ARBUSCULAR MYCORRHIZAL COLONIZATION AND SPORE DENSITY IN RHIZOSPERIC SOIL OF *ARACHIS HYPOGAEA* L. IN ARDHAPUR REGION OF NANDED DISTRICT

S.B. Wankhede
Rajiv Gandhi Mahavidyalaya Mudkhed, Dist. Nanded, Maharashtra India
drsavitawankhede@gmail.com

ABSTRACT

Arbuscular mycorrhizal fungi play an important role in the mobilization nutrients and enhancing plant growth. It maintains the intimate link between the plant roots and soil. Arbuscular Mycorrhizal colonization and spore density in rhizospheric soil of Arachis hypogaea L. in Ardhapur region of Nanded District. Rhizospheric soil was collected from fields of Ardhapur region of Nanded District and were analysed by using wet sieving and decanting method suggested by Gerdman and Nicolson method (1963). The roots of Arachis hypogaea L. showed 90 % mycorrhizal colonization and the rounded, vesicles were prominent. The rhizospheric soil was screened for spore density and population. The spore density were recorded as 300 spores per 100gm of soil and The spore population mainly consist of different species of Arbuscular mycorrhizal such as mainly Acaulospora laevis, Glomus mosseae, Glomus reticulatum, Glomus macrocarpum and Glomus globiforum Gigaspora rosea, Scutellospora sp.

Keywords: *Arbuscular Mycorrhizal fungi, Root colonization, Arachis hypogaea*

Introduction

German Botanist Frank (1885) coined the term mycorrhizae for the first time to designate the symbiotic relationship between the fungi and plant roots. Since then scientists started exploiting them for the welfare of mankind. The term ‘mycorrhiza’ in its broadest sense is the non-pathogenic association of fungi and the roots of higher plants. The root- fungus association is symbiotic and the whole association is being considered as a ‘’functionally distinct organ’’ involved in mineral nutrient uptake from the soil. (Kar, 1993).Mycorrhizal fungi are having intimate association with roots of higher plants forming a symbiotic relationship providing nutrients to the plants. The Arbuscular Mycorrhizal diversity in herbaceous vegetation medicinal plants, in halophytes plants have been investigated by many workers [Bagyaraj, D. J. (2014) Kannan, K. and Lakshminarashiman, C. (1988) Kumar., *et. al* (2013). Mulla, R. M *et. al.*, (1994) Mulani., R. M *et. al.*, (2004) Mulani, R. M and Waghmare, S. S. (2012). Mulani, R. M and Prabhu, R. R. (2002). Parameswaran, P and Augustine, B.(1988). Isolation and identification of arbuscular mycorrhizal fungi from agricultural fields of Vietnam investigated by (Sasvari *et.al.,* 2012). Growth and biomass of *Piper longum* L was increased with inoculation of arbuscular mycorrhizal fungi. (Seema and Rajkumar,2015). Essential oil production, nutrient uptake and root colonization in basil was increased with inoculation arbuscular mycorrhizal fungi. (Mirhassan *et.al*.,2010).

Arachis hypogaea is derived from two Greek words "Arachis" meaning to legume and "hypogea" meaning below ground, referring to the formation of pods in the soil. Family : Leguminoseae. Arachis hypogaea is cultivated in all tropical and sub-tropical regions worldwide. Peanut is one of the most important crops in the world, both for vegetative oil and as a protein source. It is the fourth important oilseed crop of the world in production after soybean, cottonseed and rapeseed. It also contains flavonoids, carbohydrate, mineral and vitamins. The previous pharmacological studies showed that peanut exerted antioxidant, hypolipidemic, antiinflammatory , analgesia mediated by opioid receptor affinity, sympathomimetic, endocrine, antimicrobial, antiparasitic, sedative, hypotensive and haemostatic effects. (Ali,2014).

