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Efficient Disease Control in 2022

Why This Year It May Be More Important Than Ever

Increased costs and lack of supply?

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Where to Start

1. Know what diseases occur or may occur in your orchard

Leaf curl (fungus)

Blossom blight (fungus)

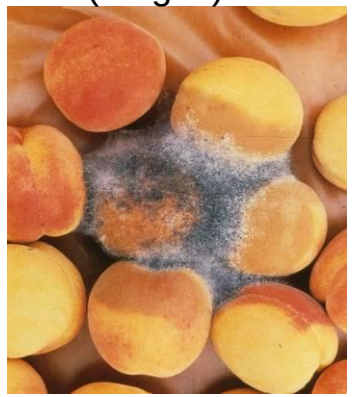
Brown rot (fungus)

Scab (fungus)

Bacterial spot (bacterium)

Anthracnose (fungus)

Rhizopus rot (fungus)



Gilbertella rot (fungus)

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2. Know the different peach tree and fruit growth stages

Peach Tree and Fruit Stages of Growth

Dormant bud

Bud swell (bud break)

Pink bud

Full bloom

Petal fall/off

Shuck split

Just before shucks off

2 weeks after shuck off

Preharvest @ 3 wks

Possibly Most Important Fruit Stages for Controlling Common Fruit Diseases

3. Know when infection and the diseases are most likely to occur

Optimal Infection Times for Peach Fruit and Foliar Diseases and When Controls Need to be Applied

Growth Stage	Leaf Curl	Bacterial Spot (Fruit)	Blossom Blight	Scab	Brown Rot
Prior to budswell (dormant)	XXXX	X	---	---	---
1 to 5% budswell (bud-break)	XXX	XXX	---	---	---
Pink to full bloom	---	XXX	XXX	---	---
Petal fall	---	XXXX	---	X	X
Shuck split to shuck off	---	XXXX	---	XXX	X
1st Cover (7-10 days after SO)	---	XXXX	---	XXXX	X
2nd Cover 10-14 days after 1st cover	---	XXX	---	XXXX	X
3rd & additional covers (2 to 3 weeks)	---	XX	---	XX	X
Preharvest sprays starts about 3 weeks before harvest	---	---	---	----	XXXX

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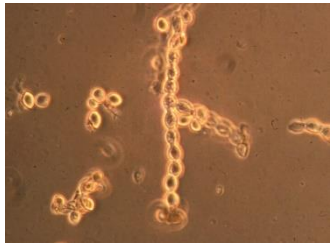
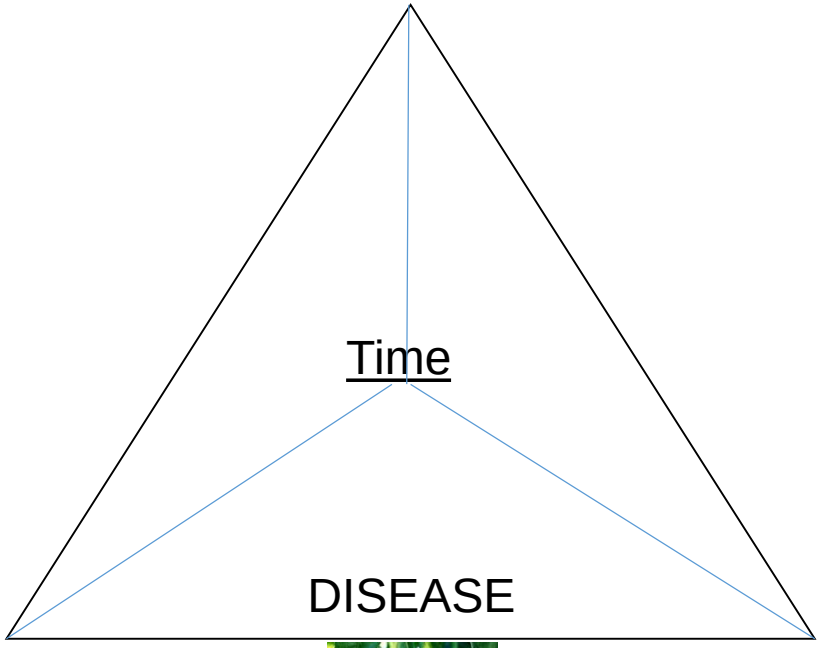
4. Know what conditions are necessary for each disease (infection & development).



Pathogen

temperature

moisture



Environment

Susceptible Host

5. Know methods for preventing or reducing infections and ultimately the disease

FOR SUCCESSFUL DISEASE CONTROL

Cannot wait until the disease is observed to begin applying controls!!!

THUS – To achieve successful disease control, ACTION must be taken at some earlier time before the disease is observed.

This time is influenced by the ENVIRONMENT
the PATHOGEN, and
the HOST.

AND

Correct use of the appropriate control(s).

