DISEASE NOTES

First Report of Bean common mosaic virus Infecting Lima Bean in Hawaii

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Bean common mosaic virus (BCMV; genus Potyvirus, family Potyviridae) is a single-stranded RNA virus that infects leguminous crops worldwide, and is transmitted in a nonpersistent manner by aphids. In July 2016, several plants exhibiting mosaic, mottling, chlorotic leaf symptoms, and stunting were found in a community garden in Honolulu, HI. Leaves from symptomatic Phaseolus lunatus (Lima bean), Araceae spp., Colocasia esculenta, Cordyline fruticosa, Crinum spp., Heliconia spp., Passiflora spp., Polyscias spp., and Syngonium spp. were collected from the community garden and tested for potyvirus infection using a Potyvirus-specific ELISA (Agdia, Elkhart, IN). P. lunatus and Passiflora spp. leaf tissue tested positive in ELISA. Total RNA was isolated from P. lunatus and Passiflora spp. leaf tissues using an RNeasy Plant Mini Kit (Qiagen, Redwood City, CA). Reverse transcription (RT)-PCR assays were conducted using a universal primer set designed to amplify a partial sequence of the potyvirus-specific ELISA (Agdia, Elkhart, IN), P. lunatus and Passiflora spp. leaf tissue tested positive in ELISA. Total RNA was isolated from P. lunatus and Passiflora spp. leaf tissues using an RNeasy Plant Mini Kit (Qiagen, Redwood City, CA). Reverse transcription (RT)-PCR assays were conducted using a universal primer set designed to amplify a partial sequence of the nuclear inclusion B (Nib) gene of the potyviral genome: Nib2F (5'-GTITGYGTIGAYGAYTTYAAYAA-3') and Nib3R (5'-TCIACIACIGTIGAIGGYTGNCC-3') (Zheng et al. 2010). The expected 350-bp products were amplified from the P. lunatus and Passiflora spp. samples, cloned into the pGEM-T Easy vector (Promega, Madison, WI), and sequenced. The sequence of the products from Passiflora spp. had an expected high similarity to Watermelon mosaic virus (WMV), which was previously reported infecting Passiflora spp. in Hawaii (Watanabe et al. 2016). The products from P. lunatus (accession no. KY473075) had
92% nucleotide and 100% amino acid sequence identity to the Niib gene of Chinese BCMV isolates (KC832501.1). BCMV-specific ELISA (Agdia, Elkhart, IN) was used to confirm the RT-PCR and sequencing results. In December 2016, seven symptomatic P. lunatus samples collected from the same community garden in Honolulu and one of seven P. lunatus samples collected from another location in Honolulu tested positive using a BCMV-specific ELISA. RT-PCR assays using the same Niib2F/Niib3R primer set confirmed the BCMV-specific ELISA results. To our knowledge, this is the first report of BCMV infecting P. lunatus in Hawaii. Further studies are necessary to determine how widespread this virus is in Hawaii in order to mitigate any potential threat to agricultural stakeholders.

References:
