Penetrant, ie Crop oil concentrate or methylated seed oil.

Fertilizer Spray Enhancer, ie… liquid 28% nitrogen or dry ammonium sulfate crystals. Softens the water.

Drift Inhibitors: ie…acrylic or silcone polymer that reduces spray drift by increasing viscosity and droplet size.

Compatibility Agents, ie…"Unite", "Dawn dishwashing detergent" helps incompatible products mix together.

Anti-Foaming Agent – eliminates foam buildup in the tank

Compendium of Herbicide Adjuvants, Southern IL Univ.:
http://www.herbicide-adjuvants.com/

Pesticide Mixing Order

Follow this mixing order if not listed on label.

Fill tank ¼ with water and begin agitation.

Add compatibility agent if needed then follow this order:

1st	WDG	Wettable Dry Granules and/or packets
2nd	DF	Dry Flowable
3rd	WP	Wettable Powder
4th	AS	Aqueous Suspension
5th	F	Flowable
6th	EC or E	Emulsifiable Concentrate
7th	SP	Soluble Powder
8th	S	Solutions
10th	Surfactants	

Keep agitated and do not let stand overnight.

Types of Herbicides

Soil Applied – root and or shoot uptake

Pre-emergence – apply before seeds germinate

Pre-plant Incorporated (PPI) – soil incorporated

Post Emergence – foliage sprays

Contact – need good coverage over leaf surface

Systemic – translocation within plant. Can be soil or post applied to foliage

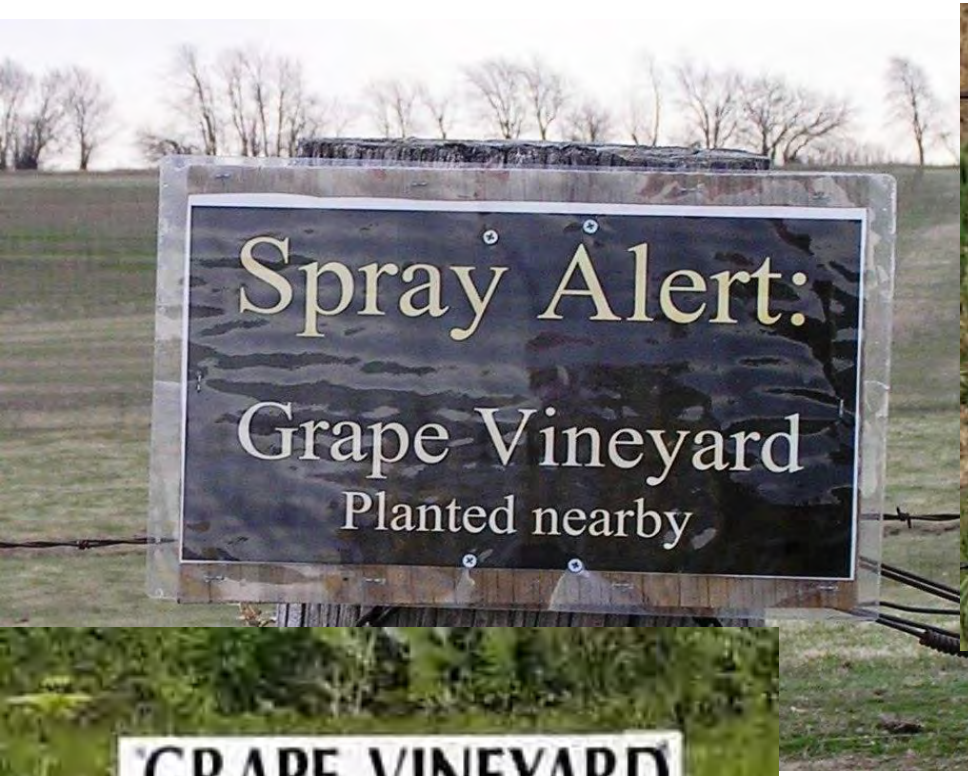
Know Your Herbicides

Relative Effectiveness of Herbicides for Small Fruit Crops[1]