5 (continued). Know methods for preventing or reducing infections and ultimately the disease

1. Orchard location – should be a site suitable for growing peaches such as full sun light and proper soil water drainage

2. Follow cultural and other management practices such as training and pruning of trees and soil and tree fertility

3. Know and select the appropriate fungicide or bactericide for the the disease being controlled

4. Know how to safely and effectively apply the chemical spray

Things to Consider When Selecting a Fungicide

-- Efficacy. Is it effective against the disease targeted? If so, how effective?

-- Physical characteristics. Is it protective? Is it systemic? Is it highly specific or broad-spectrum? How long is it effective? Does it "weather" well?

-- Risk of resistance. Has resistance to the fungicide occurred? If not, is there potential for resistance to develop?

-- Label restriction. Safety? Number of applications? Re-entry period? Time between last application and harvest?

-- Cost. What are the costs? Price of the fungicide? Loss of crop? Lower price for poor quality? Loss of return customers?

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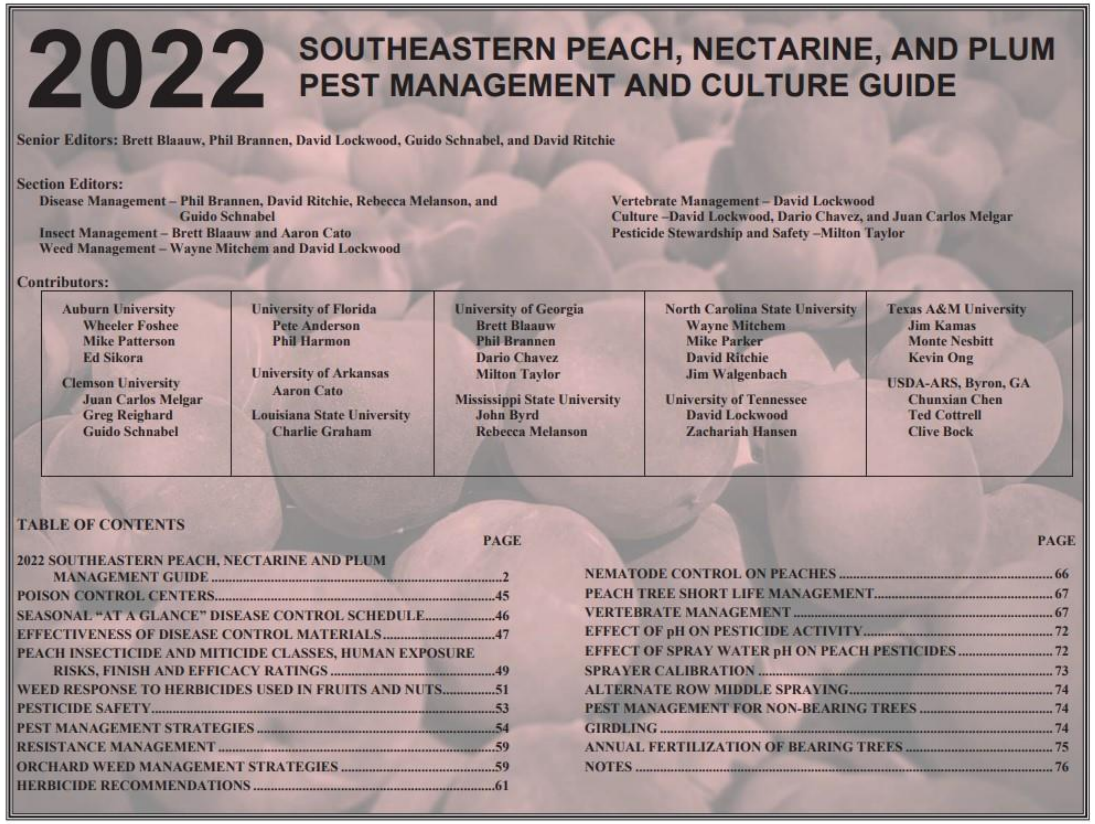
Sources of Pesticide Information

2022
North Carolina
Peach and Nectarine Disease
and Pest Management Guide

https://peaches.ces.ncsu.edu/peaches-pest-management/



2022 SOUTHEASTERN PEACH, NECTARINE, AND PLUM PEST MANAGEMENT AND CULTURE GUIDE

Senior Editors: Brett Blaauw, Phil Brannen, David Lockwood, Guido Schnabel, and David Ritchie

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Insect Management – Brett Blaauw and Aaron Cato
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"2022 Southeastern Peach, Nectarine and Plum Pest Management and Culture Guide"
https://extension.uga.edu/publications/detail.html?number=B1171

Web site that provides many pesticide labels and MSDS information:
http://www.cdms.net/Label-Database

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RELATIVE EFFECTIVENESS OF DISEASE CONTROL CHEMICALS FOR PEACHES AND NECTARINES

E - excellent; **G** - good; **F** – fair; **P** – poor; **NC** – no control, no data, or not applicable

[MOA*] Fungicides or Bactericides based on rates indicated on product label and in this publication	Days for** PHI (REI)	Leaf Curl	Bacterial Spot	Blossom Blight	Scab	Brown Rot	Anthracnose	Rhizopus Rot
[11] azoxystrobin (Abound 2.08F)	0 (4)	NC	NC	G	G-E	G	G	NC
[11] azoxystrobin+[3]difenoconazole (Quadris Top)	0 (12)	NC	NC	G-E	G-E	G	G	NC
[M04] captan (Captan 50WP, 80WP, Captec 4L)	0 (12)***	NC	NC	F	G-E	F-G	F-G	NC
[M05] chlorothalonil (Bravo Weather Stik, Equus, Echo 6F)	n/a (12)***	G	NC	G	G-E	NC	NC	NC
[M01] copper (Kocide 2000, 3000, Cuprofix Ultra 40D, Nordox 75WG, Badge 2.27SC and other formulations)	n/a (12-48)	F-G	G	NC	NC	NC	NC	NC
[9] cyprodinil (Vangard 75WG)	n/a (12)	NC	NC	G-E	NC	NC	NC	NC
[9] cyprodinil+[3] difenoconazole (Inspire Super)	0 (12)	NC	NC	G-E	F	G-E	NC	NC
[9] cyprodinil+[3] difenoconazole (Inspire Super) + propiconazole [3] (Tilt)	0 (12)	NC	NC	G-E	F	G-E	G	NC
[3] fenbuconazole (Indar 2F)	0 (12)	NC	NC	G-E	F	G	NC	NC
[3] flutriafol + [11] azoxystrobin (Topguard 4.3EQ)	7 (12)	NC	NC	G-E	NC	G	NC	NC
[2] iprodione (Rovral 50WP, 4L)****	n/a (24)	NC	NC	G-E	NC	NC	NC	NC
[3] mefentrifluconazole (Cevya 3.34SC)	0 (12)	NC	NC	G-E	NC	G-E	NC	NC
[3] metconazole (Quash 50 WDG)	14 (12)	NC	NC	G-E	F	G-E	NC	NC
[3] myclobutanil (Rally 40WSP)	0 (24)	NC	NC	G	NC	F	NC	NC
[41] oxytetracycline (FireLine, Mycoshield 17WP)	21 (12)	NC	F-G	NC	NC	NC	NC	NC
[7] penthiopyrad (Fontelis 1.67F)	0 (12)	NC	NC	G	NC	G	F	NC
[3] propiconazole (Tilt, PropiMax, Bumper 3.6EC)	0 (12)	NC	NC	G-E	NC	G	NC	NC
[7] pydiflumetofen+[3] difenoconazole (Miravis Duo)	0 (12)	NC	NC	G-E	G-E	G-E	NC	NC
[11] pyraclostrobin+[7] boscalid (Pristine 38WG)	0 (12)	NC	NC	G-E	F	G-E	G-F	F-P
[11] pyraclostrobin+[7] fluxapyroxad (Merivon)	0 (12)	NC	NC	G-E	F	E	G	F-P
[M02] sulfur (numerous formulations)	0 (24)	NC	NC	P	F-G	P	NC	NC
[2] thiophanate-methyl (Topsin M 70WP, WSP)	1 (48)	NC	NC	G	G-E	G	NC	NC
[11] trifloxystrobin (Gem 500SC)	1 (12)	NC	NC	G	G-E	G	G	NC
[11 trifloxystrobin + [7] fluropyram (Luna Sensation 4.2SC)	1 (12)	NC	NC	G-E	F	G-E	G	F-P
[M03] ziram (Ziram 76DF)	14 (48)	G	F	P	F-P	NC	F?	NC

* Fungicide **M**ode **o**f **A**ction groups. Group numbers distinguish the fungicides according to their mode of action (killing of the fungus). Fungicides having the same MOA are prone to cross resistance, thus not appropriate mixing or alternating partners.

** PHI = preharvest interval (**DAYS** between last spray and harvest); REI = reentry interval (**HOURS** between last spray and reentry without using personal protective equipment (PPE). **ALWAYS CHECK/READ LABELS FOR TIMES BEFORE USE**.

*** REI is 12 hours for captan and chlorothalonil, but see label for precautions related to risk for eye damage and required protection.

**** Rovral is not registered for use after petal fall.

DFR – January 2022

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Peach Leaf Curl

Dormant

Budswell

Time of infection

Conditions for infection:
-- tree growth stage: **budswell**
-- weather: **extended cool (45-60F), and wet**

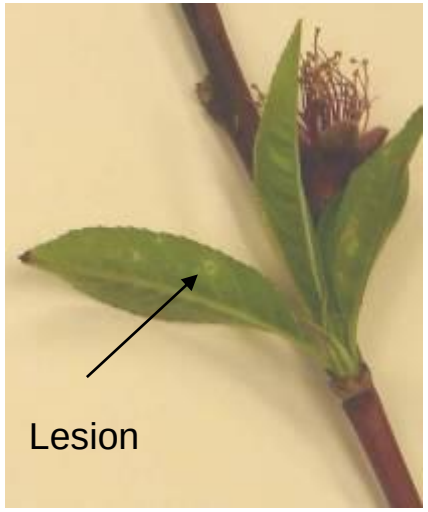
CONTROL – based on protection fungicide must be present before conditions for infection occur

