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Research Article

STUDIES ON THE EFFECT OF GRADED LEVELS OF NITROGEN AND AZOSPIRILLUM ON YIELD OF ASHGOURD (*BENINCASA HISPIDA COGN.*) CV. CO-1

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ABSTRACT

An investigation was conducted to study the effect of graded levels of nitrogen and *Azospirillum* on growth and yield of Ashgourd (*Benincasa hispida cogn.*) cv.CO-1" was taken up in a new area, vegetable unit, Annamalai University, Annamalinagar during 2014- 2016. The mineral nutrient nitrogen was applied at 5 levels viz., 30, 45, 60, 75 and 90 kg ha⁻¹ and *Azospirillum* was applied in two levels [with *Azospirillum* (A_t) and without *Azospirillum* (Ao)] and totally there were ten treatment combinations in three replications and the experiment was laid out in Randomized block design (RBD). The results of this experiment revealed that the plots that received combined application of nitrogen 75 kg ha⁻¹ along with of *Azospirillum* -@ 2 kg ha⁻¹ of soil evinced better performance on the growth attributes like, vine length, number of primary Branches, number of leaves per vine, leaf area, leaf area index, days to first female flowering, number of female flowers per vine, sex ratio, number of fruits per vine, fruit length, fruit girth, fruit weight, fruit yield

INTRODUCTION

Vegetables are important constituents of Indian agriculture and nutritional security due to their short duration, high yield, nutritional richness, economic viability, and ability to generate on farm and off-farm employment. Our country is blessed with diverse agro-climates with distinct seasons, making it possible to grow wide array of vegetables. The ash gourd fruits are valued for its medicinal properties too. In India and china, they are used as an anthelmintic, antiperiodic and aphrodisiac for lowering blood sugar, against epilepsy, insanity and other nervous diseases. They are recommended in Ayurvedic medicine for the management of peptic ulcers. The seeds are used as averninfuge (Kausar *et al.*, 2013). The famous Ayurvedic preparation Kushmanda rasayanam used as a nerval tonic and health rejuvenater is prepared using fruits of ashgourd cultivar called Vaidyakumbalam or Neikumbalam. Ashgourd is also useful in treating respiratory disorders like asthma, blood related diseases and urinary diseases like kidney stone (Paul, 2012). Ashgourd is an excellent source of vitamine B (Thiamine), a good source of vitamin 63 (Naicin), and vitamin C. It is also rich in many minerals like calcium. Its high potassium content makes this a good vegetable for maintaining a healthy blood pressure.

MATERIALS AND METHODS

The experiment on "Studies on the effect of graded levels of nitrogen and *Azospirillum* on growth and yield of ashground

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(*Benincasa hispida cogn.*) cv. CO-1" was carried out during January to May 2016. Ashground variety CO-1 was used for the study. The seeds were procured from the Vegetable Research Station of Tamilnadu Agricultural University at Palur. The experimental area was ploughed thoroughly with tractor drawn disc plough and the soil was brought to fine tilth. At the time of last Ploughing, 25 t ha⁻¹ of FYM manure was incorporated. Plots were earmarked for each treatment with an area of 18m² and then beds were formed at a spacing of 1.5 m within each plot. Pits of size 30 cm³ were made at a spacing of 2 x 1.5 m. Five seeds were sown in each prepared pits. Thinning was done 10 days after germination. The required quantity of nitrogen was applied in two split doses as per treatments. The first dose was applied at the time of sowing followed by top dressing at 30 days after sowing. The entire phosphorus and potassium were applied basally during the time of sowing the fertilizers were applied in the form of urea, single super phosphate and muriate of potash.

RESEARCH AND FINDINGS

Application of various levels of nitrogen and *Azospirillum* significantly influenced the number of fruits per vine, fruit length, fruit girth, individual fruit weight, fruit yield plot⁻¹. Similar results were reported by Mangal *et al.* (1977) and Xu and Cheng (1989) in watermelon, Janakiraman (1996) in Gherkin and Selvakumar (1998) in cucumber the reason may be due to the increase in the number of cells as well as elongation of individual cells and also due to the better translocation of soluble ions under optimum level by nitrogen. Similar findings were reported by Amirthalingam (1988) in chillies. *Azospirillum* have a dominant role in increasing the fruit length, fruit girth, fruit weight, number of fruits and yield plot⁻¹.

