

## ARBUSCULAR MYCORRHIZAL COLONIZATION AND ISOLATION OF RESTING SPORES FROM RHIZOSPHERIC SOIL OF *ELUSINA CORACANA*

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### ABSTRACT

*Arbuscular mycorrhizal fungi play an important role in mobilization of nutrients and enhancing plant growth. It maintain the intimate link between the plant roots and soil the present investigation deals with arbuscular mycorrhizal colonization and isolation of resting spores from rhizospheric soil of Eleusina coracana done on pot level condition at Swami Ramanand Teerth Marathwada University Nanded. Development of mycelia growth in the root tissue and the density and diversity of Arbuscular mycorrhizal spores in the rhizospheric soil of the Eleusina coracana plant. The roots and rhizospheric soil was collected and were analysed. The roots showed 92 % Arbuscular mycorrhizal fungal colonization with extensive mycelial growth in the cortical tissue. The coenocytic hyphae was observed in cortical tissue mainly and even in vascular tissue. The vesicles were mainly oval, round and elongated. The soil analysis show presence of 240 resting spores in 100 gm of soil and there is so much Arbuscular mycorrhizal species diversity dominating mainly by species of Glomus. The important AM genera recorded are Glomus mosseae, Acaulosporalaevis Glomus citricolla, Glomus fragilistatum, Glomus macrocarpum., Glomus globiform, Glomus fasciculatum, Glomus reticulatum, Scutellospora pellicida, Scutellospora auriglobosa, Scutellospora calspora. Gigasporarosea.*

**Keywords** - Arbuscular Mycorrhizal Colonization, *Eleusina coracana*

### Introduction

Mycorrhiza the term first referred by German Botanist Arbert Frank in 1885 for symbiotic relationship between fungi and plant root. It is non-pathogenic association of fungi with roots of higher plants. It perform important function in mobilising nutrients mainly uptake of phosphours ,inorganic and organic nitrogen and transport nitrogen and various organic material to the host plant (Atul Nayyar *et al* ;2009).and provide sustainanae in drought condition to many herbaceous plant.(Bagyaraj-1995 and Sadhana-2014),The Arbuscular Mycorrhizal diversity in herbaceous vegetation medicinal plants ,in halophytes plants have been investigated by many workers as Mulani and Waghmare 2012, Mulani and Prabhu, (2002,2004), (Pare and Kakade;2012), (Mulla, and Kanade;.1994). (Parmeshwaram and Austine,1988),(Prabhu,2002,Sathe,2002, Kanan and Lakshminarashiman,-1988, Bagyaraj-2014; Kumar et.al.2013,Zaman *et.al.*(2008).

*Eleusina coracana* commonly called as Ragi in India.*Eleusina coracana* belonging in Family-Poaceae and class-Monocotyledon. *Eleusina*

*coracana* is highly nutritional. It is rich source of protein, minerals, dietary fibres, calcium. it is also a rich source of thiamine, riboflavin, iron, methionine, isoleucine, leucine, phenylalanine and other essential amino acids. The occurrence of these phytochemicals enhances the nutraceutical potential of finger millet, making it a powerhouse of health benefiting nutrients. It has distinguished health beneficial properties, such as anti-diabetic, anti-diarrheal, antiulcer, anti-inflammatory, antitumorigenic, atherosclerogenic effects, antimicrobial and antioxidant properties. (Chandra *et, al.*, 2016).

### Materials and Methods

**Isolation of spores from rhizospheric soil by using Wet-sieving-decanting method. (Gerdman and Nicolson; 1963).**

Isolation of spores was done by using three sub steps such as wet-sieving, flotation, sedimentation. Mix 05 gm rhizospheric soil in 250 ml lukewarm water in beaker and it stirred well by using glass rod. It allows the heavier particles and debris settle down. Then solution was decanted through series of sieves and the solution decanted through 710mm sieves for the

removed of debris and roots. Then solution decanted through series of sieves i.e 710mm, 210mm, 150mm, 75mm, 45mm, and 25mm respectively. Highest number of spore density was found in sieves 75mm, 45mm, 25mm and large organic debris, unwanted stones and roots were found in the sieves i.e 710mm and 210mm were discarded. Then spores were taken from each sieve on glass slide with help of brush, capillary tube and it observed at microscope for spores and sporocarps.

### 3.2) Assessment of Mycorrhizal infection in root-(Percentage of root colonization) (Phillips and Hayman , 1970).

Percentage of root colonization was done by using (Phillips and Hyman-1970) technique. The roots of the plant were collected in polythene bags and collected roots were washed with tap water 2 to 3 times for removing the soil and debris. Collected roots cut into 1cm segments and root segments were taken in test tube containing 10% KOH. Then

autoclaved at 15 lbs for 1hrs and 10 drops of H<sub>2</sub>O<sub>2</sub> was added after cooling for destaining the roots. After 15 minute 10% KOH was removed from test tube and it washed with water 2-3 times and for decolorisation of pigmented root deep in alkaline solution of Hydrogen peroxide until bleached. After washing 10ml 1N HCL was added in test tube and it kept for 5 minute for neutralization of root tissue. Then HCL was removed from test tube and root segments were washed with water 2 to 3 times. After 30 minute cotton blue with lacto phenol was added in test tube and it kept for 24 hours. After 24 hours stained root segments were mounted on glass slide with acetic acid and glycerol 1:1 respectively. Root segments were covered with cover slip by using DPX added on four corner of glass slide. It observed under compound microscope for root colonization and percentage of root colonization was calculated by using following formula.

