Blueberry Disease Update

FBGA Fall 2021 Meeting

UF UNIVERSITY of FLORIDA
IFAS Extension

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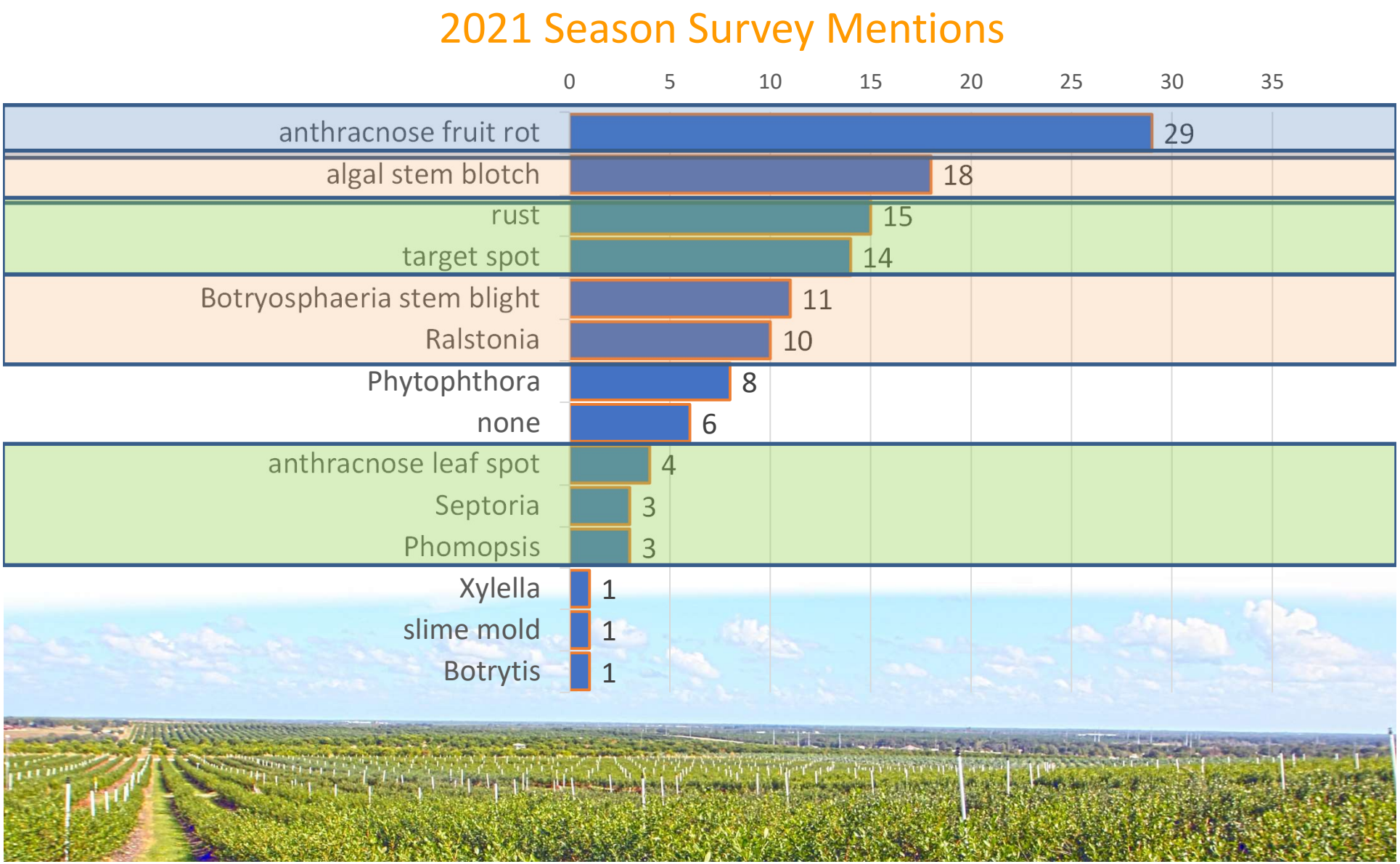
2021 End of Season Survey