Table 1. Effect of graded levels of nitrogen and *Azospirillum* on yield parameters in Ashgourd (*Benincasa hispida cogn.*) cv. CO-1

Treatments	No. of fruits per vine-1	Single fruit weight (Kg)	Fruit length (cm)	Fruit grith (cm)	Flesh thickness (cm)	Seed weight (g)	Pulp: Seed ratio	Fruit yield vine-1 (kg)	Fruit yield plot-1 (kg)	Fruit yield (t ha-1)	Dry matter production (g plant-1)
T ₁ – 30:60:80 kg NPK ha ⁻¹	2.21	2.93	14.94	28.14	2.41	224.77	8.68	4.38	23.70	12.08	399.85
T ₂ – 30:60:80 kg NPK ha ⁻¹ + <i>Azospirillum</i>	2.66	3.23	17.05	31.07	2.90	251.62	8.80	6.24	33.43	16.91	440.17
T ₃ – 45:60:80 kg NPK ha ⁻¹	3.13	3.55	19.18	34.02	3.32	278.47	9.14	8.11	43.14	21.74	488.51
T ₄ – 45:60:80 kg NPK ha ⁻¹ + <i>Azospirillum</i>	3.27	3.67	19.87	34.97	3.45	287.41	9.24	8.72	46.37	23.32	493.92
T ₅ – 60:60:80 kg NPK ha ⁻¹	4.31	4.31	24.76	41.80	4.42	350.09	10.70	13.05	69.02	34.596	587.97
T ₆ – 60:60:80 kg NPK ha ⁻¹ + <i>Azospirillum</i>	4.90	4.68	27.56	45.70	4.97	385.88	10.88	15.51	81.19	40.99	641.72
T ₇ – 75:60:80 kg NPK ha ⁻¹	4.45	4.38	25.45	42.77	4.55	359.03	10.78	13.66	72.28	36.16	601.40
T ₈ – 75:60:80 kg NPK ha ⁻¹ + <i>Azospirillum</i>	5.37	5.00	29.69	48.65	5.41	412.69	11.22	17.38	91.69	45.84	682.06
T ₉ – 90:60:80 kg NPK ha ⁻¹	3.84	4.01	22.65	38.85	4.00	323.22	10.36	11.18	59.29	29.73	547.65
T ₁₀ – 90:60:80 kg NPK ha ⁻¹ + <i>Azospirillum</i>	3.72	3.94	21.19	37.90	3.89	314.28	9.56	10.57	56.08	28.15	534.24
S.Ed	0.16	0.11	0.17	2.19	0.15	8.96	0.12	0.63	3.25	1.62	13.45
CD (p=0.05)	0.46	0.34	2.15	6.58	0.46	26.89	0.36	1.89	9.75	4.87	40.36

Increased yield could be due to properly colonized roots, which increased water and mineral uptake from soil and also by increasing biological nitrogen fixation (Okon, 1984). It could also be attributed due to the production of indole acetic acid gibberellins and cytokinin like substances produced by the bacteria as evident from the findings of Veeraragavathatham *et al.*, (1988) in chillies. The photosynthetic ability was more due to *Azospirillum* inoculation which inturn favoured an increased accumulation of dry matter and also efficient portioning of photosynthates towards sink. Similar results were recorded by Dhanalakshmi and Pappiah (1993) in tomato, Sharma *et al.* (1995) in bhendi. Another reason for this is nitrogen which was made available by biological activity of the inoculated bacterium and it was utilized in the formation of nitrogenous substances such as protein and they act on build up of new tissues thus culminating in the production of fruits (Mahandran *et al.*, 1995). The combined application of 75 kg nitrogen ha⁻¹ along with *Azospirillum* @ 2 kg ha⁻¹ of soil (T₈), significantly influenced the fruit yield plot (91.69 kg) when compared to the individual application, the reason may be due to the combined effect of the treatments which increased the biological activity of the soil, which in turn increased the yield.

Conclusion

Based on the present investigation, among the various treatments (T₈) application of 75:60:80 kg NPK ha⁻¹ plus *azospirillum* @ 2 kg ha⁻¹ recorded the highest yield parameters, ashgourd.

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