

Powdery and downy mildews – identification, management, and fungicide resistance issues

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UNIVERSITY OF GEORGIA



Grapevine Downy Mildew (*Plasmopara viticola*)

- Signs
 - White “downy” growth on the underside of leaves or on berries
- Symptoms
 - “Oil spots” on the top of leaves
 - Dessication and defoliation
- Management
 - Fungicide applications



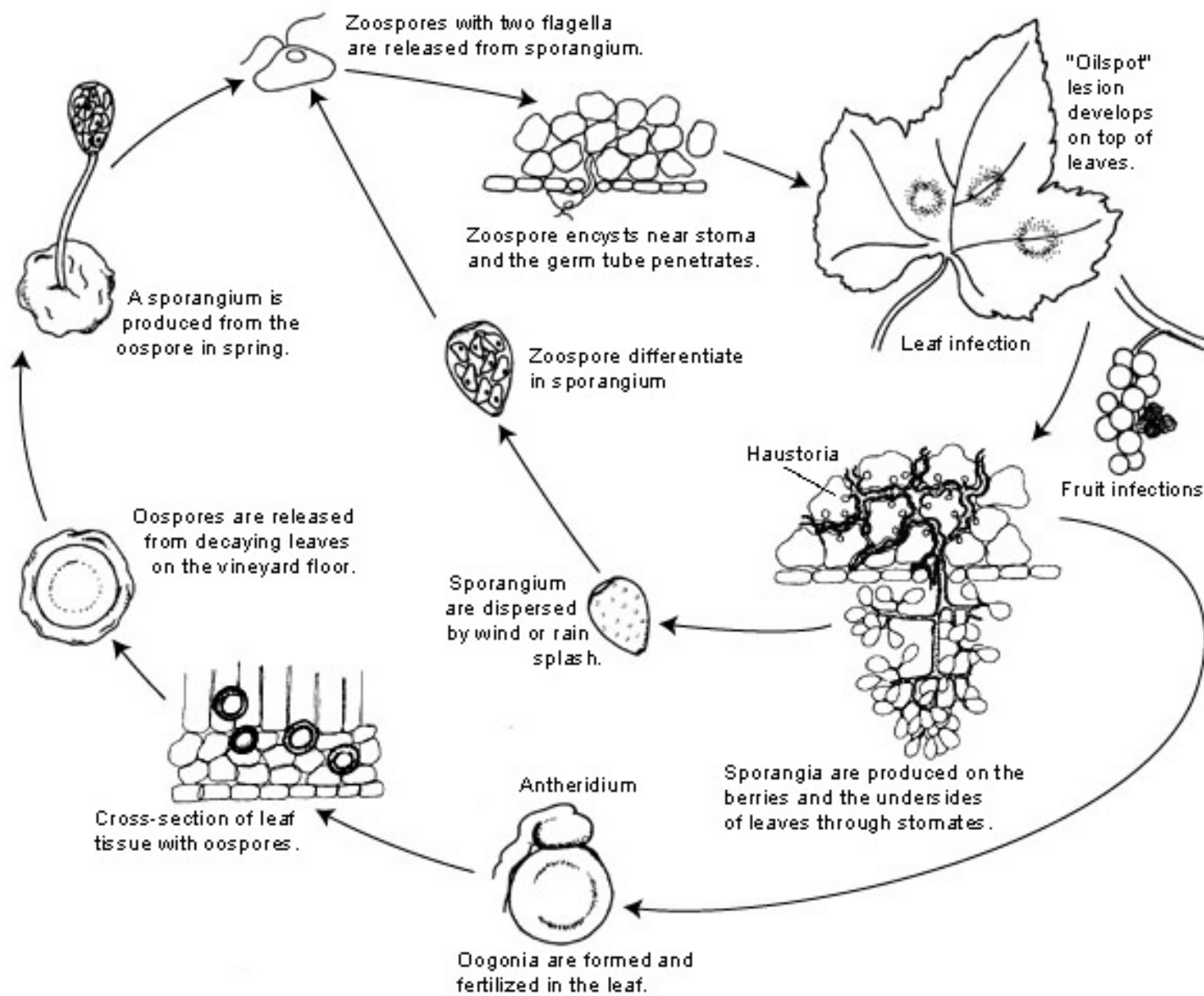


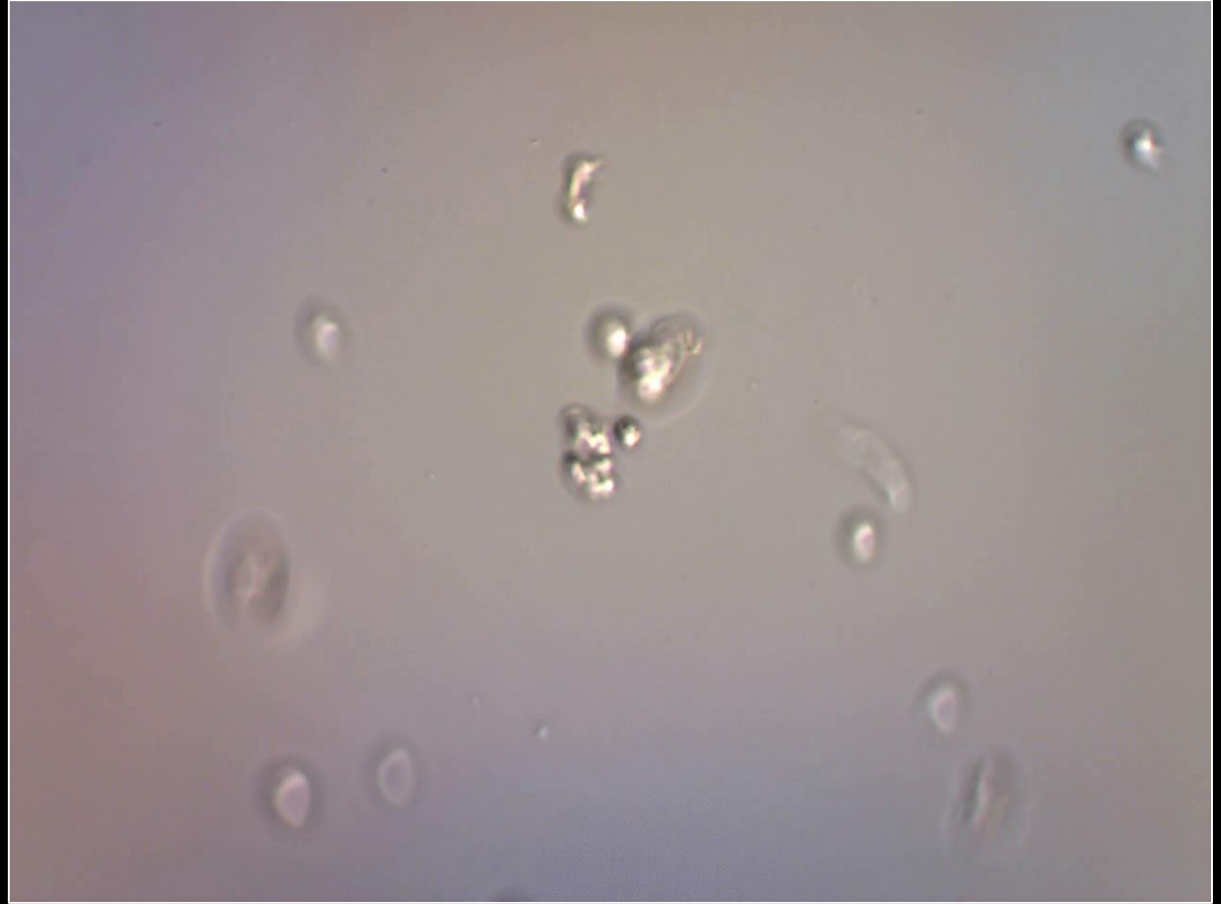












Fungicides	FRAC Code	Efficacy
Ametocradin + dimethomorph (Zampro)	40 + 45	+++++ Systemic
Azoxystrobin (Abound)	11	??? Systemic (Resistance prevalent; always mix with mancozeb or Captan)
Boscalid + Pyraclostrobin (Pristine)	7 + 11	??? Systemic (Resistance prevalent; always mix with mancozeb or Captan)
Captan	M4	++++ Contact protectant; combine with Phosphonates
Cyazofamid (Ranman)	21	++++ Locally systemic; combine with Phosphonates
Famoxadone + Cymoxanil (Tanos)	11 + 27	++++ Use with Captan or mancozeb (required)
Mancozeb	M3	++++ Contact protectant
Mandipropamid (Revus)	40	+++++ Translaminar protectant
Mandipropamid + Difenconazole (Revus Top)	3 + 40	+++++ Translaminar protectant
Mefanoxam + Mancozeb (Ridomil Gold MZ)	4 + M3	+++++ Systemic + contact protectant
Phosphonates (Prophyt, etc.)	33	++++ Systemic (combine with Captan)
Ziram	M3	++++ Contact protectant
Zoxamide + Mancozeb (Gavel)	22 + M3	++++ Contact protectant fungicides

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Objectives

- Survey fungicide sensitivities in current Georgia downy mildew populations
- Evaluate field efficacy of fungicides against downy mildew

Resistance Testing



Bioassays

- Revus
(mandipropamid; CAA Group 40)
- Abound
(azoxystrobin; QoI Group 11)
- Ridomil
(mefenoxam; PA Group 4)



PULL HERE TO OPEN

GROUP 11 FUNGICIDE



Abound[®]

Flowable Fungicide

syngenta.

GROUP 40 FUNGICIDE



Revus[®]