FUNGICIDES:
-- chlorothalonil (Bravo, Equus, Echo)
-- Ziram
-- Copper containing materials

BACTERIAL SPOT

16 March

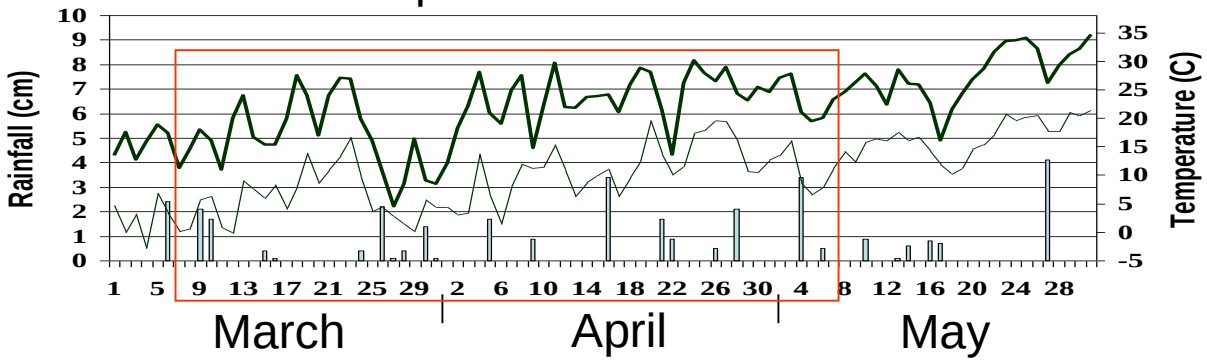
23 March



Conditions for infection:
-- susceptible varieties
-- new leaves/fruit emerged
-- extended wet