Herbicide	Grasses					Annual Broadleaves																Perennial Weeds				
	barnyardgrass	crabgrass	foxtails	goosegrass	panicum, fall	chickweed	cocklebur	groundsel, common	henbit	lambsquarters	marestail	morningglory, annual	mustards	nightshades	palmer amaranth	pigweed	purslane	ragweed	shepherdspurse	smartweeds	velvetleaf	waterhemp	dandelion	johnsongrass	nutsedge, yellow	thistle, Canada	woodsorrel, yellow
Pre-emergence																											
Alion	G	G	G	G	G	G	N	G	F	F	G	F	G	N	N	G	G	F	G	G	G	N	G	N	N	N	F
Callisto	N	N	N	N	N	G	G	N	N	G	F	F	N	G	F	G	N	G	N	G	G	G	N	N	F	N	N
Casoron	N	G	G	G	G	G	F	G	G	G	F	N	G	N	N	G	G	G	G	G	G	N	G	N	N	G	G
Chateau	N	N	N	N	N	F	F	N	N	G	G	F	N	G	F	G	G	F	G	F	F	F	N	N	N	N	N
Post-emergence																											
2,4-D	N	N	N	N	N	F	F	G	N	F	G	G	G	G	F	F	N	G	G	F	F	F	G	N	N	F	N
Aim	N	N	N	N	N	N	F	G	F	G	N	G	G	G	F	G	G	F	F	F	G	F	N	N	N	F	N
Chateau	N	N	N	N	N	G	N	N	N	G	G	F	N	F	F	F	G	F	G	F	G	F	N	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	F[2]	N	N	N
Goal	N	F	F	F	N	N	F	G	G	G	F	F	G	G	N	G	F	N	F	F	F	F	N	N	N	N	F
Gramoxone	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	N	G	G	G	N	F	N	N	N
Mission	N	G	G	N	N	G	N	G	G	G	G	N	G	N	N	G	G	G	G	N	N	N	F	N	G	G	N

PHENOXY
Drift

2,4-D & dicamba (Banvel)



Signs are worth a 1,000 words!

Register Your Commercial Site on Driftwatch

driftwatch
Specialty Crop Site Registry
by FieldWatch

Map My Specialty Crops

Click here to sign up as a commercial crop producer.

beecheck
Apiary Registry by FieldWatch

Map My Apiaries

Click here to sign up if you only keep bees.

FieldWatch
Communication. Cooperation. Collaboration.

Applicator Registration

Click here to sign up if you are a licensed applicator.

https://driftwatch.org

Windsock for Wind Direction & Speed

All kinds: Approx. $15 to $120

Flyrite Windsock Sizes in metres

Angle of Windsock	1.0 m	1.4 m	2.0 m	2.5 m	3.6 m
90°	12/14/22	15/17/28	18/21/33	20/23/37	27/31/50
80°	8/9/15	10/12/19	12/14/22	14/16/26	21/24/39
60°	6/7/11	8/9/15	10/12/19	11/13/20	16/18/30
45°	4/5/7	6/7/11	8/9/15	9/10/17	12/14/22
30°	3/3.5/6	5/6/9	6/7/11	7/8/13	10/12/19
0°	0	0	0	0	0

Approximate Wind Speeds knots/mph/kph

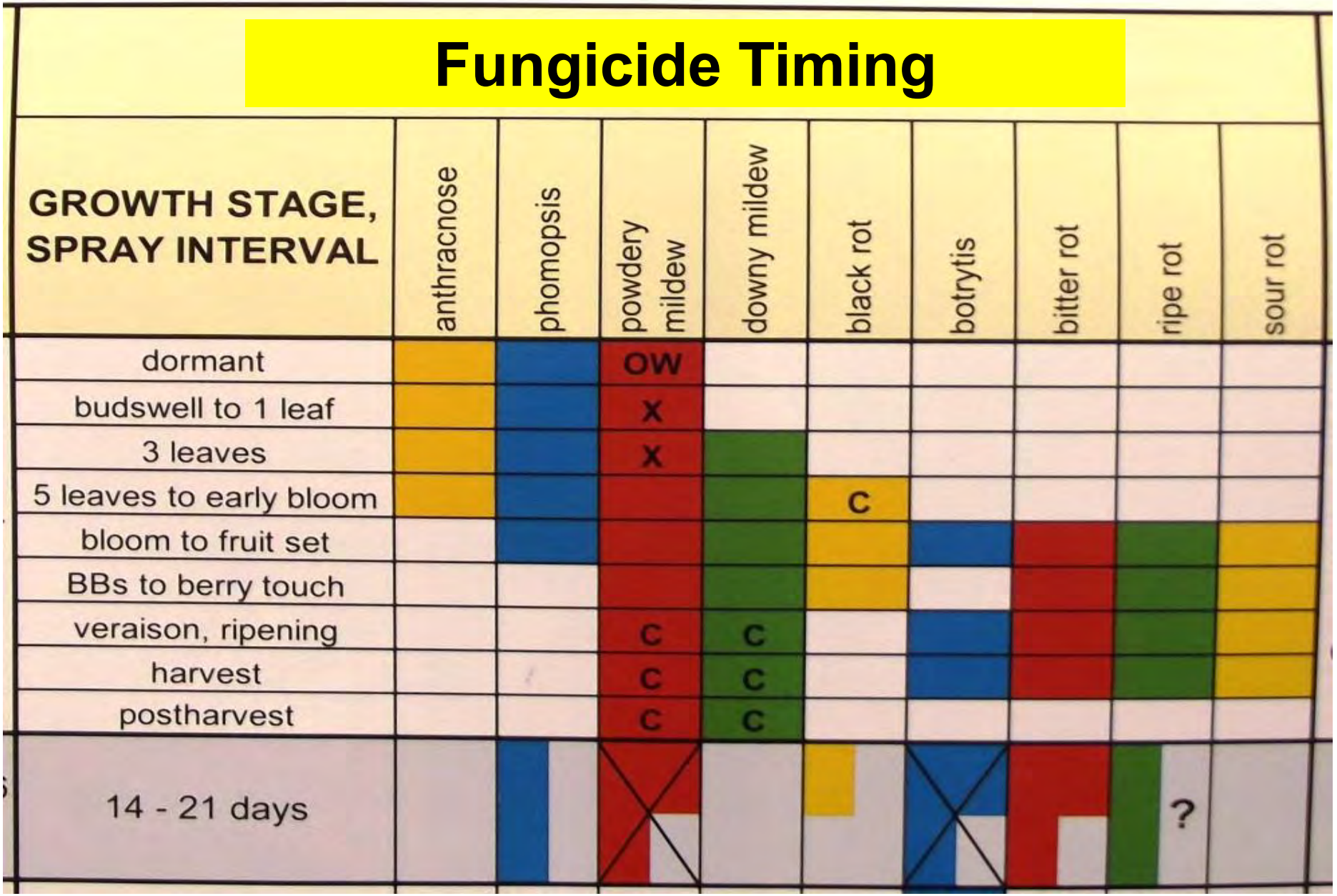
1 knot = 1.151 mph = 1.852 kph. Wind speeds have been rounded up or down as necessary.

