

Mildew Task Force – Organic Spinach
Meeting Notes
May 16, 2017

- The cultural practices list contains only those best practices that growers feel are not proprietary (i.e. not included are proprietary mixtures of fungicides, seed varieties by area, soil additives, etc.)
- Cultural practice – undercut and then burn the field. Although not cheap, burning would at least ensure the pathogen does not have any plant material left to survive on after plowing.
- Cultural practice – clean the dust from the seed in the bag. In his random lot study SK found that if present, the oospores tend to be more concentrated in the dust. Over time and through handling the dust tends to settle to the bottom of the bag. This may explain the higher concentration of oospores in the bottom of the bag versus the top.
- The Yuma seed trial results that J. Correll published are for a point in time and place. They are not intended to speak for resistance of those varieties under all conditions or regions. Clean seed addresses one vector, but the mold can still travel a long way in the air.
- Seed transmission of downy mildew has already been published (1983 - “Seed Transmission of Spinach Downy Mildew”, Inaba, Takahashi, Morinaka, Ibaraki, Japan), (1918- Keimung der Oosporend “Germination of the Oospores”, Jakob Eriksson, Arkiv For Botanik, v.15). The German study included pictures of the mutation occurring (Klosterman presentation at LGRB symposium).
- A temperature variance of 3 degrees (C) can impact how the mildew survives and spreads. Ideally mildew likes 15-18 degrees (C) and since it is a water-based mold the drier the better.
- MZ will follow up with S. Klosterman to see if he can provide the varieties of the 130 random seed lots that he tested for oospores.
- Instead of focusing on the 16-21% that he and Correll found were infected is there a way to focus on replicating the other 80%?
- Most of the 133 random seed lots tested came from Denmark. No one expects distributors to just toss 20% of their seed (can we designate anything found for conventional until further notice?).
- Producers agree that if the NOSB requires organic seed for organic spinach there is no way to produce enough seed.
- Until further notice growers may want to consider asking for (0) levels of oospores in seed destined for new growing regions. Understanding that a standardized test does not exist today, S. Klosterman (USDA Ag Ctr) has offered to inspect seed lots in advance for oospores using a seed wash assay.
- Steam treating and hot water baths still present germination issues. The other challenge is that the seed has two natural coatings. If the oospores are under the

first coating, a surface treatment might not be effective. This is one reason washing sometimes produces more oospores from the second wash.

- If oospores are introduced into the soil, the first crop may not be infected. There are still many unknowns when it comes to the epidemiology of the pathogen. If we can understand the germination process we have a better chance of finding ways to disrupt it.
- Some considerations for developing a standardized test are varieties and temperatures. Slight variances in temperatures can change how the pathogen survives and grows. We have seen different rates of sporulation in the same race with just a 3-degree (C) change in temperature.
- Oospores will sporulate in a package if the temperature and moisture are right.
- MR - if growers would consider getting back to reporting by variety what races are developing, in what regions, and include environmental factors (temperature, moisture, etc.) seed producers would be able to accelerate resistance work.
- No new races between 95'-03'. Stopped using Apron in 04' and race proliferation took off from Race 4.
- UC Ag Extension lab should be better equipped today to handle samples. A couple of years ago it took too long to get samples through.
- RF – will talk to the Californian Seed Association at their next quarterly meeting about the technical committee elevating mildew and an approach for standardization of seed testing.
- We could also look to IST or AFTA to assist in standardization protocol. The group felt it was important to seek some outside help in standardizing a test, utilizing a qualified third party lab.
- Subbarao and Klosterman “early warning” study is still a year away from making any recommendations due to data collection needs.
- Next meeting we need to decide how far, or frequent (maybe every 8 weeks versus 5-6) to take this task force.
- Could we apply for a USDA “Specialty Crop Block Grant” to fund additional help for S. Koike, or bring on someone with his experience temporarily to be the technical driver of this process? The grant application process is in the fall. This group can only take things so far and we may be close to that already.

Next Meeting: Tuesday, June 27, 2017
Grower Shipper large conference room
2pm-4pm