



**EFFECT OF ARBUSCULAR MYCORRHIZAL FUNGI ON THE GROWTH OF *TEPHROSIA PURPUREA* PERS. IN DROUGHT PRONE AREA OF SATARA DISTRICT OF MAHARASHTRA, INDIA**

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**Abstract**

*Medicinal weed belongs to family fabaceae were studied for the effect of native Arbuscular Mycorrhizal Fungi on the growth of Tephrosia purpurea Pers. Test plant was grown in permanently drought prone area Dahiwadi in eastern part of Satara District of Maharashtra India. The results exhibited in medicinal weed Tephrosia purpurea were found Arbuscular Mycorrhizal fungal association, Spore population and colonization percentage in the rhizosphere soil. However, more AM spore population, percent root colonization of AM fungi was attributed maximum with inoculation of Glomus dimorphicum while minimum with Glomus geosporum. Acaulospora delicate, Glomus dimorphicum, Glomus fasciculatum and Glomus geosporum AM fungi selected for the inoculation effect on growth of plant.*

**Key words:** Arbuscular Mycorrhizal Fungi, Tephrosia purpurea, colonization percentage, Spore population.

**Introduction:**

Arbuscular Mycorrhizal fungi are the most commonly occurring fungi and they are ubiquitous in nature. Power and Bagyeraj, (1986), Harley and Smith, (1983). They are associated with almost all plants in nature. Bruderett, M. (2004), Zhao, et al., (2001). AM fungi play a most important role in soil fertility, nutrient acquisition. Bagyaraj, (1986). AMF improve the quality of soil by influencing its structure and texture, and hence plant health (Zou et al., 2016; Thirkell et al., 2017). Many soil microbes form symbiotic association with plants, among them AMF stand out because of their enhanced plant nutrition, stress tolerance, production of growth promoting substances and protection from root pathogen. Abdullah et al., (2021). Arbuscular Mycorrhizal (AM) fungi are the key components of soil microflora and obviously interact with other microorganisms in the rhizosphere which is the zone of influence of plant roots on microbial populations and other soil constituents. Hindumati and Reddy, (2021). The importance of other soil microorganism for plant growth is well documented by different researchers in recent days. Namdas and Khilare (2009). Mane and Khilare (2013), (2016).

**Material Methods:**

**Study site:** The Arbuscular Mycorrhizal communities were studied in a field of Botanical Garden of affiliated research lab Department of

Botany Dahiwadi College Dahiwadi in Shivaji University, Kolhapur. Study site recognized as permanent drought prone area in Satara District of Maharashtra State India.

**Spore isolation from field and its identification:**

The soil samples of test plant were collected in sterile zip lock polythene bags. AMF were isolated from rhizosphere soil by wet sieving and decanting method of Gerdemann and Nicolson (1963). Intact AM spore were examined under binocular stereo microscope mounted in Polyvinyl lacto glycerol (PVLG) solution. Koske and Tessier (1983) and identified spores with size shape and wall layers and hyphal attachments using the species descriptions given by INVAM and manual of Schenck and Peerez 1990. Blaszkowski (1993). Book of Mycorrhizae, Rodrigues, (2009).

**Treatments:**

The field experiment was carried out in a complete randomized design with three replicates. Four treatments were considered; Control plants or nonmycorrhizal plants, Test plant inoculated with *Glomus geosporum* (Gg). *Acaulospora delicate* (Ad), *Glomus dimorphicum* (Gd), *Glomus fasciculatum* (Gf) and *Glomus geosporum* (Gg).

**Percent root Colonization:**

Root samples were collected from plant growing site Dahiwadi permanently drought prone area in

Satara District. Root samples were collected, washed with tap water and cut in to small pieces with sharp blade. Small segments of roots were autoclaved for 2-3 minutes in the trypan blue solution and de-stained with lactic acid in autoclave. Philips and Haymon, (1970).

### Result and Discussion:

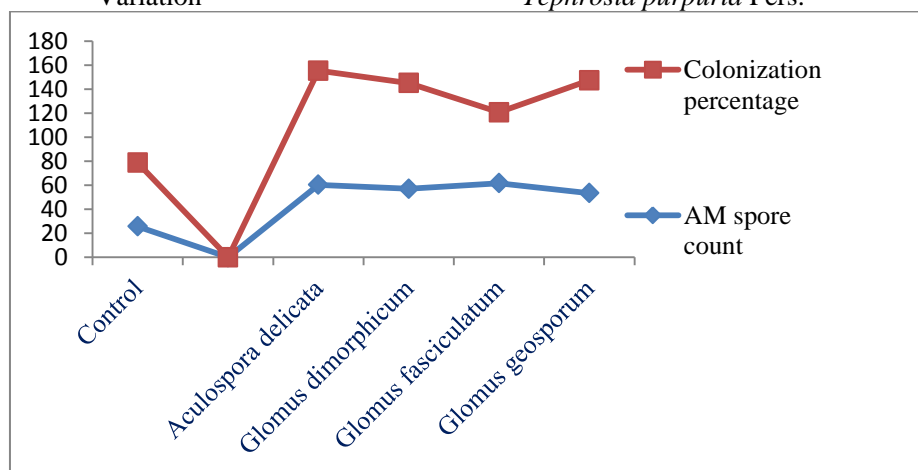
The results were depicted in Table no. 1. Fig. no. 1 indicated that, Maximum AM

population and percent root colonization was exhibited with inoculation of *Acaulospora delicata* (60.33), (95.00), and minimum with inoculation of *Glomus geosporum* (53.33). Whereas percent root colonization and AM spore population was absent in nonrelated test plant at 135 days plant. Table no. 1 Effect of AM fungi on AM spore population, percentage root colonization in *Tephrosia purpuria* Pers.

T	AM spore count	Colonization percentage
Control	25.67±2.03	53.00±0.58
<i>Acaulospora delicata</i>	60.33±12.71	95.00±0.58
<i>Glomus dimorphicum</i>	57.00±6.43	88.00±0.58
<i>Glomus fasciculatum</i>	61.67±3.67	59.00±0.58
<i>Glomus geosporum</i>	53.33±12.71	94.00±0.58
S. E. (Mean)	7.6531	0.7663
S. E. Diff	10.8232	1.0837
C.D. at 5%	1.1324	2.3246
C.V.%	26.3358	1.7821

SD- Standard deviation, S.E. Standard error, C.D. –Critical difference and C.V. Coefficient of Variation

Fig. no 1: Effect of AM fungi on AM spore population, percentage root colonization in *Tephrosia purpuria* Pers.



### Discussion:

A Effect of Arbuscular mycorrhizal fungi in different plants was reported by Walker et al., (1982), Sylvia, (1986); Koske, (1987). The variation in percent root colonization and AM spore population changed due to different environmental factors. Brundrett (1991); Boddington and Dodd, (2000). Howeler et al., (1987) also highlighted large variation occur in spore population and colonization percentage due to different agricultural sites. Desai and Rodrigues (2012) studied AM fungal effect on Vegetable crop Potato and reported effect of *Acaulospora* species found more in alkaline soils with pH 7.2.

### Conclusion:

Percent root colonization and AM spore population was increased with effect of *Glomus dimorphicum* and less with *Glomus geosporum*.

It is concluded that *Glomus dimorphicum* extensively colonized *Tephrosia purpuria* roots and considerably improved growth parameters as well as nutrient uptake.

### Acknowledgement:

The authors are Thankful to honorable Director Dr. B. T. Jadhav of Rayat Shikshan Sanstha's Yashvantrao Chavan Institute of Science, Satara (Autonomous) and Head, Department of Botany, for their constant support and facilities provided.

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