THE OHIO STATE UNIVERSITY

COLLEGE OF FOOD, AGRICULTURAL, AND ENVIRONMENTAL SCIENCES

Ohio Apple Diseases-A Year in Review

MELANIE LEWIS IVEY, ASSISTANT PROFESSOR

OSU PLANT PATHOLOGY, CFAES-WOOSTER

JANUARY 2020

2020-A Year in Review

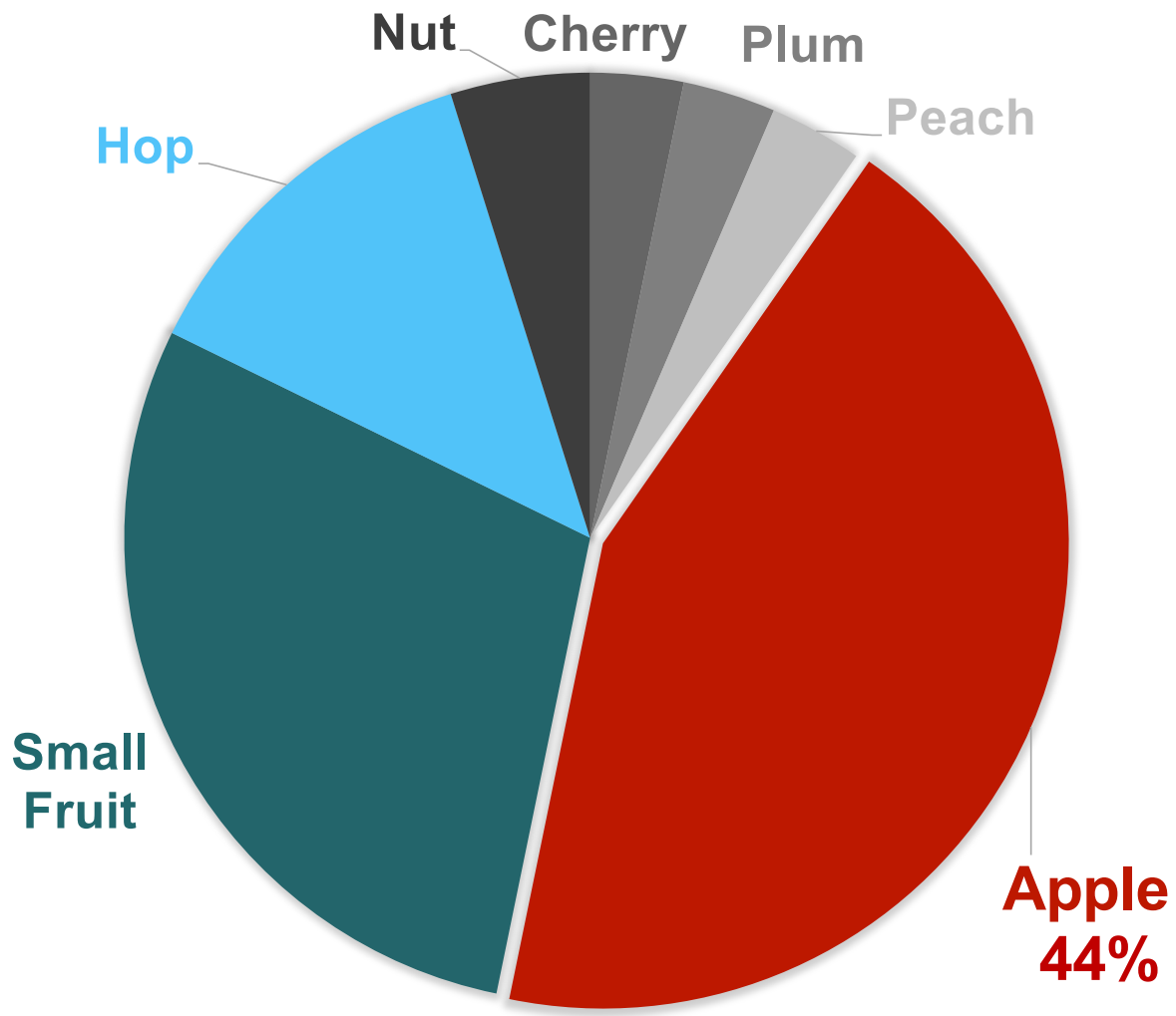
Diagnostics

Research

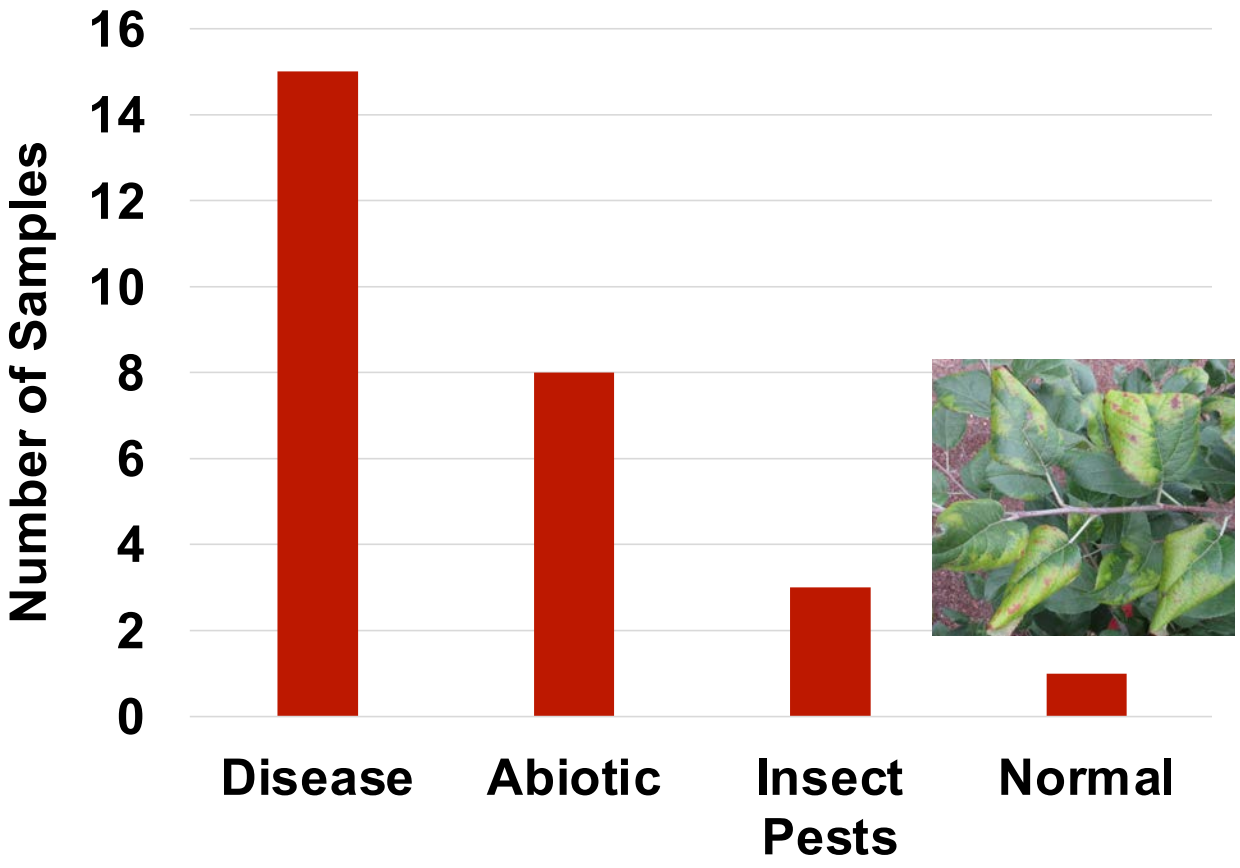
Extension

2020 Diagnostic Samples

- 62 samples
- 53% Tree fruit



2020 Apple Samples



Black Stem Borer

OFN, October 202

By Celeste Welty - Extension Entomologist

There have been several detections of the black stem borer in Ohio over the past year or two. This borer is a tiny beetle that attacks and can kill young apple trees, often in the first year or two after planting. This species is *Xylosandrus germanus*, which has been known since the 1930s but has been reported as causing problems only recently. It is associated with young trees under stress, most likely from summer drought or extreme winter cold. This species is in the group known as ambrosia beetles, which feed on fungi that the cultivate within tunnels that they chew in the tree trunks.

Black Stem Borer

Image by Pennsylvania Department of Conservation and Natural Resources - Forestry, Bugwood.org.jpg

Black stem borer hole in a young apple tree

A factsheet from Michigan State University, by Michael Haas, Julianna Wilson, and Larry Gut, published in 2017, is a good source of additional details and suggestions for insecticidal control by trunk applications in the spring.