Fungicide

AGRICULTURAL
SUSPENSION

GROUP 4 FUNGICIDE

PULL HERE TO OPEN



RidomilGold[®] SL

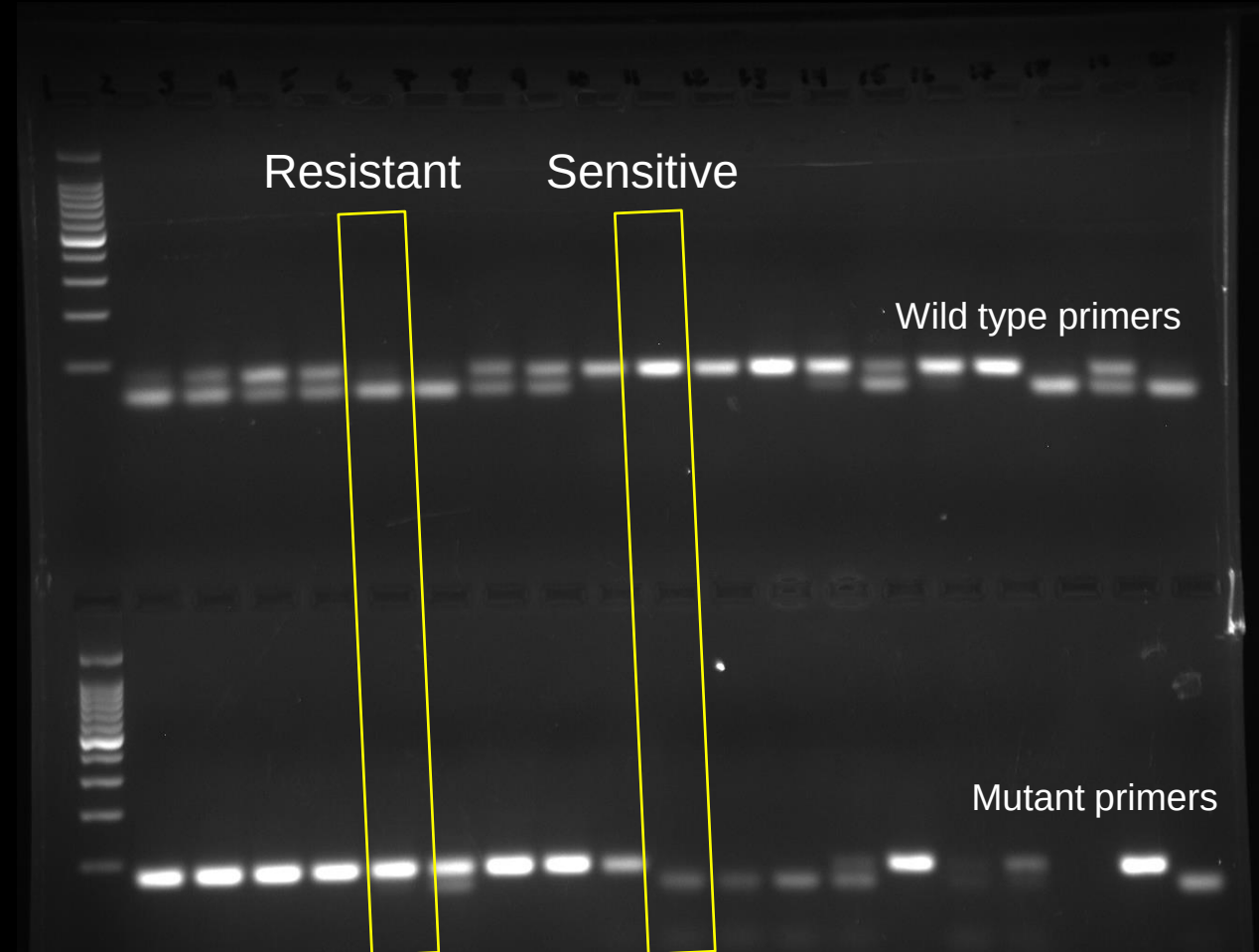
syngenta



Resistance Testing with PCR



CAA



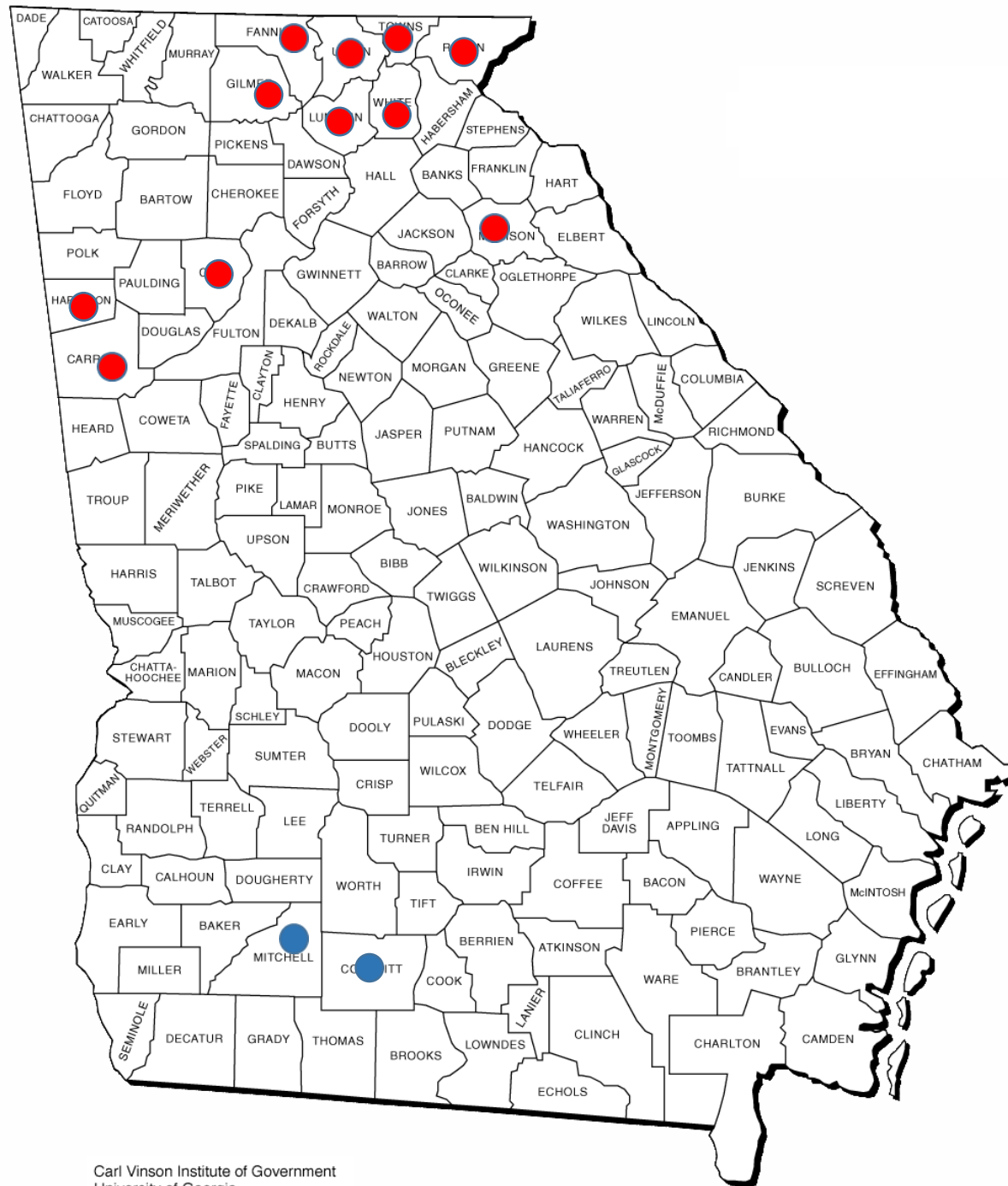
Qol

QoI

Group 11

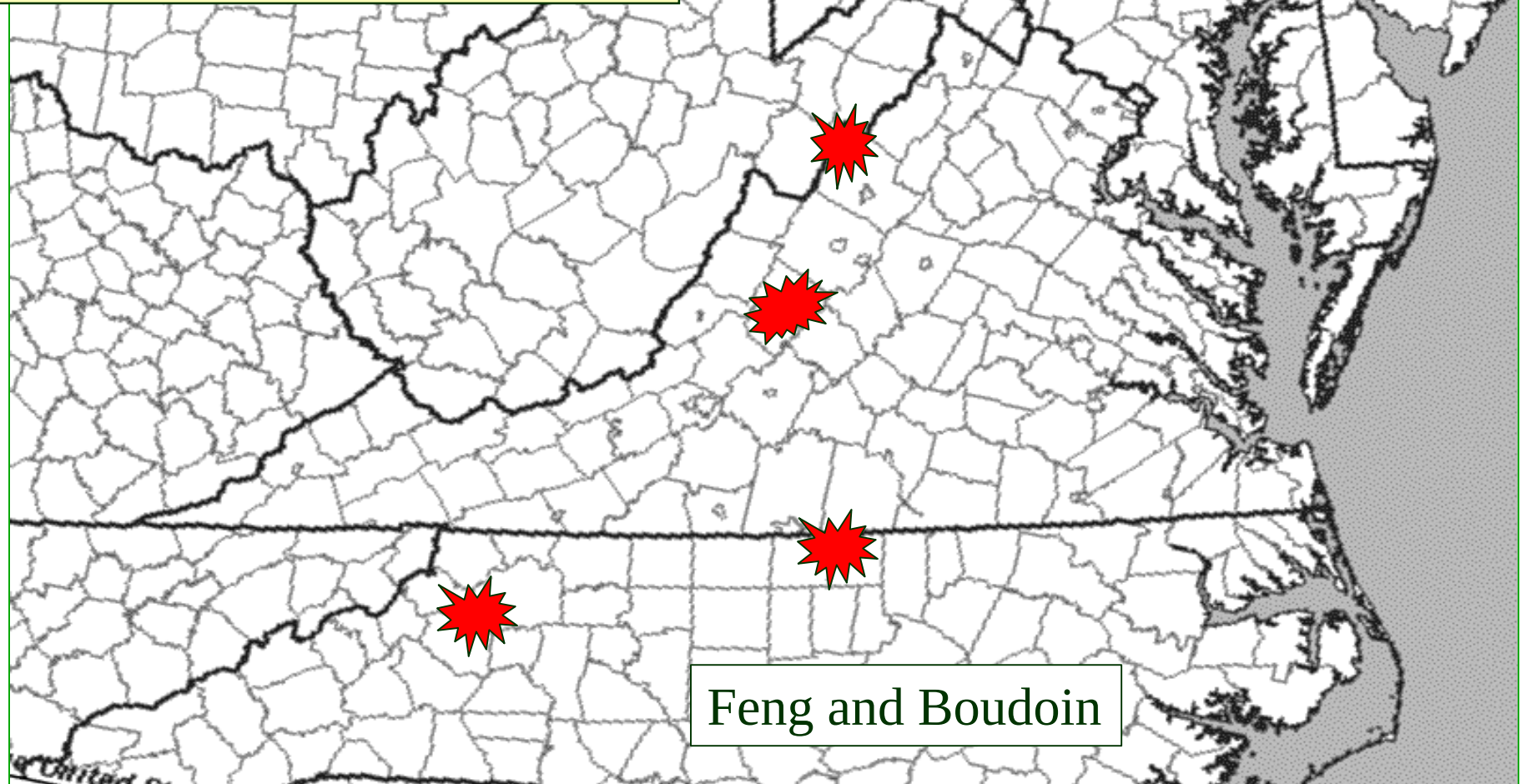
Ex. Abound, Pristine

● Resistant
● Sensitive



Downy mildew, 2016-2017

★ CAA resistance



Field Trials

- GMREC, Blairsville, GA; Montaluce Vineyards, Dahlonega, GA; Kaya Vineyards, Dahlonega, GA
- 11 treatments
- 4 applications: bloom, post-bloom, bunch closure, and second cover

