

Scouting for Diseases in the Vineyard

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Benefits of Disease Scouting

Preventative sprays > curative/remedial sprays

- Timely and optimal disease control – what/when to spray for
- Estimate infection timing – evaluate efficacy of sprays/programs

Major Grape phenological stages.

When scouting your vineyard for pests take note of the stage of development of the grape vines



Dormant

Early Bud Swell

Late Bud Swell

Bud Burst

1-to 3-inch
shoots



4-to 8-inch
shoots



10-to 16-inch
shoots



Immediate pre-
bloom



First bloom

Eichorn-Lorenz Grapevine Phenology

Major Diseases

- Phomopsis (**fungal disease**)
- Black Rot (**fungal disease**)
- Powdery Mildew (**fungal disease**)
- Downy Mildew (oomycete, behaves like a fungus)
- Late Season Bunch Rots * (mainly caused by **fungi**)

April

October

Dormancy

Budburst

4 inch-shoots

Pre-bloom

Bloom

Setting

Pea-size

Veraison

Harvest

Disease Scouting Principles

- Scouting blocks in areas with the highest disease issues in the past
- Scouting varieties that seem to be most prone to disease infections (disease susceptibility)
- Scouting every 2 to 3 days, during a growing season

Knowledge required

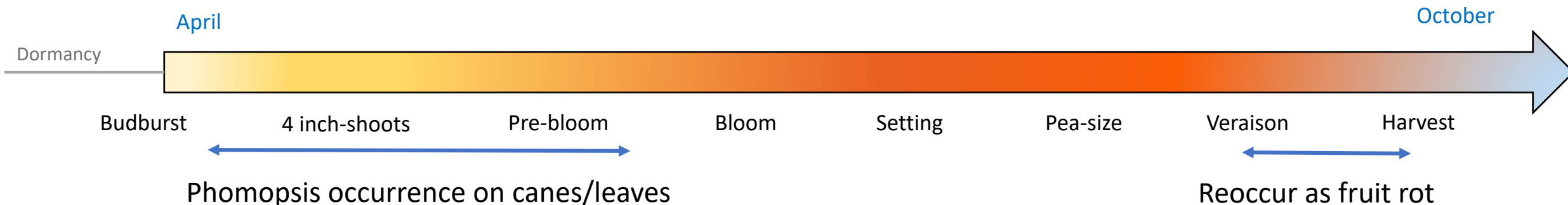
- Recognition of early symptoms
- Understanding disease dynamics based on growth stages
- Understanding time needed from infection to expression of symptoms

Phomopsis disease

- Occurs very early in the season, as soon as shoot growth begins
- Pay attention to first 3-4 internodes/nodes on shoots
- It may take a couple of weeks from the time of infection to the time of symptoms
- Not much from bloom to veraison
- Fruit rot resulted from rachis infections occurred in May – spray efficacy ‘feedback’

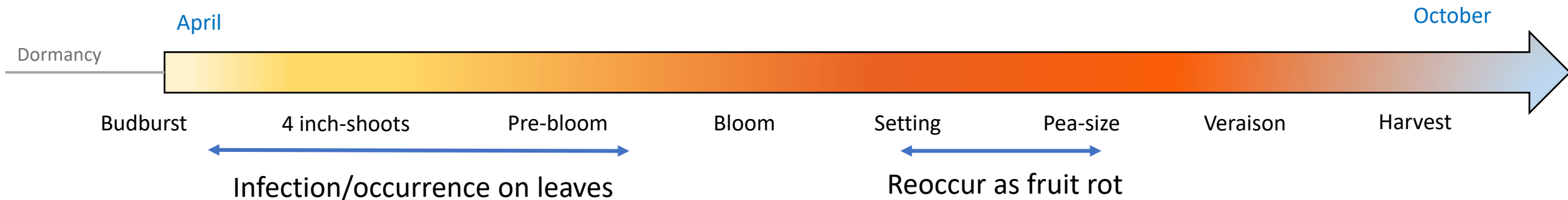


Black spots and scabs on green shoot



Black rot

- Epidemics can cause major yield losses
- Disease infection can occur during early shoot growth
- Scouting leaves regularly – Red/brown leaf spot with very small black bodies
- It takes about 12-14 days from leaf infection to symptom expression
- Knowing **leaf infection timing**: feedback on spray programs
 - early stages of expansion – large lesions
 - later stages of expansion – small lesions
 - Leaves are infected after fully expanded – little/no lesions
- The position of leaves that are infected may be important



Black rot

- **Fruit infection:**

3-4 weeks after bloom, fruit start to develop resistance to black rot

12-14 days for fruit symptoms to appear after an infection has occurred (within 3-4 weeks postbloom)

14 to 20 days to develop symptoms for infections occurred 4 to 5 weeks after bloom