Fungicide Effectiveness

Effectiveness of Fungicides for Control of Grape Diseases[1] *(continued)*

Trade Name	Common Name	FRAC Code[2]	Phomopsis cane and leaf spot	Black rot	downy mildew	Powdery mildew	Bunch (Botrytis) rot	Bitter rot	anthracnose	Grape Pre-harvest Intervals (PHI) and Limitations (maximum amount per acre per season)[3]	REI[4] (hours)
JMS Stylet Oil	oil	-	0	0	0	E	0	0	0	0	12
Kenja 400SC	isofetamid	7	0	G-E	0	F	F	0	0	16 (66 fl. oz.)	12
Luna Experience	fluopyram + tebuconazole	7+3	G	G	G	E	E	G	0	14 (34 fl. oz)	12 / 5 days[5]
Merivon Xemium	fluxapyroxad + pyraclostrobin	7+11	0	0	0	E	0	0	0	14 (33 fl. Oz)	12
Mettle 125ME	tetraconazole	3	0	E	0	E[8]	0	0	E	14 (10 oz.)	12 / 7 days[5]
Pristine	pyraclostrobin + boscalid	11+7	F	E	E[8]	E	G	1	E	14 (69 oz.)	12 hr / 5 days[5]
Procure 480SC	triflumizole	3	0	G	0	E[8]	0	1	1	7 (32 fl. oz.)	24
Prophyt, Phostrol, Agri-Fos, Legion, Rampart	phosphorous acid	33	0	0	E	0	0	0	0	0	4
Quadris Top	difenoconazole + azoxystrobin	3+11	F	E	E	E	G	1	E	14 (56 fl. oz.)	12
Quintec	quinoxyfen	13	0	0	0	E	0	0	0	21 (33 fl. oz.)	12
Rally 40WSP	myclobutanil	3	0	E	0	E[8]	0	1	E	14 (1.5 lbs.)	24
Ranman 400SC	cyazofamid	21	0	0	E	0	0	0	0	30 (16.5 fl. oz.)	12
Reason 500SC	fenamidone	11	G	G	E	E	1	1	1	30 (8.1 fl. oz.)	12
Rewas	mandipropamid	40	0	0	E	0	0	0	0	14 (32 fl. oz.)	4
Rewas Top	difenoconazole + mandipropamid	3+40	0	E	E	E	1	1	E	14* (28 fl. oz.)	12
Ridomil Gold MZ WG	mefenoxam + mancozeb	4+M	F	G	E	0	0	G	G	66 (10 lbs.)	48
Ridomil Gold SL	mefenoxam	4	F	F	E	G	F	F	0	60*	48
Ridomil Gold Copper	mefenoxam + copper	4+M	F	F	E	G	F	F	0	42 (8 lbs.)	48
Rovral 4 Flowable	iprodione	2	0	0	0	0	G	0	1	7*	48
Scala SC	pyrimethanil	9	0	0	0	0	G	0	1	7 (36 fl. oz.)	12
Sovran	kresoxim-methyl	11	F	E	G[8]	E[8]	G	1	E	14* (25.6 oz.)	12
Sulforix	calcium polysulfide	M	G	0	0	0	0	0	E	0*	48
Sulfur (wettable)	sulfur	M	F	0	0	E	0	0	1	0	24
Switch 62.5 WG	cyprodinil + fludioxonil	9+12	0	0	0	0	G	1	0	7 (56 oz.)	12
Tanos	famoxadone + cymoxanil	11+27	0	0	E	0	0	0	0	30 (72 oz.)	12
TebuStar 45 WSP	tebuconazole	3	0	E	0	E[8]	0	1	E	14 (2 lbs.)	12
Topsin M WSB	thiophanate	1	G	F	0	E	G	G	E	7 (6 lbs.)	2 days
Torino	cyflufenamid	U6	0	0	0	E	0	0	0	3 (6.8 oz.)	4
Vangard WG	cyprodinil	9	0	0	0	0	E	0	1	7* (30 oz.)	12
Vintage SC	Fenarimol	3	0	E	0	E[8]	0	1	E	21 (21 fl. oz)	24
Vivando	metrafenone	U8	0	0	0	E	0	0	0	14 (42.6 fl. oz.)	12
Zampro	ametoctradin + dimethomorph	45 + 40	0	0	E	0	0	0	0	14 (56 fl. oz.)	12
Ziram 76DF	ziram	M	G	E	G	0	0	1	G	21 (28 lbs.)	48

