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2021 Pesticide Safety April 27: Cranberry Fungicide Options: A Review

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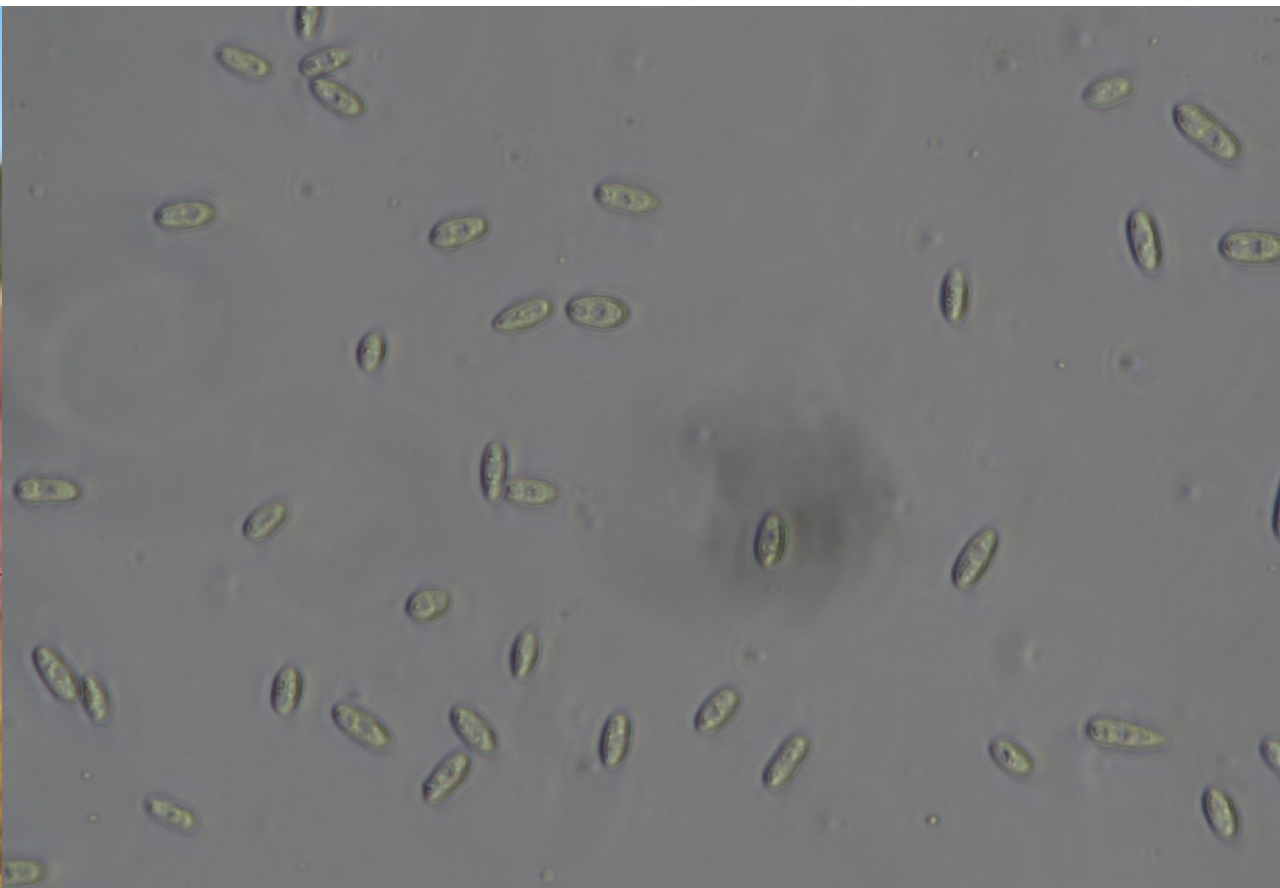
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CRANBERRY FUNGICIDE OPTIONS: A REVIEW

Leela S. Uppala, UMass Cranberry Station, 4-27-2021



POLL QUESTIONS: SET 1

WHAT IS GOING ON WITH STRESSED VINES?

- Drought?
- Winter Damage?
- Upright Dieback?



WHAT SYMPTOMS?

- Individual uprights dyeing back from the growing point toward the runner.
- Every upright on some runners; or one or a few infected uprights (orange, bronze or brown discoloration; heavy defoliation) on some runners.
- Most of the affected bogs had symptoms spread across the field.



UPDATE

For the past 3 weeks we visited several fields and received several samples showing symptoms of “stress”.

Several samples had typical upright dieback symptoms.

