

## VARIATION IN DEMAND, SUPPLY AND MARKET PRICE OF DIFFERENT GENOTYPES OF GLADIOLUS FLOWER AVAILABLE IN BANGLADESH

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### Abstract

The present experiment was carried out at the flower central market Agargaon and Shahbag, Dhaka during the period from November 2013 to October 2014 to investigate the market demand, supply and price of different genotypes of gladiolus flower. The experiment included five gladiolus genotypes. Data were collected from different wholesalers and farmers. The results indicated that the existence of wide variability among the genotypes on their market demand, supply and price of different genotypes of gladiolus flower. These indicators were varied among different month of the year, different days of the week and different special days of the year. The highest demand was observed in February (100%) and the lowest was in July (70%). The highest supply was observed in February (112%) while the lowest was in June and July (58%). The average highest price of gladiolus flower was observed in August (Tk. 11.40) and the lowest price was observed in March (Tk. 4.90). The highest and lowest price of different genotypes of gladiolus flower was ranged from Tk. 2.00 to Tk. 16.00 stick<sup>-1</sup>. The white genotype had the highest price Tk. 16.00 stick<sup>-1</sup> while the orange genotype had the lowest price Tk. 2.00 stick<sup>-1</sup>. There was significant positive correlation between demand and supply (0.96). The price was negatively correlated with supply (-0.94).

**Keywords:** Gladiolus, genotype, demand, supply and price.

### Introduction

Gladiolus (*Gladiolus grandiflorus* L.) belongs to the family Iridaceae and it is a herbaceous perennial. The name gladiolus has been derived from the Latin word gladius, meaning a sword as it has sword shaped leaves (Lewis, *et al.*, 1872). So, gladiolus popularly known as sword lily is an ornamental bulbous plant native to South Africa (Sharma and Sharma, 1984). It is now grown as a cut flower widely in the continent of Europe, particularly in Holland, Italy and Southern France (Butt, 2005). It was introduced into cultivation towards the end of the 16<sup>th</sup> century (Innes, 1985). In Bangladesh gladiolus was introduced around 1992 from India (Mollah *et al.*, 2002). It has recently become popular in Bangladesh and its demand in the country is increasing day by day. It has been rated as the second most important popular flower in the world, especially from the economical point of view (Hamilton, 1976). Gladiolus spikes are most popular in flower arrangement and preparing high class bouquets and it is known as the bulbous flowers (Mukhopadhyaya, 1995). Commercial cultivation of gladiolus is gaining popularity due to export potentials and prevalence of favorable growing condition in different parts of the country. In Bangladesh, the agroecological conditions are very conducive for the survival and culture of gladiolus. Profitability in gladiolus flower is higher than other flower in Bangladesh. So its demand in the market is increasing day by day. Sayla (2010) conducted an analysis of commercial production of flower in Dhaka and Narayanganj district. She attempted to examine the profitability of three selected crops. Per hectare net return of producing rose, marigold and gladiolus were Tk. 319372.01, Tk. 146080.91 and Tk. 631428.9, respectively. Its elegant spikes, richly varied in color and with a long vase life, are the reason for its ever-increasing demand. Gladiolus flowers have been important in Bangladesh for three main considerations, namely aesthetic, economic, and social. Gladiolus spikes are most popular in flower arrangement and preparing high class bouquets and it is known as the bulbous flowers. In the present times, gladiolus flowers are used at all the social, cultural and religious occasions as cut-flower which are preferred for bouquets and flower arrangement. It is also used as bedding flower, herbaceous borders or dose quite

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well in pots (Bose and Yadav, 1989). There are significant variation among the different genotypes of gladiolus on their market demand, supply and price. It is the most important and popular flower in Bangladesh. Gladiolus is a very popular flowering plant and occupying fourth place in international cut flower trade (Bose and Yadav, 1989). Gladiolus is one of the most important bulbous cut flowers in the flower industry. It occupies eighth position in the world cut flower trade and has a global history (Ahmad *et al.*, 2008). It has gained popularity in many parts of the world owing to its unsurpassed beauty and economic value (Chadha and Choudhuary, 1986). Gladiolus flowers are grown round the year but large scale production is done during winter season. Farmers grow it in the field for commercial purpose. In recent past various kinds of flowers are imported from abroad. Bangladesh has spent roughly Tk. 2 - 3 million in importing flower and commercial plants to meet the market demand in every year (Mou, 2006). At present, Bangladesh is almost sufficient with her domestic flower. With increasing the demand of flower the production is also increasing day by day. The living standard of people is uprising in the urban areas which tend to increase the aesthetic sense. As a result the numbers of gladiolus flower lovers and flower buyers are increasing day by day. Recently, Bangladesh has started exporting a small amount of gladiolus flowers to the European and Middle East countries and earns foreign currencies. Considering overall situation the present study was done to achieve the following specific objectives: a) Know the demand, supply and price of different gladiolus flower genotype; b) Know the variation in demand, supply and price of gladiolus flower genotype; and c) Find out the suitable gladiolus genotype for commercial cultivation.

