Winter 1-2021

2021 Update Mtg: Optimizing Fruit Rot Management

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OPTIMIZING CRANBERRY FRUIT ROT MANAGEMENT

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UMass Cranberry Station
1-26-2021

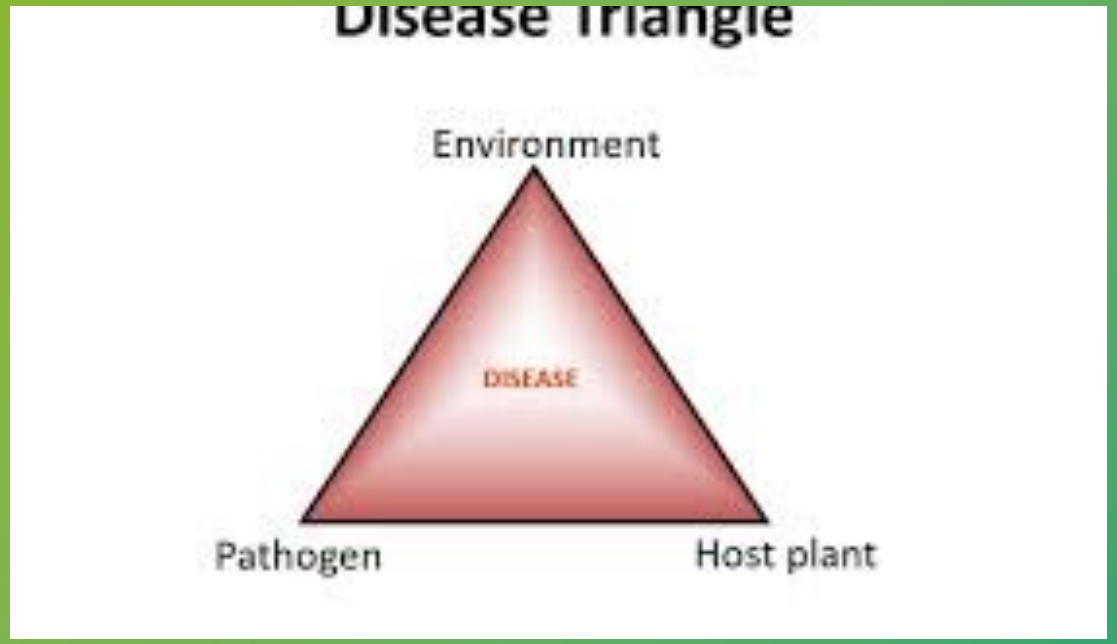
Outline

What Causes Fruit Rot?

What Management Strategies Do We have?

Why and How to Optimize the Management Strategies?

Ongoing and Future Research Studies



What Causes Fruit Rot?

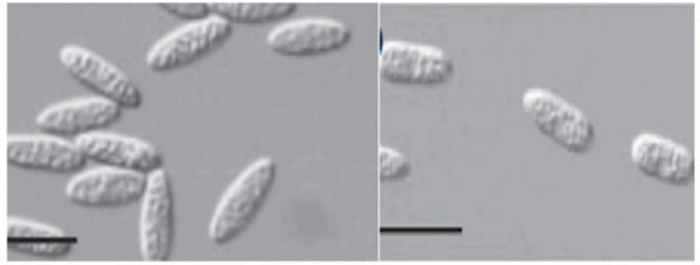
- A "disease complex" caused by multiple, interacting factors which are not fully understood.

Pathogen

Field rot fungi are reported to infect early in the growing season and remain latent until fruit begin to ripen.

Allantophomopsis spp.

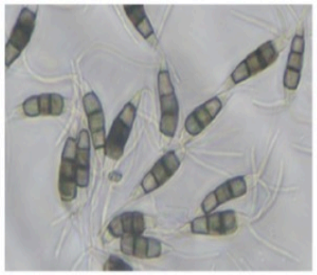
Coleophoma empetri



Colletotrichum spp.

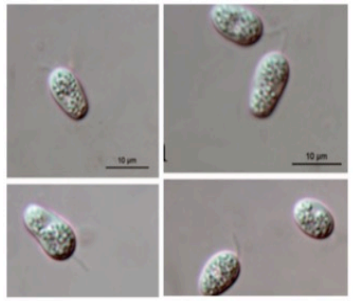
Epicoccum spp.

