

Present Status and Future Prospects of Gladiolus Cultivation in Punjab, Pakistan

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Present status and future prospects of gladiolus cultivation in Punjab, Pakistan were investigated so as to explore the potential areas for gladiolus cultivation, analyze the trends prevailing in the area, study the infrastructural facilities available for gladiolus cultivation and study the socio-economic conditions of growers. It was concluded that gladiolus is a potential crop but the practices being performed by the farmers at present time are not according to the international standards and government and private agencies should help the growers for the uplift of the gladiolus industry.

Key Words: *Gladiolus grandiflorus*, flower, economics, investment

Pakistan'un Punjab Eyaletinde Glayöl Yetiştiriciliğinin Bugünkü Durumu ve Geleceği İçin Öneriler

Pakistan'un Punjab eyaletinde glayöl yetiştiriciliğinin bugünkü durumu ve geleceği ile ilgili olarak; glayöl yetiştiriciliği için potansiyel bölgelerin saptanması, halen bölgede geçerli olan eğilimlerin irdelenmesi, glayöl yetiştiriciliği için mevcut olan altyapı imkanlarının ve glayöl üreticilerinin sosyo-ekonomik durumlarının araştırılması üzerinde çalışılmıştır. Sonuç olarak glayölün potansiyeli olan bir ürün olduğu ancak üreticilerin uyguladığı yetiştiricilik yöntemlerinin uluslararası standartlara uygun olmadığı, kamu ve özel sektör kuruluşlarının glayöl endüstrisinin gelişmesi için üreticilere yardımcı olması gerektiği kanaatine varılmıştır.

Anahtar Kelimeler: *Gladiolus grandiflorus*, kesme çiçek, corm, melez, yatırım

Introduction

Gladiolus grandiflorus, generally called "Glad", a member of family Iridaceae and sub-family Ixidaceae, originated from South Africa, is a prominent bulbous cut flower plant. Gladiolus is also known as the Sword Lily, due to its sword shaped leaves, or Corn Lily. Being an important bulbous ornamental plant, it occupies a prime position among commercial flower crops which has high demand in both domestic and international markets. It occupies eighth position in the world cut flower trade and has a global history. Totally, 19,900 stems of Gladiolus were imported in European market (Excluding Netherlands) at the rate of 0.52 US\$ per stem during 2006. Japan produced 82,760 stems of cut Gladiolus domestically at the price of 0.45 US\$

per stem while imported 28,800 stems from Netherlands and Taiwan at the price of 0.27 US\$ per stem. Singapore imported gladiolus stems from China and Malaysia at the rate of 0.44 US\$ and 0.61 US\$, respectively (Anonymous, 2006).

Gladiolus is one of the most important bulbous flowering crops grown commercially for cut-flower trade in Pakistan. Its cultivation is gaining popularity among the farmers in different areas of the Punjab province of Pakistan and has recently been seen as a lucrative enterprise. In last few years, an increased awareness and recognition of high return on investments, rapid population growth, high standards of living, rising desire to live in an environment friendly atmosphere and increase in hotels and restaurants' business has led to more demanding

and choosy clients. Pakistan has better scope in the future as there is a shift in trend towards tropical and sub tropical flowers and this can be gainfully exploited by the country like Pakistan with reasonable diversity in indigenous flora and climatic conditions in different regions. The suitable agro-climatic conditions of the country clearly indicate that wide range of ornamental crops can be grown, which can improve the economic conditions of the growers. At present, there is an urgent need to standardize agro techniques which are most suitable for local climatic and edaphic conditions. As gladiolus is cultivated in rural areas, its potential for generating employment is an added advantage to improve the economic conditions of the weaker section of the society.

The present case study was planned to prepare an inventory of the gladiolus growers, identify the potential areas for gladiolus cultivation, analyze the trends in area, production and yield of gladiolus, study the infrastructural facilities available for gladiolus cultivation and study the socio-economic conditions of flower growers.

