



REGULAR ARTICLE

EFFECTS OF COMBINED INOCULATION OF AM FUNGI AND AZOSPIRILLUM ON THE GROWTH AND YIELD OF ONION (*ALLIUM CEPA* L.)

S. Sridevi^{1*} and K. Ramakrishnan²

¹Research and Development, Bharathiyar University, Coimbatore-641 046

²Department of Botany, Annamalai University, Annamalainagar – 608 002

SUMMARY

An experiment was conducted to study the effect of AM (Arbuscular mycorrhizae) fungi and *Azospirillum* on onion (*Allium cepa* L.). Both the inoculants were applied by seed, seedling and soil application method. These inoculants were tried at as a single and dual inoculation and comprised with control. Over all influences by these two beneficial microbes played a vital role in supplying N and P to the onion and found enhanced the growth and yield over the untreated control.

Key words: Onion, AM fungi, *Azospirillum*, Dual inoculation, Biofertilizer

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*Corresponding Author, Email: leninreegan@gmail.com

1. Introduction

The onion (*Allium cepa* L.) is one of the most important commercial crop among vegetables and spices. Onion is only vegetable in which India figures prominently in the world for production and export (Singh and Joshi, 1978). Onion has immense medicinal values and is useful in fever, dropsy, catarrh and chronic bronchitis. Raw onion has an antiseptic value through the alimentary canal. It promotes bile production and reduces blood sugar (Pandey and Singh, 1993). In order to meet the increasing demand of the consumers and fill the gap in off-season, onion is now gaining popularity as kharif season crop also. Crop production of onion is affected by several factors. Usually little or no chemical fertilizer is added to this crop and hence characterized by low yield. Hence, there is a need to study the possible ways of improving the yields of this crop. Biofertilizer have recently gained with momentum for effecting the sustainable increase in crop yield under various agroclimatic conditions. Role of biofertilizer on the crop growth and yield was documented by Vijayakumar *et al.* (2000) and Ramakrishnan and Thamizhiniyan (2009). The present investigation has been taken

upto assess the significance of nitrogen fixer and phosphorus mobilizer on the improvement of growth and yield of onion.

2. Materials and Methods

The filed experiment was conducted to find out the effect of AM fungi (*Glomus mosseae*) and *Azospirillum brasilense* on the growth and yield of onion. The field was prepared as per the recommended agronomic practices. Onion CO 1 variety was utilized for this study. AM fungi and *Azospirillum* were inoculated alone and in combination. These inoculants were applied as seed, seedling (*Azospirillum*) and soil application (AM fungi) method. Each treatment was replicated four times. Seedlings were transplanted at 20 × 10 cm spacing in 3 × 5 m² plots. Biometric observation like plant height, number of leaf sheath/plant, bulb equatorial diameter, bulb polar diameter, scale number per bulb and bulb yield was recorded.

3. Results and Discussion

The results on the effect of combined inoculation of AM fungi and *Azospirillum* on the growth and yield of onion var. CO 1 is

presented in Table 1. Bioinoculation of Arbuscular mycorrhiza and *Azospirillum* as seed, seedling and soil broadcasting effected enhanced establishment of vigour indexes of onion. The various growth biometrics *viz.*, plant height, number of leaf sheaths/plant at 30 and 60 days after transplanting in main field was found significantly increased over untreated control. The effect being registered with the dual inoculation of both the bioinoculants which might be due to the provision of nitrogen and growth promoting substances (IAA, GA) by phosphorus by AM

fungi created with sustainable growth of the crop. Appa Rao Podle (1995) reported seedling of *Bacillus subtilis* found to increase the yield of pigeon pea. Similar to the present investigation, Upadhyaya *et al.* evinced the role of nitrogen fixing microbes in the rhizosphere of onion found to record high nitrogenase activity and it was altered by the varieties, age and nature of the soil. Gopal (1991) critically reviewed the role of biofertilizers on the sustainable crop productivity.

Table 1. Effect of combined inoculation of AM fungi and *Azospirillum* on the growth and yield attributes of CO 1 onion

Treatments	Plant height (cm)	No. of leaf sheath/plant	Bulb equatorial diameter (cm)	Bulb polar diameter (cm)	Scale number/bulb at harvest	Bulb yield (q/ha)
Control	46.06	4.67	2.17	2.68	6.19	134.40
AM fungi	50.89	9.40	3.38	3.12	8.90	286.02
<i>Azospirillum</i>	51.68	9.21	3.47	3.64	9.08	290.10
AM fungi + <i>Azospirillum</i>	61.19	12.29	4.91	4.55	11.49	310.73
CD at 5%	0.800	0.328	0.075	0.142	0.138	5.913

At harvest the inoculation of AM fungi and *Azospirillum* significantly enhanced the bulb diameter, scale number per bulb and bulb yield (q/ha) over their respective control. Kundu and Gaur (1982) reported the yield of wheat was increased due to the inoculation of *Azotobacter* and phosphobacteria. Saxena and Tilak (1994) critically analyzed the role of biofertilizers on the crop productivity over all influences by these two microbes played a vital role in supplying nitrogen and phosphorus to the onion and found enhanced the growth and yield over the untreated control.

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