They were plated in our lab in Petri dishes.

Isolated several fungi and processed through Microscopy.

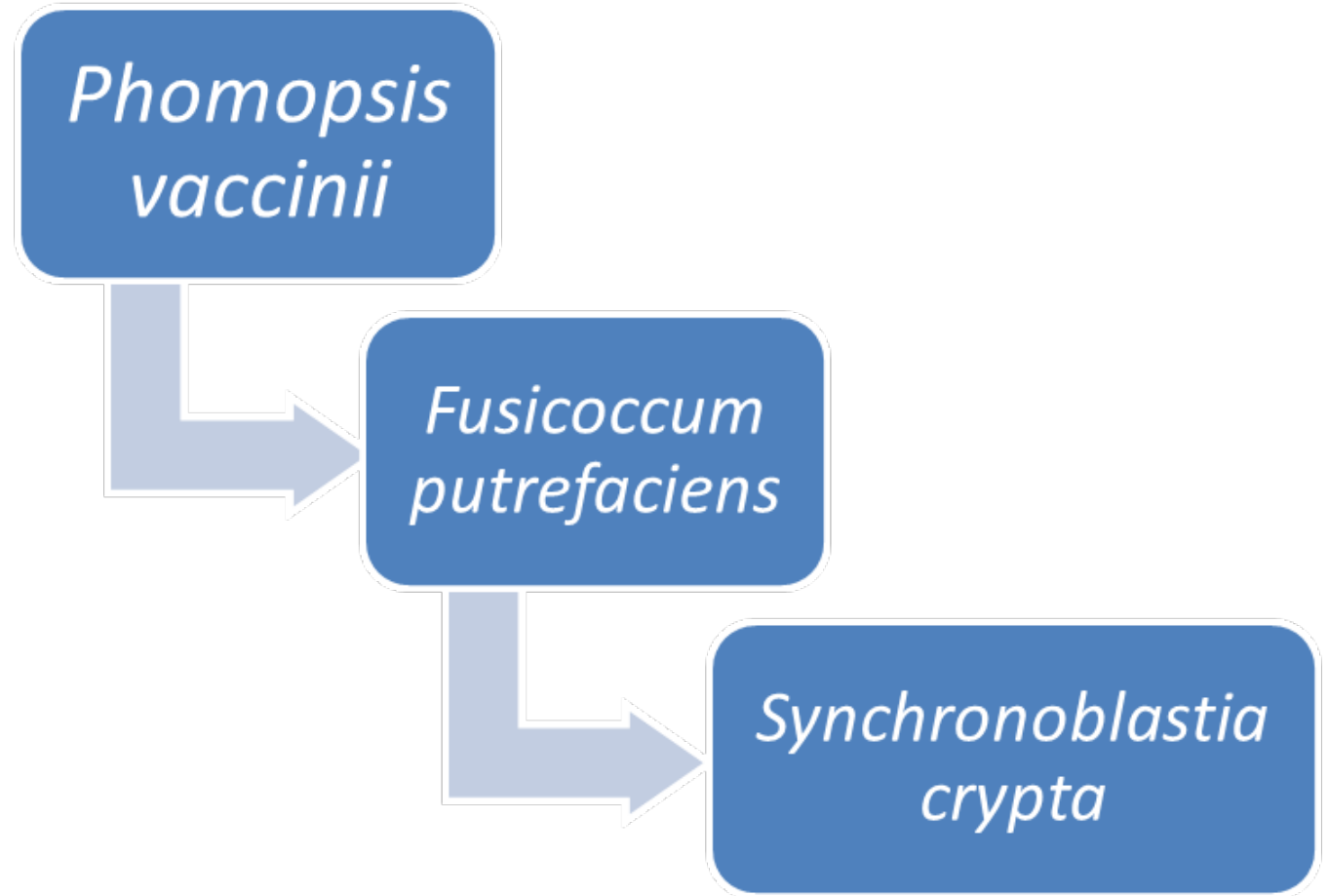




**WHAT ARE THESE
FUNGI DOING?**

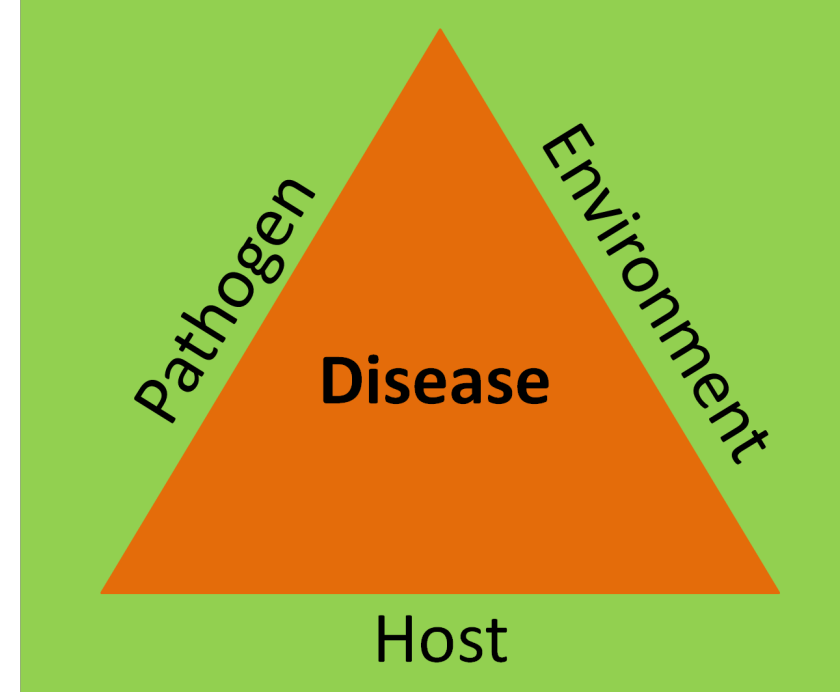
RESULTS

- Most of the samples (EB, BL, SK, GH, DM, MQ) tested positive for UDB.



MORE TO THE STORY....

- Typical textbook disease triangle story.
 - Not so typical timing.
 - Lots of unknowns (thresholds, possible yield impact, why this early?)
 - “drought, early cold temperatures in the fall, oxygen deficiency, warm January days followed by cold days” – Frank Caruso
 - Frank recalled similar incidence from 1986 spring.
-



TO SPRAY OR NOT TO SPRAY?

- To be conservative, consider 5% as a threshold significant enough to spray.

❖ **Coppers and Chlorothalonil fungicides are registered.**

eg: Champ DP, Champ Flowable, Champ WG (48-hour restricted entry interval)

Bravo Ultrex, Bravo Weather Stik, Equus DF (12-hour restricted entry interval)

❖ Timing of applications:

Early applications at **bud break and/or bud expansion** are known to provide excellent control.

UPRIGHT DIEBACK FUNGICIDE RECOMMENDATIONS

PESTICIDE/FORMULATION	RATE (amt/A/app)	COMMENTS/RESTRICTIONS
