Title: Microbes associated with cacao-diseases and disease control

Speaker: Bryan A. Bailey, Sustainable Perennial Crops Laboratory, USDA/ARS/PSI

Abstract:
We have been studying the complex molecular interactions between cacao and the beneficial and detrimental microbes cacao encounters in the field. This work has focused on beneficial microbes in the genera *Trichoderma* and *Bacillus*. These beneficial microbes have the potential to protect cacao from pathogens including the frosty pod pathogen *Moniliophthora roreri* (Mr) and the witches' broom pathogen *Moniliophthora perniciosa* (Mp). The isolates of the *Trichoderma* and *Bacillus* studied are endophytes of the above ground tissues of cacao including leaves, stems, plumules, flower cushions, and pods. Some of these same isolates stimulate strong induced resistance responses when applied to pepper roots, yet the molecular responses in cacao remain muted and general in nature. Why this might be the case will be discussed. Mr and Mp stimulate a strong molecular response from cacao during infection and we are actively seeking to identify Mr and Mp genes important in pathogenesis and have initiated studies for characterizing genes critical to cacao disease resistance. Field studies using *Trichoderma* and *Bacillus* species to control Mr and Mp have given variable but interesting results bringing us closer to developing functional control of disease in the field. Results from our most recent 2 year study in Costa Rica using 2 *Trichoderma* isolates applied in varying formulations suggest we may be maximizing the disease control potential of *Trichoderma* against Mr and future research efforts will focus on reducing the cost of field application and considering the use of microbial combinations.