Fungicide Timing

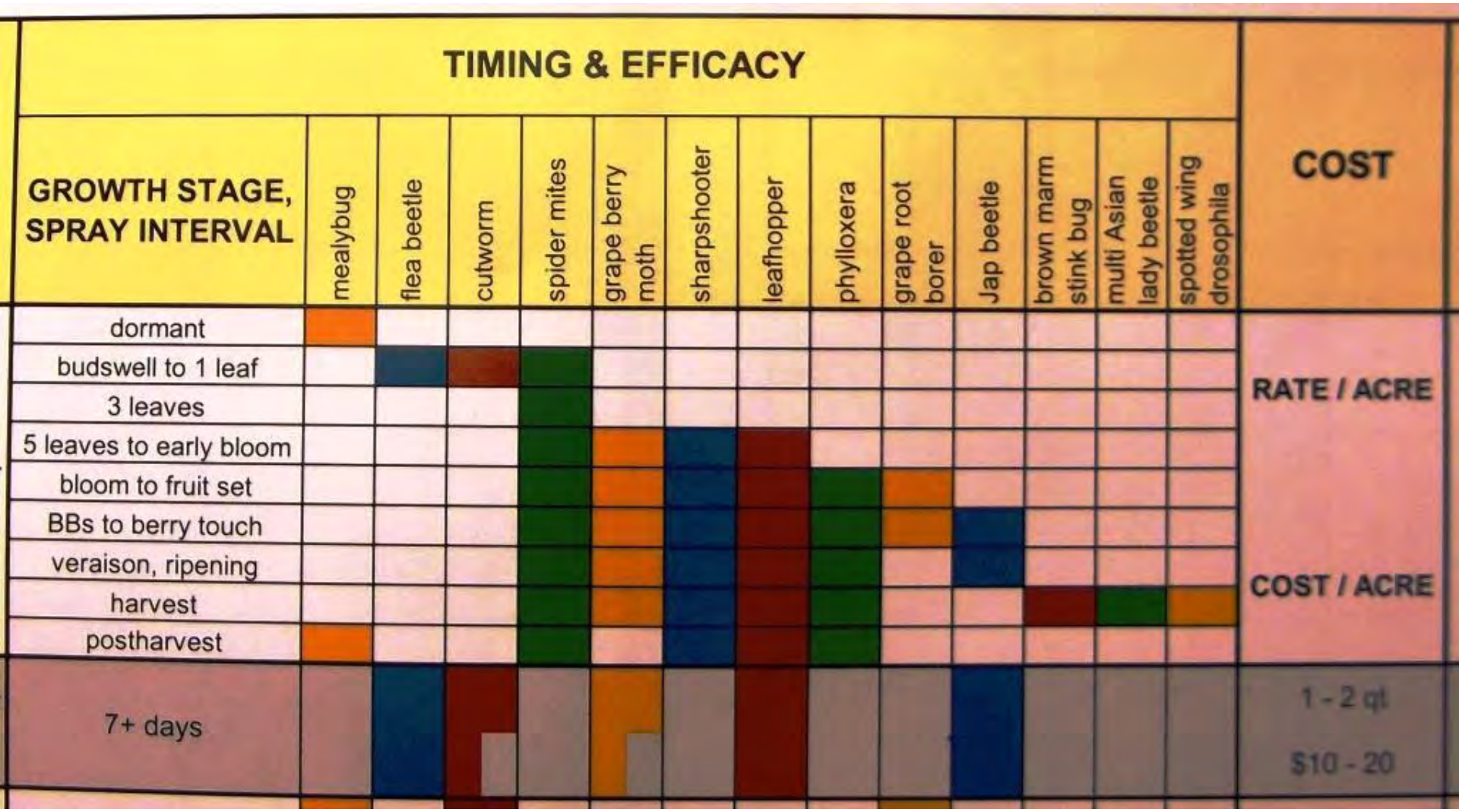


Insecticide Effectiveness

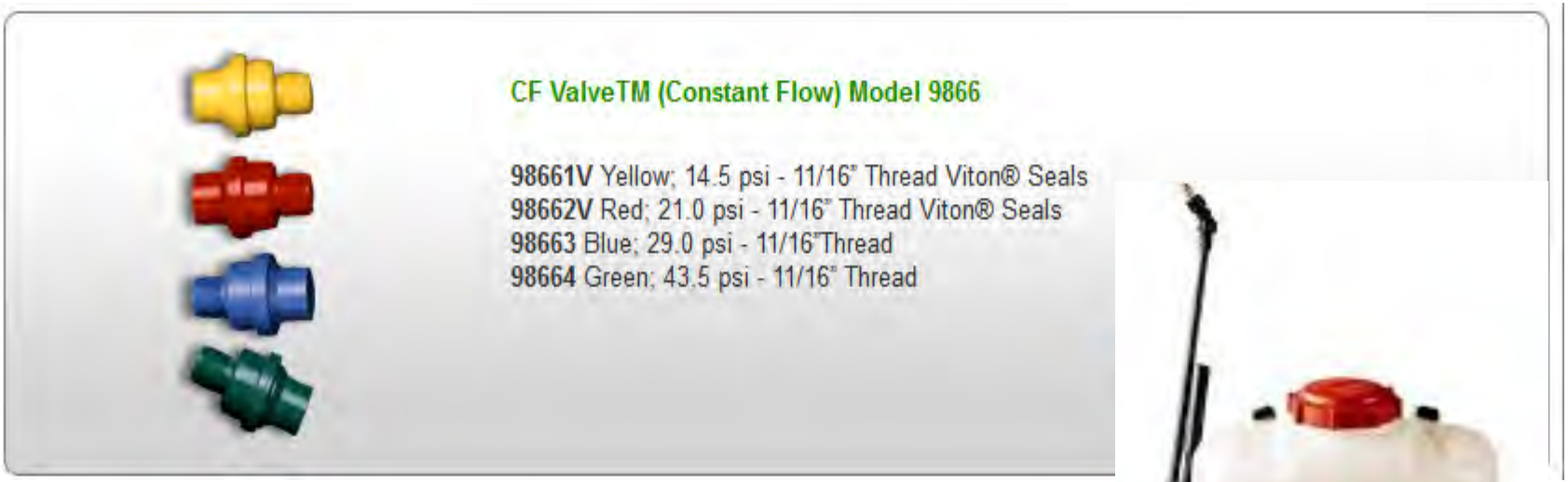
Table 3. Effectiveness of Pesticides for Control of Grape Insects and Mites

	Climbing cutworm	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, Fruitflies
Insecticides														
Actara		-	-	-	-		-	-	++	-	-	-	-	-
Admire	-	-	-	-	-	++	-	+	+++	++	-	+	-	+
Altacor	-	-	+++		-	-	-	-	-	-	+++	-	-	-
Applaud	-	-	-	-	-	-	-	-	++	-	-	-	-	-
Assail	-	-	-	-	-	++	-	++	+++	-	-	+++	-	+
Baythroid, Renounce (RUP)	-	-	+++	++	++	++	-	+++	++	++	-	+++	-	+++
Belay	-	-	+	-	-	-	-	+	+++	+++	-	-	-	-
Belt	-	-	+++	-	-	-	-	-	-	-	+++	-	-	-
Brigade (RUP)	-	-	++	-	++	++	-	++	++	-	-	++	-	+++
Danitol (RUP)	-	-	+++	-	-	+++	-	+++	++	-	-	-	++	+++
Delegate, Radiant	-	-	+++	-	-	-	-	-	-	-	+++	-	-	+++
Dibrom	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Entrust	-	-	++	-	-	-	-	-	-	-	++	-	-	++
Imidan	-	-	++	-	+	-	-	++	++	-	++	++	-	++
Intrepid	-	-	+++	-	-	-	-	-	-	-	++	-	-	-
Lorsban (RUP EC only)	-	-	-	-	-	-	++	-	-	-	-	-	-	-
Malathion	-	-	+	-	-	-	-	++	++	-	-	++	-	++
Movento	-	-	-	-	-	+++	-	-	-	-	-	-	-	-

Insecticide Timing



Control Flow (CF) Valves "Highly" recommended for hand sprayers



Adjustable Pressure Gauge

- **Constant Flow**
- **Uniform Pressure**
- **Less Pumping**
- **Less Drift**

1. Put 1 gallon (128 fl. oz.) of water into sprayer.
2. Pump up sprayer to desired pressure.
3. Hold nozzle level and move evenly back and forth while spraying at normal walking speed until sprayer runs out.

