RESEARCH ARTICLE

ECONOMIC FEASIBILITY AND PROFITABILITY OF GLADIOLUS (*GLADIOLUS HYBRIDUS* L.) CULTIVATION UNDER OPEN FIELD CONDITION

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Abstract: Gladiolus occupies a pristine place in the garden for its magnificent inflorescence, wide array of colours, and fascinating varieties of shapes and sizes. The demand for gladiolus cut flower is gaining momentum with increasing aesthetic sense and higher socio-economic standard of the people. Owing to its ever increasing demand every year at a galloping speed has now created enough opportunities for economic growth potential in future. Hence, to evaluate economic viability of cultivation as a commercial cut flower crop the present investigation was carried out under open field condition. Economics study showed that there is a significant difference with respect to genotypes. Among the different genotypes studied highest gross returns were obtained from genotype Arka Amar (Rs. 17,58,000/ha), followed by Tilak (Rs. 12,78,000/ha), Sagar (Rs. 12,78,000/ha) and Aarti (Rs. 12,42,000/ha) with a net return of Rs. 12,75,050, 795050, and Rs. 759050/ha, respectively compared to other genotypes grown under open field condition. The investment in gladiolus crop was found to be economically sound and highly remunerative as these genotypes produce highest yield (flower spikes) per hectare resulted in maximum B:C ratio of 2.64, 1.65 and 1.5 respectively, hence the same can be exploited for commercial cultivation to meet the increasing global demand.

Keywords: Gladiolus, Genotypes, Economics, B:C ratio, Open field condition

INTRODUCTION

Gladiolus (*Gladiolus hybridus* L.) is an important bulbous ornamental plant prized for its beauty of spikes as well as longer vase. It is the leading geophyte grown worldwide and it is one of the most attractive and popular bulbous flowers, known for its majestic spikes possessing attractive, elegant and delicate florets. There is no flower to surpass its beauty due to its long lasting spikes occurring in striking colors as unicoloured, bicoloured or multicoloured. Tournefort christened Gladiolus as a genus, which was accepted by Linnaeus in botanical literature (Lewis et al., 1972). The genus Gladiolus is a member of family Iridaceae and sub-family Ixioideae (Goldblatt, 1991). In Europe it is called as Corn flag because *Gladiolus illyricus* was found to be weed in corn field. Popularity of this crop as a cut flower is increasing day by day because of its attractive flower spikes and availability in wide range of colors of the florets, varying number of florets and their size, wide range of keeping quality and adaptability to different seasons. These characters have made it very attractive for use as a cut flower, vase and bouquet preparation, growing in herbaceous borders, beddings, rockeries and pot cultivation. At present there are about 255 species (Pragya *et al.*, 2010b) in gladiolus, the modern cultivars of *G. grandiflora* are believed to be originated from a number of wild species viz., *G. cruentus, G. natalensis, G. oppositiflorus, G. papilio and G. saundersii* (Barnard, 1972; Imanishi, 1989). It occupies a pristine place in the garden for its magnificent inflorescence, wide array of colours, and fascinating varieties of shapes and sizes. It ranks fifth next to tulip , lily (Lilium spp), freesia (Freesia spp) and hippeastrum (Hippeastrum spp) among the geophytes in international florist trade (Flower Council of Holland 2008) and first in domestic bulbous flower trade. The major gladiolus cut flower producing countries are USA, Holland, Italy, France, Poland, Bulgaria, Brazil, Australia and Israel. In Europe, gladiolus has been popular for over 500 years, whereas in India, it is of comparatively recent introduction and gained importance as a modern cut flower only in the recent past. The modern cultivars are derived from inter specific crosses among several species. There was not any in depth study regarding the economics and marketing of floriculture. However, some researchers have conducted economics and marketing studies of floriculture. Since gladiolus cultivation is an upcoming business opportunity especially in India, it is essential to work out the economics, which ultimately reflects on cost of cultivation and finally to recommend the suitable genotypes to produce desired quantity and quality of flowers for domestic as well as export market is of greater importance. Keeping all these point in view the present investigation was carried out to work out the economics of gladiolus genotypes cultivation in open field condition.

MATERIAL AND METHOD

The present investigation was carried out at the experimental block of the Department of Floriculture and Landscape Architecture, College of Horticulture, Mudigere is situated in hill zone of Karnataka at 13^0 7′ North latitude, 75^0 37′ East longitude with an altitude of 982 m above mean sea level. It receives an

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annual mean rainfall of 2486.7 mm. Twenty gladiolus genotypes *viz.*, Greenstar, King Lynn, Magma, Liemonocello, Algarve, Cheops, Pinklady, Bangladesh, Poonam, Arka Naveen, Shobha, Tilak, Arka Amar, Arka Gold, Aarti, Arka Kesar, Kum Kum, Sagar, Anjali and Charms Flow were selected to study economic feasibility and profitability under open field condition.