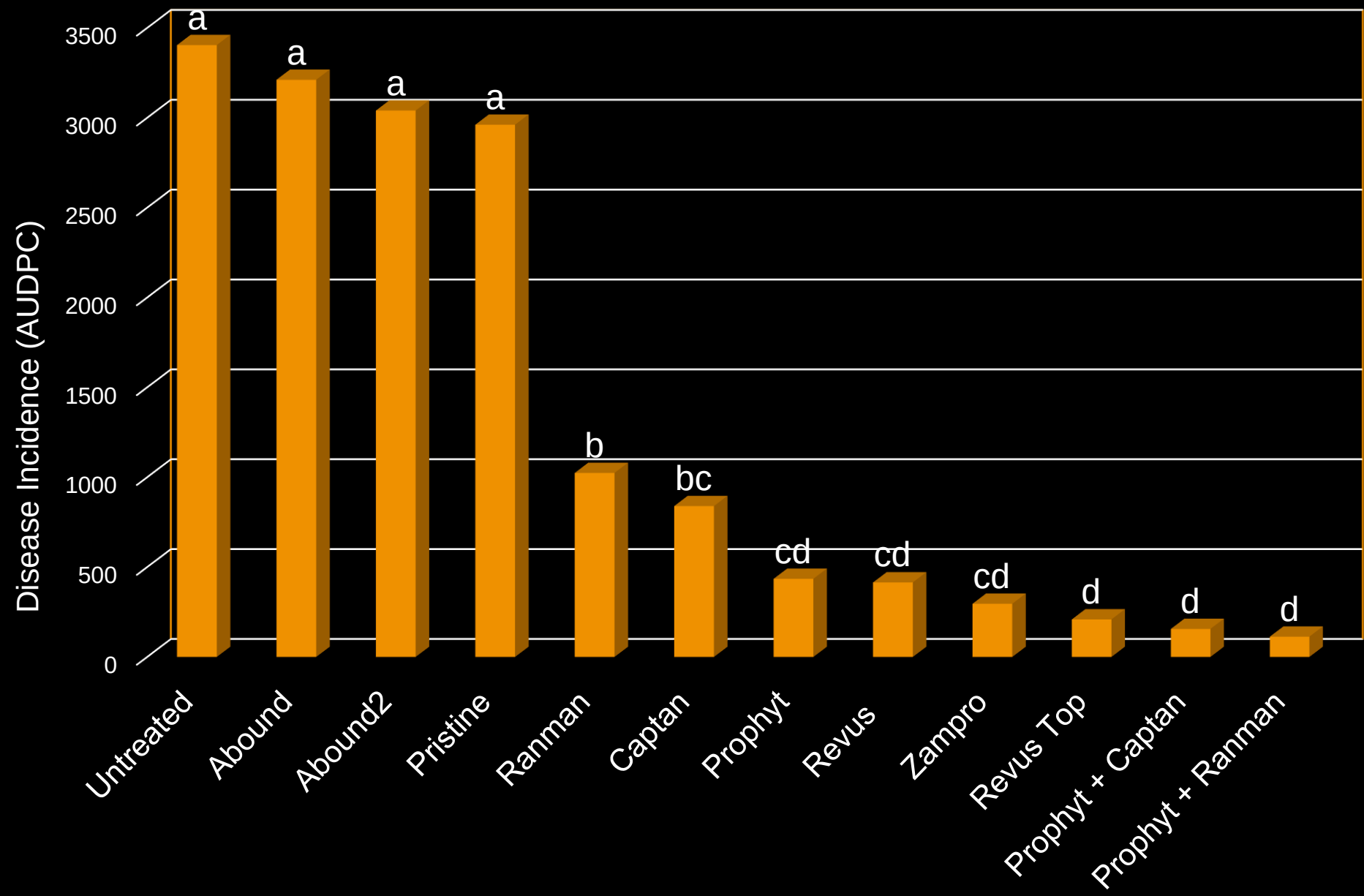


Experimental Design

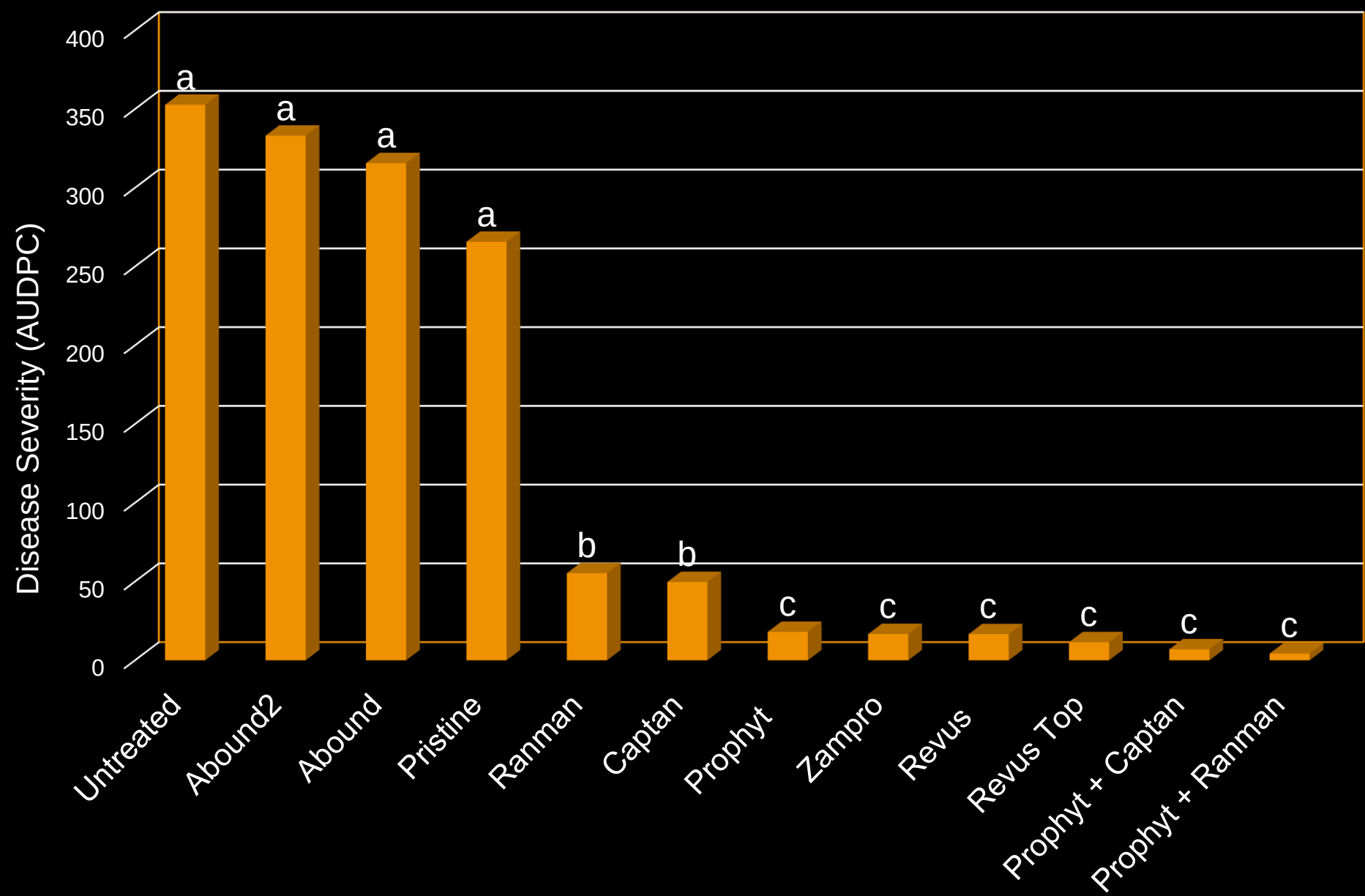
- Randomized complete block design with five replications (six at GMREC)
- Treatments
 - Untreated Control (GMREC only)
 - Abound
 - Abound2
 - Pristine
 - Revus
 - Revus Top
 - Zampro
 - Prophyt
 - Ranman
 - Captan
 - Prophyt+Ranman
 - Prophyt+Captan

