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Association of *Ceratobasidium theobromae* and *Lasiodiplodia* species with symptom variation in vascular streak disease of cacao

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ABSTRACTS - Oral Presentations

Association of *Ceratobasidium theobromae* and *Lasiodiplodia* species with symptom variation in vascular streak disease of cacao

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Vascular streak dieback (VSD) is an endemic disease of cacao in Southeast Asia reported to be caused by *Ceratobasidium theobromae*. A survey was conducted in 2016-17 from 20 cacao-growing provinces in the Philippines to characterize VSD symptom expression. Fifty three percent of the leaves and petioles sampled (620/1170) exhibited marginal necrosis and chlorosis with epidermal cracks on the petiole or leaf midrib. Approximately 10% of the samples (115/1170) exhibited characteristic chlorotic spotting symptoms. Chlorosis with random necrotic spots and a chlorotic halo was observed in 19% of the sample, while varying mixtures of necrosis and chlorosis on the leaf represented approximately 18% of the samples collected. To validate the presence of fungi associated with the predominant symptom, a PCR-based detection assay using ITS species-specific primers was performed on 30 petiole samples exhibiting leaf symptoms and revealed 100% and 73% detection frequency for *Ceratobasidium theobromae* (Ct) and *Lasiodiplodia* spp., respectively. To examine localization of Ct and *Lasiodiplodia* spp. within a branch, we examined sections of 25 intact twigs grouped per symptom type to determine the frequency of occurrence. Approximately 22% of the segments sampled across symptom types were positive for Ct, 76.1% for *Lasiodiplodia* spp., including in asymptomatic samples, and 16.9% for both species. Morphological and sequence analysis of ITS, *tef1- α* , *tub2*, *rpb2*, and *cmdA* for 10 randomly selected fungal isolates sampled from VSD infected plants were identified as *L. theobromae* and *L. brasiliensis*. Our results suggest the possible role of *Lasiodiplodia* species in the observed variation in VSD symptoms.