Arbuscular Mycorrhizal Status of *Vetiveriazizanioides* (L) Nash of Family Poaceae

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Abstract: Arbuscular mycorrhizal fungi play an important role in mobilization of nutrients and enhancing plant growth. It maintain the intimate link between the plant roots and soil the present investigation deals with Arbuscular mycorrhizal fungi status of *Vetiveriazizanioides* (L) Nash of family Poaceae with main emphasis on percent root Arbuscular mycorrhizal fungi colonization. Development of mycelia growth in the root tissue and the density and diversity of Arbuscular mycorrhizal spores in the rhizospheric soil of the plant. The roots and rhizospheric soil was collected from the botanical garden of Swami Ramanand Teerth Marathwada University Nanded and were analysed. The roots showed 90% Arbuscular mycorrhizal fungi colonization with extensive mycelial growth in the cortical tissue. The coenocytic hyphae was observed in cortical tissue mainly and even in vascular tissue. The vesicles were mainly oval, round and elongated. The soil analysis show presence of 240 resting spores in 100gm of soil and there is so much species diversity dominating mainly by *Glomus*, and important species are *Glomus mosseae*, *Glomus microcarpum*, *Glomus pachycaulis*.

Keywords: Arbuscular Mycorrhizal Colonization, *Vetiveriazizanioides* (L) Nash.

1. Introduction

Mycorrhiza the term first referred by German Botanist Arber Frank in 1985 for symbiotic relationship between fungi and plant root. It is a non-pathogenic association of fungi with roots of higher plants [12]. It perform important function in mobilising nutrients mainly uptake of phosphorus, inorganic and organic nitrogen and transport nitrogen and various organic material to the host plant [2]. Provide sustainanae in drought condition to many herbaceous plant [4,28]. The Arbuscular Mycorrhizal diversity in herbaceous vegetation medicinal plants, in halophytes plants have been investigated by many workers [3,11,13,14,16,17,18,19,21,26,29].

*Vetiveriazizanioides* (L) Nash is perennial grass locally called as Walla or Khas-Khas or Vetiver grass. It belongs to family Poaceae and occurring tropical climate worldwide mainly in Bangladesh, Burma, Ceylon, and spread South west Asia to tropical Africa. It grows luxuriently along river bank and in marshy soil and even can withstand extreme drought condition. It is an important species which control soil erosion also grown as soil binder. It can grow in all types of soil with high variation of pH ranging from 4.0 to 9.6 but profusely grown in well drained sandy, loamy soil [1,6,25]. It grows about 1.5 meters high and grows in large clumps from number of branched spongy rootstocks [10]. The root system is mat like extensive, fibrous and adventitious. The leaves are long, thin and rigid. The produces purple brownish flower.

The roots of *Vetiveriazizanioides* (L) Nash are refrigent, febrifuge, stomach and having immunogogue properties and essential oil extracted from the roots is used in perfumery and aroma theory [22]. The roots have antiinflammatory, anticeptic, properties and used as tonic, ,Cicatrisant, Nerveine, sedative, [1]. It is also used for many of their oilments such as mouth ulcers, fever, boil epilepsy, snake bite, headache, rheumatism, burn, scorpion sting. Paste of fresh roots applied on burns in santhal tribes of Bihar and west Bengal. The root ash issued from for acidity in organ tribes [5,9,24]. In various parts of India The roots are used as water flavouring agents and in North India is soft drink is prepared from fresh root. The roots are also used in preparation of mats or screen for windows, doors, desert cooler during summer month.

2. Materials and Methods

2.1 Study Site

Botanical Garden of School of Life Sciences, Swami Ramanand Teerth Marathwada University Campus, Nanded

2.2 Root Collection

The roots and rhizospheric soil of *Vetiveriazizanioides* (L) growing in Botanical garden of university campus was collected in month of August 2014, without damaging the root system. The collected plants along with root system were kept in beaker containing water for the removal of adhering soil and for separation of roots. Then the roots were washed under tap water. The young roots were cut into the small segments of 1 cm each. The Arbuscular mycorrhizal colonization was done using method suggested by [20] for the extent of mycorrhizal colonization of root segment. The root segments were kept in 10% KOH in test tube and autoclaved at 15 lb pressure for 20 minutes. Then 10% KOH was removed. De-staining of roots were done by adding 10 drops of H₂O₂ Neutralization of root segments was done by adding 10 ml of IN HCL. After 30 minutes cleared root segments were stained in cotton blue with lacto phenol and kept for 24 hr. Next day root segments were observed under microscope, for Arbuscular Mycorrhizal Colonization [20].

The occurance of arbuscules, mycelium, and Vesicle in the whole mount of roots were considered as positive root colonization.
colonization. Then the percentage of root colonization was calculated by using following formula. [8].

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\text{Per cent of mycorrhizal colonization} = \frac{\text{Number of root segments colonized}}{\text{Total number of root segments examined}} \times 100
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Simultaneously the rhizospheric soil collected was air dried and preserved for propagule studies. Spore isolate was done by using method of [7] with slight modification [17], in which 100 gmrhizospheric soil was dissolved in 1 liter of distilled water containing few drops of tween-20. The solution was stirred well by using glass rod and allowed to stand still for 15 to 20 minute.

The solution was then sieved through series of sieves i.e. 710µm, 210µm, 150µm, 75µm, 45µm, and 25µm respectively. Since the spore density was only found to be present on 75µm, 45µm and 25µm sieves, the debris of these sieves were collected and centrifuged in 1% sugar solution at 1000 rpm for 5 minutes. The supernatant was poured into Petri dish containing Nylon mesh with 20µm pore size for finding the spores were identified by using Manual for the identification of VA Mycorrhizal fungi suggested by[27].

3. Result and Discussion

The roots of Vetiverazizanioids(L).showed 90% ArbuscularMycorrhizal colonization. The vesicles were rounded, globular, elongated and prominent. The hypae are coenocytic, non-septate and branched. The rhizospheric soil analysis showed 240 spores/100gm of soil. The Arbuscularmycorrhizal genera recorded are Glomusmicrocarpum,Glomusmosseae, Glomuspachycaulis. The genus Glomus was dominant as compared to other genera of Arbuscularmycorrhiza.

Coenocytic hyphae, Vesicles are seen in root whole mount of Vetiverazizaniodes ( fig-a,b) and Magnified view of rounded vesicles are seen in whole mount of root of Vetiverazizaniodes(fig-c,d,e). Arbuscles in whole mount of root of Vetiverazaniodes are seen (fig- f,g,h). Different types of spores are seen such asGlomusmicrocarpum - Chlamydospores with thick , laminate wall and subtending hyphae.(fig.i).Glomusmosseae-Walls of spores double with thin outer and thick inner layers.(fig.j).Glomuspachycaulis- Spores with shorter and thick walled attached hyphae radially arranged on a central plexus of hyphae.( fig. k).

![Image](image-url)
Figure-II: Isolated Arbuscular Mycorrhizal fungal spores-(i) Glomus microcarpum - Chlamydospores with thick ,laminate wall and subtending hyphae. (j) Glomus mosseae- Walls of spores double with thin outer and thick inner layers. ( k ) Glomus pachycaulis- Spores with shorter and thick walled attached hyphae radially arranged on a central plexus of hyphae.

References


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