<u>COPPER FORMULATIONS</u>		
Champ DP Dry Prill	5.3 lb	Must be applied pre-bloom. 48-hour restricted entry interval.
Champ Formula 2 Flowable	5.33 pt	
Champ WG	4.2 lb	
<u>CHLOROTHALONIL FORMULATIONS</u>		
Bravo Ultrex, Equus DF	3.8 – 6 lb	One pre-bloom application should be applied after the terminal bud has broken dormancy (begun to swell or has begun new growth). The exact timing will depend on whether the variety is early or late-season. 12-hour restricted entry interval.
Bravo Weather Stik	4 – 6.5 pt	
Chlorothalonil 720, Equus 720 SST	4 – 6.5 pt	
Chlorothalonil Zn	5.66 – 9.25 pt	
Echo 720	4 – 7 pt	
Echo 90DF	3.25 – 5.75 lb	
Initiate ZN	5.75 – 9.25 pt	

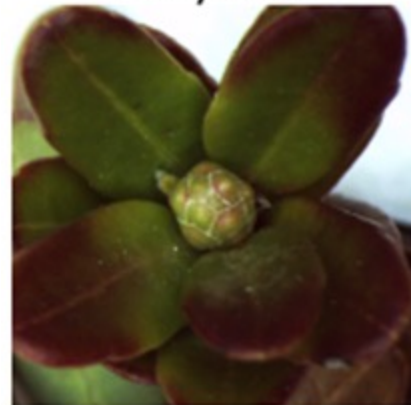
For all above chlorothalonil formulations: Hold water for 3 days after application. In beds subject to Zone II regulations, growers must follow the required process (See Zone II section) to determine if these products may be used. As per the label, the maximum allowable number of chlorothalonil applications in a growing season is 3. **If one chlorothalonil application is used for upright dieback, only 2 applications are allowed for fruit rot.**

