

Interview
Professor Eric Schmelz
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1. Specifically, how do fungi affect the growth of plants?
 - a. The effect of fungi on the growth of plants varies. Some can be deadly and directly target the root of the plant which slows down the growth significantly. But for some, the effect can be very positive and the plant won't be able to grow without the help of those fungi.
2. Were there any cases in the past where specific fungus or bacteria seriously endangered certain types of plants? How did we overcome the threat?
 - a. There were many cases in the history where the fungus or bacteria seriously endangered certain types of plants. For example, the Irish potato famine can be one of them and in that outbreak, people dealt with it by abandoning their farms and leaving the land. Even now this practice is common throughout the farm regions of the South America. Another way to more effectively resist the threat is by creating resistance to the infection and create diversity in the plant like what we are doing.
3. If we develop this treatment and implement it to the crops or plants that people consume, will there be any ethical issues? And how would scientists address those issues?
 - a. When we are experimenting with food that people consume, it is critical for the people to know what they are intaking. There are millions of so called jumping genes which are dead, transposable genes that can be altered to our benefits, but even inserting a single different genes can cause discrepancy with 2-3% of the population which will hurt both the maker and the consumer. The maker will probably be sued and lose tons of money while the consumers will suffer from their body's reactions. Aside from these considerations, there are political and religious concerns that we cannot address.
4. We would like to experiment with mutations and hope to evolve some genes in chitinase. Do you have any suggestions for us in terms of lab work?
 - a. Production of chitinase genes through transformation can be very effective. Extracting the best enzyme out of the experimented conditions (aka Enzyme evolution) is the best way to find the best enzyme. However fungi can still be resistant to the chitinase due to their ability to shield themselves against chitinase which is called isolation. If you refer to specific government websites, they have

collection of all the genes that they have experimented with and from that we might be able to find the best strand of chitinase sequence. Since there is this resource, we can utilize it in our studies. Nature has also experimented with chitinase evolution over hundreds of years and that can also be our resource in finding the best strand of chitinase aside from our bacterial evolution experiment.