$$\text{Percent of mycorrhizal colonization} = \frac{\text{Number of root segments colonized}}{\text{Total number of root segments examined}} \times 100$$

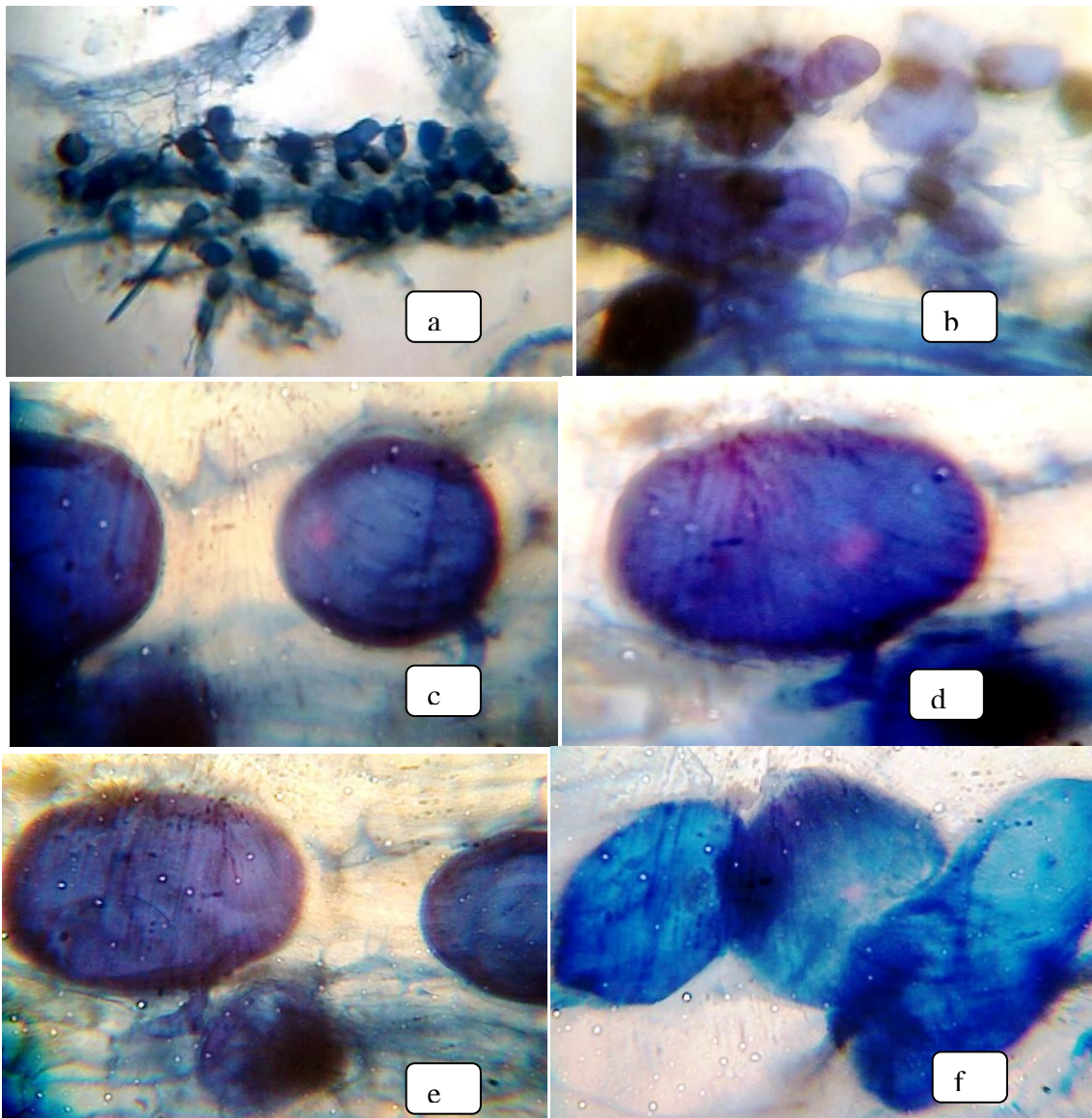
### Results and Discussion

The roots of *Eleusina coracana* showed 92 % Arbuscular Mycorrhizal colonization. The vesicles were rounded ,globular ,elongated and prominent. The hyphae are coenocytic , non-septate and branched. The rhizospheric soil analysis showed 240 spores/100gm of soil. and The Arbuscular mycorrhizal genera recorded are *Glomus mosseae*, *Acaulosporalaevis*, *Glomus citricolla*, *Glomus fragilistatum*, *Glomus macrocarpum*, *Glomus globiforum*, *Glomus fasciculatum*, *Glomus reticulatum*, *Scutellospora pellicida*, *Scutellospora auriglobosa*, *Scutellospora calspora*, *Gigasporarosea*. Similar observations were made by Sarah and Ibrar, (2016) reported 56 to 260 spores/100gm of soil and 32 to 100% of

root colonization was observed in *Helianthus annuus*. The root colonization rate was 91% and 114 spores/gm soil in *Morus alba* reported by Lu *et. al.* (2015). Root colonization was 69% and spore density 193/100g soil in *Panicum miliaceum* reported by Channabasava *et. al.*, (2015).

Root colonization of *Eleusina coracana* inoculated with *Glomus mosseae*. Fig. a, b: Coenocytic Hyphae and Vesicles seen in the root whole mount of *Eleusina coracana*. Fig. c, d: Magnified view of rounded vesicles seen in whole mount of root of *Eleusina coracana*. (40X) Fig. e, f: Magnified view of rounded vesicles seen in whole mount of root of *Eleusina coracana* (100X).

## PLATE-I



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