
SHORT COMMUNICATION

Vesicular Arbuscular Mycorrhizal (VAM) Fungi status on roots of coriander (*Coriandrum sativum* L.) grown in red laterite soil of Mandangad Tahsil, Ratnagiri District, Maharashtra

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VAM fungi status on coriander (*Coriandrum sativum* L.) root was studied in red laterite soil of Mandangad tehsil by isolating these from two week old plant roots. Under light microscope 80% to 90% of VAM fungi colonization was observed in the root of coriander. This is the first time that natural colonization of VAM fungi in coriander roots grown in red laterite soil of Mandangad tehsil, Ratnagiri district, Maharashtra, has been reported.

Keywords : Coriander, Laterite soil, Root, Vesicular Arbuscular Mycorrhizal (VAM) Fungi,

INTRODUCTION

Vesicular Arbuscular Mycorrhizal (VAM) fungi symbiotic association is found in most of the terrestrial plants (Schüßler *et al.* 2001; Ghosh, 2014; Tao and Zhiwei, 2005). It is known to play important role in uptake of nutrient and water particularly in nutrient poor soil. It acts as a bridge between the host plant and soil (Pierzynski, 2000). It receives carbohydrates from plants and in return provides phosphorous, nitrogen and other nutrients to host plant. Mycelial mats of VAM fungi help to retain moisture for plants to survive in drought conditions (Kuila and Ghosh 2022). It boosts defense mechanism in plants and protects them from pathogenic fungi and nematode disease. It is also known to build up a stress tolerance mechanism in plants. Diversity of VAM fungi depends on plant species, some are host specific and some are non-host specific). Application of VAM fungi has resulted in enhanced productivity in agricultural plants. In particular, utilization of AM fungi is a green solution to reduce the utilization of hazardous agrochemicals.

Mandangad tahsil is remote and hilly area situated in Ratnagiri district of Maharashtra, India. Red laterite soil is mostly found in this region. Some other studies on red lateritic soil suggested that red laterite soil has acidic pH and lower water holding capacity.

Deficiency of major nutrients such as phosphorous, nitrogen and organic carbon are commonly seen in red laterite soil (Koley, 2000). In red laterite soil, colonization status of VAM fungi on medicinal and vegetable crops was studied by other research group. But colonization status of VAM fungi on coriander in red laterite soil is still not studied.

Coriander is an annual herb belonging to family Apiaceae used in cuisines throughout the world. All parts of the plant are edible, but the fresh leaves and the dried seeds are the parts most traditionally used in cooking. The essential oil from coriander leaves and seeds gives aroma and flavour to wide variety of dishes. So considering its importance, coriander was cultivated at Boricha mal, Mandangad and status of VAM fungi studied on it.