Black Stem Borer

- Affects young trees under stress
- Leaves wilt and tree dies

Marssonina Leaf Blotch of Apple

OFN, October 202

By Amy Miller- Graduate Research Assistant

Irregular leaf lesions of Marssonina Leaf Blotch

Marssonina leaf blotch (MLB), caused by the fungus *Marssonina coronaria*, is an apple leaf disease unknown to many Ohio growers. The disease was first reported in Japan in 1971 and has been spreading around the globe, with serious outbreaks at different points in time in East Asia, Europe, South America, and North America.

Detection of and attention to this disease in eastern North America has only occurred within the last 5 years, with reports of outbreaks from Connecticut in 2016, Pennsylvania in 2017, New York in 2018, and North Carolina in 2019. This year we observed leaf symptoms on apple seedlings grown in eastern Ohio for research purposes that at first glance appeared to be those of frogeye leaf spot or Glomerella leaf spot. However, upon further investigation (spore shape and size) we diagnosed the disease as MLB.

Marssonina Leaf Blotch

- Caused by the fungus *Marssonina coronaria*
- Can be confused with Glomerella Leaf Spot or Frogeye leaf Spot
- Necrotic spots, leaf yellowing, premature leaf drop

Summer Fungal Fruit Rots and Their Management

By Lianna M. Wodzicki- Graduate Research Assistant

** This article was first published as a blog on the Smart Apple Spray website.*

As the final cover sprays are applied in apple orchards, you may notice some unsightly spots on your fruit. Fungal fruit rots can cause significant losses in yield and reduce fruit quality. These diseases often appear just prior to harvest, during harvest, or in storage.

Bitter rot (*C. acutatum*) symptoms on the apple surface (top) and internally (bottom).

If these rots are not prevented through the integration of sanitation and cultural practices, and often fungicides, they can cause severe losses. The expression "one bad apple spoils the whole barrel" is a good description of what fruit rot can do. Bitter rot, black rot, and white rot are the three disease that cause the most damage to fruit, often rendering them unsalable.

Bitter rot (caused by the *Colletotrichum acutatum* fungal complex) is characterized by brown, sunken spots. After rain periods, these spots can develop masses of orange spores on the surface. Internally, the discoloration of the flesh tapers down to the core in a V shape. The discolored flesh is corky or spongy to the touch. Bitter rot is a major problem in Ohio due to prevalence of warm and humid summers. Diseased fruit, infected twigs and mummified fruit (in the tree and on the ground) are the primary sources of these fungi.

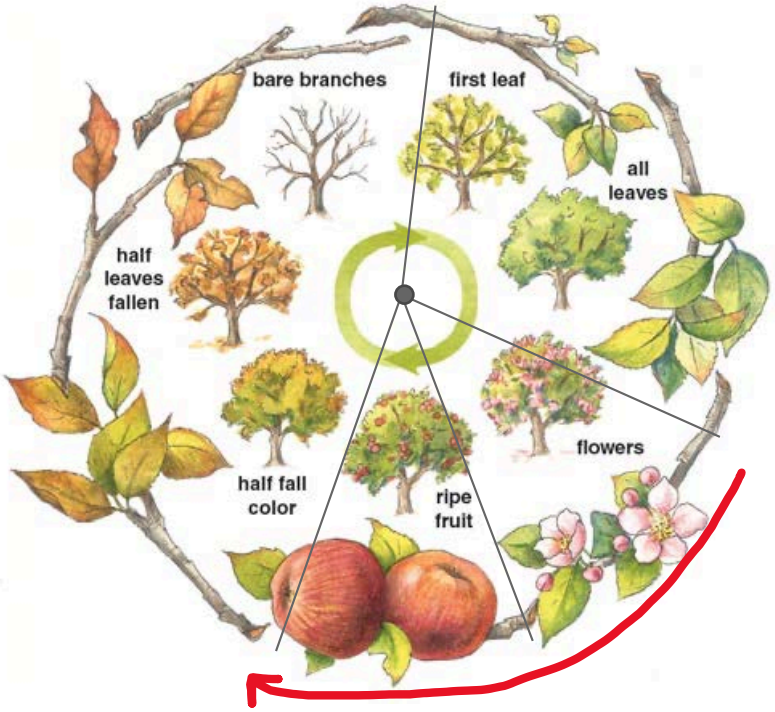
OFN, October 202

Fruit Rots

- Bitter rot, white rot and black rot
- Fungicides are the first line of defense

Fungicide Spray Program for **Summer Rots** of Apple

- Bitter rot drives the fruit rot spray schedule
- Begin applications at petal drop
  - 7-10 day until 3rd cover
  - 10-14 day 4th cover through harvest
  - Add a spray if 1 inch rain or 6 hr wetting period
- Use systemic fungicides strategically