- Thanks to Doug Phillips for sharing the grower survey

Grower Disease Issues



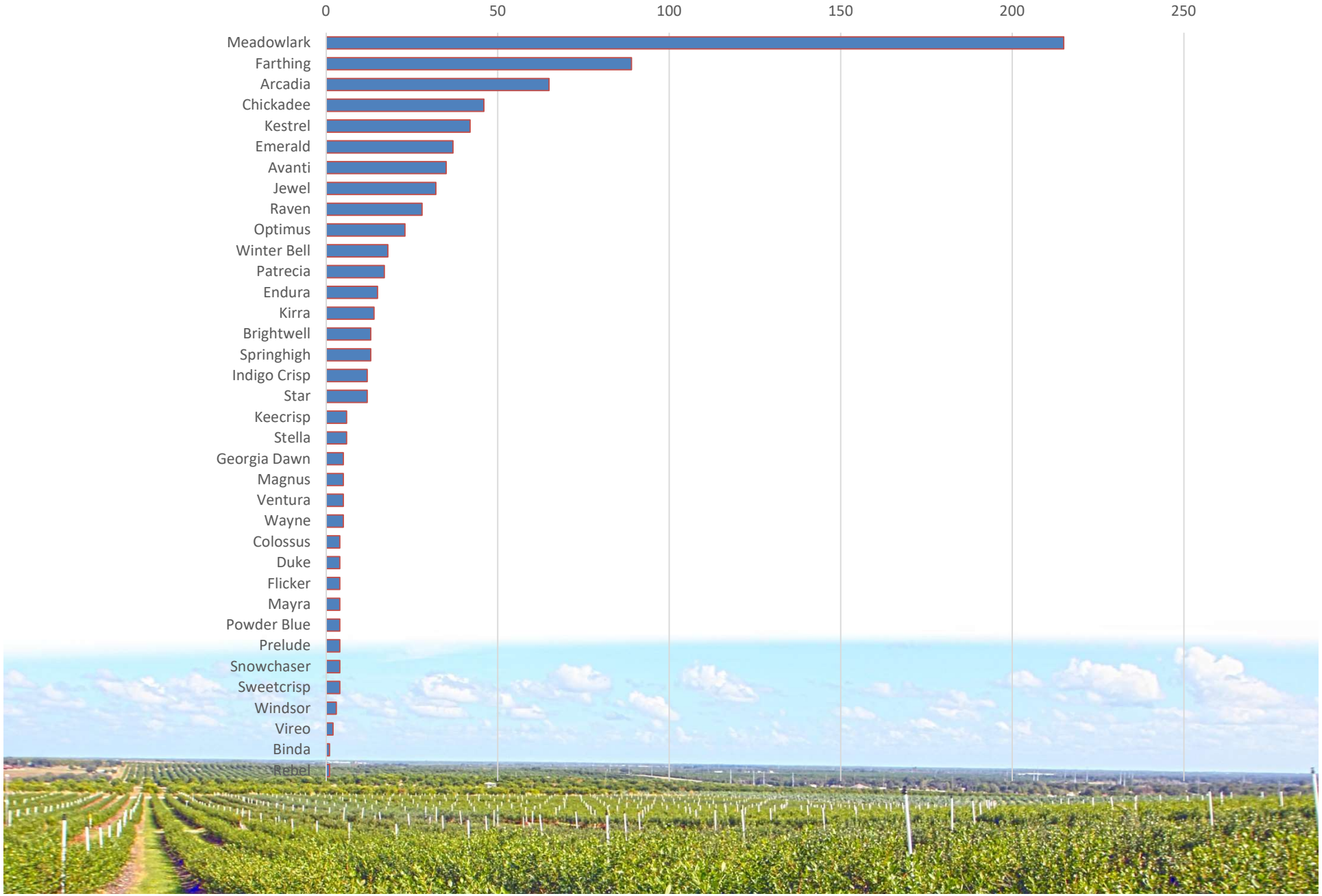
2021 PDC Blueberry Data

Pathogen	No.	Pathogen	No.
Botryosphaeria	63	Insects	3
Colletotrichum	54	Septoria	3
Phytophthora	32	Bipolaris	2
Phomopsis	22	Stemphylium	2
Pestalotia	15	Abiotic disorder	1
Xylella	14	Agrobacterium	1
Fusarium	9	Alternaria	1
Cephaleuros	6	Monilinia	1
Xanthomonas	6	Phyllosticta	1
Ralstonia	5	Pucciniastrum	1
Pythium	4		
Red Ringspot Virus	3		

2021 PDC Blueberry Data

Variety and Diagnosis	No.	Variety	No.	Variety and Diagnosis	No.	Variety	No.	Variety	No.
Emerald	**25**	**Optimus**	**18**	**Winterbell**	**15**	**Avanti**	**12**	**Raven**	**5**
Phomopsis	9	Stem blight	8	Anthracnose	6	Stem blight	11	Anthracnose	5
Anthracnose	6	Phytophthora	3	Stem blight	4	Phytophthora	1	**Springhigh**	**5**
Algal stem blotch	4	Septoria	3	Fusarium	3			Anthracnose	5
Fusarium	2	Anthracnose	2	Pestalotia	2			**Magnus**	**4**
Pestalotia	2	Phomopsis	2					Anthracnose	4
BRRV	1							**Optimus**	**4**
leaf rust	1							Anthracnose	3
Meadowlark	**22**	**Sentinel**	**17**	**Farthing**	**13**	**Arcadia**	**11**	Crown Gall (OW)	1
Stem blight	10	Bacterial leaf spot	6	Phytophthora	6	Stem blight	4	**Keecrisp**	**3**
Phytophthora	7	Phytophthora	2	Anthracnose	3	Anthracnose	3	Anthracnose	2
Pestalotia	3	Stem blight	2	Algal stem blotch	2	Bacterial wilt	2	Phomopsis	1
Bacterial leaf scorch	2	Anthracnose	2	Insect Damage	1	Pestalotia	2	**Primadonna**	**3**
		Phomopsis	2	Stem blight	1			Stem blight	3
		Girdling Roots	1					**Colossus**	**2**
		Insect Damage	1					Phytophthora	2
		Stem blight	1					**Bluecrisp**	**1**
								Anthracnose	1

Diagnoses 2017-2020



"Anthracnose"

