Freezer Spinach Questions

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From: Mary Zischke <MaryZ@calgreens.org>
Date: 11/21/2016 12:29 PM (GMT-06:00)
To: ericschwartz.oms@comcast.net, mikethewormguy@aol.com
Subject: RE: Questions

Mike and Eric,

There is good evidence that the faster a diseased field gets disked, the better, because it destroys inoculum (asexual spores) that would otherwise become airborne and act as a source of infection in other fields. Those spores are relatively delicate and would be largely destroyed by ground work, dry soil conditions and long-term exposure to UV light. We don't think the baby leaf growing cycle is long enough for oospores to develop. Oospores, the result of the sexual phase, have the durable shell that makes them long lived in soil and on seed. Bunched spinach could be another story. With its longer growing cycle, there is time for oospores to develop. As far as I know, there are limited reports of oospores forming in spinach tissue in California. It takes both mating types and no researcher I know of has investigated what D.M. races are what mating type. From our work on lettuce D. M., we know that we only found one mating type the vast majority of the time for over thirty years. Now, they are routinely picking up both mating types for lettuce D. M. and that is part of the reason we are seeing it become more of a problem in organic lettuce production.

There has been work done by the USDA that shows that mildew-infected lettuce tissue is more conducive to E. coli setting up shop. The same could be said for many bacteria because the mildew results in "leaky cells" in the host that provide a source of nourishment for bacteria. The experiments were done using very high inoculum levels of the E. coli, so the results were not surprising. I'm sure they could show the same thing on spinach and with additional species of bacteria that are known foodborne pathogens. I like to point out that if spinach D. M. and E. coli were truly linked, we would see more frequent outbreaks, given that D. M. is so prevalent in spinach production.

Regarding other plant pathogens, since D. M. is an obligate parasite, it tends to attack healthy tissue. It is the first to colonize and other pathogens tend to be secondary colonizers in its presence.

I don't know of any work done on the interaction of Cd and D. M. Is there any anecdotal info that says the mildew is worse or better on high Cd ground? Almost all of the ground in Salinas has some Cd, except on the east side, and I think we see mildew on all types of ground.

Q- do the fresh cuts on the spinach provide access to DM ? alot. of baby leaf is 2nd cut. for freezer.....

If there are infected leaves that are still attached to the plant after the first cut, they could be candidates for oospore production while the regrowth is happening for the freezer.
The cut edges are probably more of an issue for bacterial growth. Remember that the DM pathogen is an obligate parasite – it needs healthy cells to infect. Those cut edges are one of

the reasons that Food Safety Managers are goosey about using second cuts for salad. The broken cells provide an excellent substrate for bacteria. It's OK for the freezer because they have a kill step with the blanching process.