plant disease

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Disease Notes

First Report of *Banana bunchy top virus* in Banana and Plantain (*Musa* spp.) in Nigeria

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Plantain and banana (*Musa* spp.) are among the most important staple crops for food and income generation for the rural and urban populations in the humid forest agroecological zone of West Africa. Until recently, *Cucumber mosaic virus* (genus *Cucumovirus*) and *Banana streak virus* (genus *Badnavirus*) were the only viruses reported to occur in *Musa* spp. in West Africa. In 2011, an outbreak of banana bunchy top disease (BBTD) caused by *Banana bunchy top virus* (BBTV; genus *Babuvirus*, family *Nanoviridae*) was reported in Ouémé *Département* (6°30′N and 2°36′E) in the Republic of Benin (2). BBTV is one of the most economically important pathogens of *Musa* spp. It is well established in Central Africa and also in Angola, Malawi, and Zambia in Southern Africa (2). Plants infected at early growth stages are severely dwarfed and do not bear fruit. BBTV is transmitted by the banana aphid *Pentalonia nigronervosa*, which is widespread in Africa (1). The regions in the Republic of Benin affected by BBTV border Ogun State (7°00′N and 3°35′E) of Nigeria. Epidemiological investigations were conducted during May 2012 at 31 locations in Ogun State to determine the potential risk of BBTV spreading into Nigeria. Plants with typical symptoms of BBTD (stunting, narrow and shortened leaves, chlorotic streaks on petioles and pseudostem) were observed in four locations: Ilashe, Odan-Itoro, Ido-Ologun, and Igbogila. Total DNA was extracted from 90 leaf samples randomly collected from symptomatic and asymptomatic banana and plantain plants in these areas. Samples were tested for BBTV by polymerase chain reaction (PCR) using primer pairs, mREP-F and mREP-R, which amplifies a 241-bp of BBTV DNA-mRep segment (1), and Scp-F and Scp-R specific for approximately 1075-bp BBTV DNA-S that encodes coat protein gene (1). The amplicons of expected size were obtained from 17 of 90 samples analyzed (18.8%). BBTV in the symptomatic plants was further confirmed by nucleic acid spot hybridization (NASH) assay using DIG-labeled 1,075-bp probe corresponding to coat protein gene and chromogenic detection as per the previously described protocol (3). The DIG-probe specifically reacted with nucleic acid from the symptomatic plants, but not with negative controls, providing conclusive evidence for the BBTV. The PCR products of DNA-mRep segment amplified from three banana plants infected with BBTV collected in Ilashe (Ipokia Local Government Area) were purified and sequenced in both directions. The sequences of these isolates were 100% identical with each other (GenBank Accession Nos. JX290301, JX290302, and JX290303). A BLASTn search revealed 100% nucleotide sequence identity with a BBTV isolate from Benin (JQ437548) and 99 to 100% identity with DNA-mRep sequences of several other BBTV isolates from Africa, Australia, India, and the South Pacific. Further analysis of the 241-bp mRep gene sequences with Neighbor-Joining phylogenetic analysis grouped the BBTV isolate with the South Pacific isolates. To our knowledge, this is the first report of BBTV in Nigeria. This underscores need for surveys to assess the extent of BBTV spread in Nigeria and strict implementation of phytosanitary measures, including restrictions on the movement of planting material from disease-affected regions, to prevent further spread of this important disease.

References: (1) P. L. Kumar et al. Virus Res. 159:171, 2011. (2) B. Lokossou et al. New Dis. Rep. 25:13, 2012. (3) W. S. Xie and J. S. Hu. Phytopathol. 85:339, 1995.

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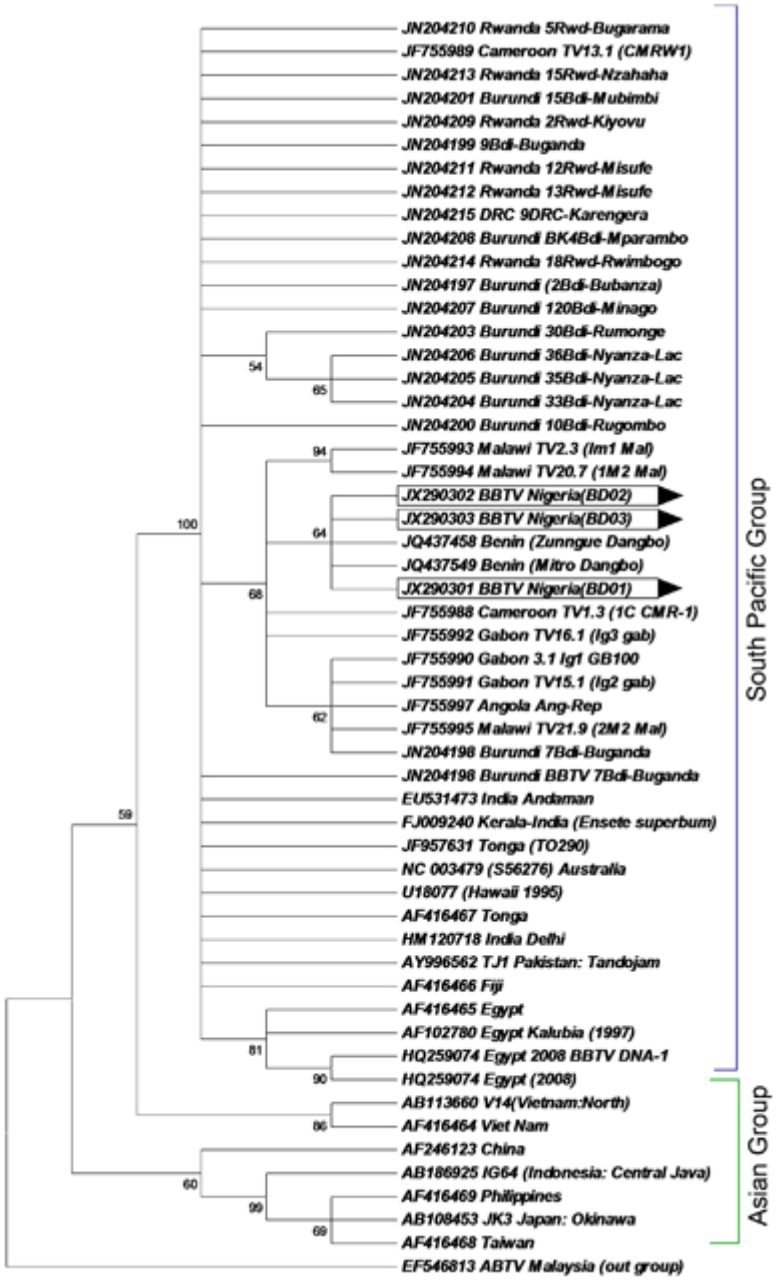
Supplemental Material

A, Banana plants with typical banana bunchy top disease (BBTD) symptoms (indicated with arrows) in Ilashe in Ogun State, Nigeria. **B,** Map of Nigeria depicting Ogun state. Survey locations are indicated as blue crosses and BBTD-affected regions as red dots. **C,** Close-up of BBTD-affected affected plant.



Neighbor-Joining tree based on the ClustalW alignment of the 240 base pairs of *Banana bunchy top virus* (BBTV) DNA-R master replication-protein of BBTV-Nigerian isolates (indicated in boxes) in relation to other BBTV sequences available in GenBank. Bootstrap values (1,000 replications) are shown as percentages at the branch points. Branches corresponding to partitions reproduced in less than 50% bootstrap replicates were collapsed. *Abaca bunchy top virus* (ABTV) was included as an out-group.