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- Central Florida farms reported severe twig dieback, primarily on the Flicker variety in 2013
  - Samples revealed *Colletotrichum* as the primary cause
  - A review of spray records showed azoxystrobin use
  - Isolates were collected from a handful of farms and tested
- Growers reported increased incidence of ripe rot in 2014 in central Florida
  - In 2015 and 2016 isolates from fruit, leaves and stems were collected

anthracnose fruit rot
ripe rot


Phyllosticta leaf spot
Gloeosporium leaf spot
aka anthracnose leaf spot

anthracnose stem canker


anthracnose stem canker

“Anthracnose”

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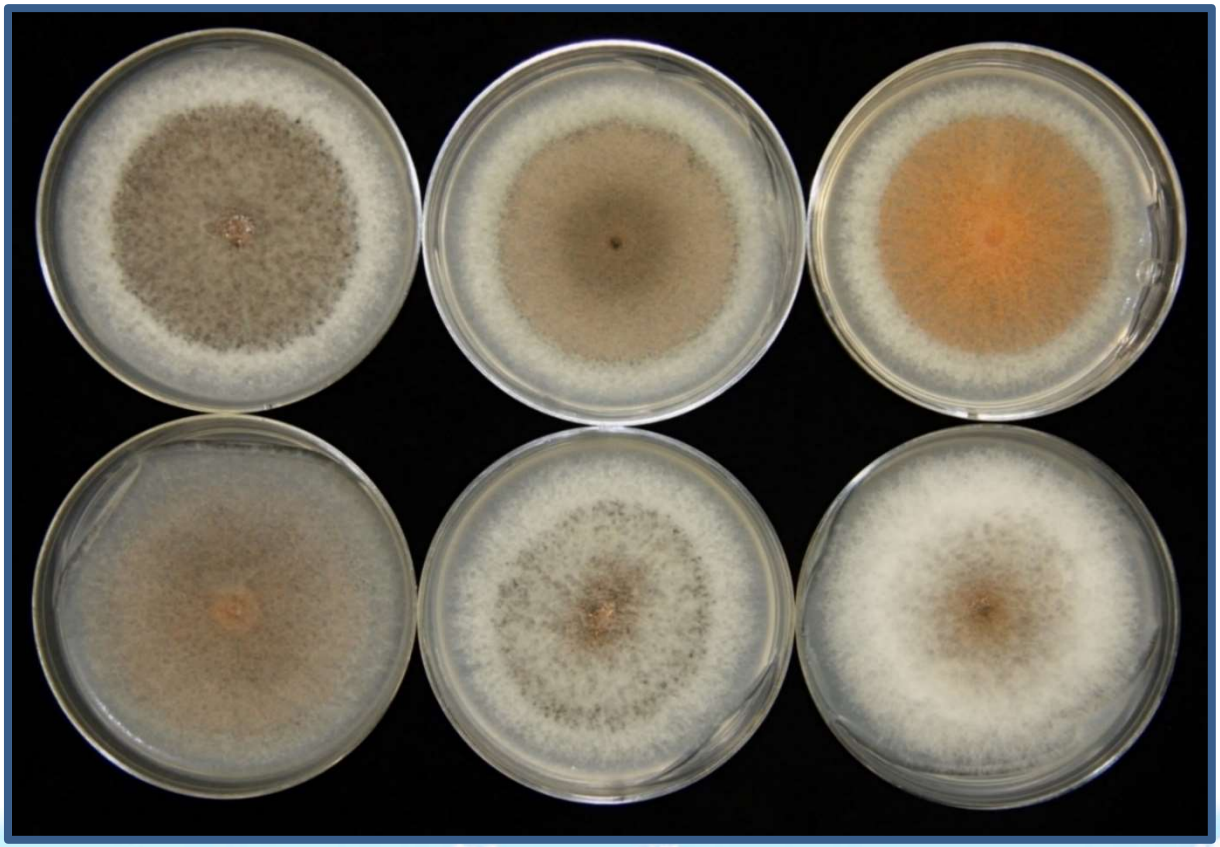
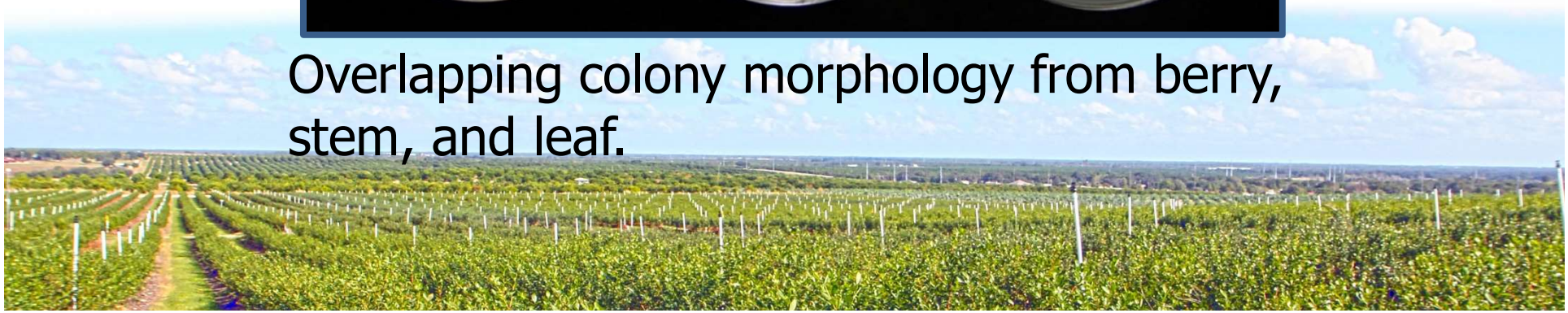
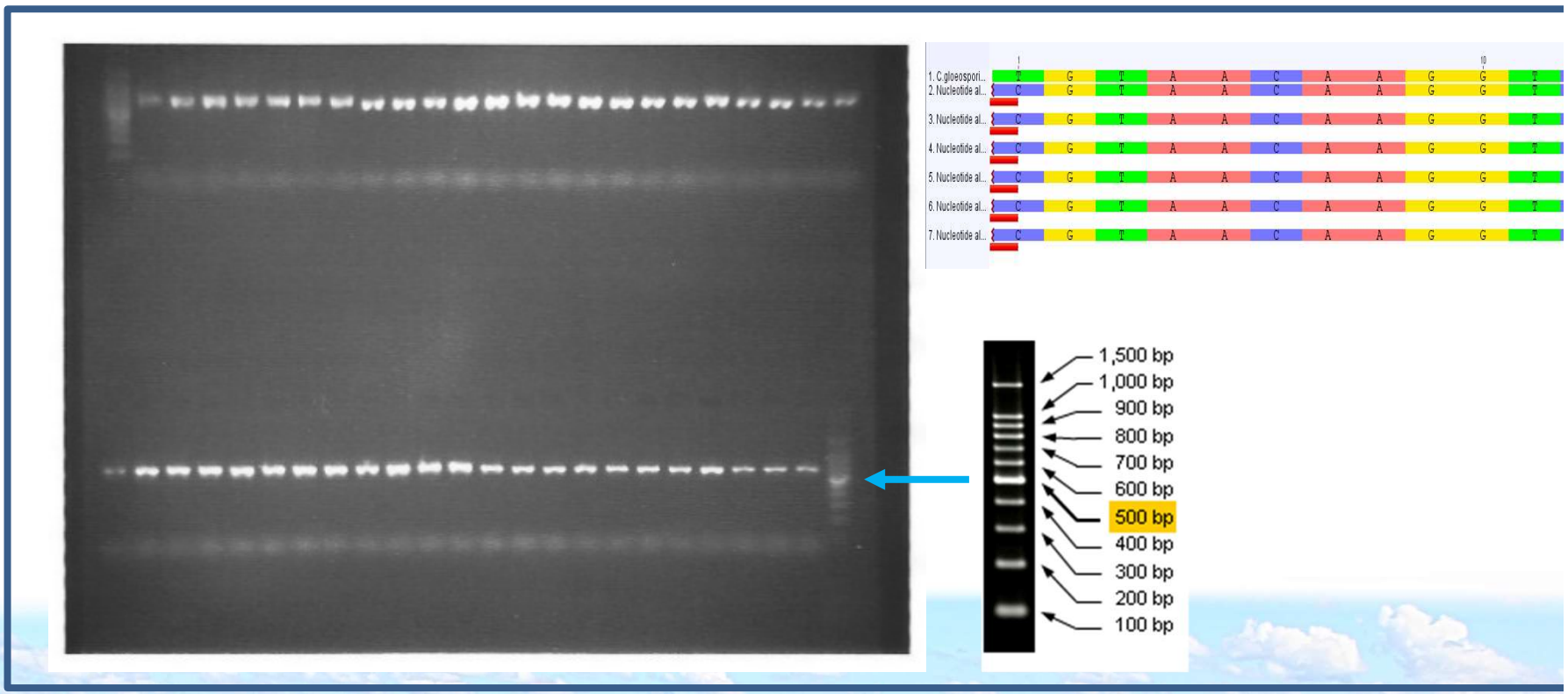