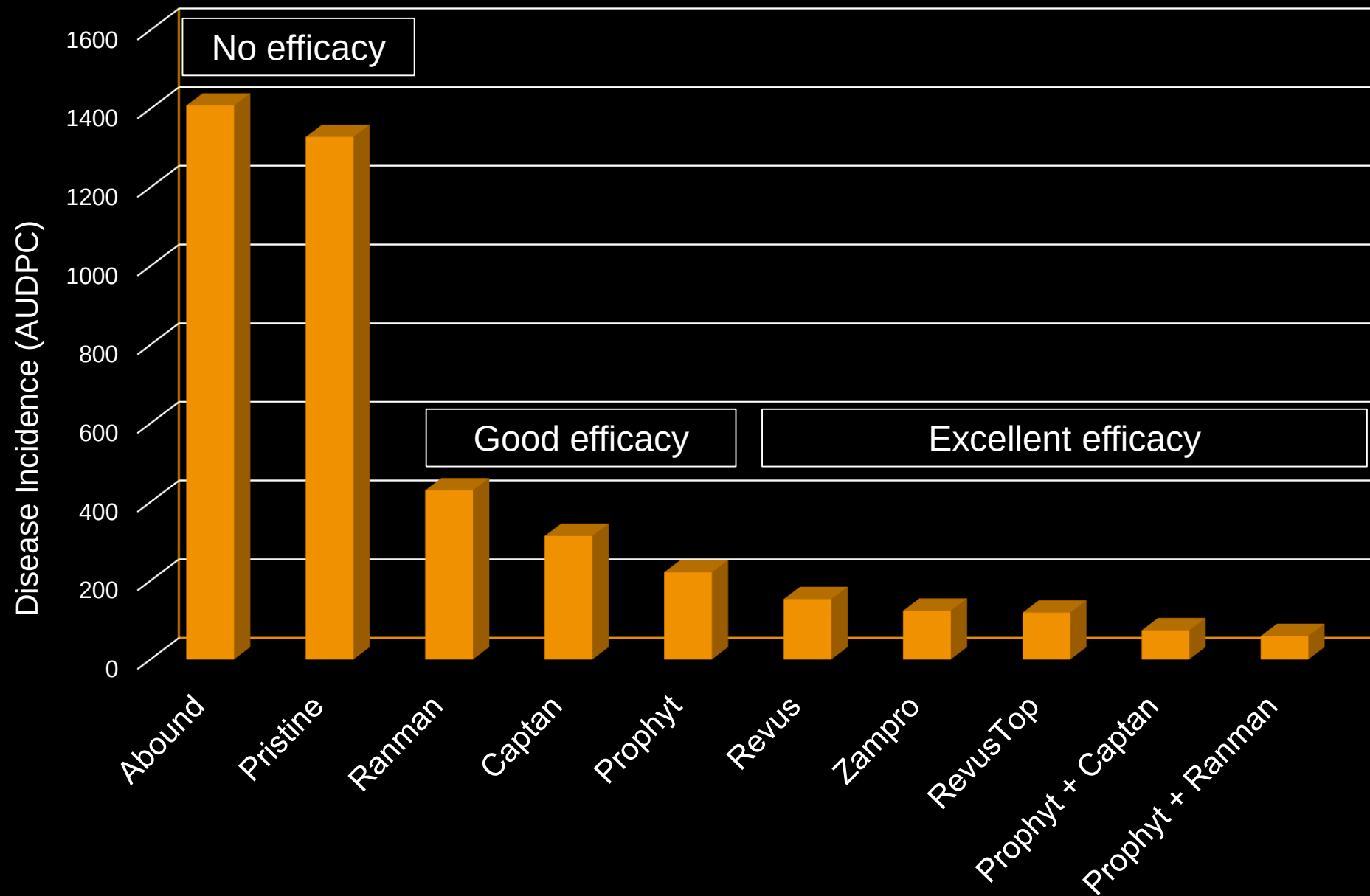


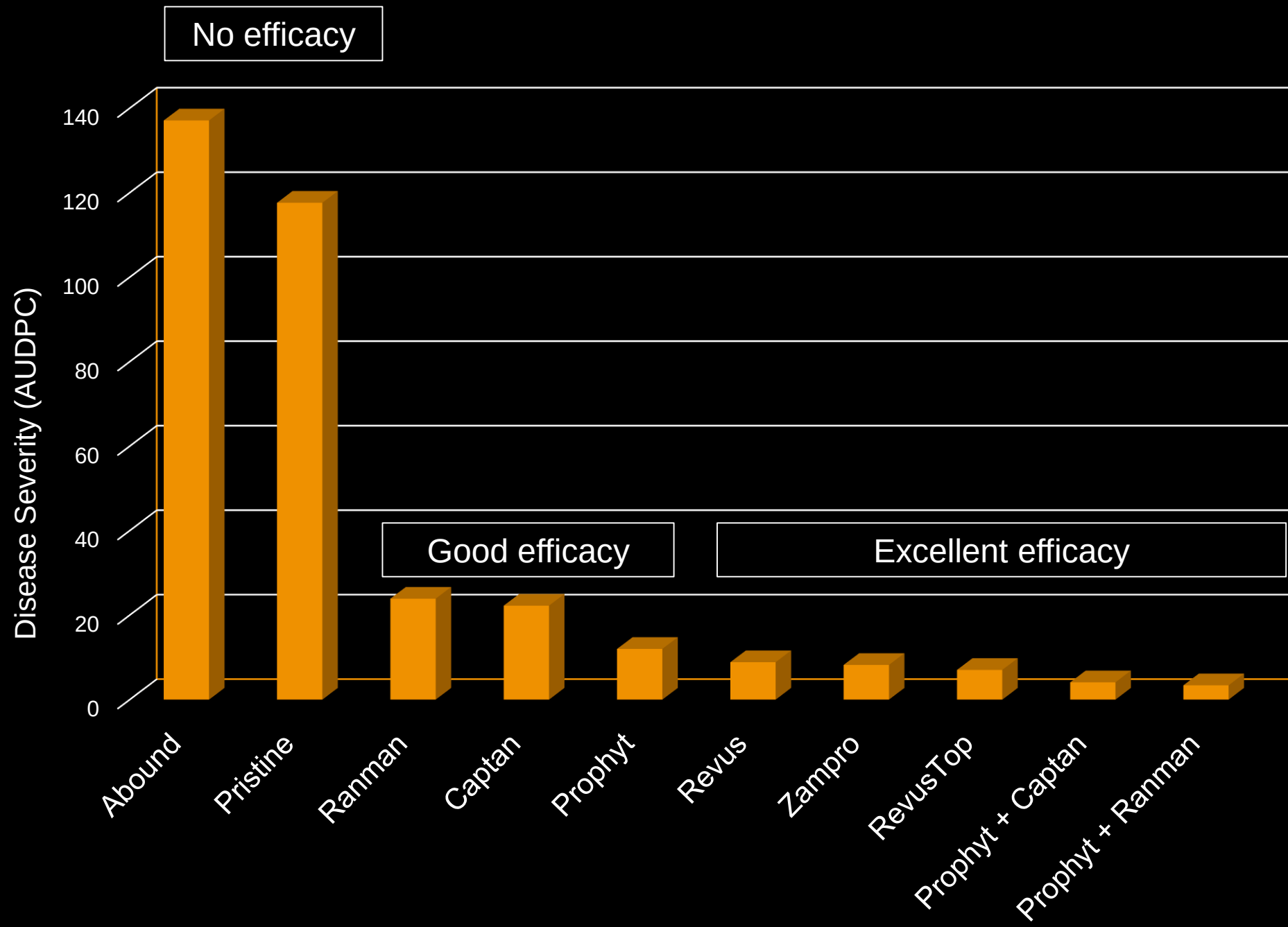
Blairsville, GA Incidence



Blairsville, GA Severity







Conclusions

- Based on bioassays, PCR of known resistance causing mutations, and field evaluation of fungicides:
 - Downy mildew QoI resistance is widespread in Georgia vineyards
