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Comparison of all registered demethylation inhibitor fungicides for efficacy against mummy berry disease of blueberry

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Objective: Determine whether multiple EPA-registered demethylation inhibitor fungicides have differential efficacy when used against mummy berry disease of blueberry

Justification and Potential Benefits:

Mummy berry (caused by the fungus *Monilinia vaccinii-corymbosi*) is a persistent problem of blueberry production in the Southeast and nationwide. The disease is firmly established in Georgia and North Carolina, two states with significant blueberry acreage. The economic importance of mummy berry disease is due to the fact that marketing organizations have a very low tolerance for mummified fruit (the result of flower infection by *M. vaccinii-corymbosi*) in the harvested product (Fig. 1). In addition, blighted blossoms and shoots can result in direct losses, sometimes approaching 90%, during bloom (Fig. 2). Clearly, blueberry producers need to have an effective management program in place to avoid major losses.

Though cultural control methods have limited impact, mummy berry can only be controlled effectively through use of fungicides. Fungicide applications should be started at green tip or when flower buds swell and continued on a regular interval until all the petals have fallen from the flowers. Chemical control options against mummy berry disease are still somewhat limited. The primary fungicide classes include demethylation inhibitors (Indar, Orbit, Proline, and Quash) and the combination of a quinone outside inhibitor and succinate dehydrogenase inhibitor fungicides (Pristine). Rotation of these materials is an important resistance management tool. However, with the registration of four demethylation inhibitors (DMIs), the question does arise as to which one is the most efficacious; this can have a direct result on both resistance management and cost effectiveness. In this grant, we proposed that these materials be compared directly to each other for efficacy against the blast and mummy phase of the mummy berry disease.



Figure 1. Mummified blueberry fruit observed prior to harvest. Infected fruit will often abscise, but some fruit will make it to the packing line, especially partially mummified fruit, and this causes issues with the packing line and results in potential customer complaints.



Figure 2. Early-season symptoms of mummy berry strikes. Mummy berry spores can infect young tissues of leaves, blooms, and stems, causing extensive damage and losses.

Methods: Fungicides tested and spray application timeframes were as presented in the below treatment regimen.

Treatment Regimens:

	Mummy Berry Sprays			
	Green Tip (or early bloom)	Bloom Sprays (10-20% bloom)	Bloom Sprays (full bloom)	Late bloom
1	NO FUNGICIDE			
2	Indar 2F @ 6.0 fl oz/A	Indar 2F @ 6.0 fl oz/A	Indar 2F @ 6.0 fl oz/A	Indar 2F @ 6.0 fl oz/A
3	Proline 480 SC @ 5.7 oz/A	Proline 480 SC @ 5.7 oz/A	Proline 480 SC @ 5.7 oz/A	Proline 480 SC @ 5.7 oz/A
4	Quash @ 2.5 oz	Quash @ 2.5 oz	Quash @ 2.5 oz	Quash @ 2.5 oz
5	Orbit @ 6.0 fl.oz./A	Orbit @ 6.0 fl.oz./A	Orbit @ 6.0 fl.oz./A	Orbit @ 6.0 fl.oz./A
6	Luna Tranquility @13.6 oz/A	Luna Tranquility @13.6 oz/A	Luna Tranquility @13.6 oz/A	Luna Tranquility @13.6 oz/A
7	Propulse @13.6 oz/A	Propulse @13.6 oz/A	Propulse @13.6 oz/A	Propulse @13.6 oz/A
8	Pristine @ 23.0 oz/A	Pristine @ 23.0 oz/A	Pristine @ 23.0 oz/A	Pristine @ 23.0 oz/A
9	Quilt Xcel @ 21.0 fl.oz./A	Quilt Xcel @ 21.0 fl.oz./A	Quilt Xcel @ 21.0 fl.oz./A	Quilt Xcel @ 21.0 fl.oz./A

Treatments were evaluated for control of mummy berry in an experimental block of a mature (>20 yr) rabbiteye blueberry variety ('Tifblue') located near Toccoa, GA. All products were foliar-applied with a 3-gal pump sprayer (35 gal/A spray volume). Application dates were green tip (15 Mar), 10-20% bloom (24 Mar), full bloom (29 Mar and 5 Apr), and late bloom (10 Apr). Six replications of each treatment were applied to a randomized complete block design, with each plot consisting of one bush; unsprayed bushes were left between each spray bush. All cultural practices were in keeping with blueberry production methods commonly observed throughout the Southeast. At the full bloom stage, all of the leaves/blossoms in each plot were evaluated for disease severity through counting the total number of strikes per bush. At the late green berry stage, 100 asymptomatic fruit were harvested from each plot for mummy berry assessments; each fruit was dissected and presence of fungal colonization of locules (+ or -) was recorded.

Results: Unfortunately, no disease was observed at this site. This has been an extremely "hot" site for multiple trials, but environmental conditions did not allow for infection in 2016. We will attempt a second trial in 2017, hopefully with better disease levels and good data.