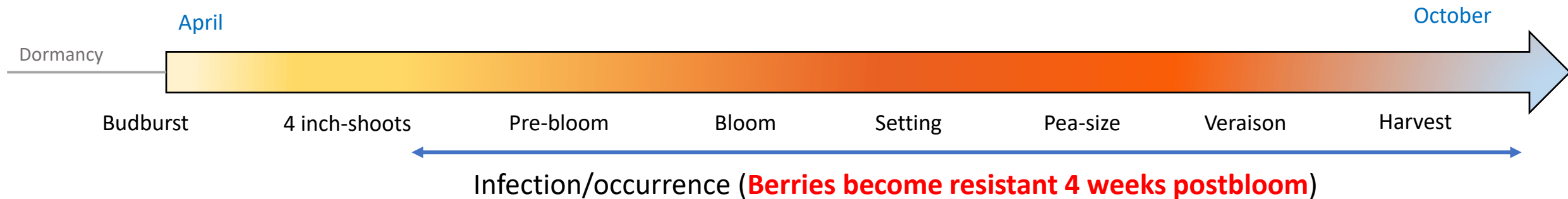
Feedback

Assess/adjust your spray programs



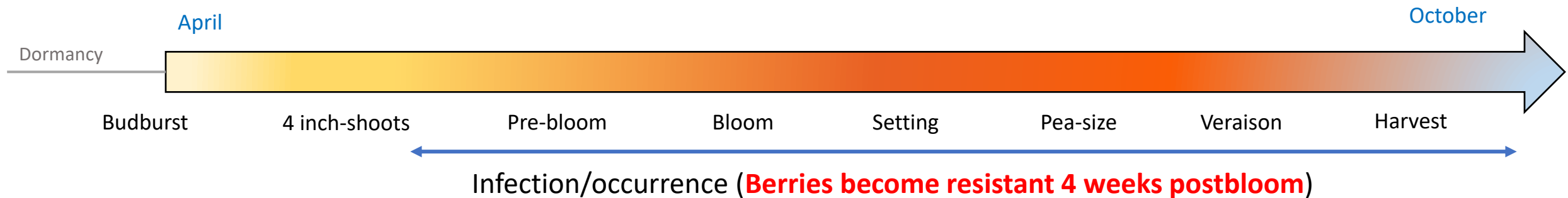
Downy mildew

- Epidemics cause major yield losses
- Scouting begins when vines average 5 to 6 leaves/shoot
- It takes only 4 to 6 days to express symptoms after an infection event (much quicker compared to Phomopsis and black rot)
- Leaves near the ground likely show symptoms
- 4 weeks after bloom, fruit acquire resistance to downy mildew



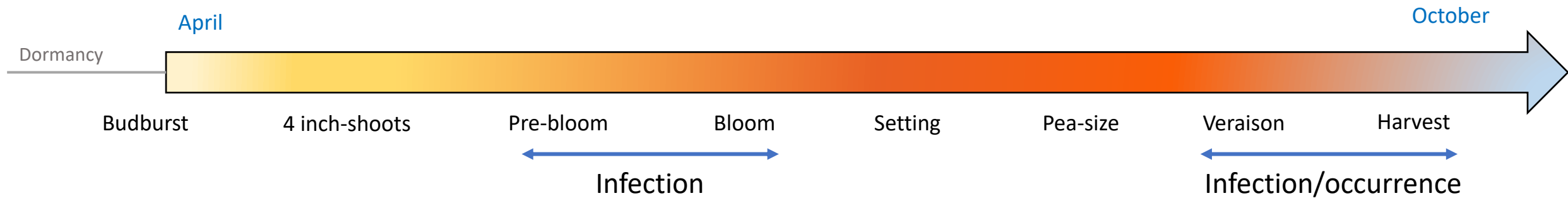
Powdery mildew

- Symptoms typically appear **first** on inflorescences and young clusters in June
- It takes only 3 to 5 days to express symptoms after an infection event
- Leaves typically do not develop symptoms until July or Aug
- Berries become resistant to PM 4 weeks postbloom
- Early PM infections could lead to more late-season rots



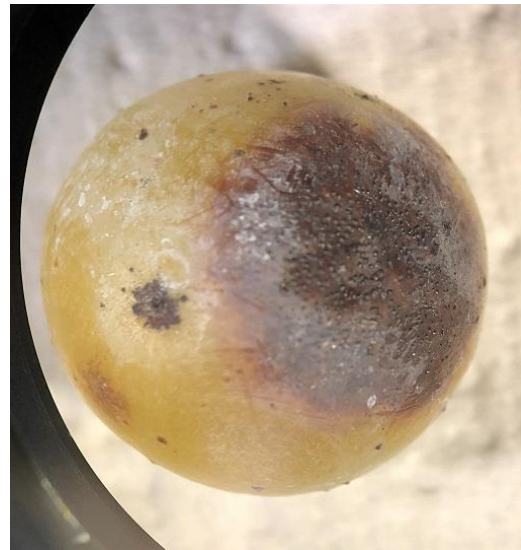
Botrytis bunch rots

- Infections could occur during bloom and/or after veraison
- Infections occur at bloom remain latent until fruit ripening
- Symptoms often occur after veraison as fruit is nearing harvest



Ripe rot (caused by *Colletotrichum* spp.)