 - No CAA or PA resistance has been found in downy mildew populations in Georgia



Powdery Mildew

(*Uncinula necator*)

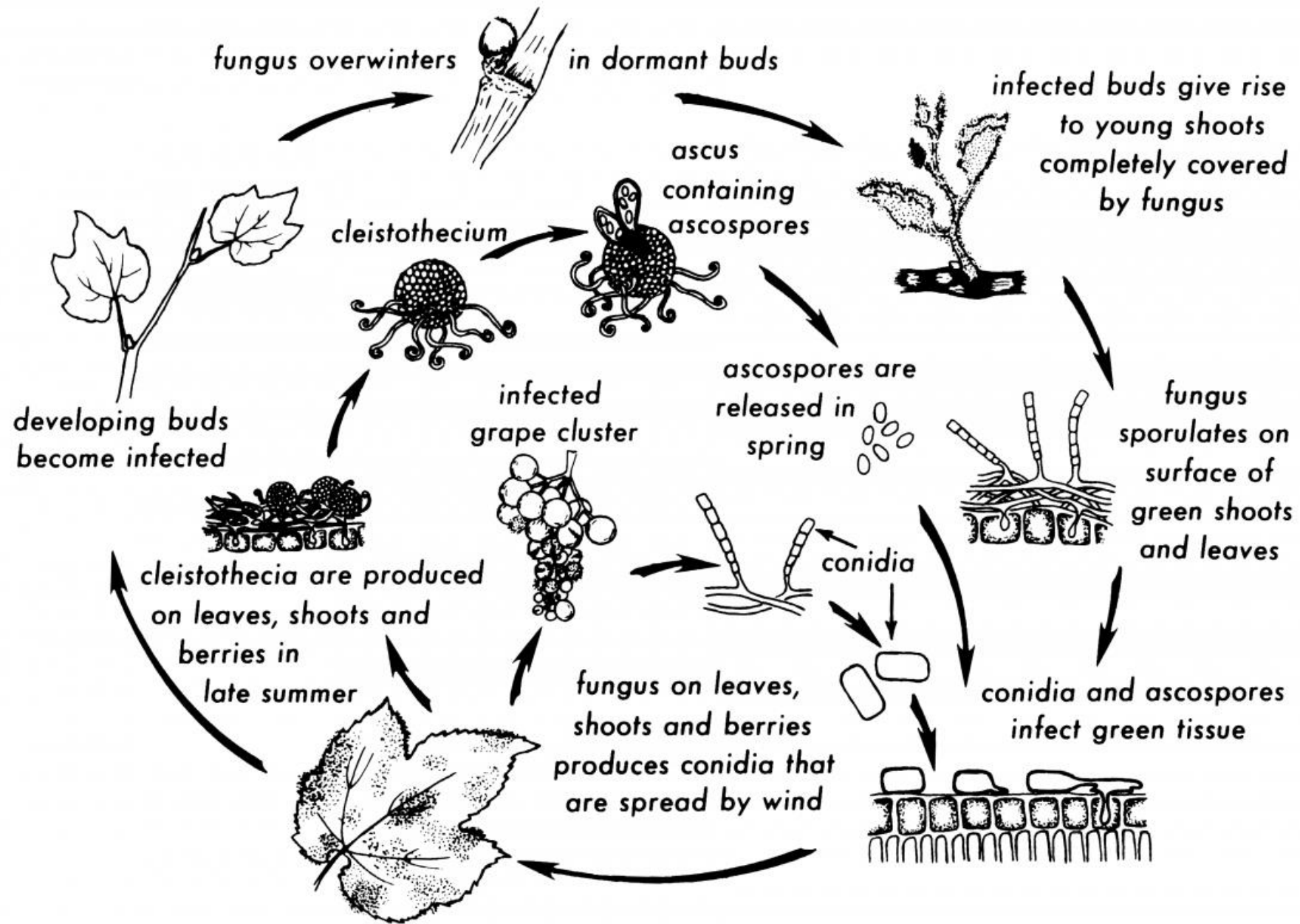
- ❖ Can also infect all green vine parts.
- ❖ White powdery growth
- ❖ Infected fruit may cause off flavor in wines.

