

## First Report of the 16SrIV-D Phytoplasma Associated with Decline of a Bismarck Palm (*Bismarckia nobilis*)

K. K. Dey,<sup>†</sup> A. Jeyaprakash, J. Hansen, D. Jones, T. Smith, D. Davison, and P. Srivastava, Florida Department of Agriculture and Consumer Services, Division of Plant Industry, Gainesville 32614; B. Bahder, University of Florida, Gainesville 32614; and C. Li and X. Sun, Florida Department of Agriculture and Consumer Services, Division of Plant Industry, Gainesville 32614

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The Bismarck palm (*Bismarckia nobilis* Hildebr. & H. Wendl), with blue-gray leaves, is an important ornamental palm commonly planted along the highways in central and south Florida. During May of 2017, severe discoloration of the younger leaves of a Bismarck palm was observed in a roadside landscape in Manatee County, Florida, and a sample was submitted to the Florida Department of Agriculture and Consumer Services—Division of Plant Industry as a suspect for Texas Phoenix palm decline (TPPD). Symptoms of TPPD can include premature fruit drop, death of inflorescences, more than usual discoloration of the oldest leaves, and death of the spear leaf (Fig. 1). Real-time polymerase chain reaction (PCR) using the TaqMan primer pair and probe of Cordova et al. (2014) was performed and indicated the presence of a phytoplasma; however, this assay amplifies three phytoplasma subgroups (16SrIV-A [lethal yellowing, LY], -D [TPPD], and -E), all present in the Americas but not reported from Bismarck palm. Two different primer sets targeting a 581-bp region of the *gcp* gene from either TPPD or LY, TPPD-F-1 (5'-GCAGCAACTCAAGGTCCAGG-3'), TPPD-R-1 (5'-GCTACCCCGCCTACGATAATC-3'), LY-F-1 (5'-TAGCTGTAAGTCAAGGCCCT-3'), and LY-R-1 (5'-AAGCGACTCCACCTACTA-3'), were designed for amplification in a standard PCR thermocycler. The primers were tested on extracted DNA samples from the symptomatic Bismarck palm, LY-positive-control DNA, and TPPD-positive-control DNA. Positive controls performed as predicted, and the DNA extracted from the Bismarck palm amplified with only the TPPD primer pair. The product of the PCR amplification using TPPD-specific primers was sequenced, and the sequence was submitted to GenBank (accession no. MG676091). A BLAST search and sequence alignment in MEGA7 software showed 99% identity between the Bismarck palm sample tested and the TPPD phytoplasma partial *gcp* gene region (GenBank accession nos. HQ-613884, HQ-613887, and HQ-613883).

Because the symptomatic Bismarck palm was destroyed shortly after the sample was collected, the identity of the host *B. nobilis* was confirmed using a species-specific TaqMan assay and sequencing the unique plastid *rpoB* gene segment (Huang et al. 2013), which has been used extensively for plant barcoding (Dong et al. 2012).

Based on these results, presence of the 16SrIV-D phytoplasma was confirmed on Bismarck palm. Association of TPPD with the 16SrIV-D phytoplasma was previously described on several palm



**FIGURE 1**

*Bismarckia nobilis* that tested positive for Texas Phoenix palm decline. Younger leaves show tan discoloration.

species from the *Phoenix* and *Sabal* genera and on *Syagrus romanzoffiana* (Jeyaprakash et al. 2011; Harrison and Elliott 2016). To our knowledge, this is the first report of TPPD detected in *B. nobilis*, expanding the host range of 16SrIV-D phytoplasma.

### Literature Cited

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<sup>†</sup>Corresponding author: K. K. Dey; E-mail: kishore.dey@freshfromflorida.com

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