Fusicoccum putrefaciens

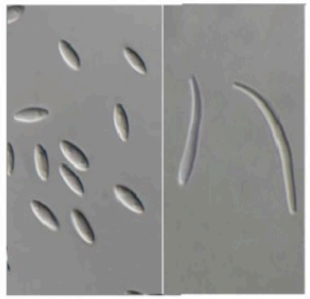


Pestalotia vaccinii

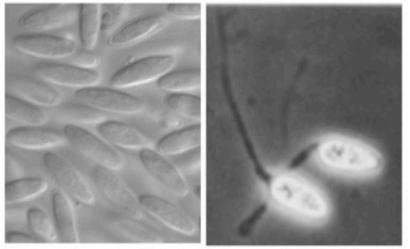
Physalospora vaccinii



Phyllosticta vaccinii



Phomopsis vaccinii



Botryosphaeria vaccinii & *Phyllosticta elongata*

Susceptible Host

- Canopy density
- Air circulation
- Vine health
- Level of resistance

Susceptible Host

Highest field rot resistance	Moderate field rot resistance	Lowest field rot resistance
Scarlet Knight, Mullica Queen, Howes, Haines, Black Veil	Stevens, Crimson Queen, Demoranville, Early Black	Ben Lear

Favorable Environment

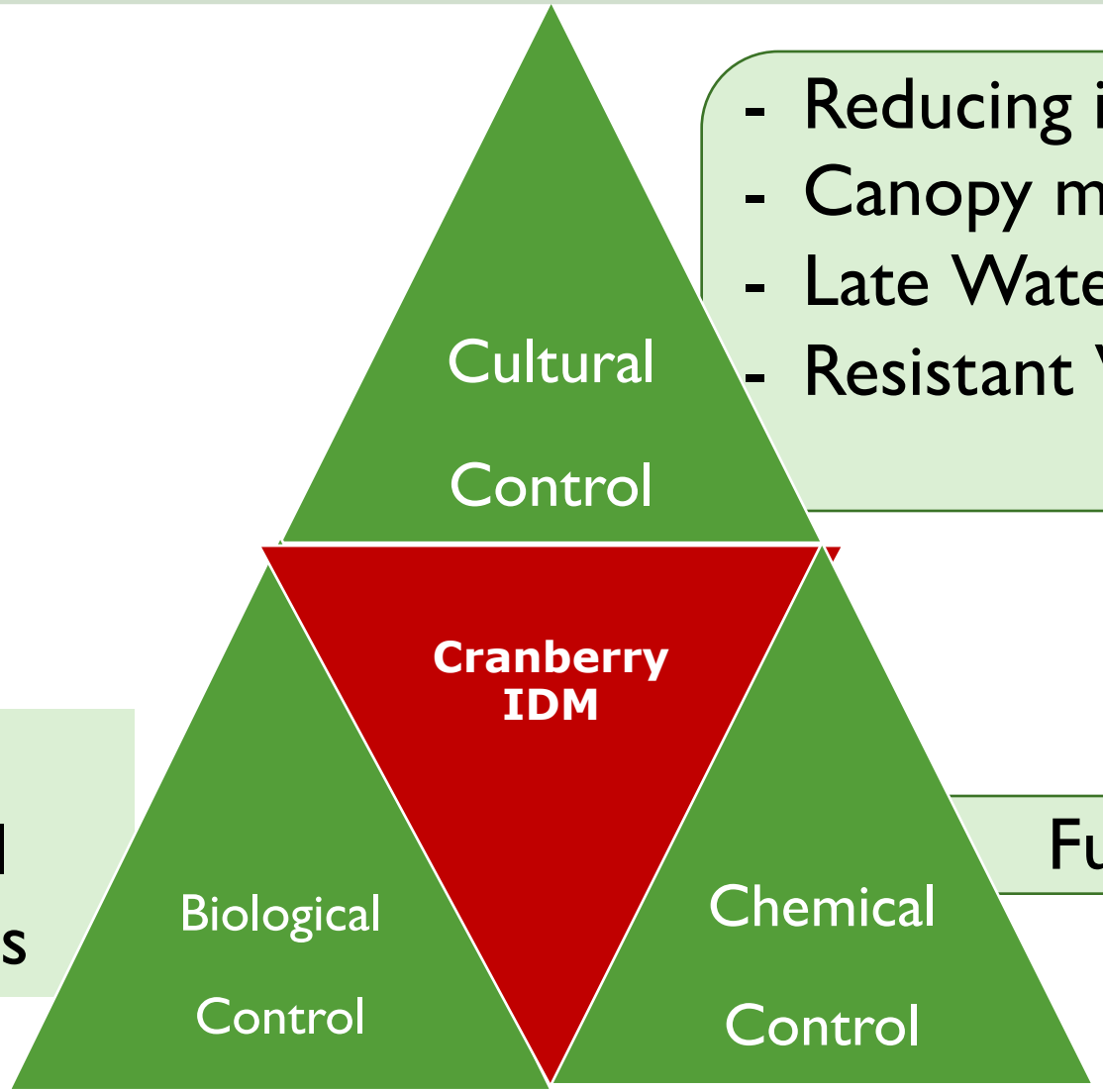
Weather - the most important variable that affects the amount of rot that occurs.