- Dispersal primarily by water splash
- Sprays after veraison are critical



April

October

Dormancy

Budburst

4 inch-shoots

Pre-bloom

Bloom

Setting

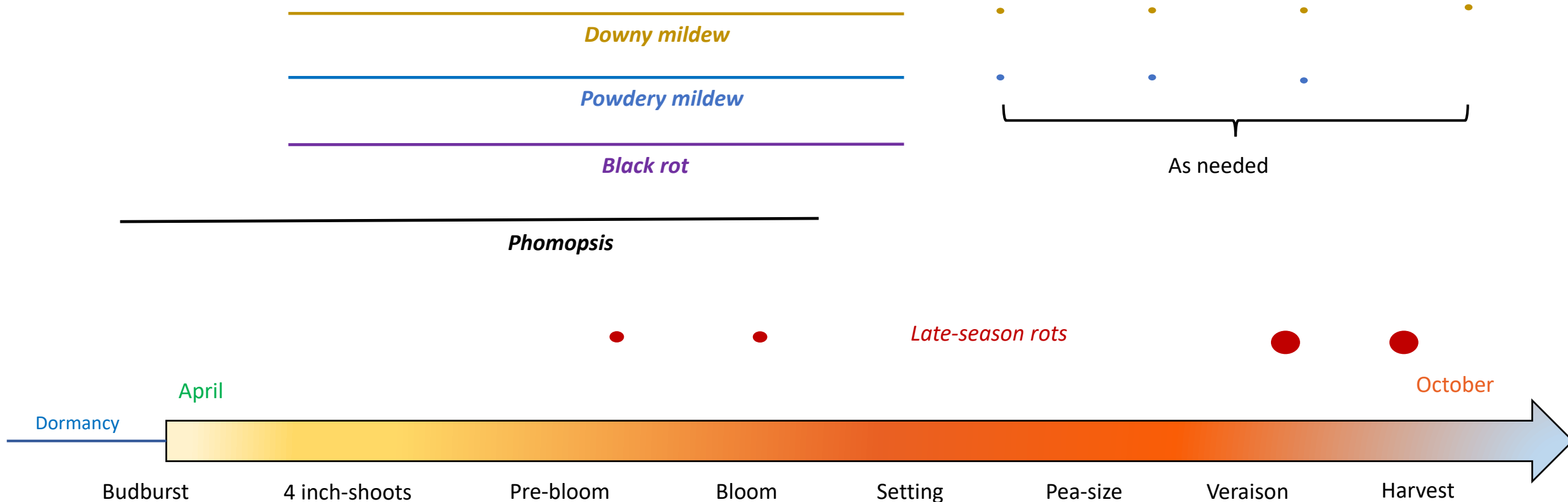
Pea-size

Veraison

Harvest

← Infection/occurrence →

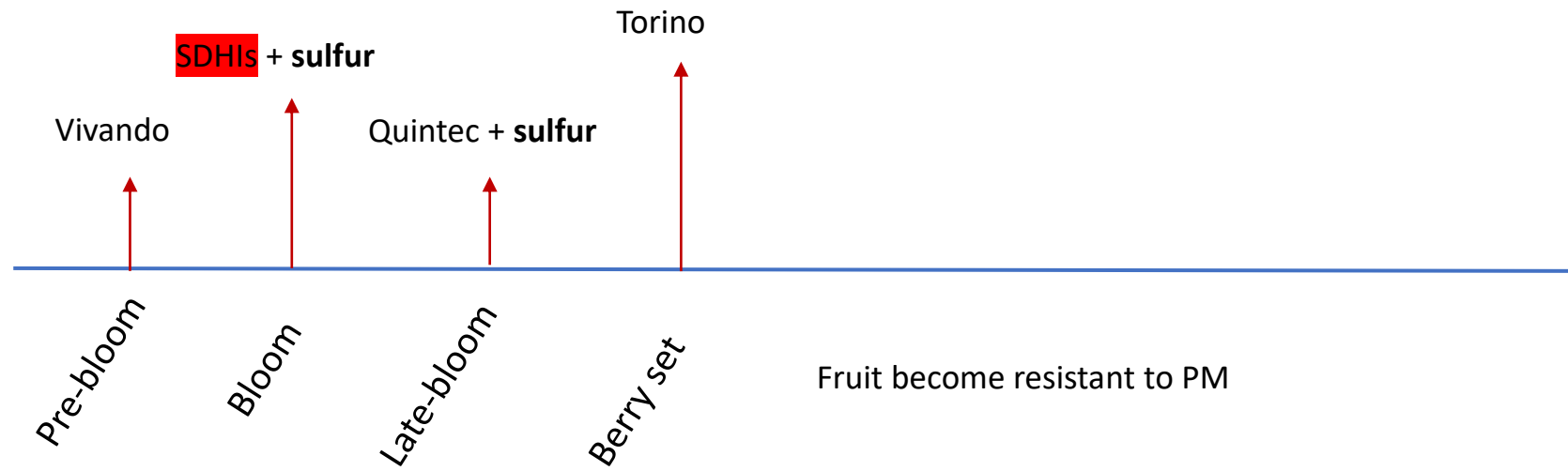
Put it together: When do you spray for grapevine diseases?