Material and Methods

The present study was conducted in various sites of Punjab province of Pakistan during 2006-07 where gladiolus is grown commercially. To conduct a field survey, an inventory of the growers from the Punjab province of Pakistan was prepared by visiting the flower markets and different farms involved in gladiolus production. Complete biodata of the growers alongwith their farm information were noted. In total, 106 growers were traced out in different parts of the Punjab and among them 60 growers were selected by simple random method. They were interviewed on detailed formatted questionnaire. The interview questions were prepared in English and then translated into Urdu (National Language) for the convenience of the respondents. Each interview took 25 to 30 minutes. Personal profile of the gladiolus growers was prepared in which their name, address, age, educational level, their experience and area under

gladiolus cultivation were noted. The growers were asked questions related to corm procurement, cultivation methods, off season cultivation of gladiolus, harvesting of flowers for marketing, lifting of corms and crop rotation to understand cultivation and management of cut gladiolus industry in Punjab.

A pilot survey of the project area was conducted before starting the actual interview. The broad purpose of the pilot survey was to acquire basic understanding of the questions and response behaviour of the respondents of the project area and to find out any mistake in the interview questionnaire.

All collected data were coded, recoded, labeled for data sheet preparations and statistical analysis in SPSS (Statistical Packages for Social Sciences). Chi-Square test was used to determine the statistical significance of non parametric population and qualitative observation (Levin and Rubin, 2000). Statistical difference of different parameters was tested at 5 % of p value.

Results and Discussion

In total, 60 respondents were interviewed on a detailed questionnaire format. Collected data were arranged, coded, and recoded. Different groups, based on age, education, and gender were identified. Data stratification on the base of demographic characteristics of gladiolus growers in Punjab Province is presented in Table 1.

Among different educational groups, respondents were sorted out as illiterate, literate, matric and above. On the basis of gender, respondents were defined as male and female, results revealed that all the respondents were male. Among the educational group, 58.3% respondents were literate who attended the school but left before completing matric and can read and write, 31.7% of interviewee were having qualification equal to matric and above, whereas 10% respondents were illiterate. Majority of the respondents were mature adults. Detailed demographic characteristics frequencies are seen in Table 1.

Table 1: Demographic characteristics of gladiolus growers in Punjab

No	Characteristics	Level	Frequency	Percentage
1	Education	Illiterate	6	10
		Literate*	35	58.3
		Matric and above	19	31.7
2	Age	Up to 30 years	14	23.3
		31- 40 years	34	56.7
		40 years and above	12	20.0
3	Gender	Male	60	100
		Female	0	0

* Those who had attended the school, but left before completing matric, can read and write.

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Farm Profile

Farm profile of gladiolus growers was prepared through a questionnaire in which some basic questions like “for how long they are involved in the business, do they depend solely on gladiolus cultivation, total area under gladiolus and how much they invest on gladiolus”. The main purpose of such questions was to overview the farm profile.

A question depicting total time of business establishment of gladiolus was asked to find out the experience of the farmers in gladiolus cultivation. Details are illustrated in Fig. 1 which shows that 16.7% of the total growers surveyed were involved in the business for more than ten

years, whereas 45% of growers were growing gladiolus for the last five to ten years, 35% of farmers were found involved in the business for the last one to five years and 3.3% of farmers were growing gladiolus for less than one year.

The growers were asked about the total area they had under gladiolus cultivation. Results presented in Fig. 2, indicate that 93.3% of farmers were growing gladiolus on 0.5-2 acres of land whereas 6.7% growers were cultivating gladiolus on an area of 2-5 acres.

Growers were asked whether they are growing gladiolus as monocrop or alongwith other floricultural crops in rotation. All the growers surveyed reported that they are not solely dependent on gladiolus cultivation. They were also growing other floricultural crops including rose, statice and tuberoses along with gladiolus. To appraise the expenditure incurred on gladiolus cultivation per acre, a question was asked to the farmers about the expenditures spent on one acre. Purpose was initially to develop an expenditure statement and to estimate profitability of the gladiolus cultivation. All the farmers reported that they are investing three hundred thousand rupees to three hundred and fifty thousand rupees per acre on gladiolus cultivation. The respondents were further investigated to explain the allocation of expenditures incurred on corm, fertilizer and cultural practices. Details of these expenditures