Systemic Fungicides for **Summer Fruit Rots**

- Use with rain-fast mancozeb
- Captan (3 lb/A) will enhance systemic fungicides during wet conditions
- Use DMIs at front and back end of season
- Save QoIs and SDHIs for primary scab

MANCOZEB (rain-fast)
CAPTAN
DMI (FRAC 3)

MANCOZEB (rain-fast)
CAPTAN
SDHI (FRAC 7)

CAPTAN
DMI (FRAC 3)
SDHI (FRAC 7)
QoI (FRAC 11)

Fungicide Selection Based on Efficacy

Product	FRAC Group	Scab	Bitter Rot	Black Rot	White Rot
Aprovia	7	+++	+	+	+
Ceyva	3	+++	+	+	+
Captan	M	++	+++	+++	+++
Luna Sensation	7+11	+++	Variable	+++	+++
Mancozeb	M	++	++	++	++
Merivon	7+11	+++	+++	+++	+++
Miravis	7	+++	Suppression	Suppression	Suppression
Omega	29	++	+	++	++
Sercadis	7	+++	-	+	+

Sources: 2021-2022 Midwest Fruit Pest Management Guide; Apple Disease Control Toolbox, PSU, K. Peter



Cedar Apple Rust on Apple

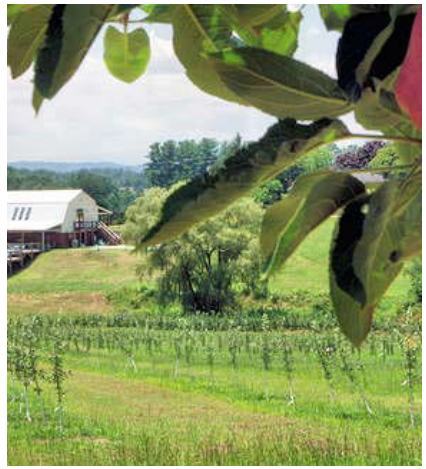
- Caused by the fungus *Gymnosporangium juniperi-virginianae*

Cedar Apple Rust on Cedar

- Caused by the fungus *Gymnosporangium juniperi-virginianae*

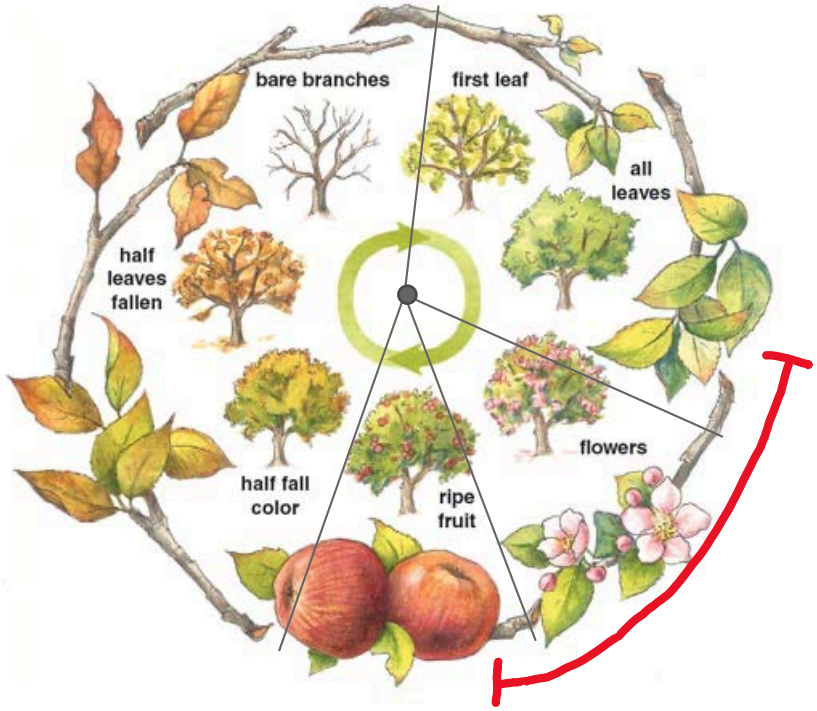
Cedar Apple Rust Management

- Select resistant varieties
- Remove volunteer cedars in orchard
- Avoid planting cedars within a mile of the orchard or plant rust resistant cedars (i.e. for U-picks or agrotourism)