CRANBERRY BUD STAGES

CABBAGE HEAD



Early Black



Howes

CRANBERRY BUD STAGES

BUD ELONGATION: BETWEEN CABBAGE HEAD AND ROUGHNECK



Early Black



Howes

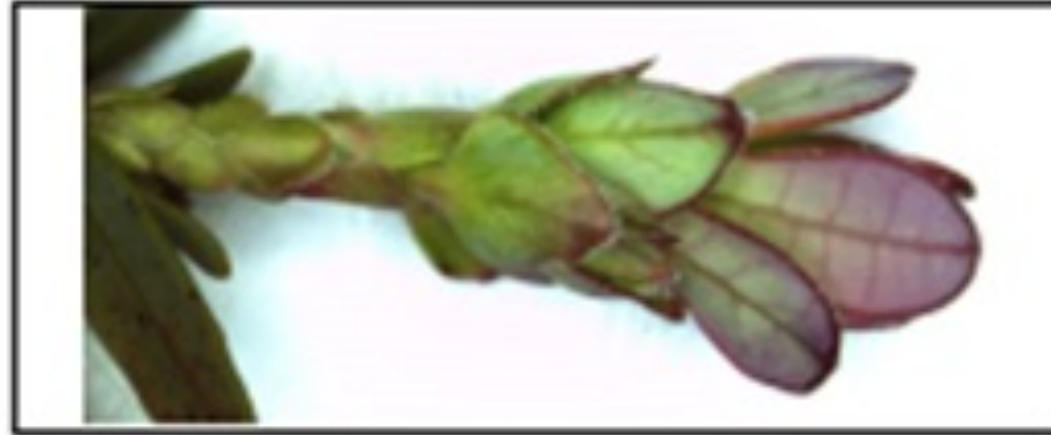


Examples of Bud Elongation



CRANBERRY BUD STAGES

ROUGHNECK STAGE



UPRIGHT DIEBACK

- Fungicides targeted for fruit rot control also provide a degree of protection against this disease during early and mid-season infection periods.

POLL QUESTIONS: SET 2

PHYTOPHTHORA ROOT ROT -*PHYTOPHTHORA CINNAMOMI*

P. MEGASPERMA *P. DRESCHLERI*



Root symptoms



UPDATE

A microscopic image of plant tissue, likely a root, showing numerous long, thin, hyaline hyphae of Phytophthora. Several circular, dark-stained structures, which are likely sporangia or zoospores, are visible throughout the tissue. The overall color is a muted purple-brown.

- Confirmed diagnosis of *Phytophthora* for four samples.
- If you suspect *Phytophthora* root rot, please drop a sample or contact me.

PHYTOPHTHORA ROOT ROT MANAGEMENT

- ❖ **Improve drainage** of the low areas of the bed.
 - ❖ Tile, stones or other materials can be utilized, and new ditches can be dug.
 - ❖ **Sand the affected areas** to get them up to grade with the remainder of the bed.
 - ❖ **Stressed plants** on the margins of dieback areas should be given extra dose of fertilizers to stimulate root growth.
-

PHYTOPHTHORA ROOT ROT MANAGEMENT

- After improving drainage, fungicides should be applied.
 - Foliar application of Phosphonate fungicides (eg: Rampart, Phostrol) or Soil application of Phenylamide fungicides (eg: Ridomil Gold SL, Ridomil Gold GR) are recommended.
-

PHYTOPHTHORA ROOT ROT MANAGEMENT

- Treatment should be considered for when the vine is actively growing roots. June, July and August.
 - If you are unable to make an application in the summer, you may consider an application in the fall. However, keep in mind that this will probably only be effective in early-harvested beds or if we have a warm, extended fall season.
-

PHYTOPHTHORA ROOT ROT MANAGEMENT

- It just takes a few infected roots to initiate and spread the disease to a new location (and the water too, which can move spores from infected to healthy plants, within and among the bogs).
 - Precautions should be taken to avoid the spread of the pathogen from infested beds to uninfested beds.
 - Machinery, equipment, footwear etc. should be sterilized using steam, 10% bleach or 70% alcohol.
-

KEEPING QUALITY FORECAST

- ❖ Issued since 1949
 - ❖ Preliminary KQF – early April; timed for the decision of whether to hold late water
 - ❖ Final KQF – early June; timed for the determination of fungicide applications and rates
-

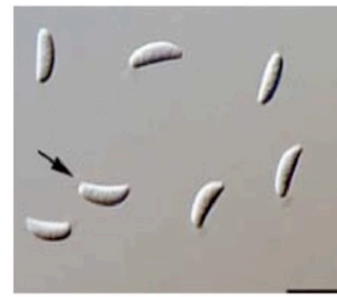
2021 PRELIMINARY KQF

- The forecast is for **FAIR** (3 points out of a possible 10) preliminary keeping quality.
 - The final keeping quality forecast (issued after June 1) could be upgraded if we have a cool and dry April and May.
 - Based on the preliminary forecast, fruit rot fungicide applications and the rate of fungicides applied should not be reduced
-