12 May

Rainfall & Temperatures 2011



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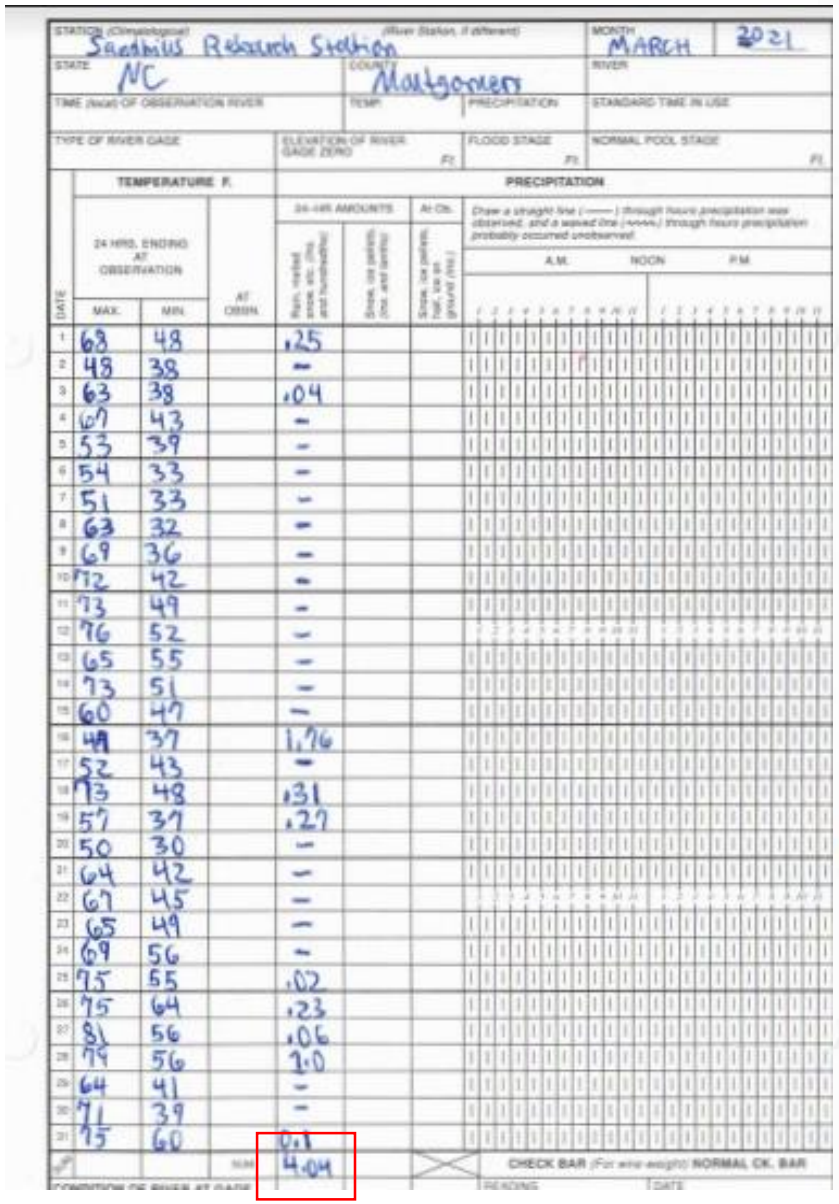
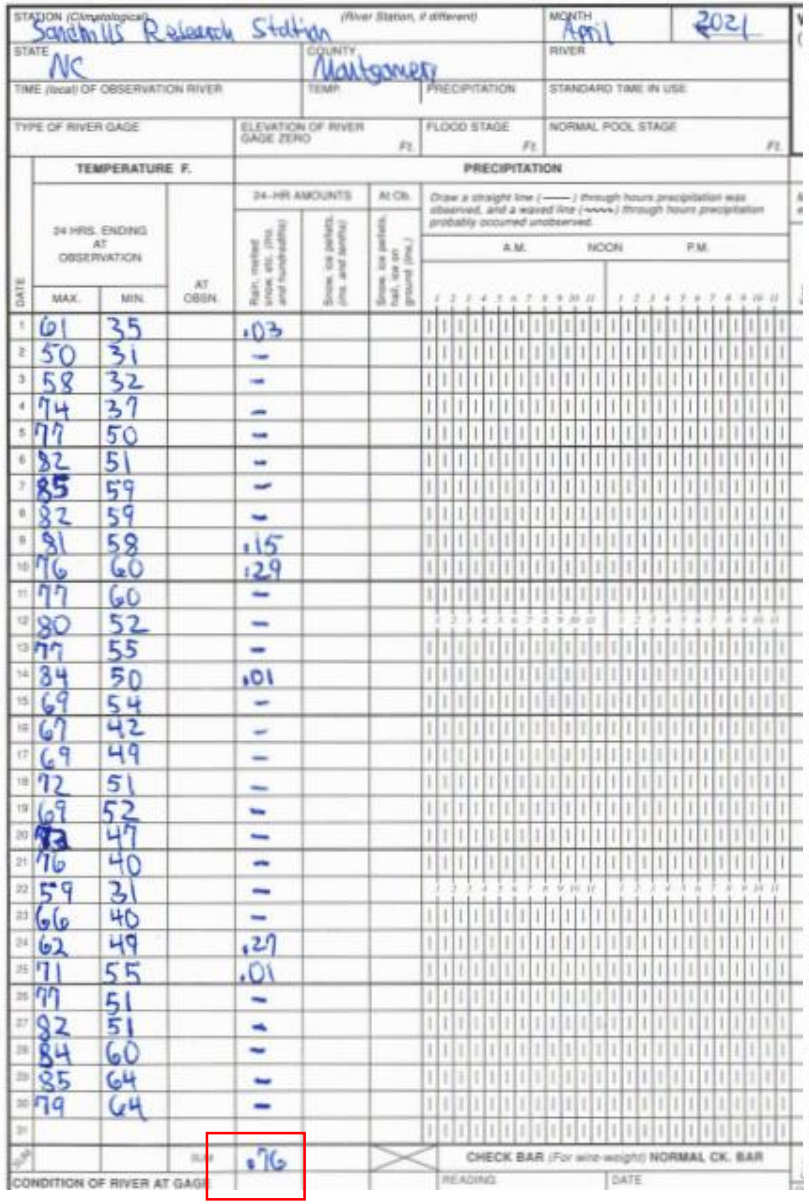
What Happened to Bacterial Spot in 2021?





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Example of a Spray Program For Bacterial Spot

NOTE: Trade names used as examples for educational purposes

Delay dormant/budswell : 1.0 – 2.0 MCE
- Cuprofix ULTRA 40: 4.0 to 5.0 lb
- Nordox 75WG: 3.0 to 4.0 lb
- Kocide 3000: 3.0 lb
- Badge 2.27SC: 10 pt
- C-O-C-S WDG: 2.0 lb

¼" leaf tissue/early pink: 0.75 to 1.5 lb MCE
- Cuprofix ULTRA 40: 2.0 to 3.0 lb
- Nordox 75WG: 1.50 to 2.0 lb
- Kocide 3000: 1.5 to 2.0 lb
- Badge 2.27SC: 6.0 to 8.0 pt
- C-O-C-S WDG: 1.0 to 1.5 lb

½" to 1" tissue with about 25% bloom: 0.75 to 1.0 lb MCE (If none to minimal injury from previous spay)
- Cuprofix ULTRA 40: 2.0 to 3.0 lb
- Nordox 75WG: 1.50 to 2.0 lb
- Kocide 3000: 1.5 to 2.0 lb
- Badge 2.27SC: 6.0 to 8.0 pt
- C-O-C-S WDG: 1.0 to 1.5 lb

1-2" leaf /terminal growth with start of petal fall: 0.5 to 1.0 lb MCE (If none to minimal injury from previous spay)
- Cuprofix ULTRA 40: 2.0 to 3.0 lb
- Nordox 75WG: 1.50 to 2.0 lb
- Kocide 3000: 1.5 to 2.0 lb
- Badge 2.27SC: 6.0 to 8.0 pt