Materials and methods

Isolation of spores by using wet-sieving method. (Gerdman and Nicolson; 1963)

Spore extraction is involved in three sub steps such as wet-sieving, sedimentation, flotation. Mix 5 gm of soil in 250 ml of luck warm water in a beaker until all aggregates disperse to a

uniform suspension. Allow the heavier particles to settle down. Filter the suspension through 710 µm sieve to remove large organic matter and roots. Then solution was sieved through series of sieves i.e710 µm, 210 µm 150 µm, 75 µm, 45 µm and 25 µm respectively. Content of each sieves i.e 210 µm 150 µm, 75 µm, 45 µm and 25 µm was taken separately on blotting paper in petriplate and This petriplate was observed under stereo zoom binocular microscope.

Percentage of root colonization. (Phillips and Hayman, 1970)

Young root segments were taken in test tube adding 10% KOH and it autoclaved at 15 lbs for 1 hr. After 10 minute 10% KOH was removed from test tube then root segments were washed under tap water with 2 to 3 times . Then 10 ml 1N HCL was added and were kept for 5 minute for neutralization of root tissue. Then HCL was removed and washed the root segments 2 to 3 times with tap water. After 30 minute root segments stained with cotton blue and kept for 24 hrs. After 24 hrs root segments mounted on slide with Acetic acid – glycerol (1:1v/v). Seal the corners of the cover slip with DPX, root colonization was observed under compound microscope. Then **%** of Arbuscular Myccorhizal fungal colonization calculated by using this formula.