Overlapping colony morphology from berry, stem, and leaf.



Colletotrichum gloeosporioides Species complex (ITS)



Conclusions

- Stem dieback on Flicker was anthracnose caused by *C. gloeosporioides*
  - Central Florida isolates from farms reporting failure were resistant to azoxystrobin (100%)
  - North Florida farm isolates were sensitive in 2015 (n=12)
  - One of the two North Florida farms had 88% resistant isolates in 2016 (n=17)
- Isolates from leaves and berries also were resistant to azoxystrobin and cross-infect


Control
Azoxystrobin
Propiconazole

Resources

UF IFAS Extension UNIVERSITY of FLORIDA PP337

Anthracnose on Southern Highbush Blueberry[1]

Douglas A. Phillips, Maria C. Velez-Climent, Philip F. Harmon, and Patricio R. Munoz[2]

Information contained in this publication is intended for Florida blueberry growers to use as a guide in the identification and management of anthracnose on southern highbush blueberries (SHB). For more information, search the EDIS website (http://edis.ifas.ufl.edu) or contact your local UF/IFAS Extension office (http://ifas.ufl.edu/extension-offices-rec-maps.shtml).

Anthracnose Diseases and Symptoms

Anthracnose is a general name given to diseases caused by a group of fungal pathogens in the genus *Colletotrichum*. These pathogens affect a wide range of plants, including fruit crops, trees, turfgrass, and vegetable crops. Anthracnose diseases occur in both northern and southern US blueberry production regions, but are most problematic in tropical and subtropical regions of the eastern United States (Cannon et al. 2012). Symptoms of anthracnose on blueberry occur on leaves, twigs, canes, blossoms, and fruit.

Fruit Symptoms

Anthracnose fruit rot is also referred to as "ripe rot." Infection may occur as early as bloom, with symptoms appearing as the fruit begins to ripen, including shriveling, development of sunken lesions, soft, rotted fruit, and eruption of orange- or salmon-colored spore masses on the blossom end of the fruit (Figure 1). In some cases, symptoms do not appear until after the fruit is harvested and stored (Polashock et al. 2017). Fungicide applications from bloom through harvest prevent significant ripe rot losses most years when coupled with frequent hand-harvesting and rapid-cooling practices that are standard for SHB growers in Florida. Pre-harvest fungicides are especially important in years where there is a high incidence of disease in the field coupled with warm, wet weather, which can promote disease development.

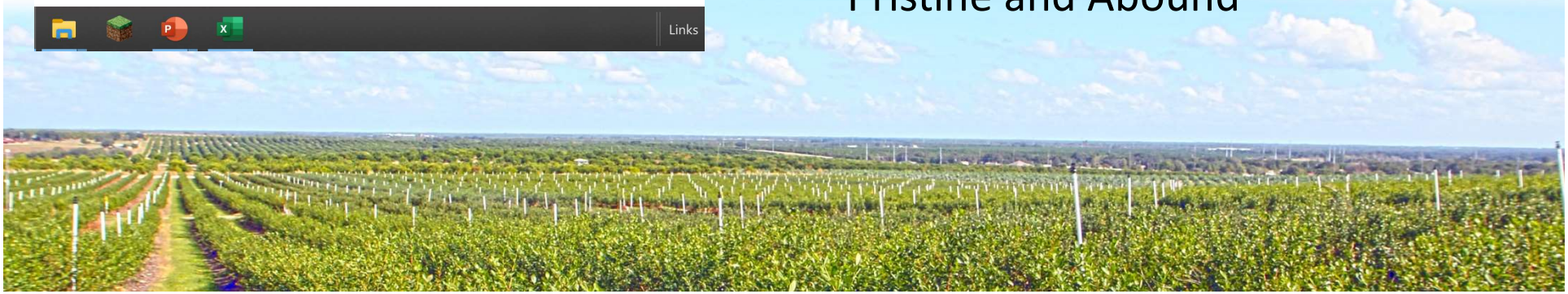
Figure 1. Anthracnose fruit rot.
Credits: M. Velez-Climent

Leaf Symptoms

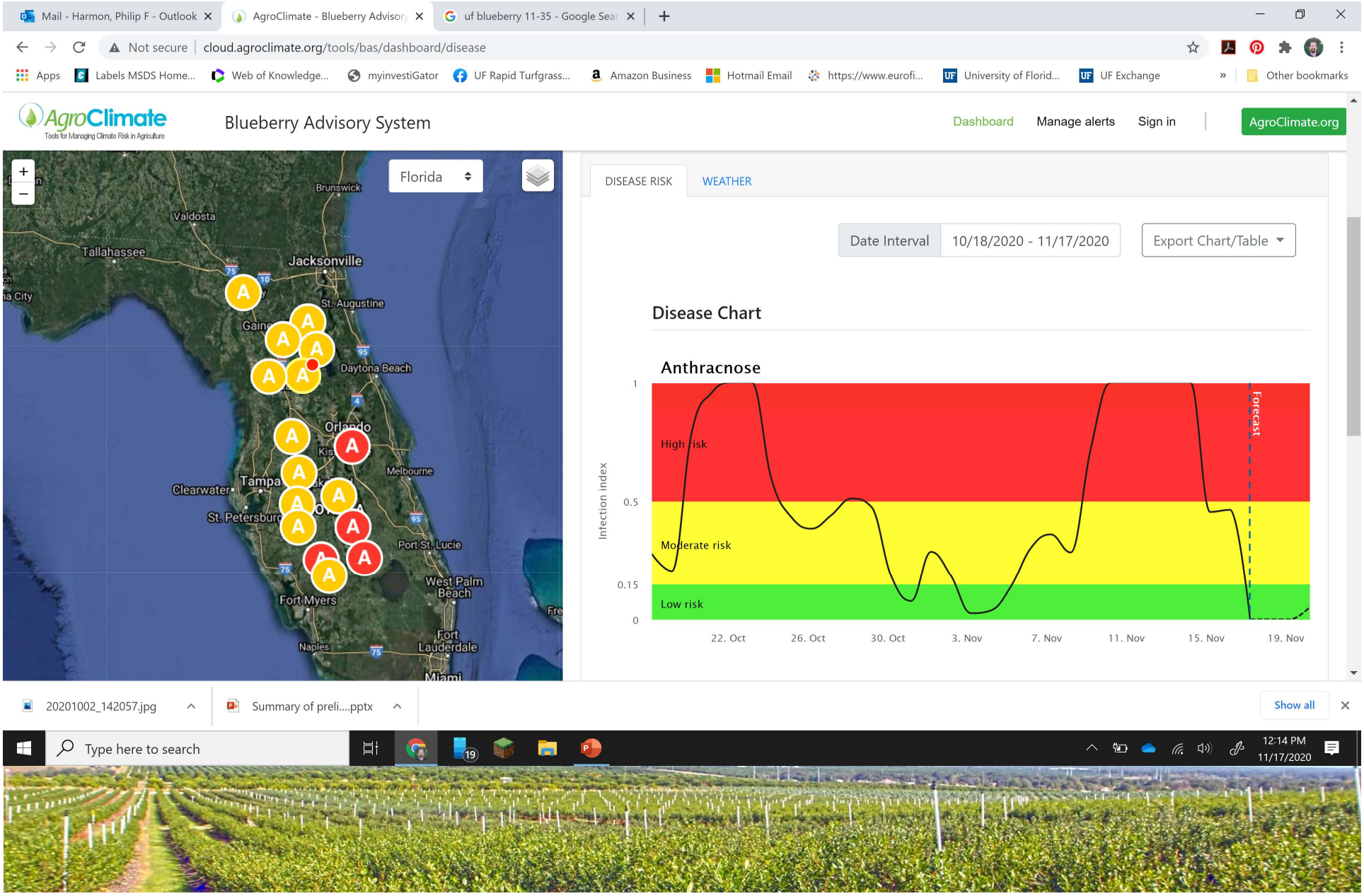
Leaf spot symptoms of anthracnose are common after harvest in Florida, and the severity differs by variety, with 'Jewel' considered to be one of the most susceptible.