- Temperature
- Humidity
- Rainfall
- Hailstorms

Local microclimatic variations

- Density of vine
- Drainage

What Management Strategies Do We have?



- Reducing inoculum levels
- Canopy management
- Late Water
- Resistant Varieties

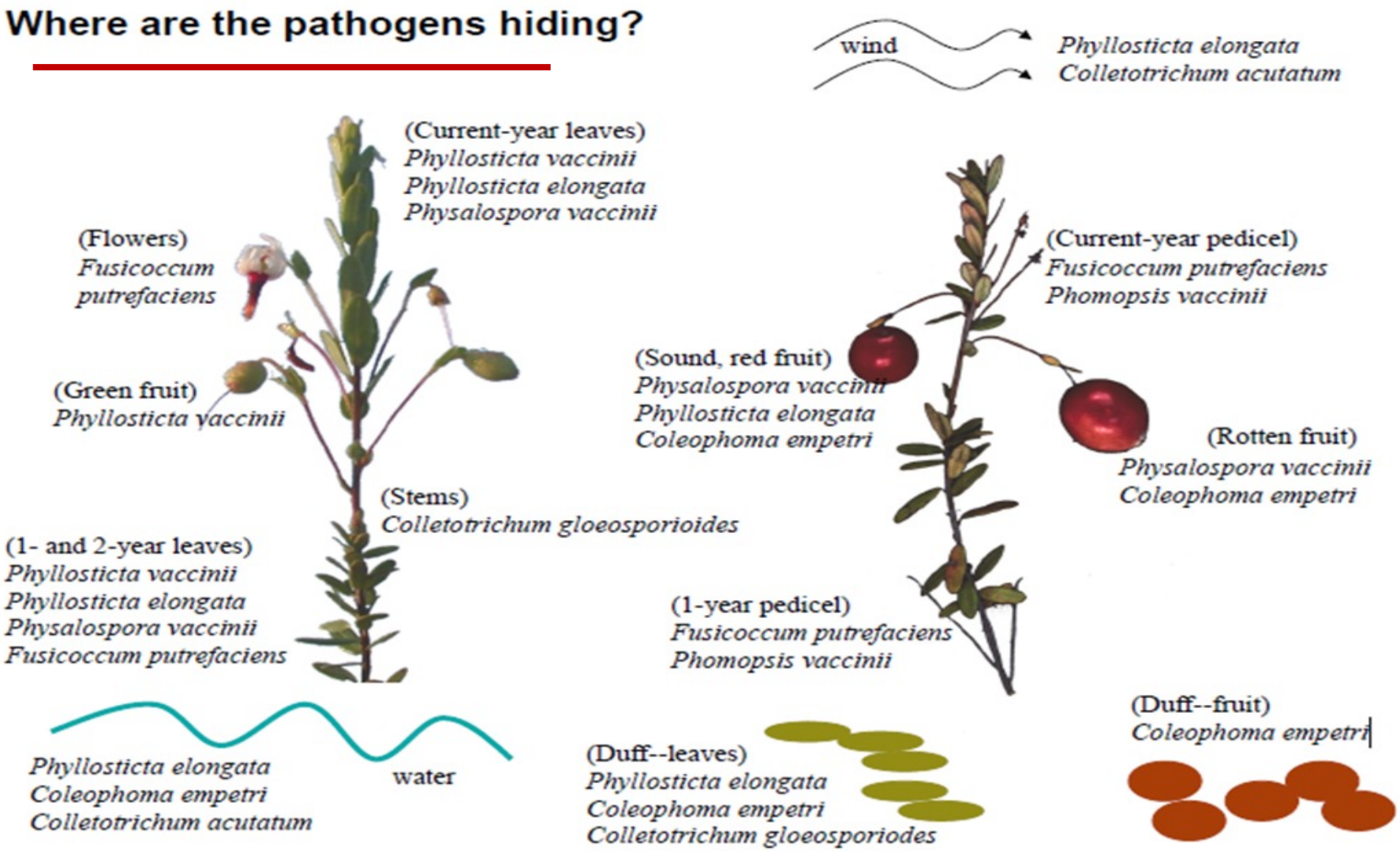
Using beneficial microbes & OMRI approved products