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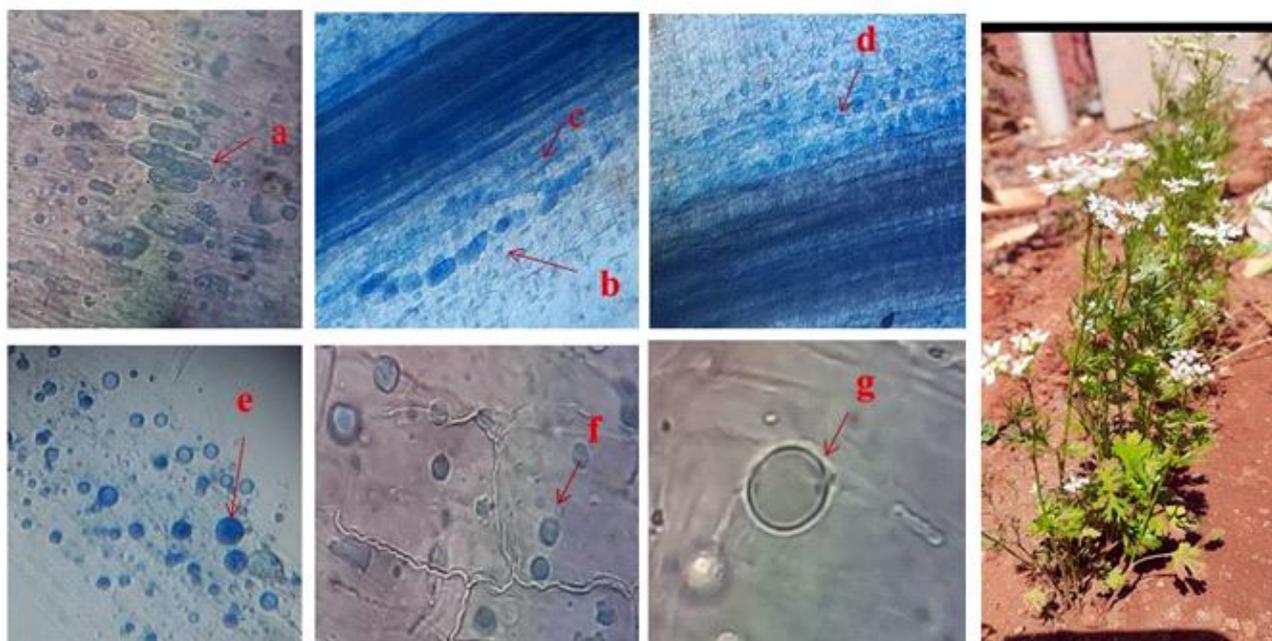


Fig.1: Different structures of vesicular Arbuscular Mycorrhizal fungi colonizing the roots of Coriander (*Coriandrum sativum* L.) : Vesicles (a-b), Arbuscule (c), spores (d-e), spores in cell (f), chlamydospores (g)

MATERIAL AND METHOD

Sample collection and staining method

Two week old grown coriander plants uprooted from the field of Boricha mal, Mandangad and brought into laboratories for the check status of VAM fungi. Entire root system of plant was properly washed with tap water to remove adhering soil. The healthy roots were cut into 1cm pieces and boiled in 10% KOH in an autoclave for 10 min. Then it washed with distilled water and acidified with diluted HCl. Again it was washed with distilled water and stained in cotton blue for 2-3min. The stained roots were mounted in lactophenol and observed under compound microscope (15X10 and 15X40). As per need cover slip was gently pressed to flatten the root pieces.

Determination of percentage of VAM infection

Percent of root colonization = Number of root segments colonized/Number of root segments observed x100

RESULTS AND DISCUSSION

In laboratory, pH and water holding capacity red lateritic soil of Boricha mal, Mandangad, was

studied. A result was indicated that soil has acidic pH of 5.61 and lower water holding capacity. Similarly acidic pH and low water holding capacity of red laterite soil was reported by Samantha (2021) from South West Bengal. Some other studies reported that the plant grown under phosphorus deficient soil such as acid lateritic soil, have greater dependence on Mycorrhizae (Ghosh and N. Verma , 2006). Hence, status of VAM colonization on coriander root was studied by using a cotton blue staining method (Samantha, 2021). Mycorrhizal colonization was indicated by presence of vesicles, arbuscules and endospores (Fig.1). Slides were observed under the compound light microscope at 15X45 magnifications. Near about 80 to 90% colonization of VAM fungi was observed in coriander roots may indicates it provides essential nutrients like phosphorous, nitrogen and some other trace elements to coriander for their growth and development. In red laterite soil of West Bengal, 10 to 80% of Mycorrhizal colonization was observed in some medicinal plants (Thenmozhi, 2011; Samantha, 2021). The red laterites soil stress may provide the ideal ecological niche for Arbuscular Mycorrhizal fungal growth, multiplication and efficient function. With extensive hyphal system Mycorrhizae help plants in absorption and translocation of phosphate and other nutrients. It has been reported that VAM

inoculation effectively reduces the phosphate fertilizer requirement (Samanta ,2021; Qian *et al.* 2024).

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DECLARATION

Conflict of interest. Author declares no conflict of interest.

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