- Fungicide Options
  - Switch
    - Save for high disease pressure periods 0 day PHI, 4 to 5 apps
  - Quash
    - 7 day PHI, 3 apps allowed
  - Captan
    - Good for low pressure periods
  - Omega
    - Good efficacy reported from strawberry research, may be tough to find

  Questionable:
  - Pristine and Abound



Blueberry Advisory System



Summer Plant Health

- Algal stem blotch
- Bacterial wilt
- Stem blight

- Foliage disease management

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PP344

Algal Stem Blotch in Southern Highbush Blueberry in Florida[1]

Douglas Phillips, Norma Flor, and Phillip Harmon[2]

Algal stem blotch has become a significant disease on southern highbush blueberries (SHB) in Florida. It can cause stunted growth and leaf yellowing (Figure 1), as well as increased susceptibility to Botryosphaeria, in some cases leading to plant death. Information contained in this publication is intended for Florida blueberry growers to use as a guide in the identification and management of algal stem blotch on SHB.

Figure 1. Plant with chlorotic leaves and stunting due to algal stem blotch infection.
Credits: P Harmon, UF/IFAS

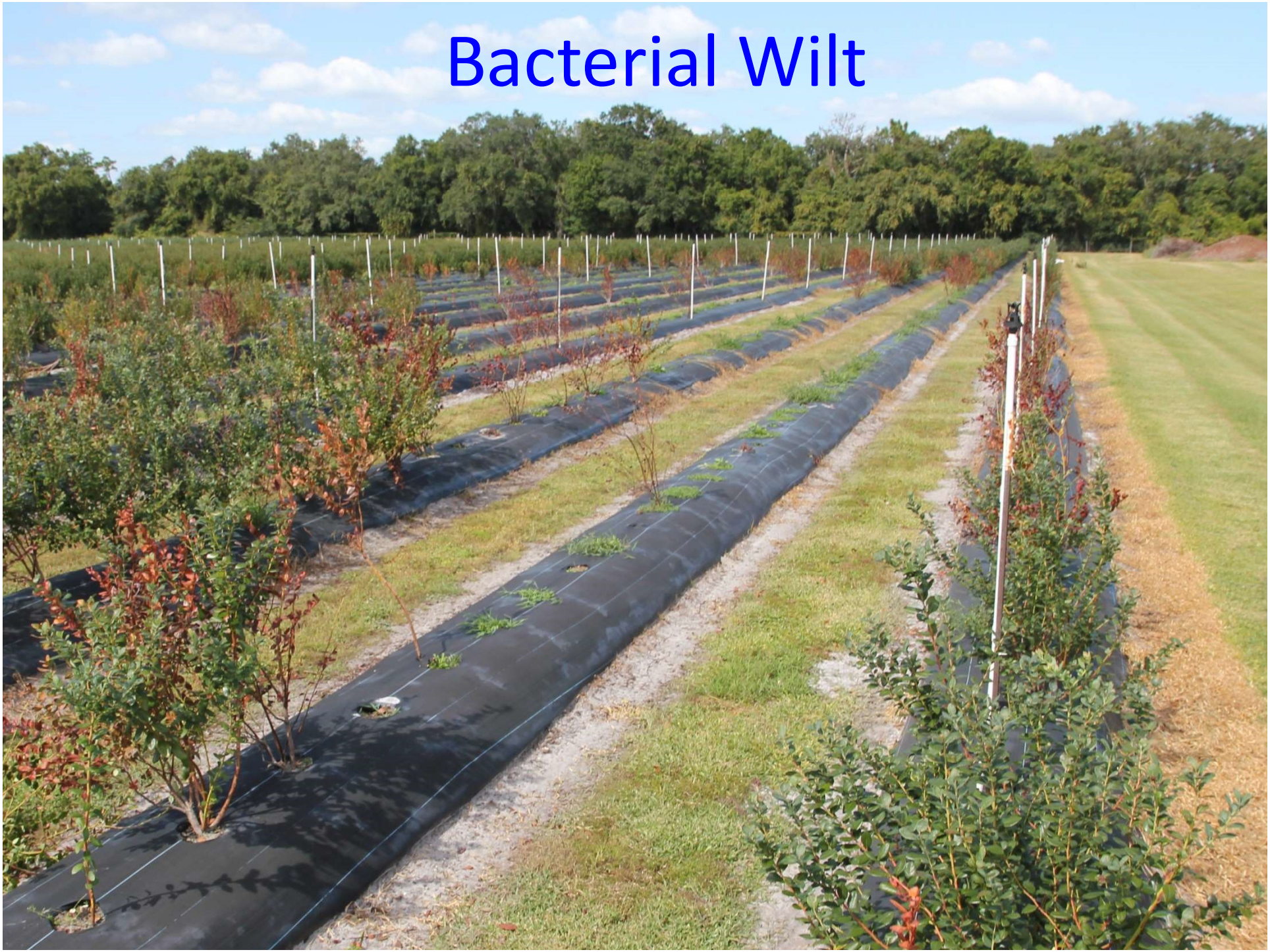
Algal stem blotch is a blueberry disease caused by the parasitic green alga *Cephaleuros virescens* Kunze. Although most blueberry pathogens are fungi, *C. virescens* is a unique alga in the order Trentepohliales and the phylum Chlorophyta. The disease occurs on many cultivars of SHB (*Vaccinium corymbosum*) and on the native sparkleberry (*V. arboreum*) throughout Florida. The pathogen and closely related species also cause orange cane blotch on blackberry, as well as common leaf diseases of camellia (*Camellia japonica*), southern magnolia (*Magnolia grandiflora*), and a range of tropical fruits and ornamental plants. Worldwide, *C. virescens* is most common in tropical and sub-tropical