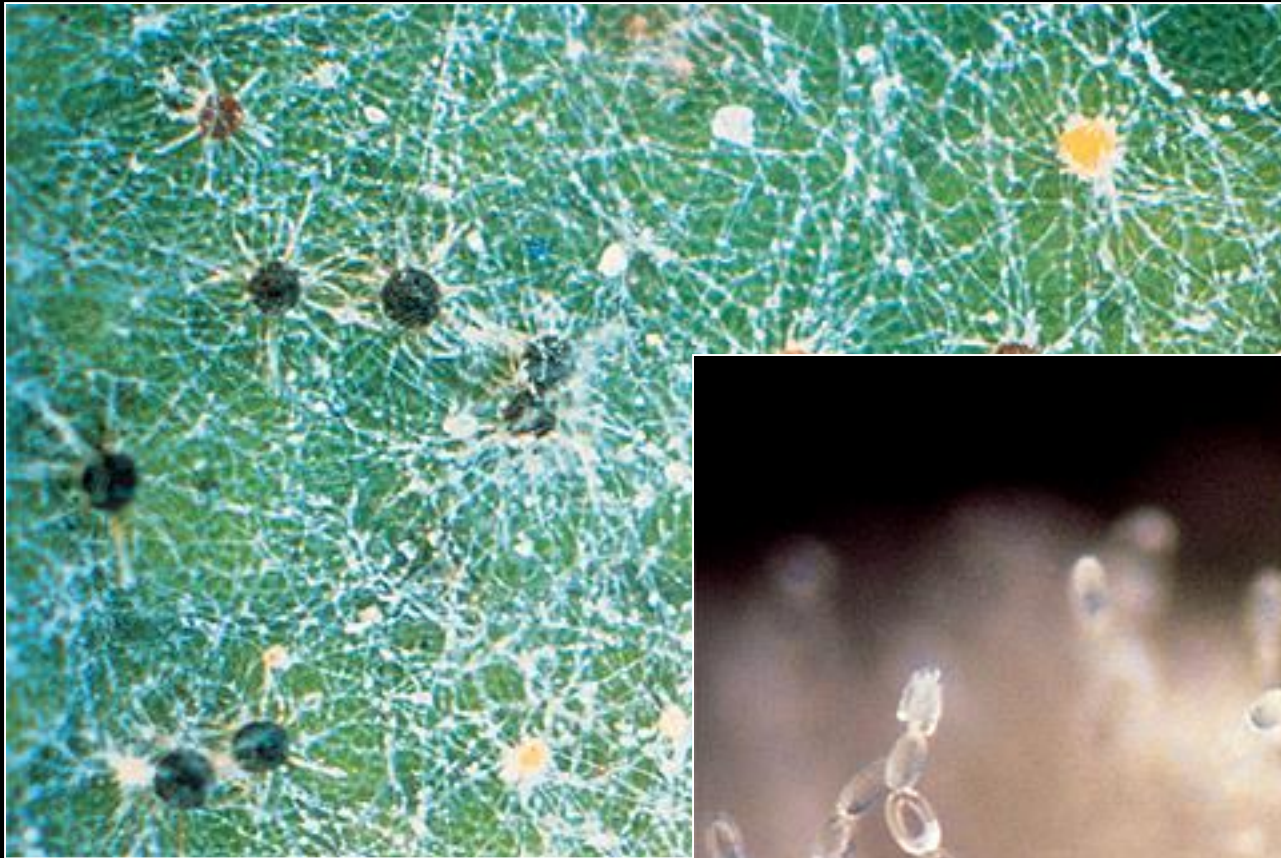








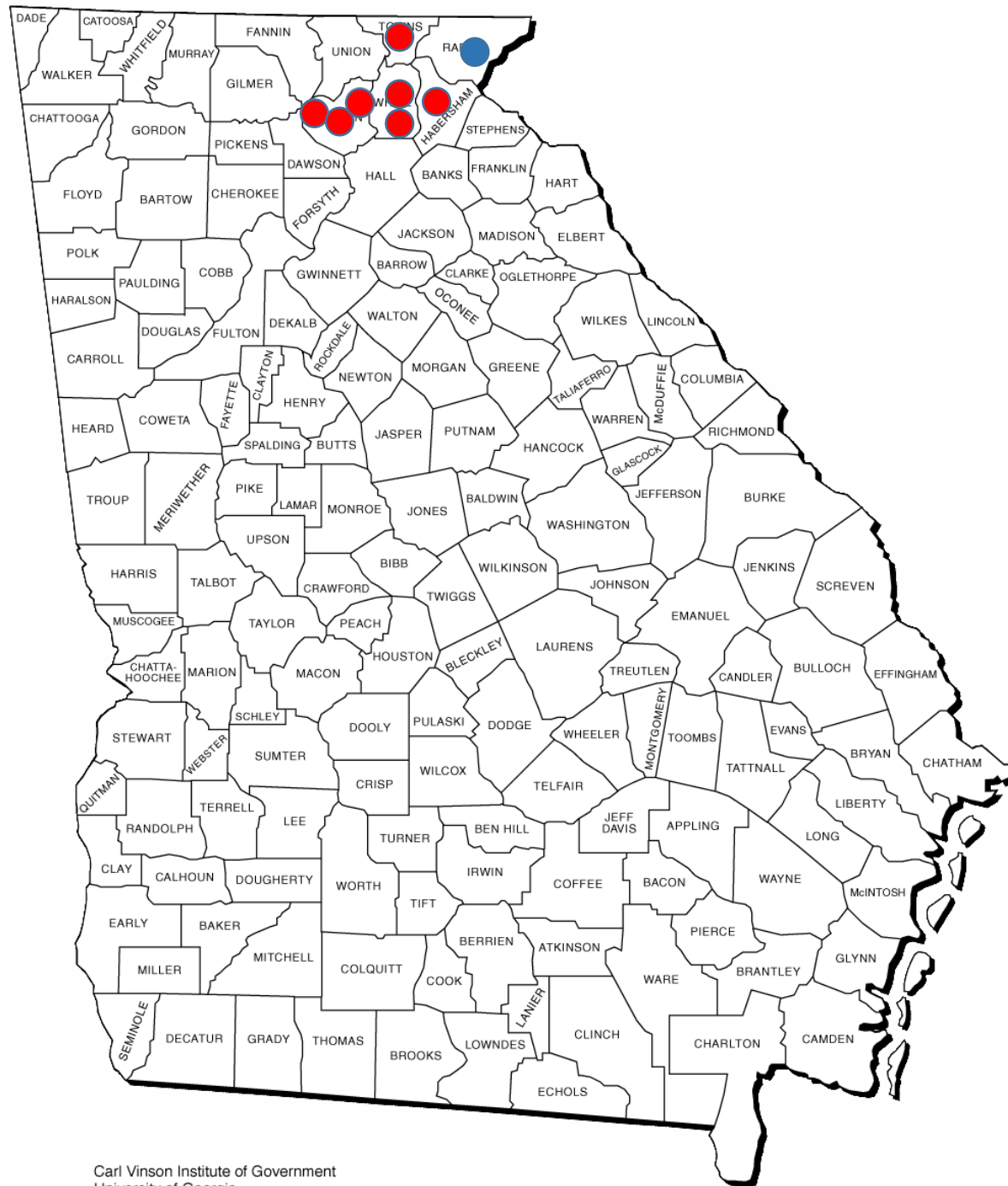




Fungicides	FRAC Code	Efficacy
Abound (azoxystrobin)	11	??? Systemic (Resistance prevalent; always mix with sulfur)
Aprovia (benzovindiflupyr)	7	++++ Translaminar; corrosive
Inspire Super (difenoconazole + cyprodinil)	3 + 9	++++ Systemics
Luna Experience (fluopyram + tebuconazole)	3 + 7	+++++ Systemics
Mettle (tetraconazole)	3	++++ Systemic
Microthiol Disperss (sulfur)	M2	++++ Contact protectant
Pristine (pyraclostrobin + boscalid)	7 + 11	++++ Sytemics
Procure (triflumizole)	3	++++ Systemic
Quintec (quinoxifen)	13	++++ Contact protectant; powdery mildew only
Rally (myclobutanil)	3	++++ Systemic
Stylet-oil (paraffinic oil)	NC	++++ Numerous phyto issues
Tebuconazole (tebuconazole)	3	++++ Systemic
Topsin M (thiophanate-methyl)	1	??? Systemic (Resistance prevalent; always mix with sulfur)
Torino (cyflufenamid)	U6	++++ Systemic; powdery mildew only
Vivando (metrafenom)	U8	++++ Systemic; powdery mildew only