Small sprayer calibration

Example:
Area Sprayed = 300 sq. ft.
Water Sprayed = 1 gallon = 128 oz.
Application Rate = 128 oz. / 1,280 sq. ft. = 0.1 oz. / sq. ft.

Application Rate / Acre = 43,560 sq. ft. X 0.1 oz. = 4,356 oz. / acre

$$\frac{\text{4,356 oz.}}{\text{128 oz. / gal.}} = \text{34 gallons / acre}$$

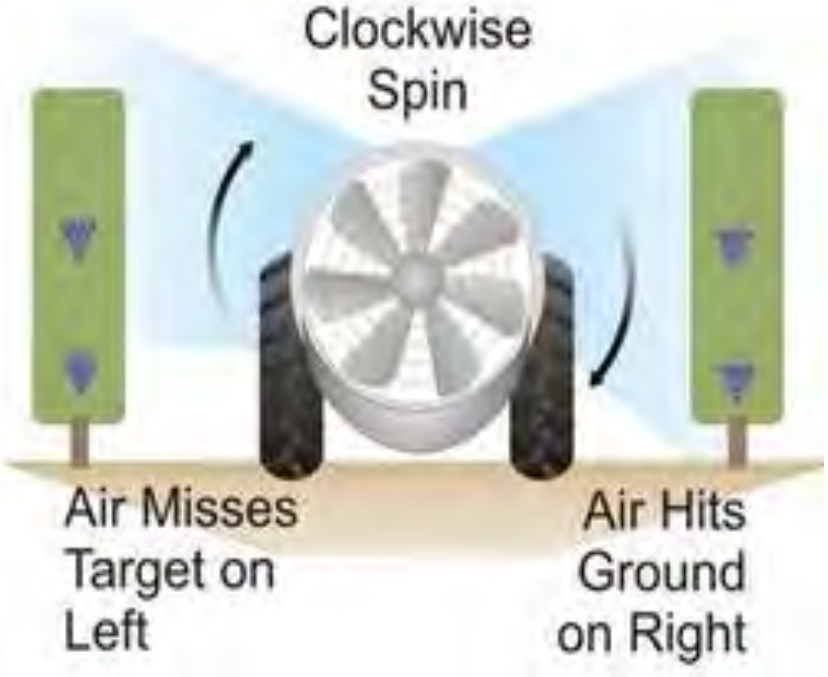
http://www.nukeaweed.com

Hydraulic Boom Sprayers

No-Drip Nozzles Best

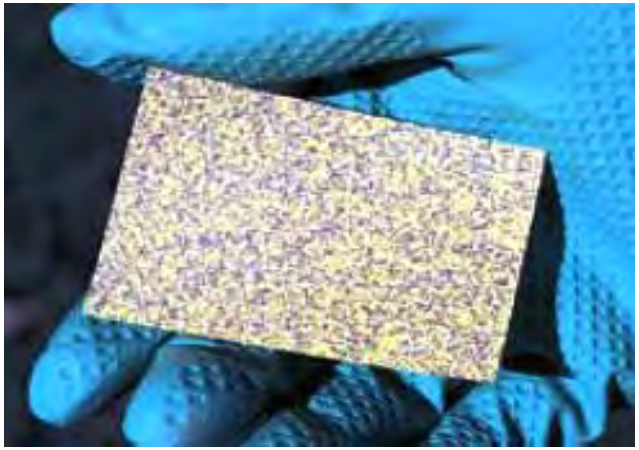
Well Calibrated Air Blast Sprayer is Needed for Winegrape Production

Overlapping Coverage

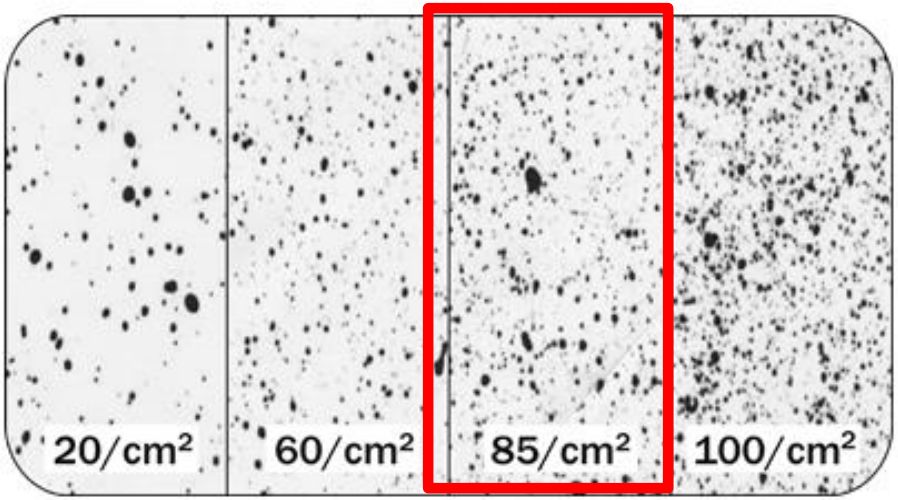


Have someone stand behind the sprayer to view overlapping coverage.

