

## Biodiversity of Arbuscular Mycorrhizal Fungi (AMF) in Some Forest Tree Species in Bangladesh

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### ABSTRACT

Status of Arbuscular Mycorrhizal Fungal (AMF) colonization in seven tree species (*Albizia saman*, *Acacia auriculiformis*, *Albizia lebbeck*, *Chickrassia tabularis*, *Eucalyptus camaldulensis*, *Gmelina arborea*, *Swietenia macrophylla*) collected from the Chittagong University Campus (CU), Bangladesh, was investigated. Roots and rhizosphere soil samples were collected from the different slopes in different seasons. Percentage of AM colonization in the roots, intensity of root colonization and number of spores/100gm dry soil were assessed. All the samples were found to be colonized by AM fungi. Percent root colonization varied widely irrespective of seasons (before, during and after rainy season) and slopes (steep, gentle & plain land). The result of the investigation reveals that the intensity and percentage of AMF infection varied in different forest tree species. The intensity of colonization was maximum in *C. tabularis* (74.43%) and minimum in *A. auriculiformis* (53.75%) before rainy season. During rainy season, *A. lebbeck* showed the maximum AM colonization (69.45%) whereas *A. saman* was minimum (24.4%). After rainy season, it was found highest in *S. macrophylla* (67.8%) and lowest in *A. saman* (19.36%). The AM infection was also varied in different slopes in various seasons. Analysis of the rhizosphere soils showed that mycorrhizal spores were present in all locations from where the plant roots were collected. The number of spores found per 100g dry soil ranged between (164-376) before rainy season whereas it was (27-310) during rainy season and (194-299) after rainy season. *Glomus* was the common species in the soil samples. Out of six recognized genera of AM fungi, *Glomus*, *Sclerocystis*, *Entrophospora*, *Scutellospora* and other unidentified spores were observed. The possibility of indigenous AM fungi has been ensured for the primary establishment of nursery seedlings.

KEYWORDS: Bangladesh, Arbuscular Mycorrhizal Fungi (AMF), Root Colonization, Spore Population.

### 1. INTRODUCTION

Bangladesh faces economic and environmental constraints, so it is necessary to develop least expensive and technologically simple methodologies for immediate benefit. Mycorrhizal technology can be one of the alternatives to improve forest products, farm profitability and environmental quality in different production systems in Bangladesh (Mridha and Xu, 2001). Although in Bangladesh, there are different types of forest tree species, very little work about the status of Arbuscular Mycorrhizal Fungi (AMF) in forest tree species has been done in our country. The objectives of the study were to observe the occurrence and colonization of AM Fungi in the roots and the biodiversity of AM fungal spores in the rhizosphere soils of forest tree species and find out the variation of the status of AMF infection in different forest tree species irrespective of slopes and different seasons.

### 2. MATERIALS AND METHODS

Roots and rhizosphere soils of seven forest tree species were collected from (0-15) cm of topsoil layer from different slopes (steep, gentle and plain) in different seasons (before rainy season, during rainy season and after rainy season) from different hilly areas of Chittagong

University Campus. Spores were extracted from the soil by following the wet sieving and decanting method (Gerdemann and Nicolson, 1963). Roots were stained by following the procedures of Phillips and Hayman (1970).

### 3. RESULT AND DISCUSSION

The prevalence of AM fungal association in all the tree species was not found to form same status. The range of colonization varied from species to species in different seasons and slopes. The highest average AM infection (74.43%) was observed in *C. tabularis* and the lowest (53.75%) was in *A. auriculiformis* before rainy season whereas *A. lebbeck* showed the maximum AM colonization (69.45%) and *A. saman* was minimum (24.4%) during rainy season. After rainy season, AM infection was highest in *S. macrophylla* (67.8%) and lowest in *A. saman* (19.36%). Range of infection was observed (53-75) %, (24-69) % and (19-67) % before, during and after rainy season. With a view to slope characteristics, the range of infection was highest in gentle slope (61.6-96.6) % before rainy season whereas in steep slope, it was (41.5-69.9)% and (36.6-83.3)% was in plain land. During rainy season, the range of colonization was about (16.7-69.9)%, (16.67-48.3)% and (29.93-78.2)% respectively in steep slope, gentle slope and in plain land. After rainy season, the highest infection was found in steep slope and plain land in all of the species. The range of colonization was about (13.3-93.3) %, (13.2-45) % and (33.3-75.10) % respectively in steep slope, gentle slope and in plain land. The number of spores ranged between (164-376) , (27-310) and (194-299) before, during and after rainy season. The highest spore population was found in *A. saman* (376) and the lowest was in *E. camaldulensis* (164) before rainy season. During rainy season, *C. tabularis* (310) showed the maximum number of spore population whereas *S. macrophylla* (27) showed the lowest number of spore population. *C. tabularis* (299) also showed the maximum number of spore population after rainy season and *E. camaldulensis* (194) showed the lowest number of spore population. A perusal of the biodiversity of the structural colonization reveals that all these tree species are more or less Arbuscular Mycorrhizal Fungal infected plant. In the study, AM colonization was varied in different seasons and also in different slopes as the richness of AM fungal species and spore population depends on the size of area sampled and yearly changes in the precipitation and temperature (Abbott and Robson, 1991).

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