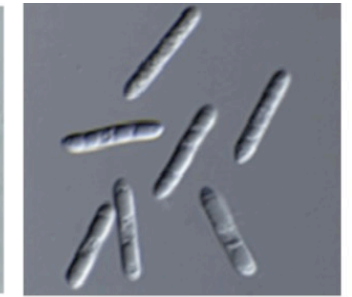
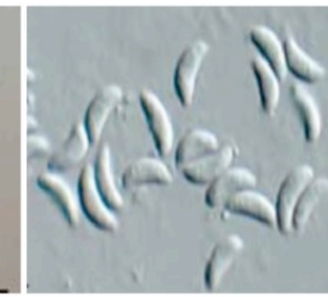
Identifying Critical Criteria to Develop a
Decision-Making Model for implementation of
Late Water Floods in Cranberry Production



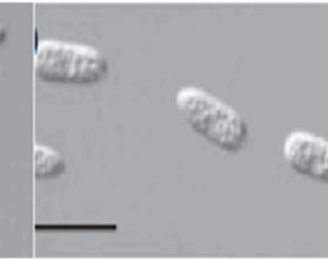
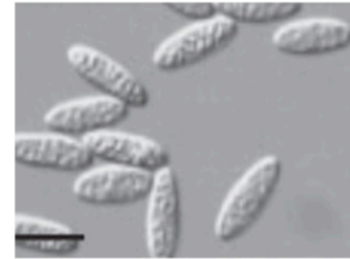
FRUIT ROT



Allantophomopsis spp.



Coleophoma empetri



Colletotrichum spp.



Epicoccum spp.



