BY A.R. CHASE AND MARGERY DAUGHTREY

FIGHTING NOT-SO-BAD FUNGI

MLD: I've been thinking about parasites and saprophytes, the yin and yang of microbes in the greenhouse. All fungi sound scary to growers, but it is important for them to understand the difference. I like to define a parasite as an organism that steals its food from another LIVING organism — the white rust fungus, *Puccinia horiana*, for example, steals its nourishment from chrysanthemums and cannot live off of potato chips.

ARC: Wow! I don't think that many things outside of humans could live off of potato chips alone. Saprophytes could live off potato chips (if we got rid of the salt). They often live on decaying organic matter like dead leaves, algae and other microorganisms. I recently had a question about stopping a saprophytic *Trichoderma* from making spores when the plants were in storage where temperatures were moderate and moisture was high. The green growth was a problem for the customer even though it was not harmful to the plants themselves. So how often do you think saprophytes are as much of a problem for producers as parasites?

MLD: I think saprophytes are increasingly problematic, and it is a pity — they are just minding their own business, breaking down vegetable matter into soil, and sometimes we humans just don't like the way they LOOK. This kind of problem is encountered by businesses growing pet grass, for example, because people don't want to look at the mold that grows on the seed coats. And with micro-vegetables, a green or orange mold beneath the tiny plant canopy might upset a chef, even if it is growing only on the substrate and not threatening the plants or humans in any way. The customer is always right, but it can be complicated or impossible to alter the carbon:nitrogen ratio, the pH or the moisture level to manage such problems. In flowering plant production, too, molds can be a problem, though not a disease, on pots and growing media.

ARC: The cleaner we become growing our crops, the more of these saprophytes I am seeing. They grow on all surfaces, including the plants, and make everyone upset. One of the reasons appears to be the fact that using "sterile" substrates like rooting cubes allows the most tolerant and flexible saprophyte to get a foothold and take off. We used to caution growers about sterilizing instead of pasteurizing potting media to avoid the introduction and establishment of a parasite. Now we are seeing the saprophytes causing problems under very clean conditions, where there isn't much of a natural microflora. What do you think about using the microbial inoculants and biological control agents to keep things in check?

MLD: I have often wondered about this ... It seems like a great use for Trichoderma, Bacillus and Streptomyces biocontrol agents, to put them out as competitors for more conspicuous saprophytes. Sometimes it is a question of what colonizes the territory first. I have suggested that people try this, but I haven't gotten any grower feedback ... and I have not seen any experimental data. To get control, they will have to change something: e.g. the substrate (what the mold is growing on), the pH, the temperature, the moisture, the nitrogen or the microflora that is there — finding something to hog up the substrate so the ugly saprophyte doesn't grow so conspicuously. Sometimes disinfestants might work, and sometimes MORE microbes might be the answer.

ARC: I have done the same and have no idea if it will work either. I am just thinking when a simple chemical won't kill a saprophyte maybe a more complex approach will work. That is what got me thinking of another organism or even mixture of organisms. Maybe this is where compost teas, anaerobic soil disinfestation and complex blends like EM (Effective Microorganisms from Teraganix) may really play a role. When the simple-minded approach fails, try something more complex. Mimicking nature might help. For that reason, I am not feeling too positive about disinfestants since they just wipe the slate clean again, making another biological vacuum. Too bad this is being left up to trial and error by each grower. A concerted effort by researchers would be a big help.

MLD: True, but I would still rather face a saprophyte than a parasite any day: The parasites EAT your crop before your very eyes. If we had more people available for greenhouse pathology work they could turn their talents to outwitting saprophytes, but for now I think we'll have to keep focused on the contagious diseases that maim, disfigure and kill our favorite crops. g

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