algal stem blotch

Managing algal stem blotch

- Most fungicides do not work on algae
- Copper fungicides can help
  - Two to four monthly applications in summer starting after harvest have been reported to keep the disease in check most years by growers
  - Kocide 3000 (also Kocide 2000) as well as several other products and formulations of copper
  - Avoid tank-mixes of Cu products
    - with phites and pesticides with EC formulation

Bacterial Wilt



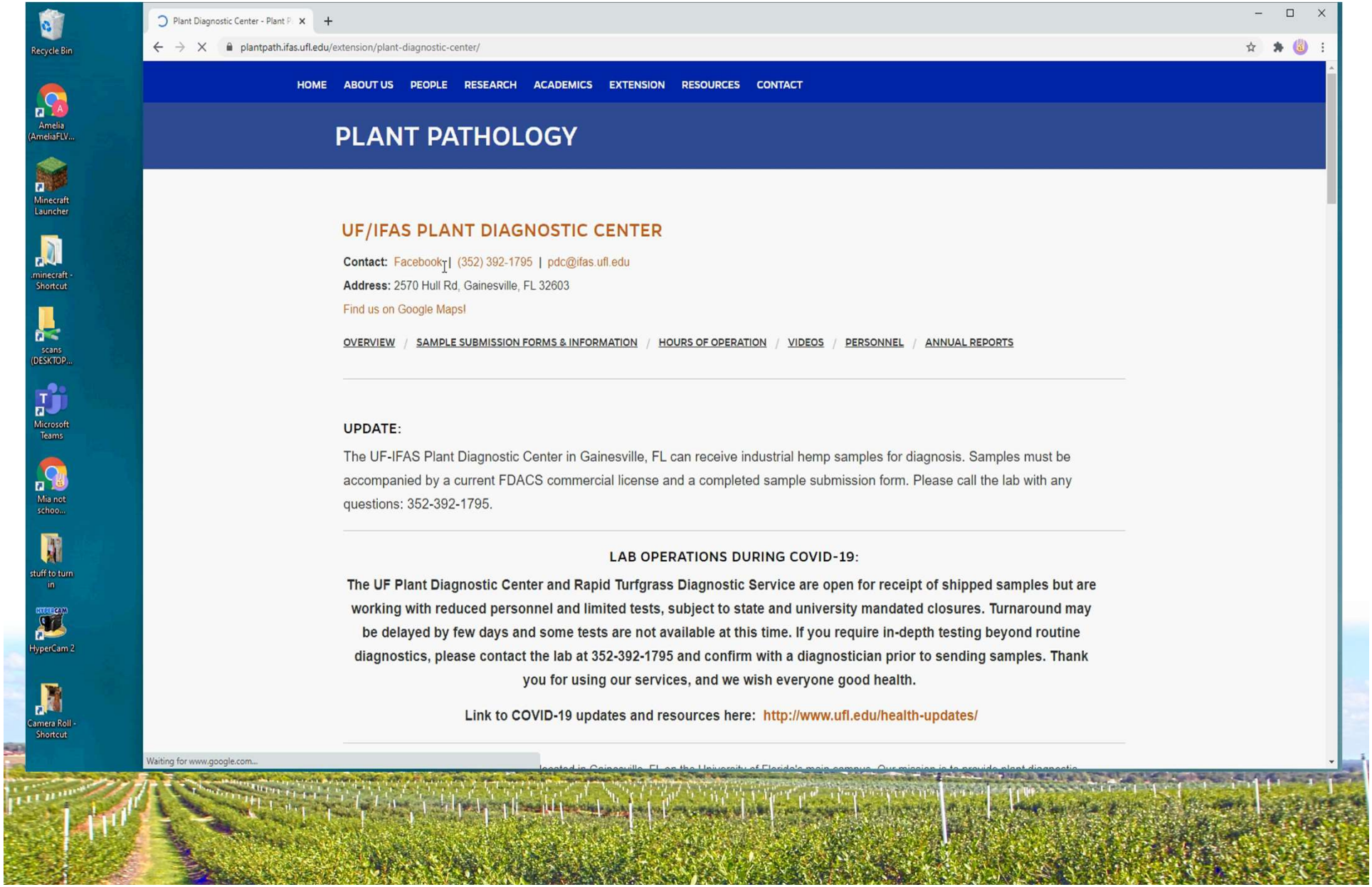
Management

- EDIS publication: http://edis.ifas.ufl.edu/pp332
- K-Phite is an example product that is labeled for the disease and for blueberry
  - chemigation
    - 2 to 4 quarts in at least 200 gal of water per acre
  - drench
    - 2 to quarts in at least 100 gal of water
  - banded application
    - 2 to 4 quarts in at least 20 gal of water followed by light irrigation
  - 28 day interval in summer, opposite copper apps for algal stem blotch

Managing foliar fungal

- Avoid overhead irrigation
- Bravo post harvest
- Rotate or tank mix systemic fungicides with compatible contact fungicides
- Do not apply more than the labels allow for any one active ingredient for the season
- Proline, Abound for rust
- Avoid stand-alone Abound for anthracnose

The Plant Diagnostic Center



The Plant Diagnostic Center

- Take a good sample!
  - Includes
    - Pictures texted or emailed
    - Details about the problem
    - The plant!
  - Does not include
    - Dead plants
    - Just soil or water
    - Picked leaves or fruit (leave them attached)

Any Questions?

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Thank you!

Efficacy of selected fungicides against diseases of blueberry (E = excellent, VG = very good, G = good, F = fair, P = poor, NA = not recommended, UN = control unknown) These ratings are benchmarks, actual performance will vary.