are illustrated in Table 2 which shows that all the farmers surveyed reported that they are spending two hundred and fifty thousand rupees to three hundred thousand rupees per acre on planting material (Corms). Expenditures incurred on fertilizer, 60% farmers reported that they are spending ten thousand to fifteen thousand rupees whereas 40% interviewee answered that they are

applying fertilizer worth fifteen thousand to twenty thousand rupees on an area of one acre. As for as expenditures spent on cultural practices are concerned, 45% farmers reported that they are spending fifteen thousand to twenty thousand rupees while 55% respondents responded that they are spending ten thousand to fifteen thousand rupees on an area of one acre.

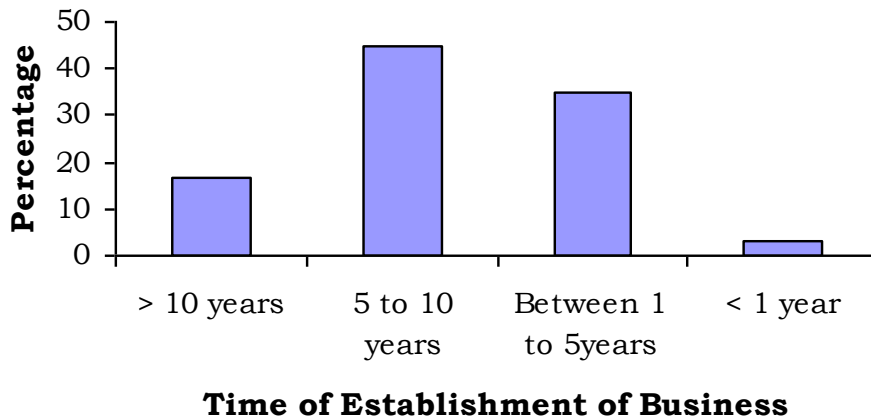


Fig. 1 Experience of business of gladiolus cultivation (N=60)

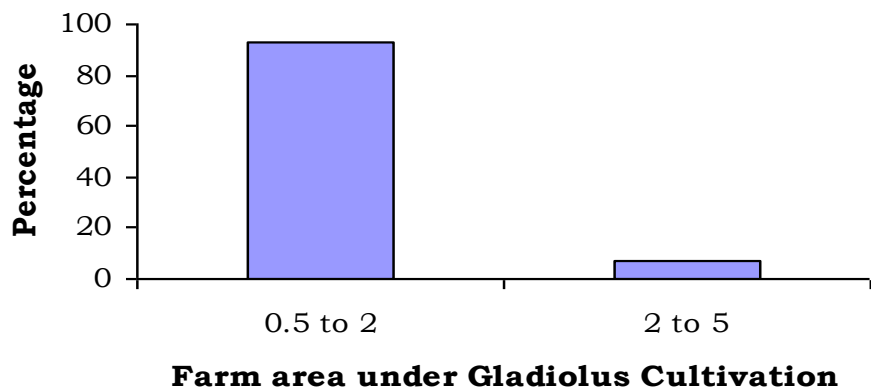


Fig. 2. Area (Acre) under gladiolus cultivation at different farms (N=60)

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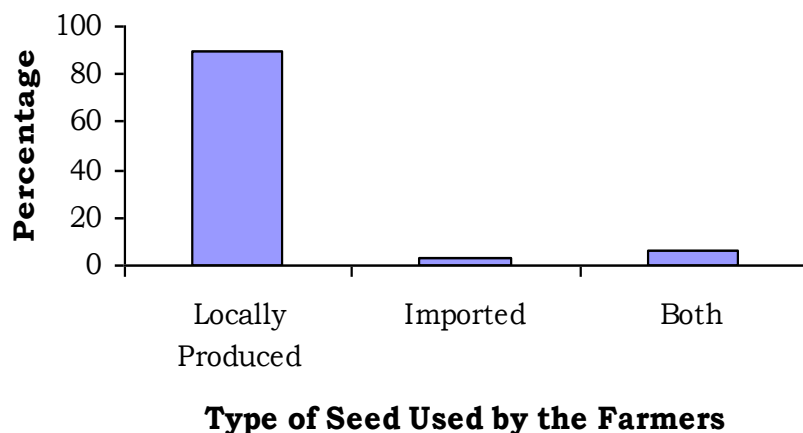


