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Impact of rainfall on epiphytic colonization of sugarcane by the leaf scald pathogen and associated plant infection

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Colonization of the sugarcane leaf canopy by *Xanthomonas albilineans* appears to be an important step in the epidemiological cycle of leaf scald disease in Guadeloupe. Previous studies showed that healthy sugarcane plants can be infected by *X. albilineans* after aerial transmission of the pathogen. Impact of climatic conditions on variation of colonization of the sugarcane leaf canopy and subsequent stalk infection by the pathogen is, however, unknown. Trials were set up in Guadeloupe in 3 different locations with cultivar B69566, susceptible to leaf scald, but still grown commercially in Guadeloupe. Disease-free tissue-culture propagated sugarcane plants were transferred to the field in 1999. Epiphytic populations of *X. albilineans* were regularly monitored for 3 crops (plant cane and two ratoons) by measuring bacterial populations in water droplets sampled from the sugarcane leaf surface. Infection of sugarcane stalks by *X. albilineans* was determined by isolating the pathogen from the stalk sap after 11-12 months of growth in each crop cycle. In plant cane, the first detection of the pathogen on the leaf canopy varied according to proximity of other sugarcane fields and climatic conditions. Additionally, once the leaf canopy was entirely colonized, epiphytic population sizes of the pathogen also varied between crop cycles and locations. Maximum population sizes were observed at the end of the wet season (November-December). These populations ranged from 2 to 10⁷ bacteria per ml of water droplet according to crop location and crop cycle. Bacterial populations on the leaf surface were correlated with total rainfall during the wet season (first half of the crop cycle) and percentage of stalk infection by *X. albilineans* varied in accordance with epiphytic populations of the pathogen. The amount of rainfall therefore appeared critical for the epiphytic phase of sugarcane leaf scald and subsequent stalk infection. If these results can be confirmed with other sugarcane cultivars, amount of rainfall could be used to predict stalk infection after aerial transmission of the leaf scald pathogen.