Number of sprays/season for vinifera grapes : **8 to 10 applications** (dry years), and **14 to 16 applications** (wet years)

Note: Hybrids are generally more disease-tolerant, which would require less fungicide input.

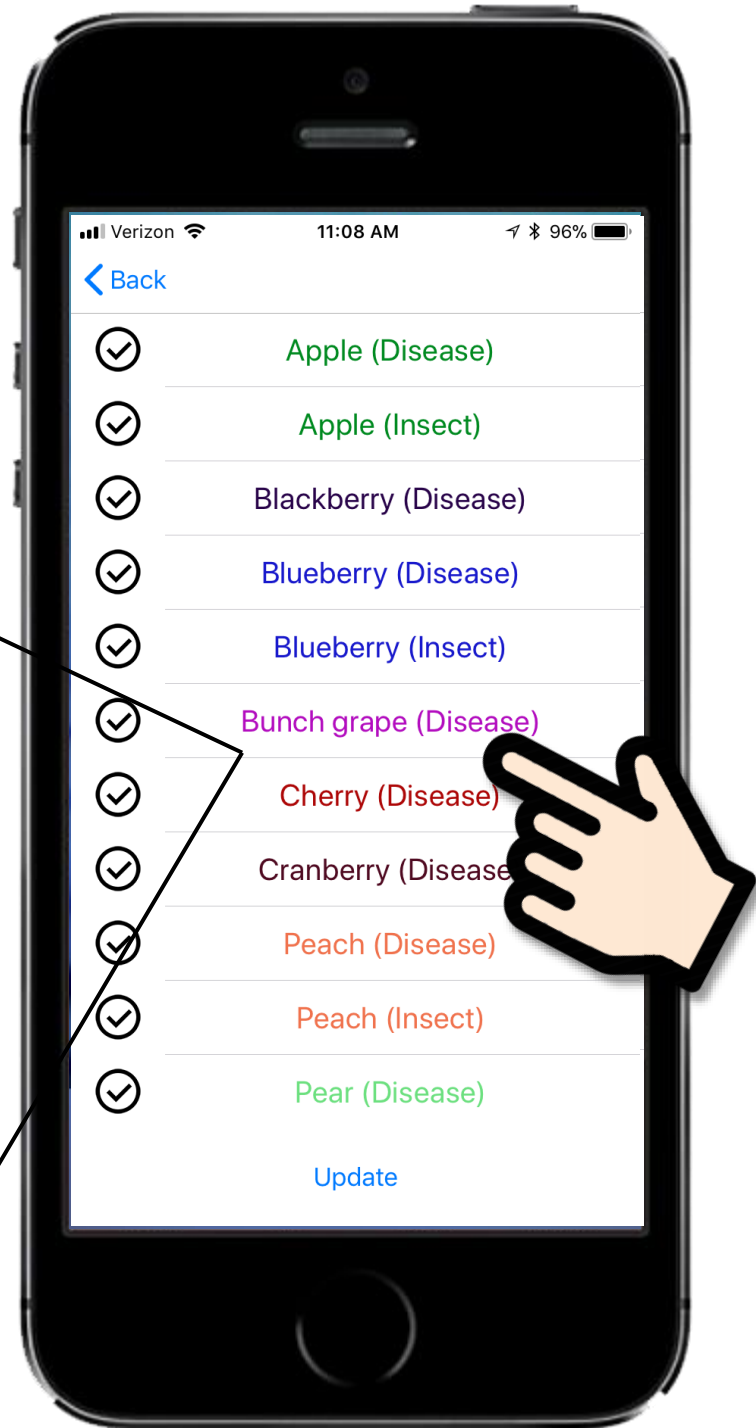
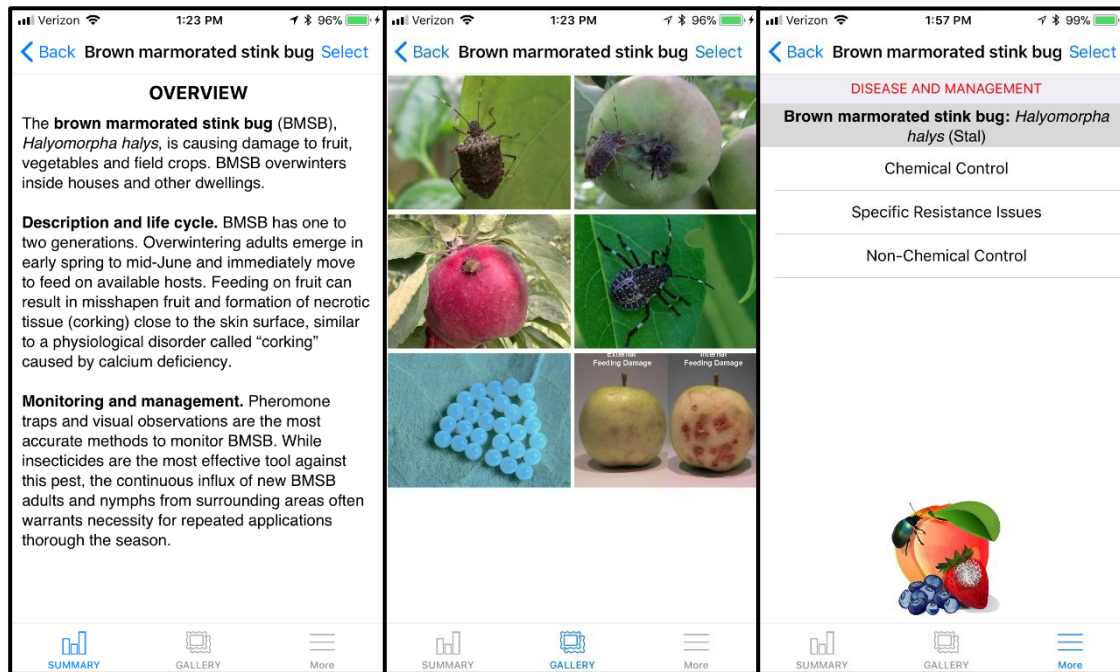
An example: Spray schedule for fruit protection from PM



