Molecular Detection of the Presence of Sugarcane Yellow Leaf Disease Phytoplasma and its Phylogenetic Relationship to White Leaf Disease Phytoplasma in Sri Lanka

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Introduction

- In Sri Lanka sugarcane is cultivated in about 20,000 hectares in the dry and intermediate zones
- Sri Lanka produces about 8 % of total consumption of sugar in the country
- Sugarcane average yield about 56 t/ha
- Spread of pests and diseases

Phytoplasma -WLD

Fungi-Smut

Bacterial-LSD

Fungi-Pokkah boeng

Rust-Fungi

Phytoplasma -? ?

- The particular disease was appeared in few commercially-grown varieties in Sri Lanka from the year 2000
- The causal agent of this disease has not yet been correctly-identified
- Based on the symptoms → Phytoplasma -YLS

- WLD is the only phytoplasma disease which is confirmed by molecular methods
- WLD causes 60 % -100% yield loss in some areas

Objectives

1. Any association of phytoplasma infections with YLS in sugarcane

2. The type/s of phytoplasma associated with YLS in Sri Lanka

3. Comparing the phytoplasma type/s with white leaf disease phytoplasma by phylogenetic analysis

Methods

Collection of diseased samples

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Extraction of DNA

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PCR using universal primers

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Sequencing and BLAST Analysis

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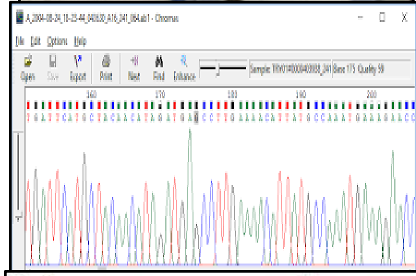
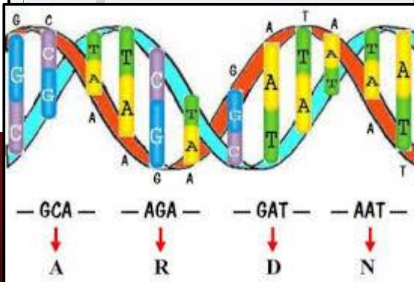
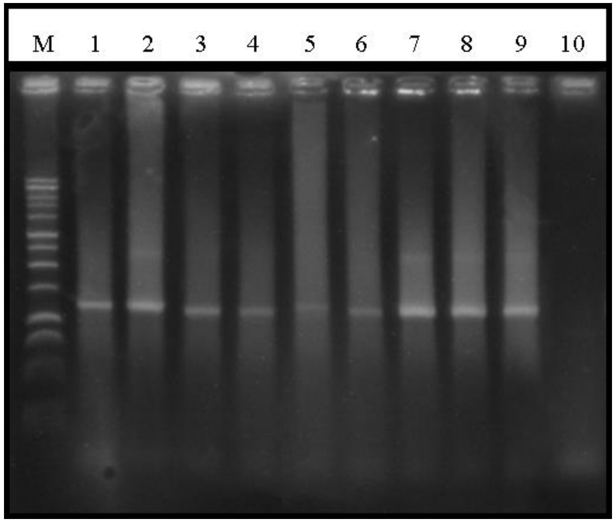
Phylogeny tree construction