Fig.3. Type of corm used by the farmers (N=60)

Table 2. Expenditures incurred on an area of one acre for gladiolus production

Commodity	Value (US\$ / Acre)	Frequency	Percentage
Corm	3,731.34– 4,477.61	60	100
Fertilizer	149.254 – 223.881	36	60
	223.881– 298.507	24	40
Cultural Practices	149.254 – 223.881	27	45
	223.881– 298.507	33	55

As given in the previous text, information based on demographic profile of the farm suggests that of the total farmers surveyed, 31.7% farmers had qualification equal to matric and above whereas 58.3% farmers were those who had attended the school, but left before completing matric and can read and write. Rest of the 10% was illiterate and unable to read and write. The purpose to explore the literacy level of the farmers was initially to understand their educational level and to plan future strategies for their training to adopt international standards for cut gladiolus production. Literacy level suggests strong need for informal education through extension services for enhancing the profitability to the farmers.

Maximum growers surveyed were involved in the business for the last five to ten years. It was observed that the domestic market is dominant by the already established growers who produce gladiolus for the domestic consumption. A very little percentage is being added to the total number of farmers cultivating gladiolus. Most of the farmers involved in gladiolus production were also engaged in nursery business and have adopted gladiolus cultivation as a side business.

Majority of the growers surveyed were growing gladiolus on a small area of 0.5-2 acres which suggests that most of the farmers are growing gladiolus only for the local market. All of the growers surveyed were also growing other floricultural crops whereas majority of growers had nursery business additionally. None of the grower had reported growing gladiolus as monocrop.

In total, the investment made on gladiolus cultivation per acre basis range from three hundred thousand to three hundred and fifty thousand rupees. The expenditures expended on gladiolus cultivation on an area of one acre are much higher as compared to the expenditures incurred on production of other crops on the same area. For instance, sugarcane production on an area of one acre requires only US\$ 515.864 (Hassan, 2007) as compared to US\$ 4,477.61 to US\$ 5,223.8806 on an area of one acre for gladiolus production. When cost of production of gladiolus is compared with the cost of production of tuberose on the same area, the expenditures expended on gladiolus cultivation are much higher. The tuberose production on an area of one acre requires forty thousand rupees to fifty thousand rupees (Farooq, 2007) as compared to US\$ 4,477.61 to US\$ 5,223.8806.

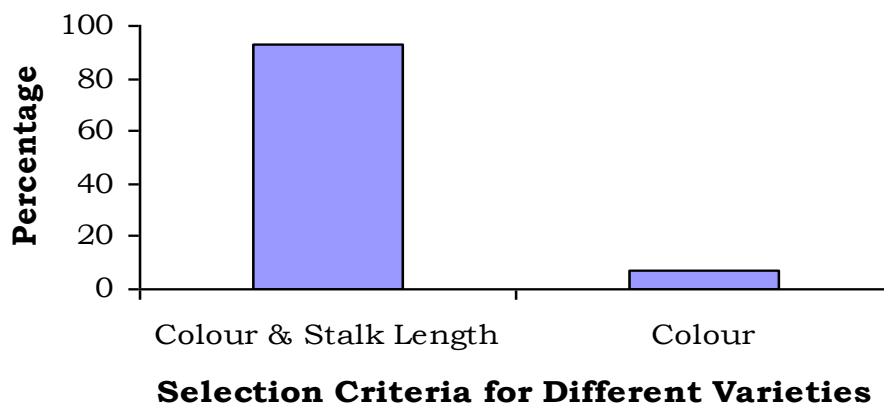


Fig.4. Selection criteria for growing a variety among the growers (N=60)