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

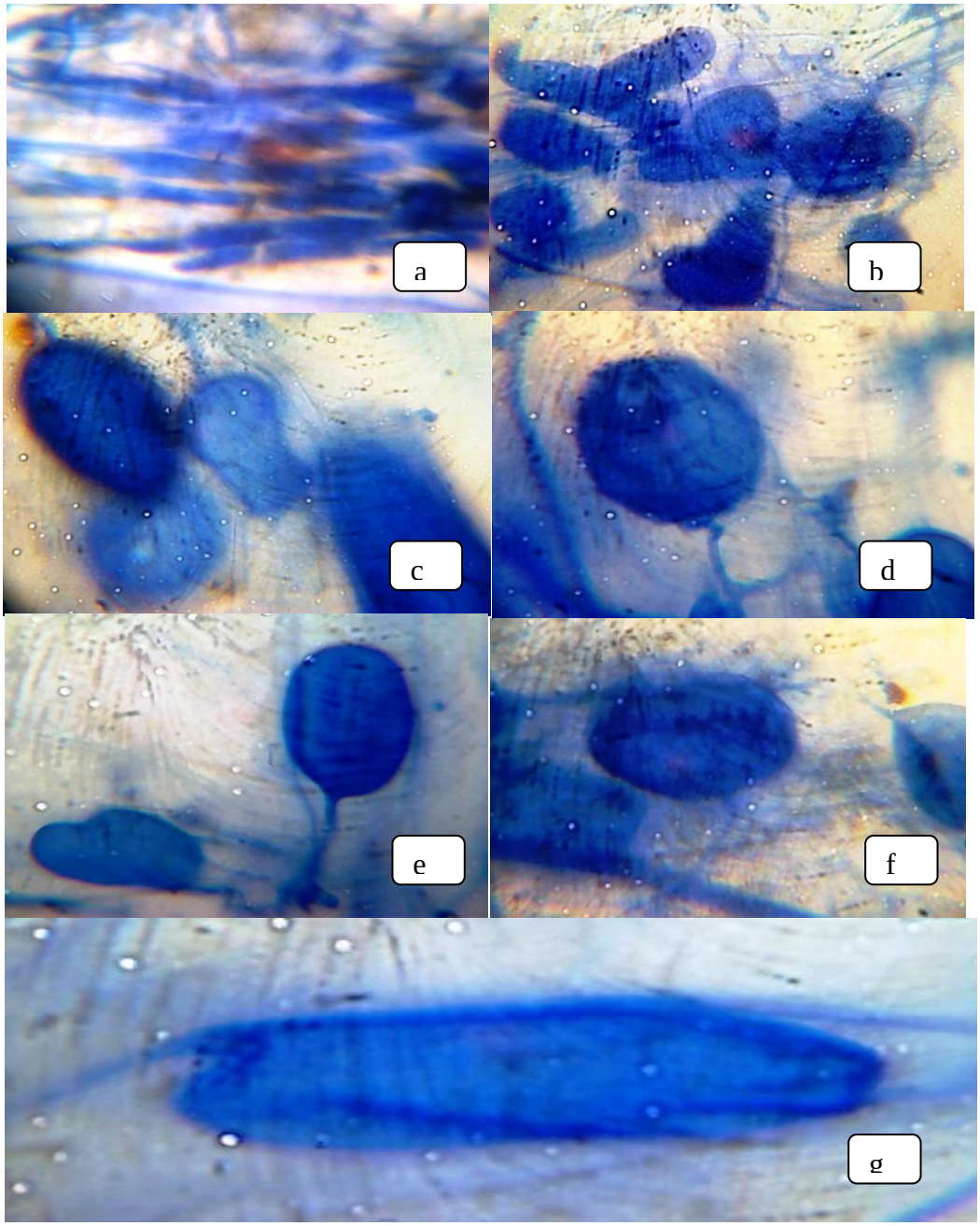
Result and Discussion

The roots of *Arachis hypogea* L. showed 90% Mycorrhizal colonization and the rounded, vesicles were prominent. The rhizospheric soil was screened for spore density and population. The spore density were recorded as 300 spores per 100gm of soil and The spore population mainly consist of different species of Arbuscular mycorrhizal such as mainly consist of *Glomus, Aculospora and Gigaspora.* spores were identified by using the manual of (Schenck and Perez, 1990). *Glomus fasciculatum* with subtending hyphae. Rounded shaped *Glomus reticulatum* and *Glomus species. Glomus fragilistatum, Glomus citricolla, ruptured wall of Glomus macrocarpum and Glomus globiforum, Glomus mosseae* and *Acaulospora laevis, Acaulospora sp*. and *Scutellospora pellicida, Scutellospora auriglobosa* and *Scutellospora calspora. Gigaspora rosea*. Similar observation made by Sasvari *et. al*., (2012) in their studies highest number of spores found in the tomato and peanuts at agricultural field of Vietnam.

The roots of *Aloe vera* showed 90 % root colonization and spore density was recorded as 250 spores per 100 gm of soil. Such observation were made by Mulani and Waghmare, (2012). The presence of large number of spore with varied population of spores indicated their universal occurance in the soil of university campus. Such observations were made by Mulani and Prabhu. (2002), Mulani et.al., (2004), Prabhu(2002) and Sathe (2005). Mulani and Prabhu had observed highest count of chlamydospores occurring in the root zone soil of *Dipcadi saxorum*. The murmy soil with moisture % and low humidity with high temperature fevers more chlymadospre formation. Similar observations were made by Harinikumar and Bagyaraj (1988) and Bagyaraj (1995) in tropical soil. Recently Pawar and Kakde (2012) have carried out the studies on the AMF associated with some medicinal plants from Mumbai region. They reported eight different species of *Glomus* namely *G. aggregatum, G. Boreale, G. fasciculatum, G. geosporum, G. heterosporum, G. segmentatum, G. tortuosum, G.radiatum* associated with the *Arachis hypogaea* L. showing in Fig : a,b c, d, e, f, g,i (Plate-I). Magnified view of rounded vesicles, Hyphae and Arbuscles seen in whole mount of root of *Arachis hypogaea* L. *(40x, 100x). different spores were isolated from rhizospheric soil of Arachis hypogaea* L. *from Ardhapur region in Nanded District.*

fig -a, b : Coenocytic hyphae, mycelium and Oval shaped Vesicles, arbuscles seen in root whole mount of *Arachis hypogaea* (10X, 40X); fig c, d, e, f, g :Magnified view of Oval shaped Vesicles seen in whole mount of root of *Arachis hypogaea* (40X, 100X).

PLATE-I



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