The experiment was laid out in randomized block design with three replications. Well-decomposed farmyard manure was applied before land preparation at the rate of 25t/ha and mixed well in to soil. Fertilizers were applied at the rate of 20:60:20g NPK/plot of 1.44sq m area. 50% of nitrogen and full dose of phosphorous and potash were applied as basal dose and remaining 50% of nitrogen was applied at 45 days after planting. Before planting, corms were dipped in carbendizim (0.2%) solution for 10 minutes and dried under shade. Planting was taken up at 30 x 20 cm spacing to a depth of 5-6cm in plots of 1.2x1.2 m size. Light irrigation was given immediately after planting and plots were kept weed free by hand weeding. Irrigation was given at regular intervals as to maintain adequate soil moisture in the soil. Pest and disease control measures were taken up whenever necessary. The economics of gladiolus cultivation in open field condition (1ha) was worked out by considering the price of planting material, fertilizers, chemicals and other inputs.

RESULT AND DISCUSSION

Flower quality parameter decides the significance of suitability of the particular genotypes, for commercial cultivation. The important biometric characters deciding the size and nature of flowers are spike length, rachis length, number of florets per spike, floret length , floret diameter, flower yield per plant and vase life. Significant differences were observed among the genotypes for these flower quality parameters and the same is depicted in Table 1.

Economics of gladiolus genotypes for one hectare are presented in Table 2. Different cost components of gladiolus production were evaluated and found that total cost of gladiolus cultivation was Rs. 4,82,950/ha including planting material (4,50,000), Fertilizers (12,450), plant protection chemicals (1500), Ploughing, land preparation and planting (9000), Intercultivation and weeding (3000), Irrigation and Harvesting and miscellaneous charges were 7000. The economic returns was computed by deducting total cost and the cost incurred for flower production from the gross receipts obtained from the sale of flowers. The economic returns was computed by deducting total cost and the cost incurred for flower production from the gross receipts obtained from the sale. The economic analysis revealed that, the maximum gross returns (Rs. 17,58,000/ha) were obtained from the genotype Arka Amar followed by Tilak and Sagar (Rs. 12,78,000/ha) with a net return of 12,75,050 and 795050, respectively compared to other genotypes grown under open field condition Table 3. Genotype Arka Amar has recorded the maximum yield (4,39,500/ha) followed by Tilak and Sagar (12,78,000 flower spikes/ha) and Aarti (12,42,000), respectively. The increased yield in these cultivars might be attributed to the greater leaf area and more number of leaves would have resulted in production and accumulation of maximum photosynthates, resulting in the production of more number of flowers which ultimately fetches highest returns per unit area. The results are in accordance with the findings of Pragya *et al.* (2010a), Neha *et al*. (2012) and Geeta *et al*. (2014) in gladiolus.

Table 1. Flower yield and quality parameters in different genotypes of gladiolus grown under open field condition

Genotypes	Spike length (cm)	Rachis length (cm)	Number of florets per spike	Floret length (cm)	Floret diameter (cm)	Flower yield per plant (No's)	Vase life (days)
Greenstar	62.93	41.47	12.60	9.65	9.12	1.00	8.00
King Lynn	70.07	50.07	11.40	10.21	10.83	1.00	8.00
Magma	74.27	57.00	17.00	10.55	10.87	1.00	8.27
Liemonocello	66.00	45.40	12.27	9.53	9.01	1.00	7.67
Algarve	48.60	36.67	9.27	9.83	10.13	1.00	6.60
Cheops	68.80	45.40	13.27	9.95	10.03	1.00	8.07
Pinklady	54.87	38.83	11.87	8.61	8.87	1.00	7.47
Bangladesh	63.73	41.93	12.60	10.01	9.58	1.00	8.13
Poonam	73.00	49.67	13.60	8.36	8.65	1.00	8.00
Arka Naveen	81.47	56.67	17.33	10.77	10.54	2.00	9.00
Shobha	75.47	56.13	16.20	9.41	8.99	1.80	8.00
Tilak	77.20	57.27	15.93	10.82	11.19	2.13	9.00
Arka Amar	66.07	50.53	14.67	10.01	8.93	2.93	8.00
Arka Gold	73.33	50.27	11.53	8.42	8.14	1.87	7.07
Aarti	54.27	37.40	10.87	8.13	7.67	2.07	7.00

Arka Kesar	77.87	58.67	19.13	10.68	10.76	2.00	9.00
Kum Kum	68.07	51.00	14.00	10.25	10.05	2.00	8.00
Sagar	90.73	69.73	18.60	10.34	10.26	2.13	9.00
Anjali	71.93	57.40	13.53	9.90	9.18	1.00	7.87
Charms Flow	73.40	40.47	12.93	9.65	9.04	1.00	8.07
S.Em±	**1.59**	**1.76**	**0.47**	**0.20**	**0.29**	**0.09**	**0.16**
CD @ 5%	**4.54**	**5.04**	**1.35**	**0.57**	**0.83**	**0.27**	**0.46**