1-4" leaf /terminal growth and shuck split has started 0.25 to 0.75 lb MCE (If minimal injury from previous sprays)
- Kocide 3000: 0.25 to 0.5 lb
- Badge 2.27SC: 2.0 to 3.0 pt
- MasterCop 1.0 to 1.5 pt
- FireLine 17W, Mycoshield 17W 0.75 lb/100 gal (150 ppm)

>4" leaf /terminal growth and shucks off 0.125 (2.0 oz) to 0.25 (4.0 oz) lb MCE (If minimal injury from previous sprays)
- Kocide 3000: 0.075 to 0.25 lb
- Badge 2.27SC: 2.0 to 3.0 pt
- MasterCop 1.0 pt
- Copper-Count-N 4-8 fl oz
- FireLine 17W, Mycoshield 17W 0.75 lb/100 gal (150 ppm)

Cover sprays – similar as previous based on weather, disease, injury from copper
- Possible use of Ziram 76 at 2.5 to 3 lb/100 gal/A (~7 to oz MZE)

Labeled for use on peaches to 14 DPH for brown rot, red spot, and sooty peach

Loss from bacterial spot can be significant

Risk of copper Injury is significant

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BLOSSOM BLIGHT

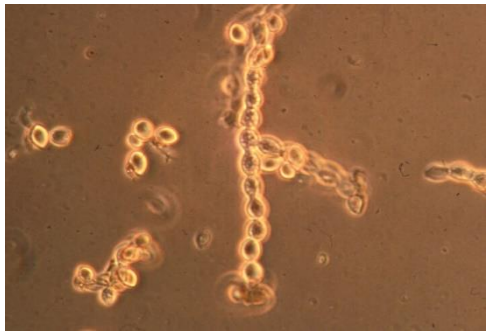
“mummies” from previous season

susceptible blossoms

Infection by the fungus to disease observed

2 – 7 days

~ 2 weeks



fungal spores

CONTROL – based on protection fungicide must be present before conditions for infection occur

FUNGICIDES:
-- chlorothalonil (Bravo, Equus, Echo)
-- Captan + Topsin M or Thiophanate-methyl
-- Rorval
-- Vangard

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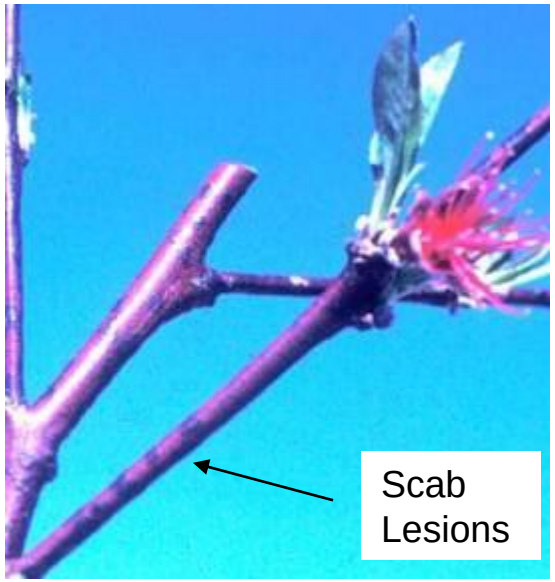
PEACH SCAB



Shuck Split

Shucks Off

Conditions for Infections:

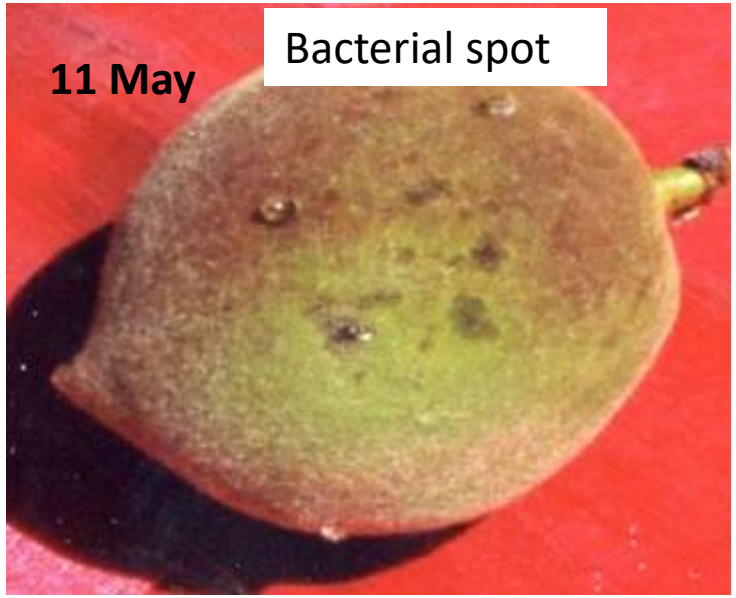
Rain or heavy dew can splash or wash the fungal spores onto the small fruit
Fruit are at shuck-split stage
4-6 weeks for lesions to dvelop