MyIPM Smartphone App

Diagnostic Tools

- Descriptions & zoomable photo gallery
- Pest biology
- Chemical, biological, and cultural control options
- Audio from specialists

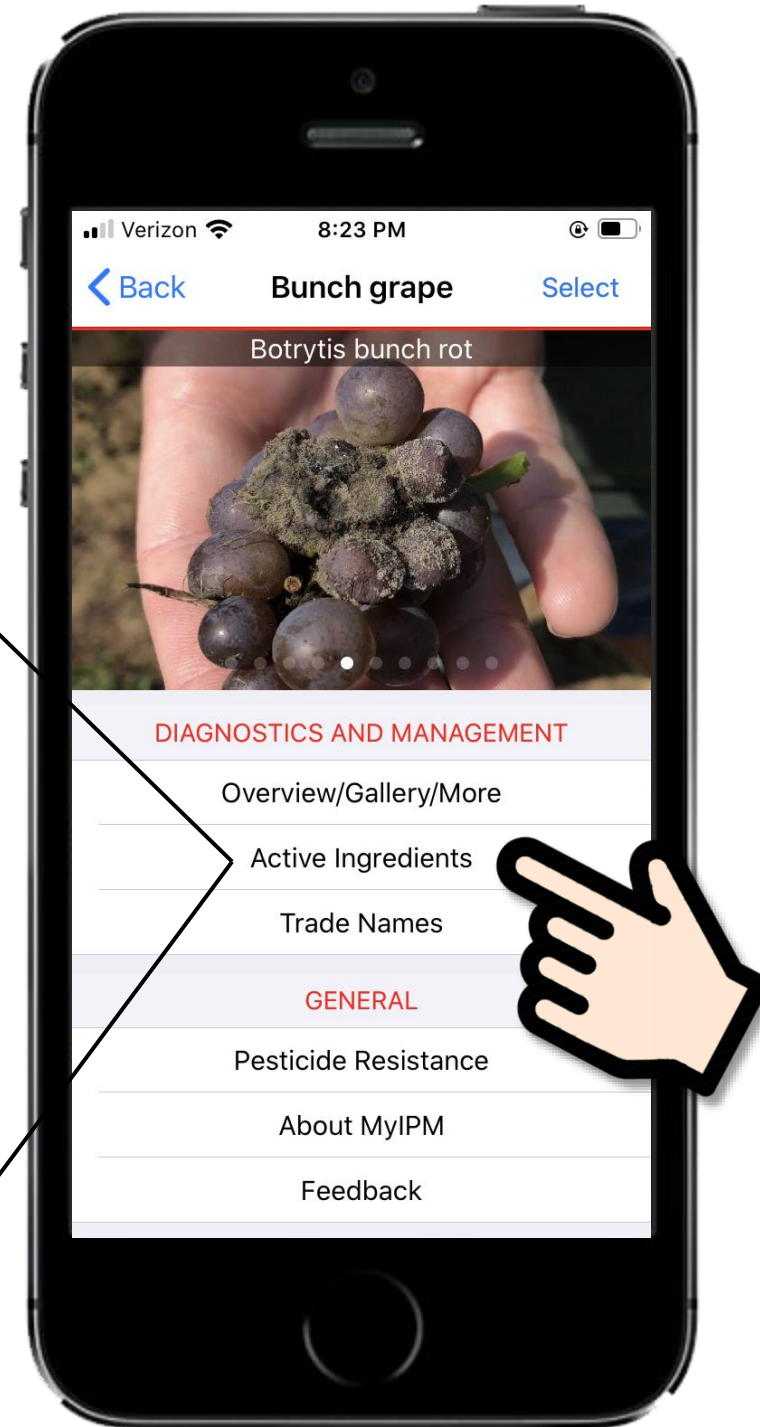


Features and Functionality

Interactive Tables featuring:

- Active ingredients & trade names
- Efficacy data
- PHI, REI, rates/acre

Conventional			Organic		
Active Ingredient	IRAC Code	Efficacy	Trade Name	Active Ingredient	Rate/Acre
Acetamiprid	4A	Low	Actara 25 WDG	Thiamethoxam	4.5-5.5 oz
Clothianidin	4A	Low	Admire Pro	Imidacloprid	7 oz
Fenpropathrin	3A	Low	Assail	Acetamiprid	8 oz
Imidacloprid	4A	Low	Belay 2.1EC	Clothianidin	6-12 fl oz
Lambda cyhalothrin	3A	Low	Danitol 2.4EC	Fenpropathrin	16-21 fl oz
Methomyl	1A	Low	Endigo ZC	Thiamethoxam	5-6 fl oz
Thiamethoxam	4A	Low	Lannate LV	Methomyl	3 pt
			Lannate SP	Methomyl	16 oz
			Leverage 2.7SE	Imidacloprid	3.6-4.4 fl oz
			Warrior 1EC	Lambda cyhalothrin	1.3-2.8 fl oz



Key features and functions

The app is designed to supplement regional fruit management guides.

With an intuitive menu and layout, the app features:

- **Diagnostic Tools** with descriptions & zoomable photo gallery
- **Interactive Tables** featuring active ingredients, trade names, efficacy data, PHI, REI, rates/acre
- **Chemical, Biological, and Cultural Control Options**
- **Pest Biology**
- **Audio** from specialists
- **Resistance Management Tools**
- **Pesticide Risk** values for trade names to estimate risk of negative impacts of pesticides (IPM Institute)
- **Continually Updated** by Leading Extension Specialists of 7 Land-Grant Universities and the Southern IPM Center

Pick your crops and pests of interest

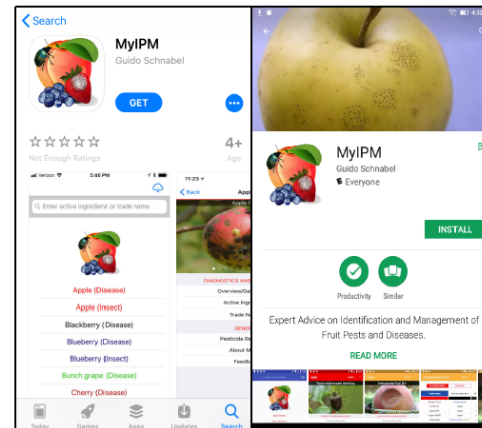
[Back](#)

- ☒ Apple (Disease)
- ☒ Apple (Insect)
- ☒ Blackberry (Disease)
- ☒ Blueberry (Disease)
- ☒ Blueberry (Insect)
- ☒ Bunch grape (Disease)
- ☒ Cherry (Disease)
- ☒ Cranberry (Disease)
- ☒ Peach (Disease)
- ☒ Peach (Insect)
- ☒ Pear (Disease)
- ☒ Strawberry (Disease)
- ☒ Strawberry (Insect)



[Update](#)

Download app for free



The MyIPM has been developed for both Apple iOS and Google Android mobile operating systems.