Fungicides

Cultural Control

- Canopy management – pruning, sanding, late water improved air circulation & rapid drying
- Reduce inoculum/Sanitation
- Minimize plant stress or lush growth
- Minimize mechanical injury to fruit during dry harvesting

Sanitation/Reducing Inoculum



Cultural/Sanitation- Trash Removal

- Remove trash from water harvested beds during harvest or as soon after as possible.
- If beds are dry harvested – remove trash with a post-harvest flood in the fall or from the winter flood before it is withdrawn.
- Trash piles should not be left next to the bed – should be moved at least a quarter mile away.

Cultural Control

Late Water –

- Mid April to Mid May.
- Once in three years.
- Bloom will be compressed into a shorter time period.
- Fungicides may be eliminated on processed-fruit beds if keeping quality is forecast to be good.
- Use reduced recommended rate and less number of applications during the late water year and the following year.
  - If one application to be made- apply at 50% bloom.
  - If two applications are to be made- at 10% bloom and two weeks later.

Cultural Control

Second year after LW has been held:

No. of fungicide applications and rates should be increased to a normal schedule

Late Water in Newly Planted Beds: (one- or two-year-old bogs)

- will help prevent inoculum buildup
- help the vines spread over the surface of the soil
- slow down weed growth

Management after the LW flood is withdrawn

- **Irrigation:** No need to irrigate (unless protecting for frost) for at least 2 weeks after the LW.
- **Frost protection:**