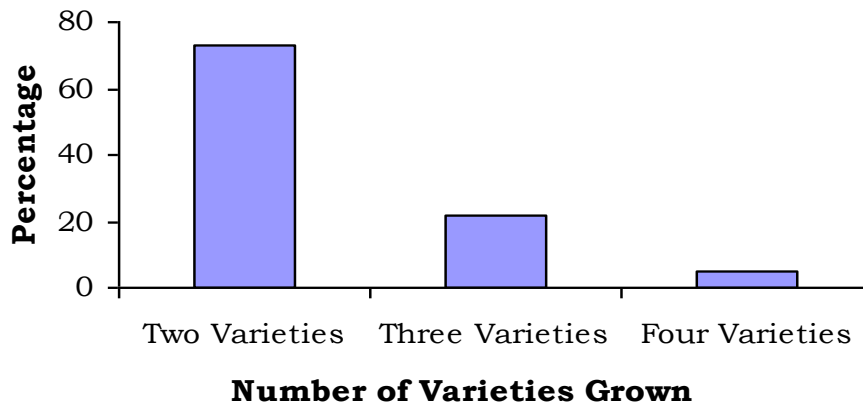


Fig.5. Number of varieties grown by the farmers (N=60)

Farm Management Practices for Gladiolus Cultivation

The farmers were asked questions related to corm, varieties grown and technology used at commercial level for gladiolus production whether to optimize commercial practices for gladiolus cultivation. Objective was to know whether they are adopting standard cultivation practices for gladiolus cultivation or not and to appraise their future needs for the introduction of modern technology.

A question regarding type of corm (locally produced, hybrid imported or both) being used by the growers was asked to know that what sort of corm is being used by the farmers. Of the total farmers surveyed, 3.3% respondents were using imported corm, 90% farmers were using locally produced corm while 6.7% farmers reported that they are using both type of corm.

The characteristics which are considered for selection of a variety were asked to know the selection criteria which the farmers adopt to select different varieties for cultivation. In answer to this question, 93.3% of farmers replied that they select a variety for cultivation on the basis of flower color and spike length whereas 6.7% of farmers responded that they select a variety only on the basis of flower color.

Number of varieties grown by the farmers was asked in order to record the all different varieties being grown by the farmers. In response to this question, 73.3% of respondents responded that they are growing two varieties whereas 21.7% and 5% of farmers were growing three and four varieties, respectively.

Regarding number of corms being planted in an area of one acre, 83.3% farmers responded that they plant 60, 000 to 70, 000 corms whereas 16.7% farmers were planted 50, 000 to 60, 000 corms in one acre. Majority of farmers were planting 65, 000 corms per acre. As for as purchase price of the corm was concerned, those who were using the imported corm, 89.47% farmers were buying corm of gladiolus @ US\$ 0.0447 to US\$ 0.0597 per corm while rest of the 10.53% growers were purchasing corms @ US\$ 0.0597 to 0.0746 per corm.

In order to know the best size of the gladiolus corm for planting, a question was asked to the respondents who stated that they are using medium sized corms (6 to 10 cm in circumference and 2-3 cm in diameter) for plantation. A question about plant to plant and ridge to ridge distance was asked to the farmers to estimate the planting distances. All the respondents reported that plant to plant distance is

5 to 8 cm whereas all the farmers were planting gladiolus on ridges at a distance of 45 cm.

In response to a question regarding harvesting of flowers which was asked to explore the optimum harvesting stage of gladiolus in the local conditions of Punjab province of Pakistan. All the growers reported that they start harvesting of flowers after 10 to 12 weeks (70 to 90 days) after the plantation.

The growers were inquired about lifting of gladiolus corms so as to know the proper time of corms lifting from the soil. In reply to this question, 55% farmers elucidated that they lift the corms after the leaves become yellow while 40.3% and 4.7% interviewee reported that they lift the corms after six to eight and four to six weeks of flower harvesting, respectively.

