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Identification of Causal Organisms of Frequently Recorded Diseases of Lablab Beans (*Lablab purpureus* L.) in Sri Lanka

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Abstract

Lablab purpureus (L.) is an important leguminous crop that ensures food security. Despite being considered an underutilized crop in Sri Lanka, it is a promising climate-resilient crop with higher protein amounts. However, none of the studies on the diseases in this crop have been performed within the country. Our objective was to identify the diseases and management packages. The disease identification was conducted using the germplasm collection of *L. purpureus* established at the Horticultural Crops Research and Development Institute. Morphological character analyses of diseased plant samples were followed by culturing parts on a PDA medium to isolate pathogens. The pathogenicity of isolated pathogens was confirmed through standard procedures in Koch's postulate. Pathogen isolates were identified morphologically, and species-level identification was done by extracting genomic DNA and amplifying and sequencing ITS-1 and ITS-4 regions. NCBI BLAST analysis corroborated the results obtained from morphological observations and colony characteristics. This study's findings hold promise for identifying and managing diseases affecting *L. purpureus* in future cultivation. Under pathogenicity testing, there were 6% foot and root rot disease incidences, and 4% Charcoal rot (ash stem blight) disease incidences were recorded. The distinguishing symptoms of foot and root rot were yellowing, wilting, and basal rot with the presence of *Sclerotia* in the plant base and symptoms of charcoal rot were yellowing and browning of leaves, stem discoloration with characteristic black patches in root and stem. The causal organisms of foot and root rot were identified as *Athelia rolfsii* (*Sclerotium rolfsii*), and charcoal rot was identified as *Macrophomina phaseolina*. With the use of literature and the use of poison food techniques, we developed two disease management packages for both diseases. For foot and root rot control; remove infected plants with soil, Crop rotation, or following, Spot application of recommended fungicides (Captan 50% WP, Thiram 80% WP, Thiophanate-methyl 50% + Thiram 30% WP), Improve the drainage at field preparation, Deep plowing and expose soil to the direct sunlight, Minimize the root damage, and Seed treatment (Captan 50% WP3g/1kg, Thiram 80% WP2g/1kg, thiophanate- methyl 50% + Thiram 30% WP2g/1kg). And also, for ash stem blight control; Following the field or crop rotation (recommended for at least 2yrs), Proper spacing with recommended plant density, Proper nutrient management, Improving the plant vigor, Flood the field 3-4 weeks before planting to destroy the pathogen, and cannot take efficient control by chemical control only.

Keywords: *Athelia rolfsii*, Charcoal rot, Foot and root rot, Lablab bean, *Macrophomina phaseolina*