Fungicide Spray Program for **Cedar Apple Rusts**

- Apply fungicides from pink bud to the end of terminal shoot growth
  - 7 to 10 day spray interval
  - Use systemic fungicides strategically



Fungicide Selection Based on Efficacy

Product	FRAC Group	Rust	Bitter Rot	Black Rot	White Rot
Aprovia	7	+	+	+	+
Ceyva	3	+++	+	+	+
Captan	M	-	+++	+++	+++
Luna Sensation	7+11	+	Variable	+++	+++
Mancozeb	M	++	++	++	++
Merivon	7+11	Suppression	+++	+++	+++
Miravis	7	++	Suppression	Suppression	Suppression
Omega	29	+	+	++	++
Sercadis	7	+	-	+	+

Sources: 2021-2022 Midwest Fruit Pest Management Guide; Apple Disease Control Toolbox, PSU, K. Peter

2020 Research Update

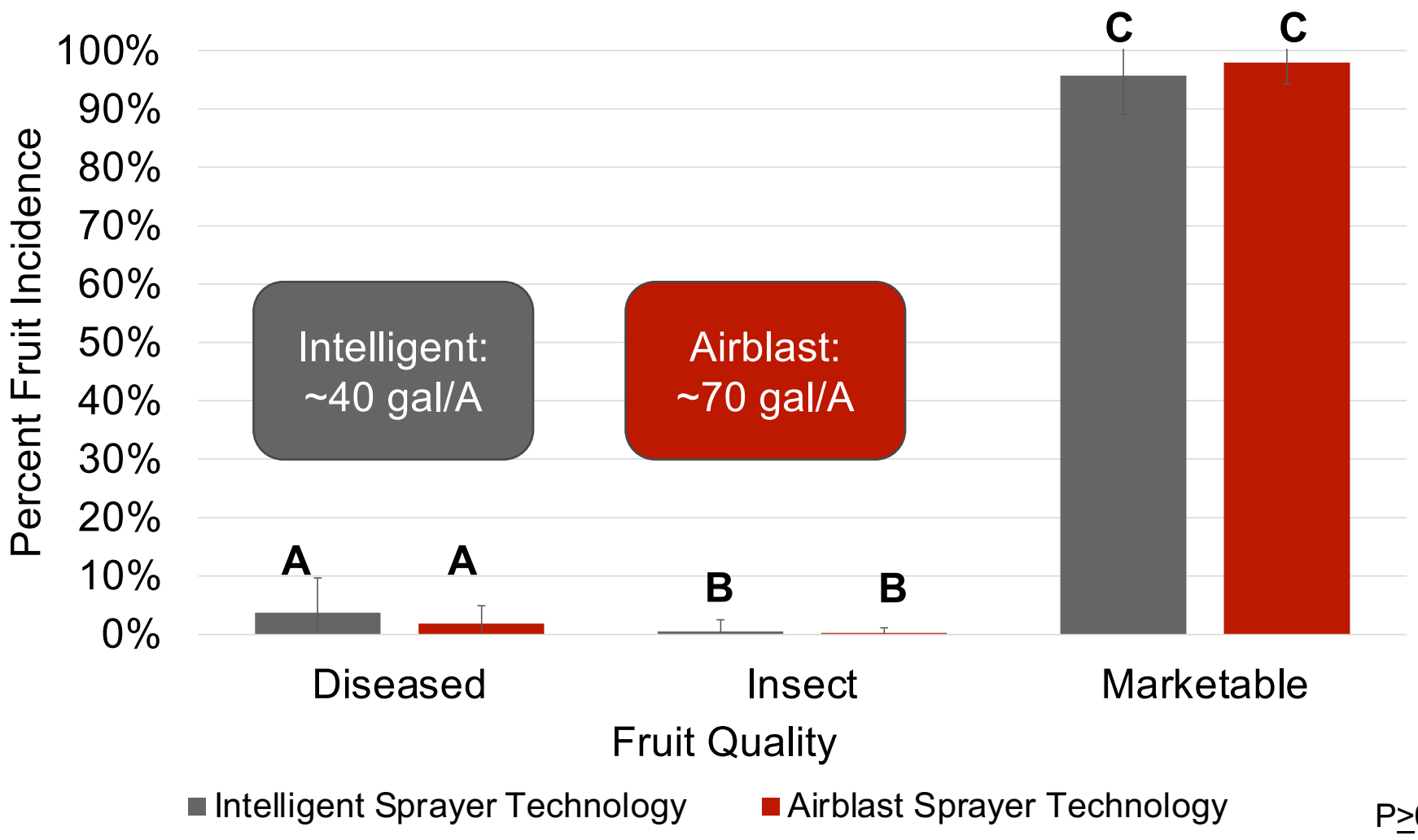
1. Fungicide efficacy trial-cancelled
2. Bitter rot mummy removal trial- 1 year delay
3. Intelligent sprayer validation trial
   i. One on-farm trial completed and one cancelled
   ii. Research farm trial- started late
4. Streptomycin resistance survey- completed