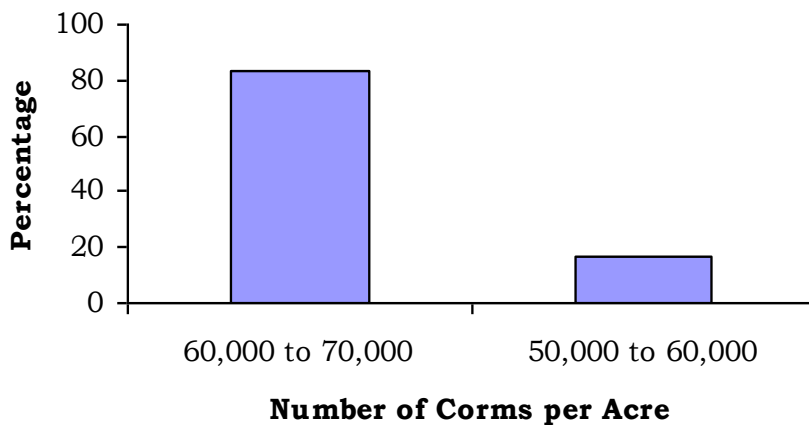


Fig. 6. Number of corms planted per acre (N=60)

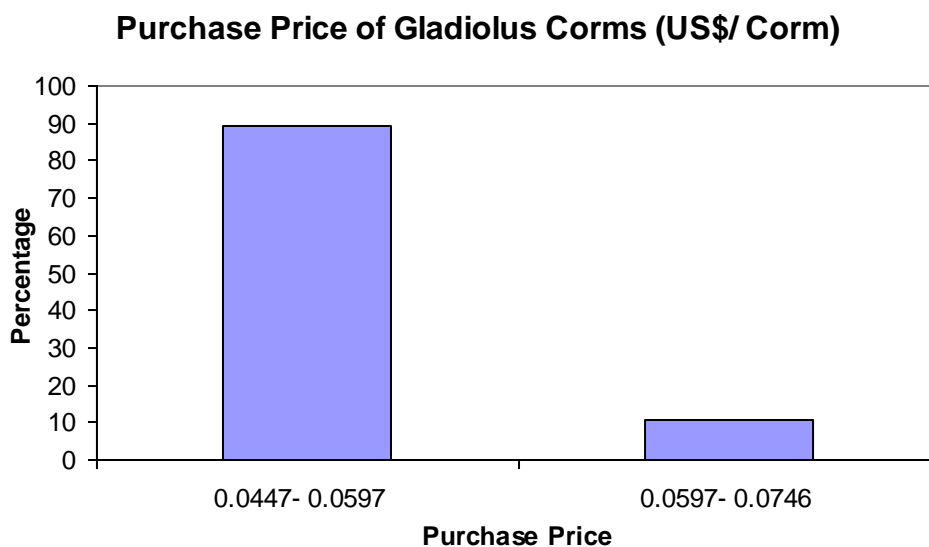


Fig.7. Purchase price of gladiolus corms (US\$/ Corm) (N=60)

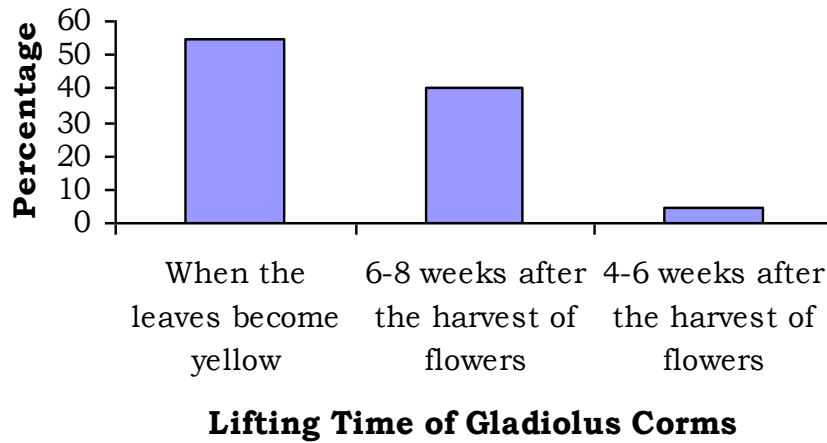


Fig. 8. Lifting time of gladiolus corms (N=60)

Regarding storage of corms, present storage conditions for the corms were investigated which are used as planting material. In response to this question, 76.6% respondents reported that they store the gladiolus corms in shade while 23.4% interviewees were storing gladiolus corms in cold stores.