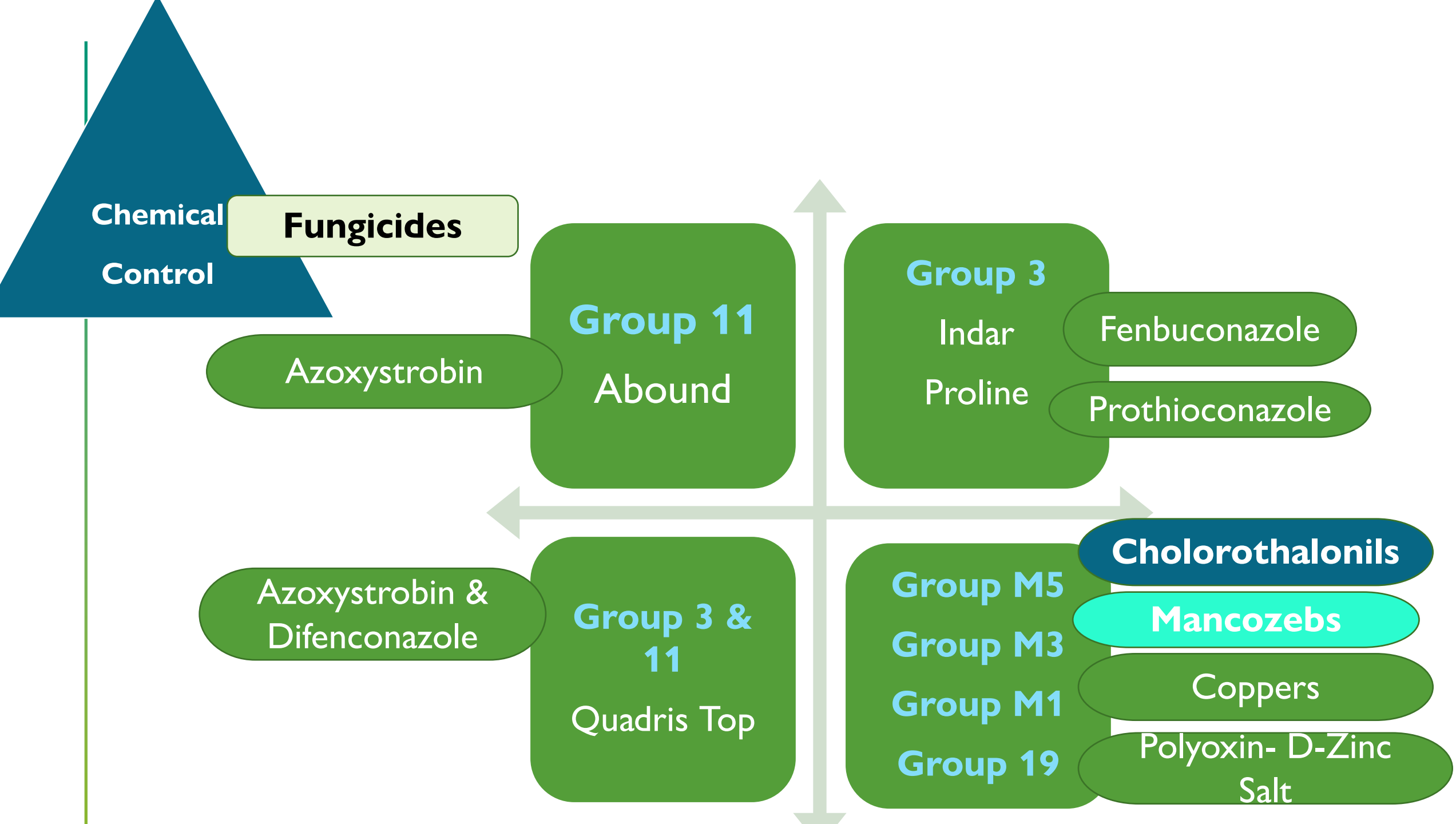
  1-2 weeks flood : Protect the bogs for 27˚F

  > 2 weeks flood : Protect the bogs for 30˚F

- **Fertilizer use:**

  < 3 weeks flood : standard fertilizer regime

  > 3 weeks flood : Reduce N dose (30-40%) to avoid overgrowth


Chemical Control
Fungicides
Group 11
Abound
Azoxystrobin
Group 3
Indar
Proline
Fenbuconazole
Prothioconazole
Group 3 & 11
Quadris Top
Azoxystrobin & Difenconazole
Group M5
Group M3
Group M1
Group 19
Cholorothalonils
Mancozebs
Coppers
Polyoxin- D-Zinc Salt

FRAC Grouping

- The Fungicide Resistance Action Committee (FRAC) developed a code of numbers and letters that can be used to distinguish the different fungicide groups based on their mode of action.

Mancozeb

- World's Second leading fungicide
- Annual total consumption: 166000 tons and
- Annual sales of US1.03 billion.
- For the first time in 20 years, EU is considering banning a substance.

Mancozeb: Facing regulatory challenges

Aug. 26, 2020

Experts from EU Member States support ban on highly toxic pesticide mancozeb Brussels, **26/10/2020** (**Agence Europe**) Experts from the EU Member States, meeting in the PAFF Committee on Friday 23 October, supported the **European Commission's proposal not to renew** the authorisation for mancozeb, a highly toxic pesticide active substance.

AGENCE EUROPE - Experts from EU Member States support ban ...

agenceurope.eu/en/bulletin/article/12589/23

IF Manzate is still available….and your Handler allows

Timing- Early to Mid Bloom

- Addition of spray adjuvants will improve distribution and deposition for mancozeb compounds.
- 30 day PHI.
- 24-hr to 48-hr REI.

IF you chose to use chlorothalonil after discussing with your Handlers….

- Apply during EARLY-MID BLOOM (10-50% bloom).
- Do not use a spreader sticker (adjuvant) with chlorothalonils.
- Limit to a maximum of 3 applications per season.
- If a Bravo application was used for upright dieback control, only 2 applications are allowed for fruit rot.
- 12 hour Reentry Interval (REI).
- Hold water for 3 days after each application.
- 50 day pre-harvest interval (PHI).