Spray Distribution Paper



80 to 90 fine to medium drops per sq. cm. is ideal for most fungicide and insecticides.



Regular note pad paper can also work with pesticide mixes with colorants

OK, my airblast sprayer is calibrated at 50 gal./ac at full canopy. How much Captan & Penncozeb do I put in my 50 gallon tank?

I want to apply 2 lbs. of Penncozeb 75DF & 2 lbs. of Captan 4L per acre.

Most labels recommend using 50 to 100 gallons of spray carrier per acre or spray to the point of runoff.

50 gallon mix for 50 gallon per acre based on full canopy in this example.

1. Fill the sprayer with 50 gallons of water.

2. Add 2 lbs. of Penncozeb 75DF & 2 lbs. of Captan 4L to the 50 gallons of water.

3. Use only the nozzles needed to cover the canopy present.

4. Your application rate per acre will be relative to the canopy present.

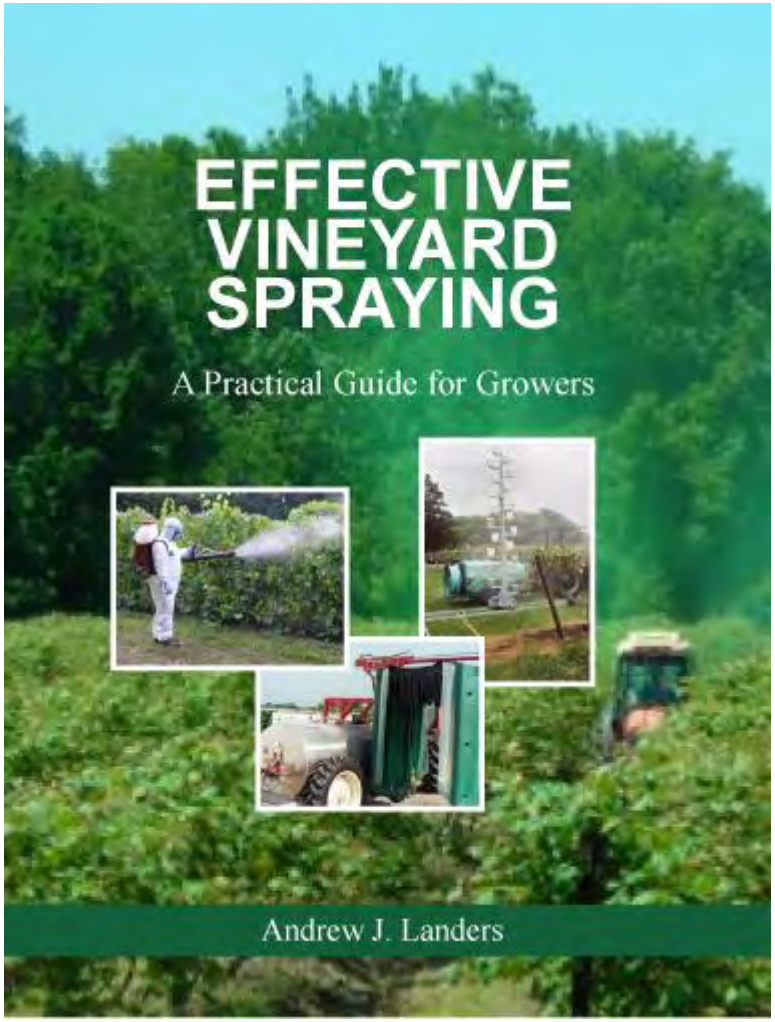
Every vs. Alternate Row Spraying

Every Row Spraying applies product to each side of the row.

Alternate Row Spraying applies product to only one side of the row.

Cornell University research shows very erratic coverage with Alternate Row Spraying. Especially with early season spraying where wind can affect the spray plume.

A 50 gal. / ac. Alternate Row Application can be reduced to 25 gal./ac. Every Row Application.