Selling price of corms was also investigated in this study and information procured is presented in Table 3. Out of total respondents, 21.67% reported that they sell corms @ US\$ 0.01492 – 0.02238 whereas 25%, 21.67%,

16.66% and 15% growers stated that they get US\$ 0.02984 -0.03730 per corm, US\$ 0.0373079 -0.0447694 per corm, US\$ 0.0447694 - 0.0522310 per corm, and US\$ 0.0447694 - 0.05969 per corm, respectively.

Another question was asked to the respondents in order to estimate earnings from corms of one acre. 63.3% of the growers reported that they earn US\$ 746.269 to 895.522 whereas 26.6% and 10.1% growers responded that they earn US\$ 597.015 to 746.269 and above US\$ 895.522 from an area of one acre, respectively (Fig. 10).

Most of the farmers surveyed were growing crop from locally produced corm. Based on field

observations and discussions, it can be concluded that production is of low standard which might be considered suitable only for local market.

The farmers select different varieties for cultivation. The results indicated that most of the farmers (93.3%) select a cultivar for growing on the basis of color and spike length. The survey clearly indicates that highest percentage (73.3%) of the farmers surveyed was growing two varieties of the gladiolus while a small number of farmers were growing three and four varieties. They are just considering the local needs perhaps unaware of the international marketing systems.

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Table.3. Selling price of gladiolus corms

Value (US\$ / Corm)	Frequency	Percentage
0.01492 – 0.02238	13	21.67
0.02984 -0.03730	15	25
0.02984- 0.0447694	13	21.67
0.0447694 - 0.05223	10	16.66
0.04476 - 0.05969	9	15

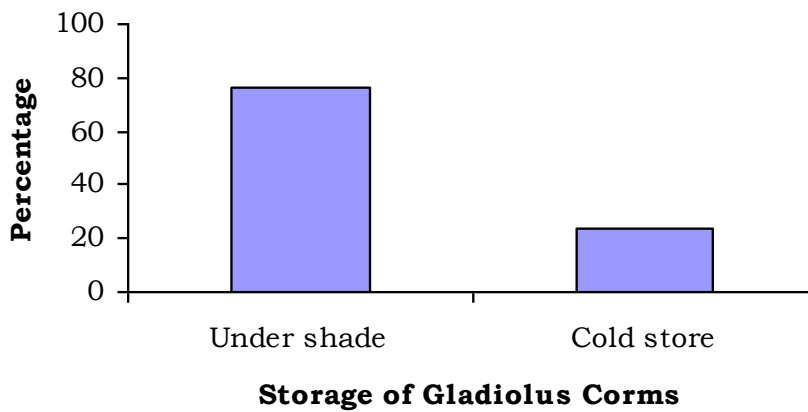


Fig. 9. Storage of gladiolus corms by the farmers (N=60)

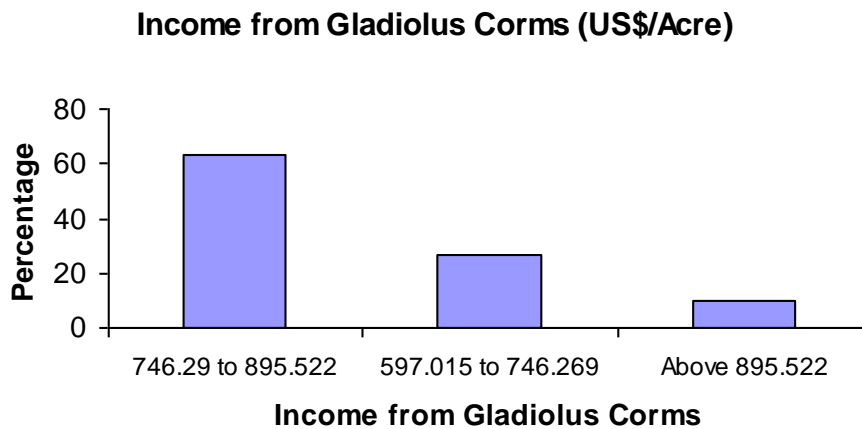


Fig. 10. Income from gladiolus corms (US\$/ Acre) (N=60)

Majority of the respondents were growing fifty thousand corms in an area of one acre. Total number of plants obtained is approximately sixty thousand. This number of plant population is less as compared to eighty thousand, nine hundred and forty plants (Fernandez *et al.*, 1975).

