First Report of Rose Rosette Disease Caused by *Rose rosette virus* on Knock Out Roses in Louisiana

Raghuwinder Singh, Rodrigo Valverde, and Madeline Cook, Department of Plant Pathology and Crop Physiology, Louisiana State University Agricultural Center, Baton Rouge 70803; and **Allen Owings**, Hammond Research Station, Louisiana State University Agricultural Center, Hammond 70403

Accepted for publication 23 August 2016.

Roses (*Rosa* spp.) are an integral part of commercial landscapes and home gardens and they continue to be very popular landscape plants in Louisiana. During the fall of 2015, Knock Out roses growing in a commercial landscape in Bossier City, LA, exhibited symptoms similar to those reported for rose rosette disease caused by *Rose rosette virus* (RRV). All 35 rose shrubs were showing varying disease symptoms.

Symptoms included “witches’ broom” (Fig. 1) with a whorl of several profusely elongated shoots, presence of soft and green thorns in excess on new shoots (Fig. 2), thicker new canes compared to last season’s growth (Fig. 3), excessive red pigmentation of new foliage (Fig. 4), and distorted and deformed leaves (Fig. 5). Light microscopy examination of symptomatic rose tissues revealed the presence of the eriophyid mite *Phyllocoptes fructiphilus* Keifer (Arachnida: Acari: Eriophyidae) (Fig. 6).

FIGURE 1

“Witches’ broom” symptoms with a whorl of several profusely elongated shoots on Knock Out rose caused by *Rose rosette virus*.

Corresponding author: “Raj” Singh. Email: rsingh@agcenter.lsu.edu.

doi:10.1094/PHP-BR-16-0022

© 2016 The American Phytopathological Society

FIGURE 2

Rose rosette virus infected canes with excessive thorns (soft and green) on new shoots.

FIGURE 3

Thicker new canes infected with *Rose rosette virus* (top) compared to last season's growth (bottom).

FIGURE 4

New foliage infected with *Rose rosette virus* exhibiting excessive red pigmentation.

FIGURE 5

Distorted rose leaf infected with *Rose rosette virus* (right) and healthy leaf (left).

manufacturer's instructions. The total RNA was used to generate cDNA using GoScript Reverse Transcription System with random primers (Promega Corporation, Madison, WI). The annealing was done at 25°C for 5 min, extension at 42°C for one hour, and inactivation at 70°C for 15 min. The resulting cDNA was diluted 1:10 with nuclease free water and further subjected to PCR amplification with RRV-specific primers RRV-F (5'-CAGAATGAACCA-TAGATGTC-3') and RRV-R (5'-AATGGTCTGCTCGAGATT-3') (Laney et al. 2011). The expected PCR product (377 bp) was obtained with all three samples and sequenced bi-directionally using primers RRV-F and RRV-R. All three samples had identical sequences and were submitted to GenBank (Accession Nos. KU956092, KU956093, and KU956094). BLASTn analysis of the nucleotide sequences indicated 99% nucleotide identity with four isolates of RRV from Florida (KF990370, KF990371, KF990372, and KF990375) and one isolate from Arkansas (HQ871942).

FIGURE 6

Presence of eriophyid mite *Phyllocoptes fructiphilus* (black arrows) on infected rose tissue.

Pathogenicity tests were performed in the greenhouse by grafting scions from infected rose sample PDC15592 to branches of three healthy, two-gallon-potted, pink double *Rosa* 'Radtkoopink' Knock Out roses. Four infected scions were wedge grafted on to each rose plant. The grafts were secured with parafilm, sprinkled with tap water, and then covered with a plastic bag for one week. One potted rose plant was grafted with asymptomatic scions as described above. Plants grafted with RRV infected scions exhibited rose rosette disease symptoms within four to six weeks after grafting. The plant grafted with asymptomatic scions remained symptomless. Symptomatic tissue from grafted plants was tested by RT-PCR as described above and turned out to be positive for RRV. Tissue from healthy control plants turned out to be negative for RRV.

Rose rosette disease has been widely prevalent in several states neighboring Louisiana during the past five years but the disease was not positively identified in Louisiana until now. During these years, rose enthusiasts in the state have taken drastic actions on their own in removing suspected plants based solely on visual symptoms without any testing of the suspected material. Several established rose plantations in commercial gardens have been removed based on the recommendations made by private landscape contractors without any confirmatory testing for RRV.

To our knowledge, this is the first report of rose rosette disease caused by *Rose rosette virus* on Knock Out roses in Louisiana. It is difficult to assess the total value of roses in Louisiana but this disease has the potential to negatively impact the thriving rose industry in the state.

LITERATURE CITED

Laney, A. G., Keller, K. E., Martin, R. R., and Tzanetakis, I. E. 2011. A discovery 70 years in the making: Characterization of the *Rose rosette virus*. J. Gen. Virol. 92:1727-1732.