

Study Of Arbuscular Mycorrhizal Fungal Associated with Wild Vegetables from Melghat

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doi.org/10.64643/IJIRT12I9-195717-459

Abstract—Arbuscular mycorrhizal fungi (AMF) form a widespread symbiotic association with plant roots and play a crucial role in improving nutrient and water uptake, enhancing tolerance to environmental stress, and providing resistance against root pathogens, nematodes, and diseases. Wild vegetables are an important component of traditional diets, serving as rich sources of vitamins, minerals, dietary fiber, antioxidants, and medicinal compounds, particularly during food-scarce periods. The present study aimed to investigate the association of AMF with selected wild vegetable species, namely *Celosia argentea* L. and *Chenopodium album* L., and to analyse AMF spore diversity and density in their rhizosphere soils. Rhizosphere soil samples were collected from selected plants, and AMF spores were isolated using the wet-sieving and decanting technique. Spore density was estimated, and morphological identification was carried out through permanent slide preparation using PVLG mounting and microscopic examination. Identification of AMF species was based on standard taxonomic keys and diagnostic morphological characters. The results revealed a significant association of AMF with both plant species. The genus *Glomus* was found to be dominant in the rhizosphere soils. Four AMF species were identified, namely *Glomus fistulatum*, *Glomus aggregatum*, *Glomus leptotichum*, and *Glomus fasciculatum*. The study highlights the importance of AMF in wild vegetables and suggests their potential role in sustainable agriculture and biodiversity conservation.

Index Terms—Arbuscular mycorrhizal fungi (AMF), Wild vegetable, *Glomus* species.

I. INTRODUCTION

Arbuscular Mycorrhizal Fungi (AMF) is a symbiotic association between plant roots and fungi. They can improve the nutrient and water uptake; induce tolerance of environmental stress and resistance to root diseases and nematodes of their host plants. AMF are vital components of the microbial soil community

forming the most commonly occurring underground symbiosis

Wild vegetables are a rich source of vitamins, minerals, dietary fiber, and antioxidants. They contribute to food and nutritional security, especially during food-scarce periods. Many wild vegetables possess medicinal properties and are used in traditional healthcare. They help preserve indigenous knowledge and cultural food practices of tribal communities. Wild vegetables are adapted to local conditions and require minimal external inputs. Their use promotes biodiversity conservation and sustainable utilization of forest resources.

II. MATERIAL AND METHOD:

Selected wild vegetable plants along with their rhizosphere soil samples were collected. Rhizosphere soil was excavated up to a depth of 15–20 cm, and about 500 g of soil from each plant was collected in labelled polyethylene bags. Soil samples were shade dried and stored properly for further analysis

Estimation of spore count

AMF spores were isolated from soil samples using the wet-sieving and decanting technique (Gerdemann and Nicolson, 1963) and observed under a stereo zoom microscope. Spore density was determined following the method of Gaur and Adholeya (1994).

Identification of spore

Morphological identification of AMF spores was carried out by preparing PVLG-mounted diagnostic slides and examining them under a compound research microscope.

Identification of AMF genera and species was based on standard keys (Morton and Benny, 1990; Schenck and Perez, 1990) using characters such as size, shape,

colour, subtending hyphae, wall layers, and cytoplasmic structure.

The present work was carried out to investigate the two plant species named as *Celosia argentea* L., *Chenopodium album* L. and related spore count analysis through permanent slide preparation and the observation of the AMF specific characteristic features like hyphae, vesicles, and the entire data was noted and the photographs were taken

III. RESULT AND DISCUSSION:

The present investigation revealed the occurrence of arbuscular mycorrhizal fungi (AMF) associated with *Celosia argentea* L. and *Chenopodium album* L. The associated AMF species were identified, and their morphological features and mycorrhizal characteristics were documented. Spores were isolated from the collected soil samples, among which the genus *Glomus* was found to be dominant. A total of four AM fungal species were identified, namely *Glomus fistulatum*, *Glomus aggregatum*, *Glomus leptotichum*, and *Glomus fasciculatum*.

Glomus aggregatum Schenck and Smith Emend. Koske

- Colour: - Pale yellow to yellow brown
- Shape: - Globose to sub- globose
- Size: - (20-) 40-85 (-120) μm
- Composite spore wall: - 2-6 (-10) μm
- Subtending hypha: - Straight, constricted, swollen or irregular and (6.4 -) 14.3(-21.6) μm wide at spore base.
- Spores produced in sporocarp

Glomus faciculatum Walker and Koske

- Colour: - Pale yellow to pale yellow brown
- Shape: - Globose
- Size: - 75-149 μm
- Composite spore wall: - (2.3)7-12(-16.1) μm
- Subtending hypha straight

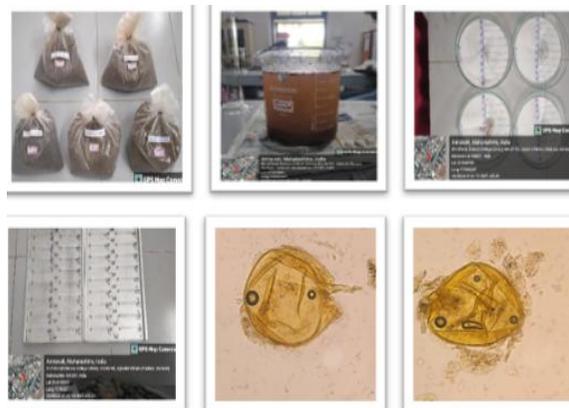


Fig: - isolation of spores by wet sieving and decanting method AMF spores *Glomus faciculatum*.

IV. CONCLUSION:

The present study revealed that the rhizosphere soil of *Celosia argentea* L. and *Chenopodium album* L. shows dominance of associated *Glomus* species.

In this AM fungal species were most dominant *Glomus fistulatum*, *Glomus aggregatum*, *Glomus leptotichum* and *Glomus fasciculatum*.

The present study offers scope for future research to further explore the association of arbuscular mycorrhizal fungi (AMF) with wild vegetables. Emphasis can be placed on evaluating the effects of dominant AMF species on plant growth parameters through mass multiplication of inoculum and its application as a biofertilizer, thereby utilizing nature's own tool for sustainable agriculture.

Future plans or outcomes mycorrhiza will provide low cost forming it will help to small and marginal farmer to use mycorrhiza as a bio fertilizer

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