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● Resistant
● Sensitive



QoI

Group 11

Ex. Abound, Pristine





Luna[®]
EXPERIENCE

Net Contents:

1 QT. (32 FL. OZ.)

GROUP 7|3 FUNGICIDE

*Broad Spectrum Fungicide
for Control of Plant Diseases*

ACTIVE INGREDIENT: FLUOPYRAM* 17.6%

TEBUCONAZOLE* 17.6%

OTHER INGREDIENTS: 64.8%

**Contains 1.67 lbs FLUOPYRAM TOTAL: 100.0%
and 1.67 lbs TEBUCONAZOLE per gallon**

***(CAS Numbers 658066-35-4 and 107534-96-3)**

EPA Reg. No. 264-1091

SUSPENSION CONCENTRATE

KEEP OUT OF REACH OF CHILDREN
CAUTION

**See additional precautionary statements and
directions for use on label.**

Produced for:

Bayer CropScience LP

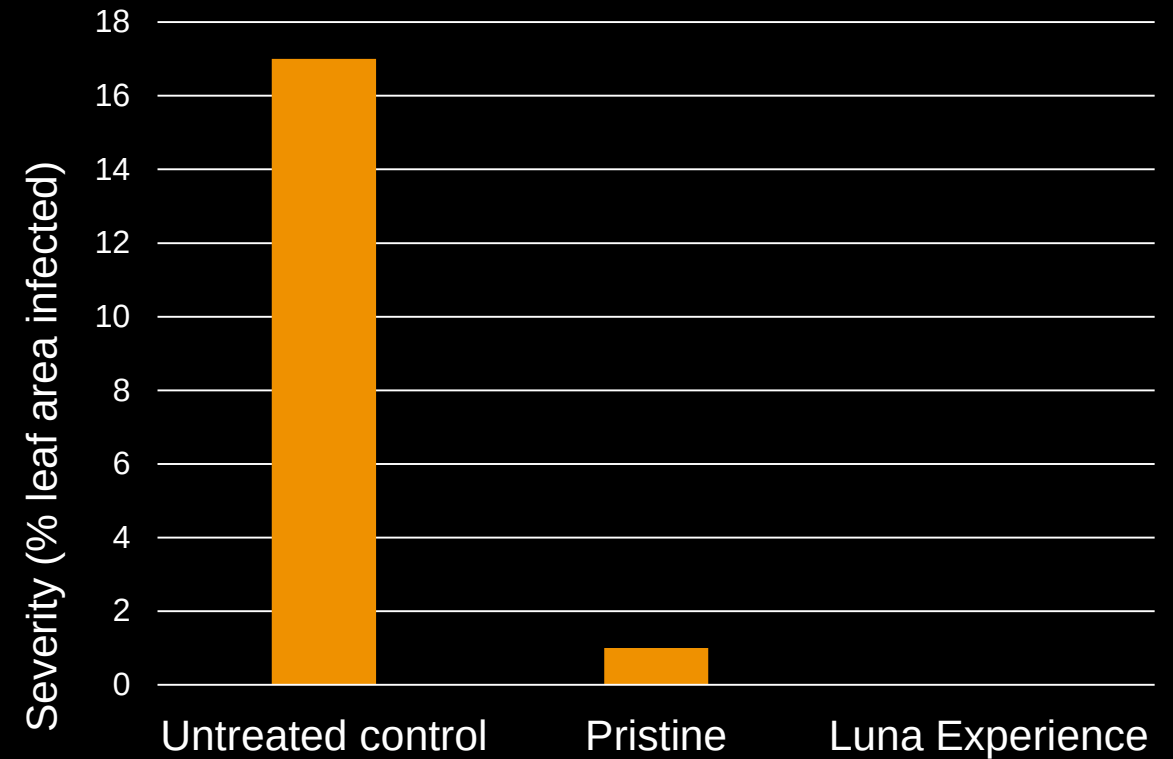
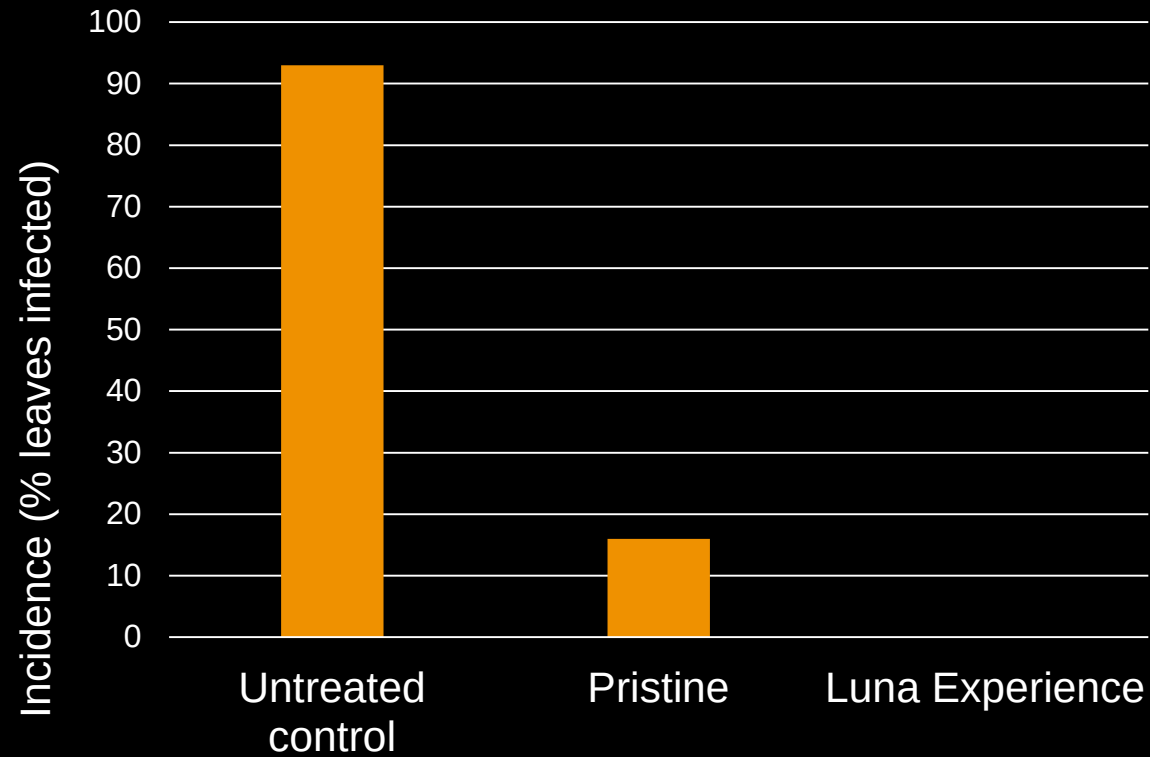
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Impact of Luna Experience on powdery mildew management





Questions???