- Search "MyIPM" in the Apple App Store or the Google Play store
- Or scan the QR code below to visit bugwood.org
- Use WiFi due to large file size



(scan me)

Extension articles/disease management guidelines

Grapes: Diseases and Insects in Vineyards 3-1

Grapes: Diseases and Insects in Vineyards

Douglas G. Puffer, Extension Entomologist, Virginia Tech
Anton B. Baudoin, Plant Pathologist, Virginia Tech
J. Christopher Bergh, Extension Entomologist, Alison H. Smith Jr. AREC
Mitsuko Nita, Extension Plant Pathologist, Alison H. Smith Jr. AREC

Additional information on pest and beneficial species identifications is available online at <http://www.virginiafruit.ento.vt.edu/>.
Application rates: The rate per acre column gives rates for low-volume or concentrate applications. Sprays may be applied as season-concentrate (40-100 gal/A) or concentrate (10-40 gal/A) sprays. Use caution with more concentrated sprays; the smaller droplet sizes associated with low-volume applications are more prone to drift. Amount of pesticide to be applied for dilute applications (usually 100 gal/A early in early season, 200 gal/A in mid season, and 300 gal/A in late season) is usually given on the label.

Pest	Chemical and Formulation	Rate/Acre	Spray Timing and Remarks
Dormant			
Anthraco-nose (Bird's eye rot)	lime sulfur solution Gulfortx	10.0 gal, or see label	Only necessary where anthracnose, Phomopsis, or powdery mildew have been a serious problem. Lime sulfur can reduce overwintering inoculum of these diseases.
Powdery Mildew			
Phomopsis			
Botryosphera canker, Eutypa dieback, ESDA	Topsin-M	0.75-1.5 lb	For Topsin-M, you need to obtain a section 24c label for VA. Please read the label for specific application information. Requires a supplemental label (can be obtained through manufacturer's website). B-lock is a latex paint with boron for pruning wound protection, and shown to be effective against number of trunk diseases.
	Rally 40WP	5 oz	
	B-lock	n/a	
Mealybugs			
	Applaud 70DF	9.0-12.0 oz	If a problem at harvest in the previous year.
	Delay Insecticide	5.0 fl oz	If a delayed dormant spray does not provide adequate control, a summer application may be made. Baythroid targets only crawlers. Mowvento pre-sprays only in table grapes. The use of Baythroid should be delayed until fourth cover in blocks where spotted wing drosophila must be controlled, in order to observe maximum applications per season.
	Venom 7D	1.0-3.0 oz (foliar)	
	Scorpion 35SL	5.0-6.0 oz (soil)	
	Assail 30SG	9.0-10.5 fl oz (soil)	
	Admire Pro	2.5 fl oz	
	Baythroid XL 1EC	1.0-1.4 fl oz (foliar)	
	Mowvento 25C	1.0-14.0 fl oz (soil)	
	Adara 25WDG	2.4-3.2 fl oz	
		5.0-6.0 fl oz	
		1.5-3.5 oz	
Grape scale	Dormant oil	2% solution	Apply in high volume (dilute) application. Loose bark on vines makes coverage of scale difficult.
Bud Swell			
Grape flea beetle	Danitol 2-SEC	5.0 fl oz	If adult beetles are present in damaging numbers. See Table 3.4 for Restricted Entry Intervals. The REI for Imidan may render it impractical for most growers. The use of Baythroid, Mustang, and Tombstone should be delayed until fourth cover in blocks where spotted wing drosophila must be controlled, in order to observe maximum applications per season.
	Imidan 70WP	2.0 fl oz	
	Baythroid XL 1EC	2.4-3.2 fl oz	
	Mustang 1-SEC	2.15-4.3 fl oz	

2016 New York and Pennsylvania Pest Management Guidelines for Grapes



2015 Concord harvest in research plots at the Cornell Lake Erie Research and Extension Laboratory, Port Jervis, NY.
(Photo by: Tim Wagle, NYS IPM Program)



Cornell University
Cooperative Extension



PennState Extension



Sample Wine Grape Spray Schedule - 2016

Ben Beale, Extension Educator, St Mary's County
Cassandra Swett, Ph.D., Assistant Professor, Grape and Small Fruit Pathology

The purpose of this TimelyVit is to help wine grape growers in Maryland to develop an effective fungicide spray program to manage a complex of the major fungal diseases affecting vines and fruit. The table below suggests a simple spray schedule for specific crops stages/calendar time frames, based on the assumptions below.