CONTROL – based on protection
fungicide must be present before infection occurs

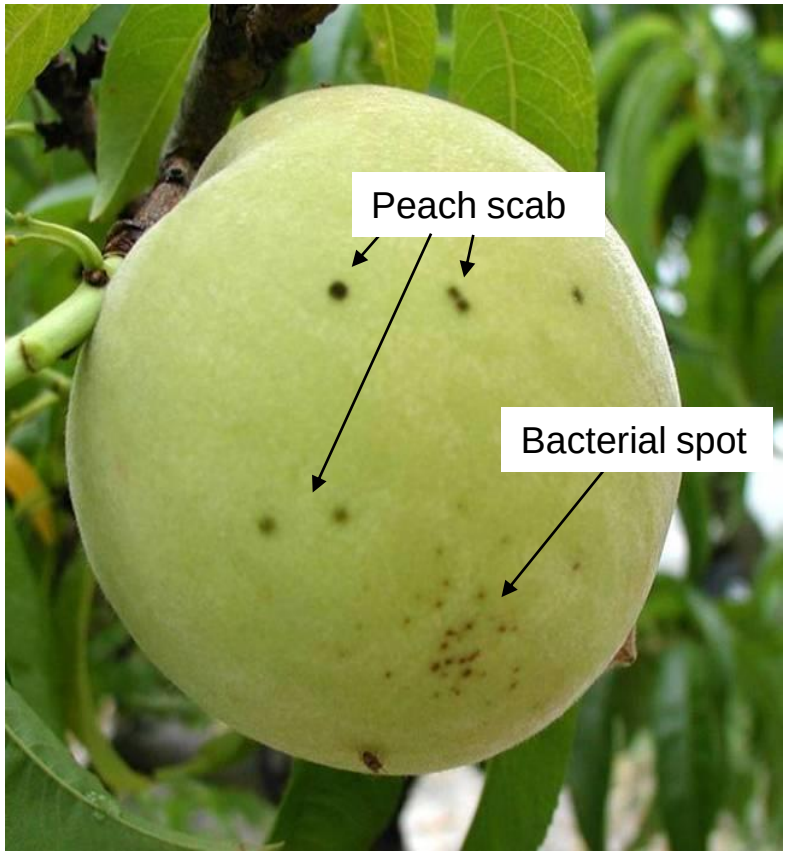
FUNGICIDES:

-- azoxystrobin (Abound)
-- chlorothalonil (Bravo, Equus, Echo)
-- captan
-- Miravis Duo
-- sulfur

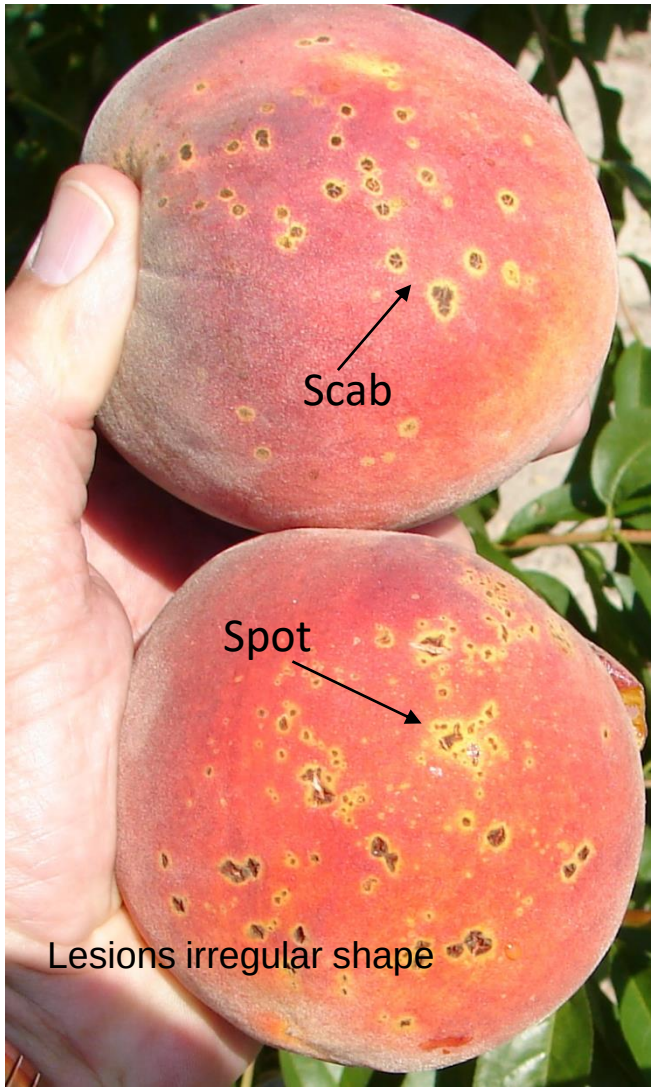
Scab or Bacterial Spot?



