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Journal

Journal of Citrus Pathology, 1(1)

Authors

Cicero, J. M.
Brown, J. K.

Publication Date

2014

DOI

10.5070/C411024842

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SEM- and TEM-informed anatomical observations of *Ca. Liberibacter solanacearum* (Lso) parasite localization in its psyllid host

Cicero, J.M. and Brown, J.K.

School of Plant Sciences, The University of Arizona, Tucson, AZ 85721 USA

With SEM, we studied external midgut surfaces of all potato psyllid instars, and, additionally with SEM and TEM, the anterior alimentary system of adults. The ontogenetically earliest point of Lso detection was in the 3rd instar, then in consecutively greater percentages of 4th and 5th instars, then in a lower percentage of teneral and mature adults. Two age-based patterns of proliferation were identified in the oral region of mature adults- streaming, in which Lso were confined to passageways, and diffuse, in which Lso occurred inside of, and around, cells of mouthpart components, muscles and epidermis.

The route(s) by which Lso access the immature and adult midgut and stylets are unknown and may be multidirectional. A continuum of proliferation occurred along the adult external midgut, along the external esophagus, inside the salivary glands, and inside the oral region, indicating that Lso can ‘strongarm’ the anatomy during parasitism, potentially reaching any region of it, so that at least some can access key oral loci to complete the circulative, propagative pathway.

The oral region houses the convergence of foregut, salivary duct and stylet canals. Apparently, acquisition involves circumventing its cuticular linings to access its lumina. Circumvention might occur at the ‘loadable’ section of the salivary glands, and/or, potentially, several oral loci where the cuticle is thin and weak. As most of its construction is poorly understood, transmission pathway studies depend on its elucidation. We used SEM, TEM and LM to identify and map it for associating Lso with named components.