

**B-17: Studies on root rot disease of teak *Tectona grandis* L seedlings in forest nurseries**

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Root diseases are major diseases in teak seedlings in forest nurseries. Several diseases have been reported in Sri Lanka at Kumbalpola nursery.

This study was undertaken in view of fungal pathogens that play a significant role and cause diseases of economic importance such as root rot. The objectives of the study were to determine causative organism of root rot disease in teak seedlings and the biology, morphology of the organism involved. Attempts were made to reduce disease level by carrying out control measures.

A survey was carried out at Kumbalpole. Quadrates (1m x 1m) were thrown in the field randomly and percentage of disease seedlings were counted in a particular area. Three regions of infected root were selected for the isolation. Macroscopic and microscopic observation were done for identification of the pathogen. Healthy seedlings were inoculated with the fungus by adding growing mycelium into sterile soil. After the formation of symptoms in treated seedlings, they were examined. Growth requirements of the pathogen were studied.

Suitable medium for the growth of the pathogen was determined using Potato Dextrose Agar (PDA), Corn Meal Agar (CMA), Malt Extract Agar (MEA), and Czapek-Dox Agar (CDA). Effect of temperature on the growth of the pathogen was studied using CMA medium at 15, 20, 25 room temperature, 30 and 35°C. Effect of pH on the growth of the pathogen was studied using the suitable medium at different pH at the optimum temperature.

In all these experiments, colony diameter was used as a growth parameter. The growth rate of pathogen under optimum conditions was also studied.

Benomyl, Captain and Bordeaux mixture ( $\text{CuSO}_4$  200g/25 l,  $\text{Ca(OH)}_2$  200g/25 l) were tested as fungicides in controlling the disease. Disc method and well method were used to determine the activity of fungicides. Different dilutions ranging from 10 to  $10^{-2}$  of the recommended doses of each of the fungicides (Benomyl  $4.5 \times 10^4$   $\mu\text{g/ml}$ , Captan  $4.2 \times 10^3$   $\mu\text{g/ml}$  and Bordeaux mixture  $\text{CuSO}_4$   $8 \times 10^3$   $\mu\text{g/ml}$ ,  $\text{Ca(OH)}_2$   $8 \times 10^3$   $\mu\text{g/ml}$ ) were used to determine the effective concentration.

The survey shows that the percentage of disease was 16.81%. The root systems of diseased seedlings were severely affected. At the early stage of the infection the root was covered with whitish mycelium. With the development of the disease the colour of the hyphae changed to black and in certain

places the hyphae were closely interwoven to form dense sclerotia. At the late stage, hyphae had penetrated by means of hyphal tips into the interior of the root. The cortex of the root was rotten completely and could be easily removed from the root.

Above ground symptoms were correlated with root symptoms. At the beginning, the leaves of the diseased seedlings showed temporary wilting followed by permanent wilting. The colour of the leaves changed to yellow and margin became necrotic. Finally mature leaves started to fall off and only immature leaves were remaining on the stem.

The causative fungus was isolated from diseased seedlings and identified as a species of *Rhizoctonia*. *Rhizoctonia* sp is an imperfect fungus which consists of branched hyphae only.

CMA was the best medium for the growth of *Rhizoctonia* sp out of 4 media tested. 30°C was recorded as optimum temperature for the growth of *Rhizoctonia* sp. The best growth was observed between pH 4 - 4.5. Among fungicides tested, benomyl ( $4.5 \times 10^4$  µg/ml) was the most effective fungicide against growth of *Rhizoctonia* sp.

Root rot is common and destructive in teak seedlings. The survey suggests that 16.81% of nursery seedlings is lost because of the activity of rot fungus. Infected plants usually grow more slowly than corresponding healthy plants. The growth requirements of the pathogen *Rhizoctonia* sp showed a close relationship with natural soil environment in nursery. It seems, therefore the disease can be easily transmitted to the tiny seedlings.

Benamyl  $4.5 \times 10^4$  µg/ml can be used to control the disease in greenhouse conditions.