Table 2. Cost of cultivation for one hectare cut flower production of different gladiolus genotypes under open field condition

Particulars	**Quantity**	**Rate unit (Rs.)**	**Total cost (Rs/ha)**
I. Inputs			
1 Corms	1,50,000	@ 3/each	4,50,000
2 Fertilizers			
a. Urea	150 kg	@ 5/kg	750
b. Single super phosphate	100 kg	@ 15/kg	1500
c. Muriate of potash	100 kg	@ 12/kg	1200
d. FYM	30 tons	@ 300/t	9000
			12,450
3 Plant protection chemicals			
a. Bavistin	2 kg	@ 500kg	1000
b. Chlorpyriphos	2 liter	@ 250lt	500
II. Labour charges			
a. Ploughing, land preparation and planting		(60 labourers @ Rs.150/labour)	9000
b. Intercultivation and weeding			3000
c. Irrigation			2000
d. Harvesting and miscellaneous charges			5000
Total cost of cultivation (Rs.)	**4,82,950**		

Table 3. Economics of cut flower production (hectare) of different gladiolus genotypes under open field condition

Sl. No.	**Genotypes**	**Total cost (Rs.)**	**Flower yield/ plant (No. of spikes)**	**Flower yield /ha (No. of spikes)**	**Gross return (@ Rs. 4per spike)**	**Net returns (Rs.)**	**Benefit to cost ratio (BCR)**
1	Greenstar	**4,82,950**	1.00	1,50,000	6,00,000	117050	0.24
2	King Lynn	**4,82,950**	1.00	1,50,000	6,00,000	117050	0.24
3	Magma	**4,82,950**	1.00	1,50,000	6,00,000	117050	0.24
4	Liemonocello	**4,82,950**	1.00	1,50,000	6,00,000	117050	0.24
5	Algarve	**4,82,950**	1.00	1,50,000	6,00,000	117050	0.24
6	Cheops	**4,82,950**	1.00	1,50,000	6,00,000	117050	0.24
7	Pinklady	**4,82,950**	1.00	1,50,000	6,00,000	117050	0.24
8	Bangladesh	**4,82,950**	1.00	1,50,000	6,00,000	117050	0.24
9	Poonam	**4,82,950**	1.00	1,50,000	6,00,000	117050	0.24
10	Arka Naveen	**4,82,950**	2.00	3,00,000	12,00,000	717,050	1.48
11	Shobha	**4,82,950**	1.80	2,70,000	10,80,000	597050	1.23
12	Tilak	**4,82,950**	2.13	3,19,500	12,78,000	795050	1.64
13	Arka Amar	**4,82,950**	2.93	4,39,500	17,58,000	12,75,050	2.64
14	Arka Gold	**4,82,950**	1.87	2,80,500	11,22,000	639050	1.32
15	Aarti	**4,82,950**	2.07	3,10,500	12,42,000	759050	1.57
16	Arka Kesar	**4,82,950**	2.00	3,00,000	12,00,000	717050	1.48
17	Kum Kum	**4,82,950**	2.00	3,00,000	12,00,000	717050	1.48
18	Sagar	**4,82,950**	2.13	3,19,500	12,78,000	795050	1.65
19	Anjali	**4,82,950**	1.00	1,50,000	600000	117050	0.24
20	Charms Flow	**4,82,950**	1.00	1,50,000	600000	117050	0.24

Benefit cost ratio is an important factor which decides the optimum levels of input to be used for maximization of production and returns of crop. The genotypes Arka Amar (2.64), Tilak (1.65), Sagar (1.65) and Aarti (1.50) had maximum B:C ratio of 2.50, 2.00 under open field condition and are highly remunerative compared to other genotypes studied whereas, some of the genotypes had less B:C ratio due to their poor performance in terms of yield, flowering behaviour and susceptibility to biotic factors. This was in accordance with the reports of Muhammad and Muhammad (2013) and Singh *et al*. (2014).

CONCLUSION

Floral business is in progress though on limited scale, but every growing demand of flowers has resulted in need to explore potential for expansion of this enterprise. The study results were highly encouraging with respect to higher economic return of floriculture. The average net income of obtained from gladiolus ranged from Rs. 117050 to 12,75,050 per hectare. Moreover, the return per rupee spent ranged from Rs. 0.24 to 2.64. From the study it can be concluded that, cultivation of genotypes under open field condition in hill zone of Karnataka, will be highly economical hence, these genotypes can be undertaken for commercial production to produce desired quantity and quality of flowers to meet the growing domestic as well as international market for this flower crop.

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