

Phenology of infection on apple fruit by sooty blotch and flyspeck species in Iowa apple orchards

ABSTRACT

Sooty blotch and flyspeck (SBFS) is a fungal disease complex that can cause significant economic losses to apple growers by blemishing the fruit surface with dark-colored colonies. Little is known about the phenology of host infection for this diverse group of epiphytes. In 2009 and 2010, we investigated the timing of infection of apple fruit by SBFS species in six commercial apple orchards in Iowa. Five trees in each orchard received no fungicide sprays after fruit set. Within 3 weeks after fruit set, 60 apples per tree were covered with Japanese fruit bags to minimize inoculum deposition. Subsequently, a subsample of bagged apples was exposed for a single 2-week-long period and then rebagged for the remainder of the growing season. Experimental treatments included seven consecutive 2-week-long exposure periods; control treatments were apples that were either bagged or exposed for the entire season. After apples had been stored at 2°C for 6 weeks following harvest, all SBFS colonies on the apples were identified to species using a PCR-RFLP protocol. A total of 15 species were identified. For the seven most prevalent species, the number of infections per cm² of fruit surface was greatest on apples that had been exposed early in the season. Two SBFS species, *Peltaster fructicola* and *Colletogloeopsis*-like FG2, differed significantly from each other in time required to attain 50% of the total number of colonies per apple, and analysis of variance indicated a significant interaction of SBFS taxon with exposure period. Our findings are the first evidence of species-specific patterns in timing of SBFS inoculum deposition and infection on apple fruit, and strengthen previous observations that most SBFS infections resulting in visible colonies at harvest develop from infections that occur early in the fruit development period. By defining taxon-specific phenological patterns of fruit infection, our findings, when combined with knowledge of region-specific patterns of taxon prevalence, provide a foundation for development of more efficient and cost-effective SBFS management tactics.

Keyword: Sooty blotch and flyspeck; Apple fruit; Iowa