Mildew Task Force
Meeting Notes November 28, 2016

Present:

Mike Flynn	Paul Fleming	Eric Schwartz
Josh Roberts	Ramy Colfer	Mary Zischke

- The next update for the larger group will be *Thursday, January 12, 2016.* Mary will talk to S. Klosterman, S. Koike, and K. Subbarao about giving an overview presentation on their work to date. She feels they are best suited to handle any research.
- Eric heard back from Dr. Michelmore. He felt that Charles Brummer, Director of the Plant Breeding Program at UC Davis, is better suited to help us on mildew. We set up an introductory conference call for interested parties Friday, Dec 2 at 9am.
- Researchers will need a more complete picture of what varieties exhibit what problems and where. Processors have the structure in place now to track varietal performance by area quicker than individual growers rolling something up. Growers may not have the complete picture in terms of how market demand impacts yields.
- We need to understand why the seed companies don't accept any evidence that the "o" spores in, or on the seed can be a source of mutation and infection. They would argue DM is airborne and in the soil already. However, clean seed might stop the next race mutation so we can focus on the current races.
- Q - a project two years ago tested inbound seed lots and found 16% of the seed lots had spores (it did not reveal what percentage of the seeds within a lot were infected). That 16% could introduce infections into the soil. We already know a very small infection can replicate throughout the crop very quickly. How do we get the seed companies to replicate the 84% into all seed so everything is clean? Does the 16% fall into race 10 and above?
- Q-Since DM is a watery mold, drier field conditions are always better than wet. Is there a way to use wind generation like the fruit guys do for frost?
- Q-is there any predator organism for this pathogen that we can use (similar to the IPM programs)? There are bacilli that attack the organism and disrupt the disease cycle.
- Literature suggests the spores can survive up to 14 years in soil if conditions are right. The conditions in Yuma are far from right and there is a seasonal break in the disease cycle.
- One grower has been testing coating seed with bacillus to use the seed as a delivery system. When we catalogue research it would be helpful to separate data into the points of entry (seed, soil, and leaf). Next we should separate the means of attacking it into chemical, physiological, and biological.

- There is no silver bullet. It will take parallel paths in seed treatment, disease cycle interruption, and cultural practices. We need to look at this like a HACCP program and attack all pathways.
- One consideration is to fund a dedicated farm advisor like a Koike.
- If the 24-hour test being developed can give a farmer even 1-2 days of prediction, they at least have some options.
- Spore trapping - since this is a 30-day crop you almost need to trap once a day. Need a leaf test that ideally tells you how many days are left, how early or late the sporulation is, and how predictive of sporulation. Important to start laying current weather conditions over the trapping since DM still needs the right conditions for sporulation.
- Trapping results vary by season and by area. It at least provides a quantitative number that tells us if the pressure is high or low. We could build a model over time if there is a feed back loop from growers. Wind speed also dictates spread.
- The traps themselves are around $1,000 each, but they cover a large area. It's the analysis that is expensive. Unlike conventional growers, organic fields don't move very often so data would be more easily gathered.
- Leaf wetness is the key to minimizing spread since it needs moisture.
- Processors would be a great clearing house for what is working in terms of varieties by area and what is not since many growers funnel through a few of them.
- Q-need to understand the desert outbreaks? This is a host specific organism, and Yuma is a high heat, dry, host free period. One processor had fields in their 5-year fallow program that had mildew on the first spinach crop.
- Need to look at all entry points in addition to seed like equipment, bins, totes, truck tires, etc.
- Q- Are the spores present at the start of an outbreak?
- Q-has anyone tested compost for "o" spores?
- Processors need to register opposition to the NOP considering that all seed be produced organically as well. Today that is not a requirement.

- <u>Follow Up</u>
- MZ and ES to talk about a way to approach seed companies. We need to determine once and for all if seed is a source or not.
- ES-set up standing monthly meeting starting Jan 12, 2017, Feb 6, 2017, and the first Monday of each month until further notice (2-4pm, GSA).
- MZ to line up Koike, Klosterman, and Subbaro for presentations on what they've done, and need for Jan 12.
- MZ and ES will put together a draft questionnaire for growers to answer what they don't know, what they need to know, and put to bed what we perceive that is wrong. This could be the basis for developing a cultural practices database.
- ES – will work on an excel spreadsheet so people can sort the questions.