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Short Communication

Effect of Biofertilizers on Corm Production of Gladiolus cv. Arka Amar

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Gladiolus (*Gladiolus grandiflorus* L.) is commonly known as Queen of bulbous flower crops which belongs to the family Iridaceae. It occupies the fifth position in the international floriculture trade. It has great economic value as a cut flower and for decoration because of its long spike, wide range of colours with acropetal opening pattern and long vase life. The crop is propagated through corms, which are round, swollen underground plant stems that are enveloped in several layers of brownish, fibrous tunics and quality propagating material is the key to success in getting better crop growth and yield. Cultivation of gladiolus doubles the profit of farmers by selling these corms along with flower spikes. Hence, now-a-days it gains the tremendous popularity among flower growers. The growth and development of plant depends on various factors, among them nutrition plays a significant role. Gladiolus is a highly nutrient responsive crop therefore for getting maximum return, farmers are applying huge quantity of chemical fertilizers. By using excessive quantity of chemical fertilizers, one can get higher return but it also has adverse effect on soil as well as beneficial organisms. Long term fertilizer experiments have made clear the negative impacts of continuous use of chemicals on soil health [1]. Verma *et al*. [2] reported that indiscriminate and continuous use of chemical fertilizers has led to an imbalance of nutrients in soil which has adversely affected the soil health, affecting the yield and quality of the produce. Therefore, nowadays to restore the soil fertility, concentration is inclined towards the use of biofertilizers along with the chemical fertilizers. Biofertilizers are the products containing living cell of different types of microorganisms which have the ability to convert unavailable form of nutrients to available form through biological process. Muraleedharan *et al*. [3] observed that addition of biofertilizers in soil increase the availability of nutrients and improve the yield by 10 – 25% without adversely affecting the soil and environment. Keeping this in view, the present experiment was carried out to observe the response of biofertilizers on corm characteristics of gladiolus var. Arka Amar.

The present experiment was conducted at Agricultural Research Station, Binjhagiri, Chatabara of the Institute of Agricultural Sciences, Siksha 'O' Anusandhan (Deemed to be University), Bhubaneswar, Odisha during November 2021 to March 2022. The experiment consists of nine treatments viz. T_1- Control, T_2- 100% RDF + Azotobacter, T_3- 100% RDF + Azospirillum, T_4- 50% RDF + Azotobacter, T_5- 50% RDF + Azospirillum, T_6- 100% RDF + Azotobacter + PSB, T_7- 50% RDF + Azotobacter + PSB, T_8- 100% RDF + Azospirillum + PSB and T_9- 50% RDF + Azospirillum + PSB. The treatments were replicated thrice in a Randomized Block Design. Corms were planted at a spacing of 40 cm x 40 cm to accommodate twenty plants per plot. Both fertilizers and biofertilizers were applied to the corms as soil application. Biofertilizers (PSB, Azospirillum and Azotobacter) were applied @ 4 kg/ha in two split doses, first before spike emergence stage and second after harvesting of spikes for better corm growth. Similarly, fertilizers were applied in three split doses, first as basal, second before spike emergence and third after harvesting of spikes. Observations were taken on different corm characteristics after harvesting of corms and the data obtained from various characters under study were analyzed by the method of analysis of variance as described by Gomez and Gomez [4].

The data presented in (Table 1) revealed that, maximum (3.73) number of corms per hill was found in T_8 (100% RDF + *Azospirillum* + PSB), followed by 3.46 numbers of corm/hill in T_6 (100% RDF + *Azotobacter* + PSB). Whereas, lesser number of corms/hill (2.06) was recorded in control (T_1) [5]. The maximum number of corms/ha (155555.4) was obtained from the treatment T_8 (100% RDF + *Azospirillum* + PSB), followed by 152222.1nos in T_6 (100% RDF + *Azotobacter* + PSB). Whereas, lesser number of corms/ha (113333.2) was recorded in control (T_1) [6]. The result might be due to the applications of bio-fertilizers which improves the number of microbes in the soil resulting in better root multiplication, enhanced absorption of nutrients and water, more photosynthesis of luxuriant leaves and improved food storage, improved combination potential of ions and water from the soil resulting into increase in yield of corms [7-8].

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Among the treatments, treatment T_8 (100% RDF + *Azospirillum* + PSB) was found to be significantly superior in recording highest corm weight (216.53 gm), followed by 197.98 gm in T_6 (100% RDF + *Azotobacter* + PSB). Corm weight was found lowest in T_1 (109 gm) [5]. The increased weight of corm per hill could be mainly due to availability of adequate quantity of nutrients for better filling up of corms, which resulted in the increased corm weight [9-11].

The maximum corm diameter (6.33 cm) was obtained from the treatment T_8 (100% RDF + *Azospirillum* + PSB), followed by 5.82 cm in T_6 (100% RDF + *Azotobacter* + PSB). Whereas, lesser corm diameter of 5.04 cm was recorded in control (T_1). An increase in the average diameter of corms is due to the use of biofertilizers may be due to the fact that it increases the photosynthetic behavior of the plants and thereby accelerates the development of the photosynthetic sink towards the source (corm). It also raises carbohydrates. Better vegetative growth resulted in more assimilation of food material and its diversion towards more corm diameter which was in close agreement with the findings of Karthiresan and Venkatesh [12] in gladiolus and Swaminathan *et al.* [13] in tuberose.

Table 1 Effect of biofertilizers and RDF on various corm characters

	Treatments	No. of corms/hill (nos)	No. of corms/ha (nos)	Weight of corm/hill (gm)	Corm diameter (cm)
T_1	Control	2.06	113333.22	109.63	5.04
T_2	100% RDF + *Azotobacter*	2.53	122222.10	158.62	5.37
T_3	100% RDF + *Azospirillum*	2.80	125555.43	166.52	5.38
T_4	50% RDF + *Azotobacter*	2.20	122222.10	131.62	5.24
T_5	50% RDF + *Azospirillum*	2.33	122222.10	138.64	5.33
T_6	100% RDF + *Azotobacter* + PSB	3.46	152222.07	197.98	5.82
T_7	50% RDF + *Azotobacter* + PSB	2.93	133333.20	172.35	5.53
T_8	100% RDF + *Azospirillum* + PSB	3.73	155555.40	216.53	6.33
T_9	50% RDF + *Azospirillum* + PSB	3.20	138888.75	185.31	5.64
	SEM	0.072	2670.776	2.661	0.122
	CD 5%	0.218	8006.131	7.977	0.367

SUMMARY

An investigation was carried out at Agricultural Research Station, Institute of Agricultural Sciences, Siksha 'O' Anusandhan (Deemed to be University), Bhubaneswar to find out the effect of biofertilizers on corm production of gladiolus cv. Arka Amar. For this, nine treatments were taken, replicated thrice in a randomized block design. The study revealed that, maximum number of corms per hill (3.73), highest corm weight (216.53 gm) and maximum corm diameter (6.33 cm) were obtained from the treatment T_8 (100% RDF + *Azospirillum* + PSB), followed by 5.82 cm in T_6 (100% RDF + *Azotobacter* + PSB). It may be concluded that, the positive effect of biofertilizers was clearly visible as compared to control. But the combination of 100% RDF + *Azospirillum* + PSB was found more effective for all the corm attributes than *Azotobacter*.

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