Most of the farmers (89.47%) were purchasing corms @ US\$ 0.0447 to US\$ 0.0597 per corm. Normally retail price for imported corm ranges twenty rupees to twenty five rupees per bulb. However, during survey farmers had mentioned that imported corms which are supplied in bulk to the growers cost US\$ 0.0447 to US\$ 0.104478.

The results suggested that all farmers prefer medium sized corms for plantation. The gladiolus corms are available in three sizes (Large, Medium and Small). Large size varies from 3-4.5 cm in diameter whereas 10 to 14 centimeter in circumference. Medium size ranges from 2-3 cm in diameter while 6 to 10 centimeters in circumference. Small size varies from 0.5-2 cm in diameter while 2 to 6 centimeters in circumference (Anonymous, 1997). The medium sized corms produce best flower spikes and cormels.

Survey clearly indicates that all the growers are planting gladiolus corms at a spacing of two inches to three inches. The corms planted at a plant to plant distance of two to three inches produce best quality spikes in terms of length and number of florets per spike as well as maximum number of cormels (102.85) per corm. Gladiolus cormels are planted at about 130 to 150 cormels per square meter about 60 to 70 cm distance between rows. When cormels are big, a lesser number is used per meter (Eu-Leh, 2007). The survey results suggest that all the growers reported that they plant gladiolus on ridges at a spacing of 45 cm. The ridge to ridge distance of 0.76 m provides good results in terms of number of cut spikes and cormels (Wilfret, 1980). Results indicated that the number of corms used on an area of one acre is less as compared to the international standards of eighty thousand and nine hundred corm per acre.

All the growers start harvesting of spikes after ten to twelve weeks of plantation. Most of the cultivars start blooming after ten weeks of planting and harvesting of spikes is dependent on specific variety, cultural conditions as well as climatic conditions during crop growing period.

Maximum percentage (55%) of the growers surveyed reported that they lift the gladiolus corms when the leaves become yellow while rest of the growers lifts their corms after six to eight weeks of flower harvesting. This information reported by the growers is in line with information provided by Webster (1972). About six to eight weeks after flowering is the most suitable time. By this time the new corms will have developed well and there will also be plenty of small cormels which can be used to increase the stock for future. Farmers should not wait for the leaves to die back; it is far better to lift the corms when the leaves are still green and healthy (Martin, 2007).

The storage conditions for gladiolus corms were also explored. Most of the growers store the corms under shade while a small percentage of the growers were storing corms in cold storage. This practice of storing under shade is not according to the international standards. Gladiolus corms are stored between 2^oC and 10^oC, preferably at 4.5^oC in a well ventilated place having 75% relative humidity (Crossley and Arrowsmith, 1972).

Maximum percentage of the farmers was selling gladiolus corms @ US\$ 0.01492 to 0.02238. This return from a single corm is very low and this is mainly because of the poor procedures of the corm procurement. If the corm is stored in proper environment, the farmers can get high returns from corm corm.

Regarding crop rotation, maximum percentage (83.3%) of the farmers was employing crop rotation which is very important to avoid soil born diseases and insect pests as well as to balance the soil fertility. A regular pattern of crop rotation will enhance the productivity of the gladiolus.

Highest percentage of the respondents (93.3%) responded that they do not grow off season gladiolus. The main reason for not growing off season gladiolus was heavy investment and harsh environment.

Conclusion

Gladiolus cultivation is a profitable business for the growers in the Punjab province of Pakistan. The practices adopted for gladiolus

cultivation are not according to the international standards. Moreover, negligence of this sector from the private and governmental agencies has added to the problems of the growers. There is dire need of the close cooperation of government and private sector to exploit the potential of this sector. This close working of the agencies in the form of corporate farming will help in boosting the whole floriculture enterprise in general and gladiolus industry in particular.

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