	Fungicide [FRAC Group]	FRAC Group	Exobasidium leaf & fruit spot	Mummy Berry	Phomopsis twig blight	Botrytis (gray mold)	Alternaria rot	Ripe rot (Anthracnose)	Septoria leaf spot	Anthracnose leaf spot	Rust	Phytophthora root rot
	Calcium polysulfide (**Sulforix**)	M2	E	NA	NA	NA	NA	NA	NA	NA	NA	NA
	ziram (**Ziram**)	M3	UN	P	G	F	F	F	UN	F	UN	NA
	captan (**Captan 50WP**)	M4	VG	F	F	F	G	G	F	G	NA	NA
	chlorothalonil (**Bravo**)* ***DO NOT USE prior to harvest because of potential to damage fruit**	M5	UN	NA	NA	NA	NA	NA	VG **Post harvest only**	VG **Post harvest only**	G **Post harvest only**	NA
	fosetyl-Al (**Aliette WDG**)	P07	NA	NA	P	NA	NA	P	VG	VG	NA	G
	mono and di-potassium salts of phosphorous acid (**K-Phite**) or potassium phosphite (**ProPhyt**) ***injury may occur***	P07	UN	NA	NA	NA	NA	NA	VG	VG	NA	VG
DMIs	fenbuconazole (**Indar**)* ***Tank mix with captan products during bloom to prevent rots**	3	G VG (with captan)	E	E	NA	NA	NA*	E	E	G	NA
DMIs	metconazole (**Quash**)	3	UN	E	E	UN	E	E	E	E	VG	NA
DMIs	propiconazole (**Tilt, Bumper, PropiMax**)	3	UN	E	E	NA	NA	NA	VG	UN	G	NA
DMIs	prothioconazole (**Proline**)	3	UN	E	E	NA	NA	UN	G	UN	E	NA
	mefenoxam (**Ridomil Gold**)	4	NA	NA	NA	NA	NA	NA	NA	NA	NA	G
	cyprodinil + fludioxonil (**Switch**)	9+12	UN	F	G	E	E	E	G	G	NA	NA
Strobilurins (QoIs)	azoxystrobin (**Abound**)	11	UN	F	F	NA	E	E	VG	VG	G	NA
Strobilurins (QoIs)	azoxystrobin + propiconazole (**Quilt Xcel**)	11+3	NA	E	E	NA	E	E	E	E	E	NA
Strobilurins (QoIs)	pyraclostrobin + boscalid (**Pristine**)	11+7	F	VG	E	E	E	E	E	E	F	NA
	fenhexamid (**Elevate**)	17	UN	F	NA	E	NA	NA	NA	NA	NA	NA
	fenhexamid + captan (**CaptEvate**)	17+M4	VG	F	F	E	G	G	F	UN	NA	NA
	fluazinam (**Omega 500F**)	29	UN	NA	G	F	G	G	NA	NA	NA	NA