

## Conference Call Notes – December 2, 2016

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- Overview: plenty of tools for conventional mildew control, but organics are challenged. We are focusing on seed, cultural practices, and curative measures. Success short term is an early warning system so we can harvest something. Long term we need a way to break the disease cycle and address the mutations. Need to put to bed the oospore on the seed issue.
- Background-Charley and Alan Van Dine have been funded the past 2-years by UC Davis, and to a smaller extent the Lettuce Research Board. Suggests we have a dedicated plant pathologist that has time and experience to look into broad based spectrum resistance. The current single resistance gene approach will not keep up with the speed with which the mutations occur. UC Davis looking at taking favorable traits from many smaller genes and combining them into resistance. Without breaking the disease cycle we will always be behind the race curve.
- He and Klosterman presented a project to look into the gene cycle last year but it wasn't funded. Important to understand why the plant has a hypersensitive response to the fungus. Looking at delaying the onset versus finding a gene resistant variety seems more possible but it takes a long time to develop. People forget the pathogen is becoming a big problem in other lettuce as well. Alan has the genome sequencing done.
- Q-when the plant is resistant what does that look like (from leaf to root system)? Per Charley, that is the question to answer. He does know the waxier the leaf the more resistant it seems to be.
- Q-when the plant is infected what does that look like?
- CB-Detecting the onset seems to be more realistic than a cure.
- Q-what is the effect of Salistic Acid?
- We need to also look at soil health, and microbes under ground. We know very little about plant health attributes.
- Q-what about quorum sensing? In order for microbes to develop biofilms, a certain number of members need to have a quorum. If the goal is to get the crop out earlier before you lose it, quorum route may be a way to go.
- Q-can we look at other crops related to spinach that have high levels of tolerance? Ans: we need to define what success is first. Immunity genes have been identified in lettuce (Michelmores study). There is a huge role to play but it's not a quick fix. Our best bet short term is cultural practices and early detection. Concurrently work through combining resistance genes.

- Q-anything new on the gene plasma development? Ans: spinach genome is sequenced. However, that was privately funded so those companies own the data. The findings will be released eventually.
- Q- is there a way to create an environment to allow the plant to resist the pathogen? Ans: there may be a way to breed higher resistance genes into the plant, and then trigger them with cultural practices. But that takes time. We have to be careful we don't make the plant so hypersensitive that it actually weakens the plant (rob "Peter" to pay "Paul").
- We need to break down the possibilities into physical, biological, and chemical components. Cultural considerations can include tractor speed, varieties, spray equipment type (need to get underneath), temperature, time of day, etc.
- We need all the different bias' (genetics, biological, mechanical) to come together to come up with comprehensive solutions.
- The solution needs to be commercially viable and affordable.