

## Diversity of Arbuscular Mycorrhizal Fungi In *Ocimum Sanctum*. L.

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**Abstract:** A study of diversity of Arbuscular mycorrhizal fungi (AMF) in root of medicinal plant *Ocimum sanctum*. L. locally known as Krishna Tulsi was conducted at Hazaribag, Jharkhand, India. Microscopic analysis of the mycorrhizal status of roots has revealed that all recovered spores were found to belong to the class – Zygomycotina. The two genus found were *Glomus* and *Acaulospora*. The species recorded are *G. fasciculatum* and *G. mosseae* belonging to order Glomales and family glomaceae.

**Key words :** AM Fungi, *Ocimum sanctum*, *Glomus*, *Acaulospora*, Jharkhand.

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### I. Introduction

Many microorganisms form symbiosis with plants that range on a continuous scale, from parasitic to mutualistic. Among these, the most widespread mutualistic symbiont is the mycorrhiza formed between AM fungi and vascular flowering plants. The symbiotic association of AMF and plants is based on bidirectional flow of nutrients. Carbon flows from plant to fungus and inorganic nutrients from fungus to the plants (Smith and Read, 2008). The most important role of AMF is to absorb nutrients specially Phosphorus from the soil and transfer them to their roots. Absorbed phosphorus is converted into monophosphate granules in the external hyphae and passed to arbuscules for transfer to the host. This flow of phosphorous occur in presence of Acid phosphatases during the arbuscule life span or senescence. The mycorrhizal infection decreases fungal pathogen and nematodes. Role of AMF on growth and biomass of plants have also been well studied by Gupta and Janardhanan (1991). AMF are geographically ubiquitous found in tropical, temperate and arctic regions (Bisht et al., 1995), water logged habitat (Khan, 1974) and stone soil (Giovannetti, 1985).

In India and abroad numerous workers like Frank (1885), Abbott and Robson (1984), Muthu and Udaiyan (2001), Rashmi and Roy (2003), Wang and Qiu (2006) and many more studied the qualitative and quantitative study on AMF, no attempt has been made to collect and identify these useful fungi in Jharkhand State except De (2003) who has collected AMF from rice field only. With the background, it was considered desirable to study the association of AM fungi with one important medicinal plant i.e. *Ocimum sanctum*. This plant belong to Labiatae family. Its leaves are used for cold, cough, dyspepsia, leprosy etc. It has great medicinal value.

### II. Material And Methods

#### Study area

Hazaribag (23.98° N latitude, 85.35° E longitudes attitude 604 m/1982 ft.) is the head office of the North Chotanagpur Commissioner of Jharkhand State in India. It is a hilly region with sufficient forest area Sixty six percent of the people depend on agriculture. The soil is red loamy type. Potassium (K) content is high whereas Phosphorus (P) and Nitrogen (N) content are low to medium. The soil is acidic to neutral (pH 5.6 to 6.5).

#### SAMPLE COLLECTION

Area close to university campus and localities in Hazaribag town were selected for the study. Soil and feeder root samples were collected from the selected fields. For this purpose, soil around the plant was dug up to 10-15 cm deep and rhizosphere soil and feeder roots were collected separately in polythene bags and tagged properly. Soil and root samples were then taken to the laboratory for analysis. Screening of root was done by wet screening and decantation methods of Gerdemann and Nicolson (1963). The suspension prepared was allowed to pass through the sieves of various measurements (710 mm to 45 mm). Spores were examined under compound microscope. The spore population was determined as number of spores per 10 gram dried soil. Spores were identified on the basis of morphological feature i.e. spore colour, size, shape, thickness of wall, lamination, attachment pattern of hyphae as described in the manual of Schenck and Perez (1988). Phillip and Hayman (1970) method was followed for determining per cent of AMF colonization.

### III. Result And Discussion

A detailed analysis of the morphological characteristics of the spore revealed the presence of the genus *Glomus* with two distinct species.

1. *G. fasciculatum* (Thax.) Gerd. & Trappe emend. C. Walker & Koska – Spore single in soil or in aggregates with 2-20 spore lacking a peridium, pale yellow globose to sub-globose, 50-130 µm in diameter with one subtending hyphae. Total number of spores (average) per 10 g soil was recorded as 10.

Table 1 : Number of spores/10g dried soil and percent of root colonized in rhizosphere of *Ocimum sanctum*.

Months	No. of spores/10g soil	% root colonization
May, 2008	22	66
June, 2008	18	70
July, 2008	16	70
Average	18	68

2. *G. mosseae* Gerdemann and Trappe – Spores globose, thick walled. The total numbers of spores (average) per 10 g soil was recorded as 5.
3. *Acaulospora* sp. – Single spore laterally on the neck of vesicle, globose to ellipsoidal, hyaline, yellow to brown, subtending hypha absent at maturity, spore wall laminated. Total number of spores (Average) per 10 g soil was recorded as 3.

By the perusal of Table 1 it is evident that AMF are high in number and mycorrhizal colonization level was recorded 68. It reflects that both the species of *Glomus* are amotrophic in nature and *Acaulospora* sp. are comparatively lesser.

Our observation here are in accordance with that reported in the finding of Payal and Mukherje (1994).

In conclusion our result showed presence of AMF spores in a good percentage which should be preserved and utilized in our ecosystem by including them in nursery plant production programs.

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