Water-soaked lesions on young fruit



Peach scab not visible until about 1st of June



Ripe fruit

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Brown Rot – the major fruit disease of peaches

When to start preharvest sprays?
This means using a fungicide highly effective against brown rot

Conditions for Infections:
Ripening fruit (3-week period)
Precipitation, high humidity
Temperatures 70s-80sF

CONTROL – based on protection
fungicide must be present before infection occurs

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Fungicide Options for Brown Rot

21 days preharvest --

Captan **[M4]** (Captan 50WP 5.0 lb/acre, Captec 4L 2.5 qt/acre, Captan 80WDG 3.25 lb/acre) --- 0 day PHI and 24 h REI **F-G**

OR

azoxystrobin **[11]** (Abound 2.08F,10.0 fl oz/acre) **G**

PLUS

thiophanate methyl **[1]** (Topsin M 70WSP 1.0 lb/acre, thiophanate Methyl 85WDG 0.75 lb/acre) --- 1 day PHI and 48 h REI

14 to 10 days preharvest --

pyraclostrobin **[11]** + boscalid **[7]** (Pristine 38WG 12 to 14 fl oz/acre) --- 0 day PHI and 12 h REI, **G-E**

OR

pyraclostrobin **[11]** + fluxapyroxad **[7]** (Merivon 500SC 6.0 fl oz) --- 0 day PHI and 12 hr REI **E**

OR

trifloxystrobin **[11]** + fluropyram **[7]** (Luna Sensation 4.2SC 6.0 fl oz) --- 1 day PHI and 12 hr REI **G-E**

7-1 day preharvest –

difenoconazole **[3]** + cyprodinil **[9]** (Inspire Super 2.82EW, 20 fl oz/acre) --- 0 days PHI and 12 hr REI **G-E**

OR

fenbuconazole **[3]** (Indar 2F, 6.0 fl oz/acre) --- 0 day PHI and 12 h REI, **G**

OR

mefentrifluconazole **[3]** (Ceya 3.34F, 5.0 fl oz/acre) --- 0 day PHI and 12 h REI **G**

OR

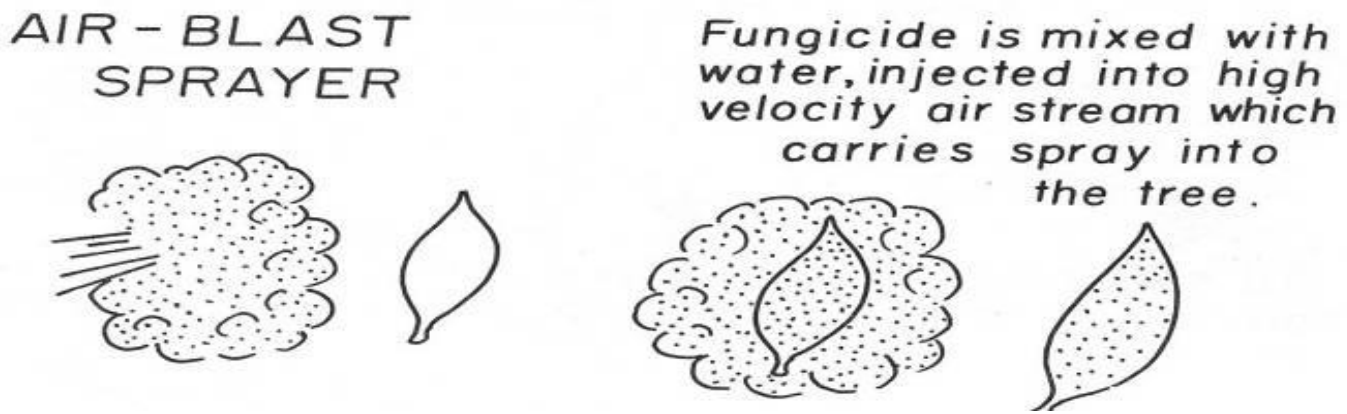
propiconazole **[3]** (Tilt 3.6EC, PropiMax 3.6EC, Bumper 41.8EC, 4.0 fl oz/acre) --- 0 day PHI and 12 h REI **F-G**

OR

pydiflumetofen+**[7]** difenoconazole **[3]** (Miravis Duo) --- 0 PHI and 12 h REI **G-E**

6. Know how to apply the sprays

Spray-Mix Coverage – Is Your Sprayer Ready?



Three Factors That Can Influence Disease Control

Time of fungicide application - For optimal brown rot and scab control, the fungicide should be present prior to occurrence of conditions for infection - that is before rainfall or other moisture (eg, dew).

Application method - For optimal results, must "hit the target". Sprayer must work properly, use correct rate of fungicide and proper amount of water per acre (100 gal/acre), conditions when fungicide is applied (wind, rain). Wind should be minimal (<5 mph) and there should be adequate drying time (>3 hours).

Disease pressure - This involves two main components – pathogen inoculum and environmental conditions for infection and disease development.

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Summary

1. Know what diseases occur or may occur in your orchard

2. Know the different peach tree and fruit growth stages

3. Know when infection and the diseases are most likely to occur

4. Know what conditions are necessary for each disease (infection & development).

5. Know methods for preventing or reducing infections and ultimately the disease

6. Know how to apply the sprays