

Interview with Chino Farm

Tom Chino

On Thursday, October 11, team members visited Chino Farm in Rancho Santa Fe to discuss our project and its potential effects on the crops grown at the farm with the owner, Mr. Tom Chino. We specifically wanted to learn how often fungal crop failure occurs at Chino Farm, what the farm does to combat crop failure, their opinions on chemical and natural remedies to fungi-caused problems, and how our project could be applicable at the farm. From this discussion, we learned that fungal crop failure is more prevalent in the winter at the farm, and that fungi tends to target their strawberries and potatoes. We also learned that their cucumbers and melons have been affected by common mildew, and that the USDA visited their farm to find ways to make their crops more resistant to fungi. Tom told us of how Dr. Wesley Bohn introduced them to the first mildew resistant gene, PMR1 and PMR2, and how he introduced them to French breeders who provided them with seeds of plants that are resistant to mildew, which has helped them combat fungal crop failure. Tom shared how he believes using chemicals to treat crop failure is sometimes a “necessary evil,” and that he is interested in using organic remedies if they are scientifically proven to be the most effective ways of preventing crop failure. He also introduced us to the fact that some scientists have been using CRISPR to try and tackle fungal crop failure. Tom told us he believes our project could be helpful to their farm’s productivity, if we were able to ensure our chitinase’s effectiveness and eliminate unwanted consequences.

1. How often does fungal crop failure occur?

It normally occurs during the winter and affects our strawberries. We have had fungi affect our crops frequently before, especially our tomatoes and strawberries.

a. Is it usually because of bacteria or fungus?

Strawberries are very susceptible to *Botrytis cinerea*, that’s the name of the fungus. And tomatoes, if the conditions are right, are very susceptible to *Phytophthora infestans*, it’s a very common fungi. Cucurbitaceae, which include cucumbers and melons, are very susceptible to common mildew.

b. Have you ever come across a case? If so, can you describe it?

In the past, we’ve had cucurbitaceae that were very susceptible to common mildew, and they did research here (the USDA) to find which things could be combatted.

2. Do you currently have methods of combating and preventing crop failure from fungi?

So tomatoes have also been affected by common mildew, and they have to be treated with sulfur and some organic chemicals have had to be used.

A very famous scientist -- his name was Wes Bohn, he retired from the USDA -- he came to help us do work to find resistance to these fungal diseases, so he was a great help.

a. Did he use a certain chemical?

He's famous for developing the first resistant gene to mildew, which is called PMR1 or PMR2, it's the common mildew resistant gene. So he did the initial work, and then he introduced us to other species of fungus that had common mildew characteristics, and we use these genetic methods, we don't have to spray our crops with anything.

[The scientists] made us aware that this gene existed, and he is actually a plant pathologist. We have not actually implement the gene into our crops ourselves, since to do that kind of work, you have to have very purebred lines, and we don't have that kind of high expertise, the plant breeders do that.

A French breeder directed us to another French breeder and we got the seeds of the plants resistant to this gene from her.

3. How effective are these methods?

Oh they're very effective.

What is your view on chemical bactericides?

Sometimes they're a necessary evil. Our jobs as farmers is to protect the environment while also growing things that are healthy for people, but sometimes without using chemicals we are unable to grow certain crops.

4. Would you prefer natural remedies over chemical ones?

If they were effective, yes. There would have to be scientific evidence proving these remedies were effective in order for us to use them. I have also been interested in learning about CRISPR techniques to tackle crop failure.

5. Do you think our project could be applicable to your farm's productivity?

Yes, I think if there was a way to ensure the chitinase's effectiveness and eliminate the possible unintended consequences, it could help us.