plant disease

Editor-in-Chief: Mark L. Gleason
Published by The American Phytopathological Society

June 2015, Volume 99, Number 6

Page 886

http://dx.doi.org/10.1094/PDIS-11-14-1225-PDN

DISEASE NOTES

First Report of 16SrII-C Subgroup Phytoplasma Causing Phyllody and Witches'-broom Disease in Soybean in Tanzania

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Soybean production in Tanzania is steadily increasing, driven by growing demand from feed and livestock producers and also for human consumption. Soybean production area has increased from 795 ha in 2003 to 4,100 ha in 2013 (FAO 2014). Major soybean production is in the Morogro, Ruvuma, Iringa, and Mbeya regions. During a soybean rust disease survey conducted in May 2014 in Morogoro in the southern highlands of Tanzania, soybean plants with phyllody and witches'-broom disorder typical of phytoplasma infection was observed on cultivar, Uyole Soya#1 in a farmer's field at Msufini village (6°17′0.099″ S; 37°28.791″ E). Symptoms consisted of shoot proliferation, reduced size of the leaflets and petiole, proliferation of axillary shoots with shortened internodes, phyllody, and viriscence. About 50% of the plants assessed (n = 20) from one plot in a farmer's field were infected. Symptomatic and asymptomatic leaves were collected for total genomic DNA extraction and PCR amplification using *Candidatus* phytoplasma universal primer pair P1 and P7 for 16S-23S ribosomal RNA encoding region (Sharmila et al. 2004). PCR amplicons of expected size (~1,700 bp) resulted from the templates of the symptomatic samples only. They were directly sequenced in both orientations and the nucleotide sequence was submitted to GenBank (Accession No. KP205526). A BLASTn search revealed that the phytoplasma sequences had a nucleotide sequence identity of 99% with those of 16SrII group phytoplasma associated with phyllody and witches'-broom disease of soybean in Malawi (HQ845208) and Mozambique (HQ840717). Phylogenetic analysis revealed the clustering of these strains with members of 16SrII group. The virtual restriction fragment length polymorphism (RFLP) pattern derived from these sequences using *i*PhyClassifier software (Zhao et al. 2009) was similar to the reference pattern of the 16SrII subgroup C (cactus phytoplasma, AJ293216), with a pattern similarity coefficient of 0.99. Previous reports of phytoplasma occurrence in Tanzania were related to coconut lethal decline disease caused by 16SrIV-C subgroup phytoplasma (Bila et al. 2014). To our knowledge, this is the first report of the occurrence of 16SrII-C subgroup phytoplasma

causing phyllody and witches'-broom disease in soybean in Tanzania. The occurrence of phyllody and witches'-broom disease was first recognized in soybean in Malawi and Mozambique in 2010 (Kumar et al. 2011). Detection of the same pathogen in the diseased soybean plants in Tanzania suggest either spread of 16SrII phytoplasma from neighboring countries or 16SrII phytoplasma may be widespread in asymptomatic wild or weed hosts in southern Africa, spreading to crop hosts like soybean because of intensive cultivation. Nonetheless, this finding underscores the need for better understanding of epidemiology of 16SrII phytoplasma, especially its natural hosts and vectors, to prevent its adverse impacts on soybean production in Eastern and Southern Africa. Further surveys in soybean production areas in Tanzania are necessary to estimate the extent of spread and economic importance.

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