Intelligent Sprayer Technology

- Commercial orchard in Rittman, OH
- High density apple planting
  - Cv. Red Delicious
- Two treatment plots of ~300 plants each
- Harvest from 15 randomly selected trees

Intelligent Sprayer Technology

- Two treatments:
  - Intelligent sprayer technology (0.06 fl. oz/ft^3)
  - Airblast technology (65 gal/A)
- Pesticides applied by grower
- Conventional calendar spray program
- Percent diseased, insect injured fruit and marketable fruit



B. Bauman Video

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Welcome to SmarterAppleSpraying!

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https://www.smartapplespray.plantpath.iastate.edu/

Midwest Fruit Pest Management Guide 2021-2022

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University of Minnesota Extension

Ohio
Ohio State University Extension
Bulletin 506

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University of Wisconsin-Extension
A4104

SCAN ME

Please give us your feedback on the new table.
qrco.de/FruitSpray

Effectiveness of Fungicides for Control of Apple Diseases – Tight Cluster through Pink[1]

Product and formulation Active ingredient	FRAC[2]	Fire blight	Powdery mildew	Rust	Scab	PHI[3] REI[4]	Max amt[5] Max app[6]
Apogee (27.5W)	PGR	9-36 oz	x	x	x	12h	99 oz.
prohexadione calcium		E	x	x	x	45d	NA
Aprovia (EC)	7	x	5.5-7 fl. oz.	5.5-7 fl. oz.	5.5-7 fl. oz.	12h	27.6 fl. oz.
benzovindiflupyr		x	F	u	E-G	30d	NA
Captan 80 WDG	M3	x	2.5-5 lb.	x	5 lb.	24h	40 lb.
captan		x	i	x	G	0d	NA
Cevya	3	x	3-5 fl. oz.	3-5 fl. oz	3-5 fl. oz.	12h	NA
mefentrifluconazole		x	G-E	E	E	0d	NA
Excalia (2.84 SC)	7	x	3-4 fl. oz.	3-4 fl. oz.	3-4 fl. oz.	12h	8 fl. oz.
inpyrfluxam		x	E-G	u	E	PF	2
Ferbam Granuflo (76 WDG)	M3	x	x	3.5 lb.	3.5 lb.	24h	NA
ferbam		x	x	G	F	NA	3
Flint Extra	11	x	2.5-2.9 fl. oz.	2.5-2.9 fl. oz.	2.5-2.9 fl. oz.	12h	10.5 fl. oz.
trifloxystrobin		x	G [r]	F	E [r]	14d	NA
Fontelis (1.67 SC)	7	x	16-20 oz.	16-20 fl. oz.	16-20 fl. oz.	12h	61 fl. oz.
penthiopyrad		x	G	E	E	28d	NA
Indar 2F	3	x	6-8 oz.	6-8 fl. oz.	6-8 fl. oz.	12h	32 fl. oz.
fenbuconazole		x	E [r]	E	E [r]	14d	4
Inspire Super (EW)	3+9	x	12 fl. oz.	12 fl. oz.	12 fl. oz.	12h	60 fl. oz.
difenoconazole + cyprodinil		x	F	E	E	28d	NA

Supporting  Fruit Production

OHIO FRUIT NEWS

Research and Recommendations from Experts at The Ohio State University

u.osu.edu/fruitpathology/fruit-news-2/

- Focus is fruit, nut and hop IPM (diseases, insect pests, weeds)
- Published every other month
- Supported by Ohio Vegetable and Small Fruit Research and Development Program and The Ohio State University Department of Plant Pathology

M. L. Lewis Ivey
Fruit Pathology
The Ohio State University-Wooster Campus
lvey.14@osu.edu
u.osu.edu/fruitpathology
Facebook.com/osufruitpathology

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