Results

- Amplicons of 1.8 kb and 1.2 kb in PCR and nested PCR assays in all varieties



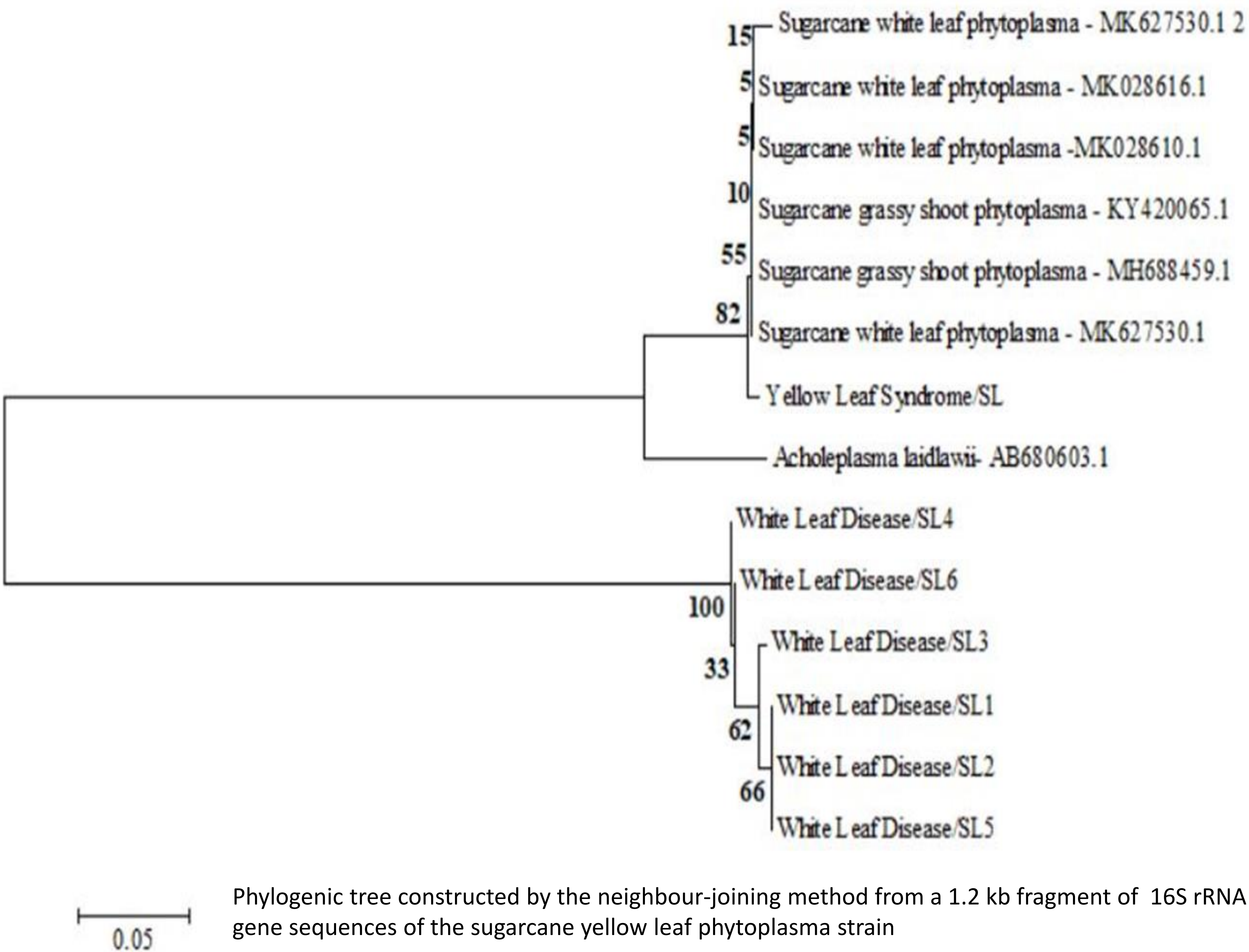
Nested PCR results for the primers R16F2n/R16 R2 for sugarcane leaf samples

- BLAST analysis of 1.2 kb partial 16S rRNA gene sequence from the YLS isolate

- 97.5 % sequence identity with *Candidatus* phytoplasma oryzae (16SrXI)
- 89% with sugarcane white leaf phytoplasma

- The phytoplasmas associated with YLS and WLD in sugarcane in Sri Lanka are closely related

The maximum distance between YLS and WLD samples studied is 0.676



Phylogenic tree constructed by the neighbour-joining method from a 1.2 kb fragment of 16S rRNA gene sequences of the sugarcane yellow leaf phytoplasma strain

Conclusion

- Same management practices can be adopted in managing these two phytoplasmal diseases

Hot Water Treatment – At 54 ° C for 50 min.

THANK YOU