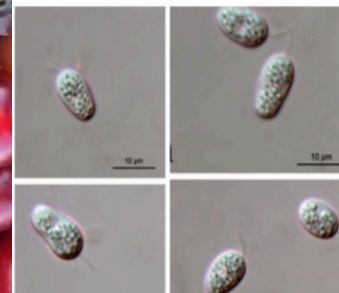
Fusicoccum putrefaciens



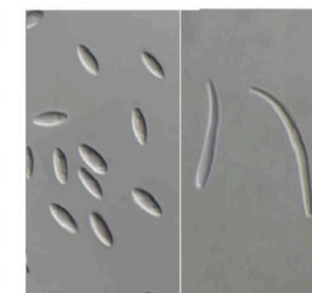
Pestalotia vaccinii



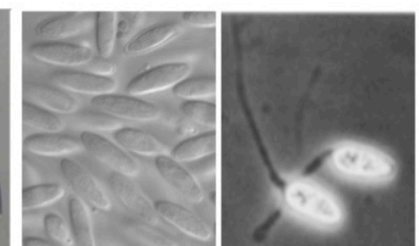
Physalospora vaccinii



Phyllosticta vaccinii

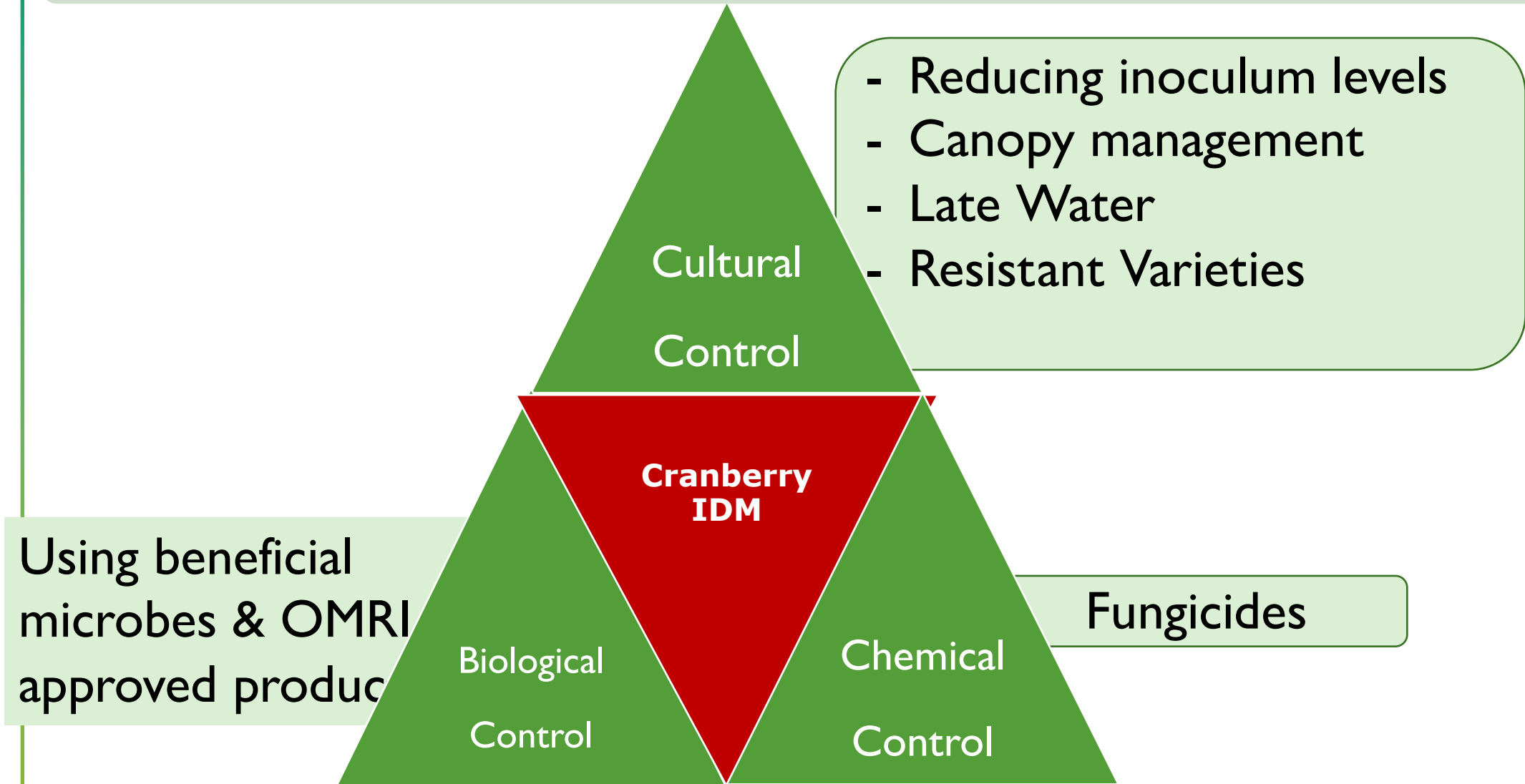


Phomopsis vaccinii



Botryosphaeria vaccinii &
Phyllosticta elongata

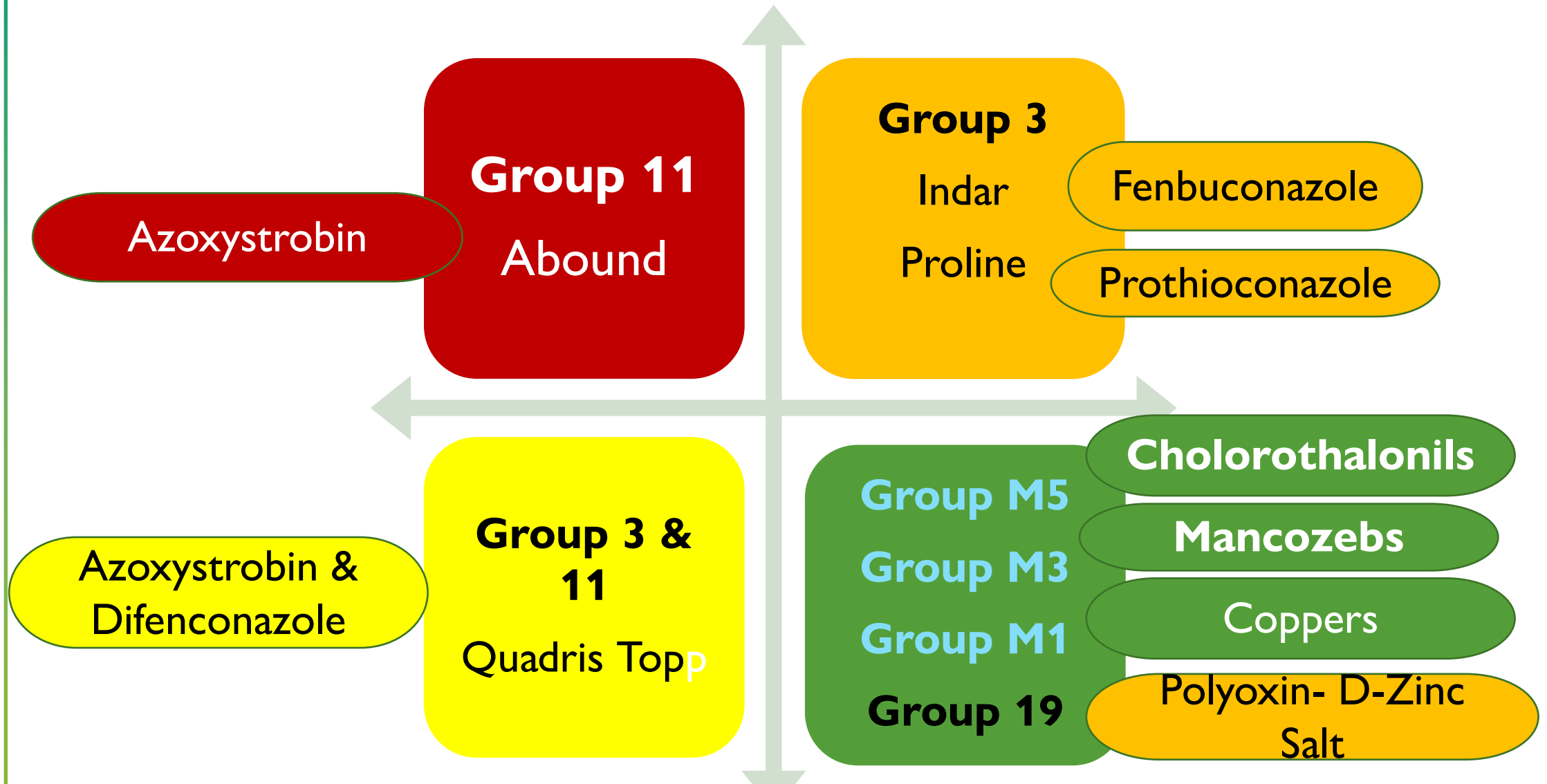
What Management Strategies Do We have?

