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Sexual Transmission of a Plant Pathogenic Bacterium, *Candidatus Liberibacter asiaticus*, between Conspecific Insect Vectors during Mating

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Candidatus Liberibacter asiaticus (Las) is a fastidious, phloem-inhabiting, gram-negative bacterium transmitted by Asian citrus psyllid, *Diaphorina citri* Kuwayama (Hemiptera: Psyllidae). The bacterium is the presumed causal agent of huanglongbing (HLB), one of the most destructive and economically important diseases of citrus. In this study, we investigated whether Las is transmitted between infected and uninfected *D. citri* adults during courtship. Our results demonstrate that Las is sexually transmitted from Las-infected male *D. citri* to uninfected females at a low rate (4%) during mating. Sexual transmission was not observed following mating of infected females and uninfected males or among adult pairs of the same sex. Las was detected in genitalia of both sexes and in eggs of infected females. A minimum latent period of 7 days was required to detect the bacterium in recipient females. Rod shaped and spherical structures resembling Las were observed in ovaries of Las-infected females with transmission electron microscopy, but were absent in ovaries from uninfected *D. citri* females. The size of the rod shaped structures varied from 0.39 to 0.67 μm in length and 0.19 to 0.39 μm in width. The spherical structures measured from 0.61 to 0.80 μm in diameter. This investigation provides convincing evidence that a plant pathogenic bacterium is sexually transmitted from male to female insects during courtship and established evidence that bacteria persist in reproductive organs. Moreover, these findings provide an alternative sexually horizontal mechanism for the spread of Las within populations of *D. citri*, even in the absence of infected host plants.

References

Mann, R.S., K. Pelz-Stelinski, S.L. Hermann, S. Tiwari, and L.L. Stelinski. 2011. Sexual transmission of a plant pathogenic bacterium, *Candidatus Liberibacter asiaticus*, between conspecific insect vectors during mating. *PLoS ONE*. 6(12): e29197.