How Does Phloem Sap Composition Impact the Rate of Asian Citrus Psyllid Infestation and HLB Infection?

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Huanglongbing (HLB), more commonly known as Citrus Greening Disease, prevails in Brazil, China, and Southern areas of the United States. The Asian Citrus Psyllid (ACP) transmits Candidatus Liberibacter Asiaticus (Ca. Las), the bacterium associated with HLB, with Florida alone citing an estimated loss of over $4 billion over five years. Although HLB hasn't been found in Arizona, the ACP has been found in Arizona citrus groves. ACP has shown a preference for specific trees in a grove, while completely ignoring others. Herein, we explore the phloem sap composition of lemon trees in the same grove that are and are not populated with the ACP. Phloem sap was collected from the branches of trees that are both populated (psyllid positive) and unpopulated (psyllid negative) by the ACP. Gas chromatography mass spectrometry (GCMS) was used to separate and analyze the chemical components of the psyllid positive and psyllid negative saps. Several compounds of organic nature were found in each sample. In particular, Benzeneacetic acid was only found in the psyllid negative sap. Benzeneacetic acid is an antimicrobial plant hormone that has a distinct bitter odor, which suggests that it may effectively deter ACP infestation and HLB transmission. This raises the exciting possibility that topical application of benzeneacetic acid in citrus groves may be an effective deterrent for ACP infestation and HLB infection. The other compound of interest, coumarin, was only present in the psyllid positive sap, suggesting this sweet smelling compound commonly found in plants may attract the ACP.

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