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Soil microorganisms play an important role in the maintenance of soil fertility. Microbial structure and biodiversity have an undeniable effect on plant growth and yield. They constitute a large dynamic source and sink of nutrients in all ecosystems and play a major role in plant litter decomposition, nutrient cycling and soil structure (Lynch and Whipps, 1990).

The rhizosphere is inhabited by variety of microorganisms. Among these microorganisms, mycorrhizal fungi are one of the predominant group of microbes associated with 90% of terrestrial plants (Allen, 1992). It has been known that different forms of inter-relationships between plants and microbes have been developed over millions of years (Law, 1985). The symbiotic mycorrhizal associations with roots of higher plants can survive under low temperature, low soil fertility, periodic droughts and other natural stress. So recently mycorrhizal research has become one of the most exciting areas of agricultural microbiology in plant science.

The word mycorrhiza has been derived from Greek word, ‘mike’ means fungi and ‘rrhiza’ means roots (fungus and root). It was first coined by Frank (1885). The vesicular arbuscular mycorrhizal (VAM) fungi have a long evolutionary history and they might have originated from early Devonian era (Pirozynski and Dalphe 1989). The word arbuscular mycorrhiza was coined by Allen (1991). Arbuscular mycorrhizal fungi are an important group of soil borne microorganisms, they are geographically ubiquitous in distribution and
they cover a broad ecological range (Read, 1991). The VAM fungi forms mutualistic association in most of the plants. They exist in soil as spores or as vegetative propagules in roots. Very little specificity is shown by mycorrhizal fungi with the higher plants (Molina et al., 1992). Smith and Read, 1997 and Schussler et al., 2001 have shown that host plants derive nutrient such as potassium, phosphorus, calcium and other minerals benefits from the VAM associations. Several studies have shown that AMF alter plant diversity and change competitive relationships between plants (Fitter 1977; Grime et al., 1987; Van der Heijden et al., 1998a; Hetrick et al., 1989; Allen and Allen, 1990; West, 1996; Marler et al., 1999; Hartnett and Wilson, 1999; klironomos, 2000; Connor et al., 2002).

Plants infected with vesicular arbuscular mycorrhizal fungi are able to take up more ‘P’ from soil and grow better than uninfected plants (Mosse, 1973a; Tinker, 1978; Abbott, et al., 1992). VAM contribute in aggregation of minute soil particles and formation of soil structure (Miller and Jastrow, 2000).

In the last three decades, lot of research work has been carried out in different aspects of vesicular-arbuscular (VA) mycorrhizae (Peterson et al., 1984).

A detailed literature survey has revealed meager reports on the effect of VAM on some finger millet varieties. Therefore present work has been undertaken where VA-mycorrhizal fungal inoculum is used as an important biofertilizer.
Ragi (*Eleusine coracana* Gaert.) is commonly called as finger millet or African millet or Korakana. Sankrit writers mentioned finger millet under the name of Rajika or Ragi. This is the third important millet of India, originated from Africa, later migrated to South East Asia. It has been proved that the millet was under cultivation since 1500 B.C. (Nagaraja Rao, 1971). There are archeological evidences to prove Ragi was under cultivation since 1500 B.C.

Ragi belongs to family Graminae (Poaceae). It is an annual herb where stem is erect having distinct nodes and internodes. Plants with linear leaves, simple, alternate with sheathing leaf bases. Inflorescence is spike, having four to six spiklets. Ragi is cultivated in India, Ceylon, Malaya, Japan, and Madagascar and in most parts of Ethiopia, Somaliland, Sudan, Tenzania and Uganda. In India it is grown in southern parts of Karnataka, Andhra Pradesh, Tamil Nadu, Uttar Pradesh and Maharashtra. It is well adapted to variety of soils ranging from rich loams to poor shallow upland soil, but thrives best on red lateritic loam. It is well adapted to the soil and climatic conditions of southern Karnataka. In India, it is grown over an area of 2,531 thousand hectares producing 2,178 thousand tonnes. Karnataka is the major ragi producing state in India covering 45 percent of total area (Anonymous, 1976-1977).

Ragi is cultivated over wide range of environmental condition from hilly regions to plains. It has come to a stage as one of the important food crops grown from time immemorial unchallenged in the regions of scanty and erratic
rainfall, poor and marginal soils. In Karnataka ragi is grown over an area of 1,023 thousand hectares producing 1835 thousand tonnes according to fully revised estimates 1996-97 to 2000-2001. As a rain fed crop, it is sown directly soon after the onset of monsoon rain, kharif crop sowing takes place between May and August, or July to November or early December. Besides, it is grown under irrigation throughout the year, whenever water is available. Ragi can be cultivated two times or three seasons as in case of Tamil Nadu and Karnataka state. Ragi matures in 3-5 months after sowing and is not affected by any serious diseases and pests. Harvesting is usually done in September and January. Ragi is highly nutritious and the richest cereals with calcium (0.33 per cent) compared to wheat (0.01 and 0.05 per cent). Some of the white grain ragi is rich in protein content ranging from 8.65 to 12.7 per cent (Mallanna and Rajashekhara, 1969). The flour obtained by grinding the grain is used for preparing cakes, porridge and pudding etc. The grain is used for preparing fermented beverages, such as beer. The stalks are used as fodder for milking cattle.

In the present work four varieties of finger millet (TNAU-914, GPU-45, RAU-8 and white seed variety) has been selected as experimental crop plant to investigate the effect of VAM as a biofertilizer.
OBJECTIVES

1. VAM spore distribution and population dynamics in finger millet growing soils of Anekal taluk of Bangalore district.

2. Screening of VA-mycorrhizal fungi and their efficacy on finger millet.

3. Histochemical studies on VAM inoculated finger millet plants.

4. Effects of phosphate fertilizer and VAM on experimental plants.

5. Tripartite interaction studies on four finger millet varieties.