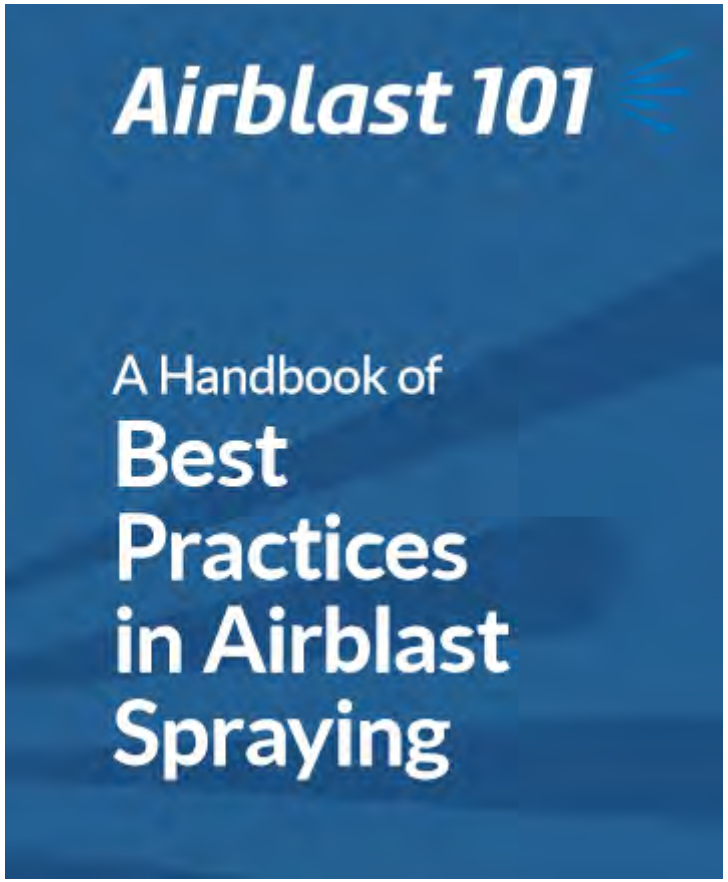
Aug. 2010 – 260 pages
Approx. $61.50 with shipping

6-28-16 Effective Fruit Spraying Clinic, ISU Hort. Station, Ames, IA with Dr. Andrew Landers:

Patternator – 6-25-11 at ISU

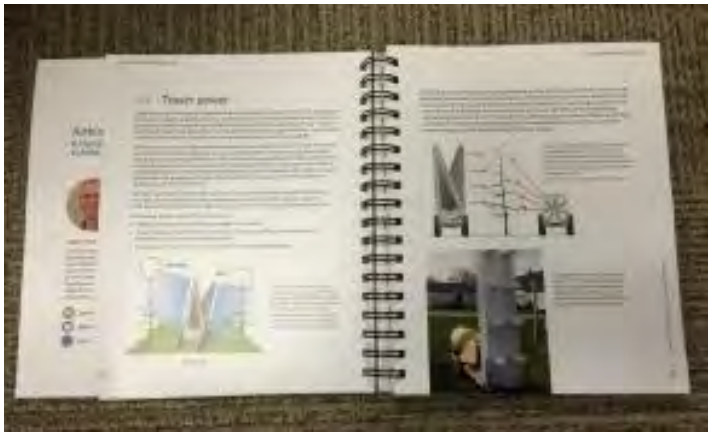
Dr. Andrew Landers
Cornell University

Sprayers 101



Jason Deveau

English, French,
Spanish, Punjabi
207 pp. v.4.0
Free PDF
Free E-Book
Print Copy: $30 plus shipping
Contact: jason@sprayers101.com



http://sprayers101.com/tag/airblast101/

Additional Resources

1. 2019 Midwest Fruit Pest Management Guide180 pp.
   https://store.extension.iastate.edu/product/14488
2. Midwest Small Fruit Pest Management Handbook, 210 pp:
   http://extension.missouri.edu/sare/documents/MidwestSmallFruitPestManagement2012.pdf
3. Pesticide Resistance Action Groups:
   http://www.clemson.edu/extension/pest_ed/issues/resistan.html
4. Pesticide Labels and MSDS sheets: http://www.cdms.net/LabelsMsds/LMDefault.aspx
5. Compendium of Herbicide Adjuvants, Southern IL Univ.: http://www.herbicide-adjuvants.com/
6. North Central IPM Guide: http://www.ipmcenters.org/pmsp/pdf/NorthCentralGrapePMSP.pdf
7. ISU Extension Pesticide Safety Program: http://www.extension.iastate.edu/psep/
   (Pesticide training, Worker Protection Standard information)
8. Gempler's Pesticide Safety Equipment: http://www.gemplers.com/
9. VineSmith Pesticide Guide: http://www.vinesmith.com/spray-guides/
10. USDA National Organic Program: http://www.ams.usda.gov/AMSv1.0/NOP
11. Organic Materials Review Institute: http://www.omri.org/
12. Demeter Biodynamic Certification: http://www.demeter-usa.org/

Summary

1. Know Your Cultivars
2. Know Your Pests
3. Know Your Pesticides
4. Calibrate Your Sprayer
5. Know the Regulations
6. Know When to Spray
7. Know the Weather
8. Know Pesticide Safety
9. Know Your Costs