Assumptions:

- Downy Mildew likely resistant to strobilurin type fungicides and Pristine/Endura
- Powdery Mildew likely resistant to strobilurin type fungicides
- Botrytis likely resistant to strobilurin type fungicides
- Best products for ripe rot: Luna Experience, Pristine
- Best products for downy mildew: Ridomil Gold, Mancozeb, Presidio, phosphorous acid (second to Ridomil and Mancozeb—good preventative)
- Best products for powdery mildew: sulfur, Luna Experience, Quintec
- Varieties being sprayed are NOT sulfur sensitive
- Disclaimer: Always read the pesticide label. The label is the law and users must follow all rates and restrictions according to label directions.**

Target Diseases:	Anticipated Pressure
Downy Mildew	Very High
Powdery Mildew	High
Phomopsis	Low
Black Rot	Low
Botrytis	Medium
Ripe Rot	High

(Continued on page 2)



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Regional spray guides

<http://www.smallfruits.org/ipm-guides.html>

Efficacy of selected fungicides against diseases of bunch grapes							
Chemical name (Fungicide product name)	Anthracoze	Black rot	Bitter rot	Botrytis rot	Downy mildew	Phomopsis cane and leaf spot	Powdery mildew
Azoxystrobin (Abound)		++++ ^a	++++	+++ ^b	++++ ^b	+++	++++ ^b
Boscalid (Endura)				++++ ^b			++++ ^c
Boscalid + Pyraclostrobin (Pristine)	++++	++++	++++	++++ ^b	++++ ^b	++++	++++
Captan (Captan, Captec, etc.)	+++	+++	++++	++	++++	++++	NA
Fixed coppers and Bordeaux mixture (various)		+++	++	+++	+++	++	++
Cyflufenamid (Torino)		NA	NA	NA	NA	NA	++++
Cyprodinil (Vanguard)		NA	NA	++++ ^b	NA	NA	++
Cyprodinil + Fludioxonil (Switch)				++++ ^b			
Cyprodinil + Difenoconazole (Inspire Super)		++++		++++ ^b			++++
Famoxadone + cymoxanil (Tanos)					+++ ^b		
Fenhexamid (Elevate)		NA	NA	++++ ^b	NA	NA	NA
Ferbam (Ferbam)		++++	+++	NA	++	++	NA
Fenarimol (Rubigan)		++	NA	NA	NA	NA	++++ ^b
Fluopicolide (Presidio)	NA	NA	NA	NA	++++	NA	NA
Fluopyrurum + tebuconazole (Luna Experience)	NA	++++	NA	++++ ^b	NA	NA	++++
Fluopyrurum + pyrimethanil (Luna Tranquility)	NA	NA	NA	++++ ^b	NA	NA	++++
Iprodione (Rovral, Meteor)	NA	NA	NA	+++ ^b	NA	NA	NA
Kresoxim-methyl (Sovran)		++++	++++	++ ^b	+++ ^b	+++	++++ ^b
Lime Sulfur (dormant application)	+++			NA	NA	+++	++
Mancozeb (various: Penncozeb, Dithane, etc.)		++++	++++	NA	++++	++++	NA
Mandipropamid (Revus)	NA	NA	NA	NA	++++	NA	NA
Mandipropamid + Difenoconazole (Revus Top)		++++	++++ ^c	NA	++++	+++ ^c	++++
Mefanoxam + Copper (Ridomil Gold Copper)		++	++	++	++++	++	++
Mefanoxam + Mancozeb (Ridomil Gold MZ)		+++	+++	NA	++++	+++	NA
Metrafenone (Vivando)		NA	NA	NA	NA	NA	++++
Myclobutanil (Rally)		++++	++	NA	NA	NA	++++ ^b
Phosphonate (ProPhyt, Phostrol, etc.)					++++		
Sulfur ^d (various)		NA	NA	NA	NA	++	++++
Tebuconazole (Elite)		++++	NA	NA	NA	NA	++++ ^b
Tetraconazole (Mettle)							++++ ^b
Thiophanate-methyl (Topsin M)		++	+++	NA	NA	+++	++++ ^b
Trifloxystrobin (Flint)		++++	++++	++++	+++	++	++++ ^b
Triflumazole (Procure and Viticure)		+++ ^b	NA	NA	NA	NA	++++
Ziram (Ziram)		++++	NA	++	++++	+++	NA

^a The efficacy rating: NA = no significant activity; + = very limited activity, ++ = limited activity, +++ = moderate activity, ++++ = good activity, +++++ = excellent activity

^b Resistance (or occasional failure of control) has been observed in some southeastern states, thus, if control failure occurs, it could indicate resistance has developed. The efficacy rating could be impacted by resistance development. If resistance has occurred, use of fungicides in the same class would likewise show resistance, and a substitute fungicide should be considered for pathogen management.

^c Insufficient data for the pathogen-chemical combination. The rating was given based on the general knowledge on the material.

^d Sulfur will cause burn on sensitive varieties, especially on hot days, >85F.