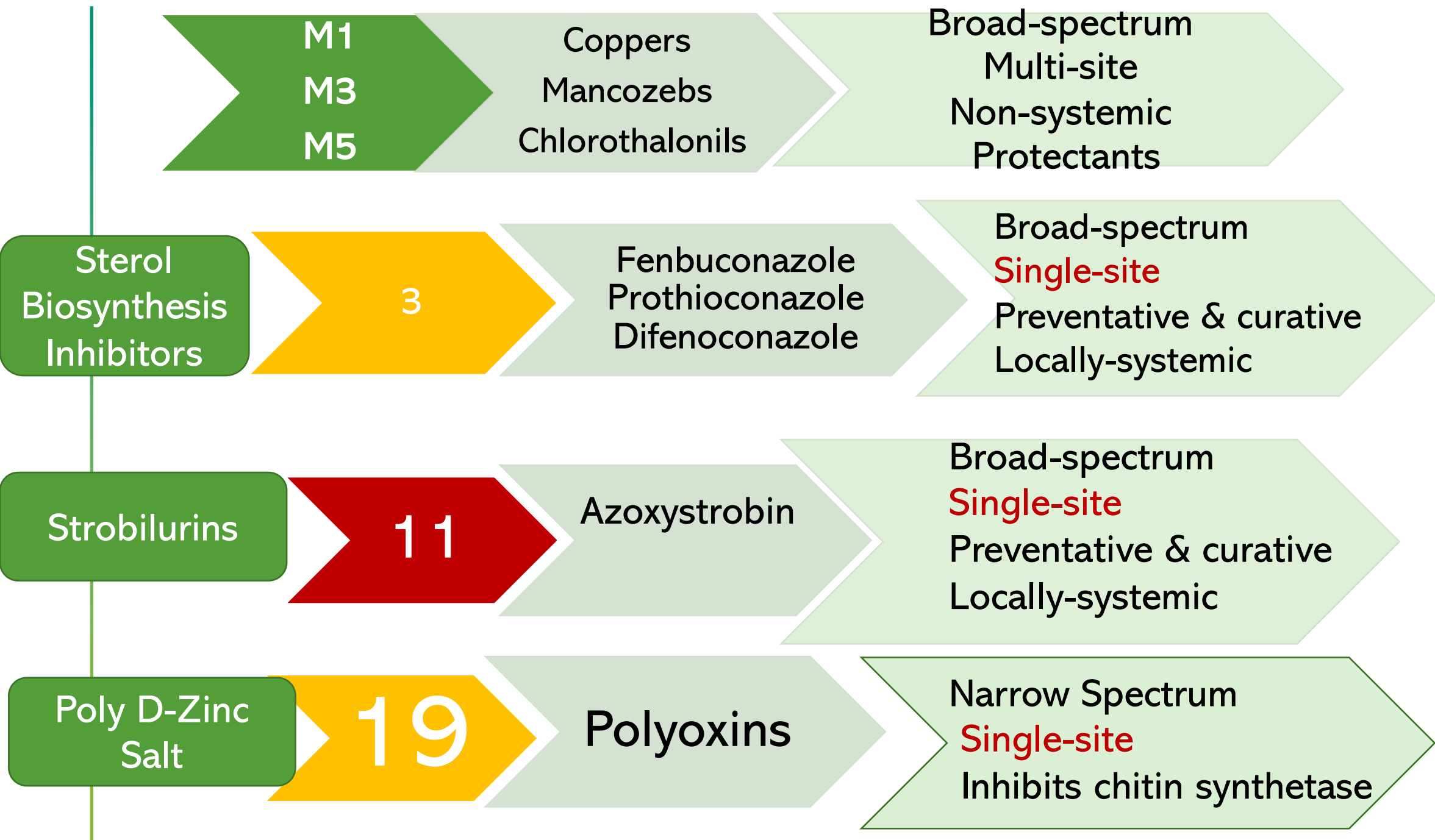


Chemical Control

- Always read the label and communicate with handlers for making fungicide decisions.
- Restrictions/recommendations may differ
 - Among handlers.
 - Export vs domestic product.
 - Your bog location

Cranberry Fungicides





Fungicides	Trade Names	Resistance Risk	Comments
Chlorothalonils	Bravo, Echo, Equus, etc.	Low	Check with handlers for market restrictions.
Mancozebs	Dithane, Manzate, Penncozeb, etc.	Low	Check with handlers for market restrictions. Anecdotally believed to have a negative effect on fruit color. In 2019 trials, we did not observe any negative effects on color in Stevens.
Coppers	Mastercop Badge X2 Champ Kocide 3000, etc.	Low	Limited research data available. Coppers could serve as resistant management tools while efficiently managing fruit rot if used as part of a fungicide program with other fungicides. More effective if used later in the season (late bloom).
Difenoconazole + Azoxystrobin	Quadris Top	Medium	
Prothioconazole Fenbuconazole	Proline Indar	Medium	For best results and resistance management, use during bloom and combine with azoxystrobin.
Azoxystrobin	Abound, AFrame, Satori	High	For best results combine with prothioconazole or fenbuconazole.
Polyoxin-D zinc salt	Oso and Ph-D	Medium	Limited research data available. For best results alternate or incorporate into a program with other fungicides for fruit rot.
SDHI, plant extracts	Kenja, Regalia, etc.		Limited research data available.

• PRESERVE THE EFFECTIVENESS AND DURABILITY OF REGISTERED FUNGICIDES

- Repeated and infective use leads to resistance.
- Follow all label instructions.
- Alternate or mix fungicides with different modes of action.



Resistance monitoring

Resistance management

Simultaneously evaluate
fungicides with different
modes of action

Efforts to expand our tool box:

Group 7, Group 9 and Group 12

Well-timed applications are key..

- **Bloom & Early fruit set** are susceptible.
 - Monitor bloom on a regular basis and plan fungicide applications.
 - Avoid sprays when pollinators are working whenever possible.
-

THERE IS NO SUCH THING AS A ONE-SIZE-FITS-ALL APPROACH IN FRUIT ROT MANAGEMENT

High- Moderate

4 to 5 applications

- High prior fruit rot incidence.
- Susceptible Varieties.
- Newly established beds.

Moderate

3 applications

- Moderate fruit rot incidence.
- Resistant varieties.

Low

0 to 2 applications

- Low fruit rot incidence.
 - Resistant varieties.
-

· PLAN AN EFFICIENT MANAGEMENT PROGRAM ·

- Focus on integrated disease management strategies.
 - Choose the right fungicide
 - Do not use a fungicide at less than the registered rate
 - Aim for uniform coverage
 - Apply at the right time
 - Apply materials with low phytotoxicity during fruitset
 - Always read the label and communicate with handlers for making fungicide decisions.
-

Please contact me...

If you need assistance with

- Choosing fungicides
- Monitoring Bloom and Timing fungicides

If you suspect fungicide resistance

Or have any disease related questions.

Contact: Cranberry Station (x 18)
suppala@umass.edu
334-728-1025