

Budsaracum Phaneukthong 2011: Microbial Diversity Under Root Rot Infested Area of Mulberry Cultivation. Master of Science (Soil Science), Major Field: Soil Science, Department of Soil Science. Thesis Advisor: Assistant Professor Savaporn Supaphol, Ph.D. 127 pages.

Root rots are the major epidemic diseases affecting mulberry plants. This study is initiated with an aim to attain the appropriate cultivation techniques that will reduce environmental factors favoring the prevalence of the causative agents in the mulberry cultivation areas. In designing the experimental plots for the field studies, one of the major considerations was given to evaluating the effects of subsurface tilling against conventional tilling of the cultivation areas and within these parameters the biological controlling effects resulting from the inoculation and no inoculation of mycorrhizal fungi were investigated. Management of soil physical condition through applying gypsum to the experiment plots under study at the rate of 0, 200, 300 and 400 kg rai⁻¹ was also investigated. The diversity and the microbial community structure of the soil were determined using the denaturing gradient gel electrophoresis (DGGE). Analyses of the soil physical and chemical properties that affect the infection of the causative agents in the host plants in the areas under study were also performed.

Outcomes of the studies of the diversities of the community structures of fungi and bacteria at the rhizosphere of the mulberry of the Khunpai and Buriram 60 varieties using gene cloning techniques revealed that from the microbial community structures were different both varieties of mulberries. In healthy plants of both varieties, the predominant microbial strains encountered at their rhizosphere were bacteria belong to the genus of *Acidobacteria* and *Microbacterium*. These microorganisms strains are antagonistic to the root rots and seed rots of both varieties of mulberry plants. As for rhizosphere community structures of the mulberry plants infected with root rot diseases, the prevalent varieties of microorganisms encountered were *Pythium ultimum* and *Fusarium solani* which are found to be the major causative agents of root rots and stem rots of many varieties of ornamental plants and many plant varieties of economic significance. The outcome of this study indicates that certain activities aimed to reduced the opportunities for infection of the causative agents of root rot diseases in the host plants led to some changes in the physical and chemical structure of soil as well as the changes in the community structures of fungal and bacterial communities at the rhizosphere of mulberry plants in the root rot epidemic areas. Analysis using the canonical correspondence analytical technique indicates that conventional till soil management with application of gypsum at high level of up to 200, 300 and 400 kg rai⁻¹ resulted in higher water conductivity and lower bulk density of soil with an average pH range of 5.5-5.9 has a tendency to reduce the devastating effects of the root rot causative agents.

Student's signature

Thesis Advisor's signature