

Growth and Yield of Cauliflower (*Brassica oleracea* Var. *botrytis*) as influenced by organic manures

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Abstract- The field experiment entitled “Growth and Yield of Cauliflower (*Brassica oleracea* Var. *botrytis*) as influenced by organic manures” was done during the Rabi season of 2022-2023 at Gulzar Group of Institutions. The experiment was conducted using complete randomized block design (CRBD) with three replications, and involving the application of ten different treatments. Treatment T10 (3 t ha⁻¹AM + 1 t ha⁻¹WM + 1 t ha⁻¹ CM) give maximum plant height(48.72 cm), number of leaves (16.62), leaf length(30.37 cm), curd diameter (20.87cm), curd weight (986.10g) and curd yield (27.39kg plot⁻¹). The minimum values were observed under treatment T1 (Control).

Keywords- Cauliflower, Worm Manure, Chicken Manure, AM

I. INTRODUCTION

Cauliflower (*Brassica oleracea* Var. *botrytis*) holds a prominent position among winter season vegetable, which belongs to the genus *Brassica* of the family Cruciferae and having a chromosome number $2n=18$. The term cauliflower originates from Latin, where ‘Caulis’ mean cabbage and ‘Floris’ signifies flower. The delicacy cauliflower curd is an inflorescence modification. The tender curd of cauliflower is consumed as a vegetable, pickling and soups. It is mostly grown throughout the country (Choudhary *et al.* 2003). Because of its delicious flavor, this vegetable is in high demand. The crop is reported to be native of Mediterranean region and it was introduced to India from England in 1822 (Abduli *et al.* 2012).

India ranks as the world’s second-largest vegetable producer, after China. In India, area under vegetable crop cultivation is 10,100 thousand ha with the production of 185883 thousand MT and productivity of 18.40 MT ha⁻¹(Anonymous 2019). Cauliflower is a cool season hardy crop and well grown in the cold and moist climate. Raw cauliflower provides large quantity of vitamins and nutrients. It provides a rich supply of protein, thiamine, riboflavin, phosphorus and potassium and also an excellent source of dietary fiber, pantothenic acid, vitamin B6, vitamin C, vitamin K, and manganese (Bhandari and Kwak 2015).

As we use inorganic fertilizer for cultivation, it results in increase the cost of cultivation and also has a harmful impact on the soil as well as on all aspect of life. Encouraged cultivators to use organic fertilizers that preserve the fertility of soil. Organic manures are utilising for the sustainable production of high graded cauliflower. Recycling of crop residue, animal manure, farm waste and other organic byproducts are all the example of organic manures (Choudhary *et al.* 2002). Crop production is benefited by organic manures such as AM, Worm Manure and chicken manure. These support the enhancement of soil structure and texture, ultimately benefiting of crop. Organic manures slowly releases nitrogen and volatilization losses are far lower than with inorganic fertilizers (Anonymous 2020).

II. MATERIALS AND METHODS

The present investigation entitled “Growth and Yield of Cauliflower (*Brassica oleracea* Var. *botrytis*) as influenced by organic manures” was conducted during winter season of 2022-2023 at Gulzar Group of Institutions. Complete randomized block design were used in the experiment with three replications and ten treatments. In each plot treatments were applied randomly viz., T1 (Control), T2 (15 t ha⁻¹AM), T3 (2 t ha⁻¹WM), T4 (1.5 t ha⁻¹ CM), T5 (10 t ha⁻¹AM + 1t ha⁻¹WM), T6 (10 t ha⁻¹AM +1.5t ha⁻¹WM), T7 (8 t ha⁻¹AM + 1 t ha⁻¹ CM), T8 (1t ha⁻¹WM + 1.5 t ha⁻¹ CM), T9 (1 t ha⁻¹ WM + 1 t ha⁻¹ CM) and T10 (3 t ha⁻¹AM + 1 t ha⁻¹WM + 1 t ha⁻¹ CM). On 15th August, 2022 seeds were planted using line sowing method in a nursery bed that had been well tilled. Seedlings are ready for transplant in experimental field within 25-30 days. In Each plot manual seedling transplantation is completed using 45 × 45 cm spacing.

III. RESULTS AND DISCUSSION

Growth attributes

The data related to plant height, number of leaves and leaf length of curd is shown in Table 1. The plant height (48.72 cm), number of leaves (16.62) and leaf length (31.89 cm) were observed maximum under the treatment T10 (3 t ha⁻¹AM + 1 t ha⁻¹WM + 1 t ha⁻¹ CM) that stays statistically at par plant height (47.43cm), number of leaves (16.29) and leaf length (30.37 cm) with treatment T9 (1 t ha⁻¹ WM + 1 t ha⁻¹ CM). The least plant height (40.41 cm), number of leaves (11.12), leaf length (26.13 cm) was observed under treatment T1 (control). The data of present investigation clearly revealed that cauliflower responded favorably to

organic manures. The results of treatment T10 showed that use of Worm Manure, Chicken manure and Animal Manure together shows excellent performance.

