Maize (Zea mays) is the most important cereal crop in sub-Saharan Africa and is critical for food security in Africa. It is especially important in smallholder farming systems.

**HISTORY**

In September 2011, a disease outbreak in Kenya was positively identified as Maize Lethal Necrosis Disease (MLND). Since then the disease has been reported in Rwanda and DRC. Symptoms similar to MLN were reported in Uganda, Tanzania, South Sudan and Ethiopia.

Internationally, MLND has been reported from Peru, USA, Argentina, Mexico, Thailand, Brazil and China. Crop losses of up to 100% were reported in some cases.

**SYMPTOMS**

Symptoms include mottling, chlorosis, dying leaves and necrosis leading to premature plant death. Other symptoms are malformed or no ears and rotting cobs.

**VIRUSES**

MLND is caused by the co-infection of Maize chlorotic mottle virus (MCMV) in addition to a number of viruses from the potyvirus family. This combination gives rise to the symptoms associated with MLND.

In other words: MCMV + potyvirus = MLND

The potyviruses involved in causing MLND in conjunction with MCMV, include: Wheat streak mosaic virus (WSMV), Maize dwarf mosaic virus (MDMV) and Sugarcane mosaic virus (SCMV).

If a maize plant infected with MCMV suffers stress, such as during drought conditions, it can also produce symptoms associated with MLND.

To date, MCMV has not been reported in South Africa (SA), although two of the potyviruses associated with MLND have been reported. These two viruses are SCMV and MDMV.

Sugarcane mosaic virus is of particular concern as it is found widespread in the sugarcane industry and sugarcane is often grown in close proximity to maize.

**TRANSMISSION**

The disease is transmitted by mechanical means as well as through insect vectors.

MCMV is transmitted by beetles and thrips in a non-persistent manner. MCMV can also be transmitted...
mechanically and by seed, although seed transmission is relatively low. MCMV can also persist in soil and plant residues or debris. This makes continuous maize planting in a field somewhat problematic.

The potyviruses are transmitted by insect vectors, namely aphids.

**CONTROL OF MLND**

At this stage, control of the disease depends upon preventing MCMV from entering SA. Phytosanitary conditions implemented by the Department of Agriculture, Forestry and Fisheries (DAFF) are necessary in this regard. To prevent MCMV from entering SA, diagnostic services provided by ARC-PPRI Virology are of utmost importance. This diagnostic service supports the efforts of DAFF in keeping this quarantine pest out of SA.

Diagnosis of MLND based on symptoms is ineffective because symptoms such as stunting and chlorosis resemble nutrient deficiencies.

The diagnostic service provided at ARC-PPRI Virology consists of:

1) An RNA extraction for each sample used directly in all the Reverse Transcription Polymerase Chain Reaction (RT-PCR) tests performed.

2) RT-PCR for the detection of Maize chlorotic mottle virus

3) RT-PCR for the detection of potyviruses such as Wheat streak mosaic virus, Sugarcane mosaic virus, and Maize dwarf mosaic virus.

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