Dow AgroSciences

Indar™ Fungicide

GROUP	3	FUNGICIDE

Group 3
Timing- Early to Mid-bloom

Indar 2F @ 6-12 fl oz/acre

- Fenbuconazole fungicide
- No more than 2 applications due to resistance concerns.
- Do not use prior to bloom.
- 30-day pre-harvest interval (PHI).

Group 3
Timing- Early to Mid-bloom

Proline 480SC @ 5 fl oz/acre

- Prothioconazole fungicide
- No more than 2 applications.
- 45-days pre-harvest interval (PHI).

Group 11
Timing- Early to Mid-bloom

Abound @ 6-15.5 fl oz/acre

- Azoxystrobin fungicide.
- No more than 2 sequential applications due to resistance concerns.
- Hold water for 14 days.

Group 3 & 11
Timing- Early to Mid-bloom

Quadris Top® - 10-14 fl oz/acre

- Combination of azoxystrobin and difenoconazole.
- 30-days pre-harvest interval (PHI).
- 12-hour Reentry Interval (REI).
- Apply on a 7-14 day interval.
- No more than 2 sequential applications before alternating to a fungicide with different mode of action.
- Hold water for 14 days

FRAC Group 19
Timing – Early to Mid Bloom

- **Polyoxin-D Zinc Salt – Oso, Ph-D.**
- No more than 6 applications of Oso or 3 applications of Ph-D when using maximum rate.
- Limited Research on efficacy.
- For best results, alternate or incorporate into a program with other fungicides for fruit rot.

Group M1
Mid – Late Bloom (>50%)

Copper Fungicides

Examples: MasterCop and Kocide

- Do not mix copper fungicides with insecticides.
- Do not tank mix with Aliette or phosphites unless spray solution has been buffered first.

Why and How to Optimize the Management Strategies?

Why to Optimize Fruit Rot Management Strategies

MRL restrictions/Loss of Key Chemicals

Fungicide resistance issues

Failures in fruit rot control

Loss of yield

Increased cost of cultivation

How to Optimize the Management Strategies?

Plan an efficient chemical control program

- 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.

CHOICE OF FUNGICIDE

FRUIT ROT FUNGICIDE EFFICACY

	Fungicide	Trade Names	Comments
High efficacy ↓	Chlorothalonil	Bravo, Echo, Equus, etc.	Check with handler for market restrictions.
	Mancozeb	Dithane, Manzate, Penncozeb, etc.	May delay fruit color. Efficacy comparable to chlorothalonil. Low risk of resistance. Should be used as a resistance management tool if using 'newer' fungicides (see resistance management section). Restricted by some handlers.
	Prothioconazole Fenbuconazole	Proline Indar	Moderate risk of resistance. No more than 2 applications recommended. For best results and resistance management, use during bloom and combine with azoxystrobin.
	Azoxystrobin	Abound, Satori	High risk of resistance. No more than 2 applications. For best results combine with prothioconazole or fenbuconazole.
	Polyoxin-D zinc salt	Oso and Ph-D	Moderate risk of resistance. Maximum of 3 Oso applications or 6 Ph-D applications. Limited research on efficacy of polyoxin-D fungicides in MA. For best results alternate or incorporate into a program with other fungicides for fruit rot.
Low efficacy	Ferbam, Coppers, SDHI, plant extracts	Champ, Kocide, Kenja, Regalia, etc.	Limited research on efficacy of Kenja and Regalia in MA. These products were not effective against rot in 2016 trials. It is possible that better results could be obtained if alternated with other fungicide products with higher efficacy ratings.

Well-timed applications are key..

- Bloom & Early fruit set are susceptible to infection.
- 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	Moderate	Low
4 to 5 applications	3 applications	0 to 2 applications
- High prior fruit rot incidence. - Susceptible Varieties. - Newly established beds.	- Moderate fruit rot incidence. - Resistant varieties.	- Low fruit rot incidence. - Resistant varieties.

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

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

Sincere Thanks…

Cranberry Growers

The Center for Agriculture, Food and the Environment

USDA NRCS
U.S. Department of Agriculture
Natural Resources Conservation Service

The CRANBERRY INSTITUTE™