The application of organic manure described the treatment T10 best because these have higher nutritional values as compared to other manures which are required to crop plant for better growth and yield. These manures released the nutrients slowly and provided it to crop throughout its whole life cycle which results in increased the vegetative development of cauliflower plant. There were macro and micro nutrients in the Worm Manure and Poultry manure which helped to increase the number of leaves⁻¹. Therefore, organic manures improve the soil porosity and provides sufficient amount of nutrients that was easily received by plants. The similar outcomes of cauliflower observed by Mehedi *et al.* (2018) in broccoli, Kumar *et al.* (2014) and Ali *et al.* (2018) in cauliflower crop.

Table 1: Growth characteristics of cauliflower influenced by organic manure:

Treatments	Plant height (cm)	No. of leaves per plant	Leaf length (cm)
T1:Control	40.41	11.12	26.13
T2: 15 t ha ⁻¹ AM	42.96	12.86	27.34
T3: 2 t ha ⁻¹ WM	45.35	15.19	29.13
T4: 1.5 t ha ⁻¹ CM	44.43	14.88	28.85
T5: 10 t ha ⁻¹ AM+ 0.5 t ha ⁻¹ WM	43.33	13.21	27.89
T6: 10 t ha ⁻¹ AM + 1.5 t ha ⁻¹ WM	44.19	14.68	28.35
T7: 8 t ha ⁻¹ AM + 1 t ha ⁻¹ CM	43.76	13.46	28.12
T8: 1 t ha ⁻¹ WM + 1.5 t ha ⁻¹ CM	46.32	15.45	29.74
T9: 1 t ha ⁻¹ WM + 1 t ha ⁻¹ CM	47.43	16.29	30.37
T10: 3 t ha ⁻¹ AM + 1 t ha ⁻¹ WM + 1 t ha ⁻¹ CM	48.72	16.62	31.89
SE(d)±	0.82	0.30	0.51
CD at 5%	1.33	0.34	1.56

Yield attributes

The data related with curd diameter, curd weight and curd yield of cauliflower is presented in Table 2. The maximum curd diameter (20.87 cm), curd weight (986.10 g) and curd yield (27.39 kg plot⁻¹) was observed with the treatment T10 (3 t ha⁻¹AM + 1 t ha⁻¹WM + 1 t ha⁻¹ CM) that stays statistically at par curd diameter (19.51 cm), Weight of curd (932.22 g) and curd yield (26.29 kg plot⁻¹) with treatment the T9 (1 t ha⁻¹ WM + 1 t ha⁻¹ CM) whereas the least curd diameter (12.22 cm), curd weight (552.16 g) and curd yield (20.29 kg plot⁻¹) was obtained in treatment T1 (control).

Table 2: Yield characteristics of cauliflower influenced by organic manure:

Treatments	Curd Diameter (cm)	Curd weight (g)	Curd Yield (kg plot ⁻¹)
T1:Control	12.22	552.16	20.29
T2: 15 t ha ⁻¹ AM	15.89	632.12	22.89
T3: 2 t ha ⁻¹ WM	18.22	776.45	25.43

T4: 1.5 t ha ⁻¹ CM	17.94	745.10	24.55
T5: 10 t ha ⁻¹ AM+ 0.5 t ha ⁻¹ WM	16.33	648.35	23.46
T6: 10 t ha ⁻¹ AM + 1.5 t ha ⁻¹ WM	17.31	732.12	24.32
T7: 8 t ha ⁻¹ AM + 1 t ha ⁻¹ CM	16.76	669.76	23.75
T8: 1 t ha ⁻¹ WM + 1.5 t ha ⁻¹ CM	18.66	884.15	25.85
T9: 1 t ha ⁻¹ WM + 1 t ha ⁻¹ CM	19.51	932.22	26.29
T10: 3 t ha ⁻¹ AM + 1 t ha ⁻¹ WM + 1 t ha ⁻¹ CM	20.87	986.10	27.39
SE(d)±	0.29	2.18	0.83
CD at 5%	1.38	3.88	1.12

Application of Worm Manure poultry manure and Animal Manure helps the soil to become more granular which leads the cauliflower to penetrate more readily into the soil. The results in increase in the diameter and weight of curd of cauliflower. It enhances the soil structure, texture and drainage capabilities, which helped to grow curd on the soil surface. Formation of amino acid in the meristematic tissue developing zone is supported by nitrogen, which were then integrated into complex proteins and supported the growth of cauliflower. In addition to fresh weight, curd diameter, and yield kg plot⁻¹ cauliflower was also produced. The findings of the present investigation align with those of prior studies conducted by Sharma *et al.* 2020, Miglani *et al.* 2017 and Alam *et al.* 2017 in the context of cauliflower i.e., combined use of organic manures.

IV. CONCLUSION

It is resulted that the combined use of Worm Manure, Poultry manure and Animal Manure increased the growth attributes like plant height, number of leaves, leaf length and yield attributes curd diameter, curd weight and curd yield kg plot⁻¹ of cauliflower. By utilising of organic manures improves fertility, structure and texture of the soil while increasing the amount of nutrients available to plants, leading to higher cauliflower growth.

V. REFERENCES

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