Could you touch on the use of biological fungicides? I hear about them from time to time, and I am wondering what they are and what actually they do. Thanks.

The idea of using of biological fungicides to bolster plant health has been gaining interest in our area by both growers and vendors of agricultural products, and so it is probably a good time for us to broach the subject here in this space.

To be clear, biological fungicides should NOT be considered as alternatives to our current fumigation and other soil pre-plant preparation practices. They can however be considered as part of the equation in an integrated approach to maintaining yields as we transition away from methyl bromide.

Biological fungicides are most often commercial formulations of fungi such as *Trichoderma virens,* bacteria such as *Bacillus subtilis, Bacillus amyloliquefaciens* and actinobacteria such as *Streptomyces lydicus.* In berries, these are often formulated to be used as plant dips followed by regular applications of solutions through the drip irrigation system. Theoretically, these organisms colonize soil around the plant's roots, facilitating the collection of nutrients and in some cases offer a measure of root protection against pathogens.

In our research, we dipped the plants in a solution of water and the biological fungicide for a few minutes, removed the transplants and then let them set overnight before planting the next day. Follow up applications were made through the drip system on a monthly basis after that.

In our own UCCE trials, I have not observed much in the way of defense against pathogens with any of these materials, but have observed early plant response in strawberry from some of them, in particular with the use *Streptomyces lydicus.* Generally, plant response looks like significantly larger plants than those left untreated in the first few months after transplant, followed by two months of significantly higher fruit production, usually in the range of 10 to 20% than in an otherwise untreated crop. Later on in the season, from June on in strawberries, the effect of these materials has not been noticeable.

In short, my work on the use of biological fungicides over the past three years supports the idea that they can be part of a program of maintaining berry plant performance in the Pajaro Valley. If you have questions about this or other topics in berry culture, please contact me at Mark Bolda, UC Cooperative Extension, 831-763-8025 or mpbolda@ucanr.edu.