## Materials and Methods

The present experiment was conducted at central flower market Agargaon and Shahbag, Dhaka during the period from November 2013 to October 2014 to investigate the demand, supply, and market price of different gladiolus genotypes in different months of the year, different days of the week, and different special days such as Valentine's Day, Bengali New Year, and National Independent day etc. of the year. The experiment included five gladiolus genotypes namely white, yellow, orange, violet and red. All data were collected from 25 wholesalers and 25 farmers who come to sell their own produced flower. Thus total sample size was 50. The study was based on the survey method of data collection. Demand of gladiolus flower was determined by intensive market survey considering 100% base line for demand and supply. Samples were randomly selected to meet the objectives of the study. According to the objectives of the study two sets of interview schedules were prepared one for the wholesalers and one for the farmers. During data collection the objectives of the study were clearly explained to the respondents. Majority of the study is based on primary data. The primary data for the present study from the selected respondents were collected through direct face to face interview. Among the wholesalers present in the market, 10 wholesalers were randomly selected from Agargaon and 15 were selected from Shahbag flower market. On the other hand, among the farmers present in the market, 10 farmers were randomly selected from Agargaon and 15 were selected from Shahbag flower market. A detail questionnaire was formulated for collecting data. The questionnaire is distributed among randomly chosen respondent. Primary data were collected by direct interview to the targeted respondents. Some secondary data were used in this study. Secondary Data were collected from books, published documents, survey reports, online journals and article. The analysis was done with both quantitative and qualitative procedure. MS-Excel was used as the software for quantitative analysis. The recorded data on different parameters were statistically analyzed. The mean of collected data for the treatments was calculated and correlation and regression analysis were performed to determine the market behavior of demand and supply and their effect on the market price.

## Results and Discussion

An experiment was conducted at the flower central market Agargaon and Shahbag to investigate the market demand, supply and price of different genotypes of gladiolus flower in different months of the year, different days of the week and different special days of the year.

**Demand:** In economics, demand is the utility for a good or service of an economic agent, relative to his or her income. Demand refers to how much (quantity) of a product or service is desired by buyers at various prices. The quantity demanded is the amount of a product people are willing or able to buy at a certain price; the relationship between price and quantity demanded is known as the demand. The term demand signifies the ability or the willingness to buy a particular commodity at a given point of time, *ceteris paribus*. Utility preferences and choices underlying demand can be represented as functions of cost, benefit, odds and other variables. In this experiment

marked differences of demand were observed of gladiolus flower in different month of the year (Table 1 and Fig. 1). The highest demand of flower was observed in February (100%), which was closely followed by December (96%), January (95%) and March (95%). The lowest demand was observed in July (70%), which was closely followed by June (72%).

**Supply:** In economics, supply is the amount of something that firms, consumers, laborers, providers of financial assets, or other economic agents are willing to provide to the marketplace. Supply is determined by: (1) Price: producers will try to obtain the highest possible price whereas the buyers will try to pay the lowest possible price both settling at the equilibrium price where supply equals demand. (2) Cost of inputs: the lower the input price the higher the profit at a price level and more products will be offered at that price. (3) Price of other goods: lower prices of competing goods will reduce the price and the supplier may switch to more profitable products thus reducing the supply. Supply is often plotted graphically with the quantity provided (the dependent variable) plotted horizontally and the price (the independent variable) plotted vertically. In the goods market, supply is the amount of a product unit<sup>-1</sup> of time that producers are willing to sell at various given prices when all other factors are held constant. In the labor market, the supply of labor is the amount of time week<sup>-1</sup>, month, or year that individuals are willing to spend working, as a function of the wage rate. In the financial markets, the money supply is the amount of highly liquid assets available in the money market, which is either determined or influenced by a country's monetary authority. In this experiment significant differences were observed in respect of supply and were varied from 58% to 112% (Table 1 and Fig. 1). The highest supply was observed in February (112%). In this month the supply was more than the demand of gladiolus flower. The lowest supply (58%) was observed in June and July, which was closely followed by August (60%). Butt (2005) reported that gladiolus is now as cut flowers vary widely in the continent of Europe, particularly in Holland, Italy and Southern France.

**Table 1. Demand, supply and price of different genotype of gladiolus flower in different month of the year.**

Varieties	January			February			March			April			May			June			July			August			Sep.			October			Nov.			Dec.		
	Demand	Supply	Price	Demand	Supply	Price	Demand	Supply	Price	Demand	Supply	Price	Demand	Supply	Price	Demand	Supply	Price	Demand	Supply	Price	Demand	Supply	Price	Demand	Supply	Price	Demand	Supply	Price	Demand	Supply	Price			
White	98	90	8.0	100	120	5.5	95	120	5.5	88	80	5.5	80	70	6.0	72	60	10	70	60	10	76	70	12	76	60	12	78	60	12	86	90	9.0	96	90	9.0
Yellow	98	95	6.0	100	130	4.5	95	130	5.0	88	85	6.5	80	80	10	72	50	11	70	60	11	76	60	11	76	80	9.0	78	90	9.0	86	90	7.0	96	100	7.0
Orange	98	95	7.5	100	100	4.5	95	60	4.5	88	80	7.5	80	70	7.5	72	70	11	70	60	10.5	76	60	11	76	70	9.5	78	80	10	86	80	7.5	96	90	6.0
Violet	98	100	6.5	100	110	5.0	95	90	4.5	88	80	6.5	80	70	7.5	72	50	11	70	50	10.5	76	50	13	76	70	11	78	60	8.0	86	70	7.5	96	100	6.0
Red	98	95	7.0	100	100	5.5	95	100	5.0	88	90	7.0	80	80	8.0	72	60	10.5	70	60	11	76	60	10	76	60	10	78	70	8.0	86	80	8.0	96	90	6.5
CV (%)	0.00	3.72	11.29	0.00	11.64	10.00	0.00	27.39	8.54	0.00	5.39	11.24	0.00	7.40	18.47	0.00	4.18	0.00	7.71	3.95	0.00	0.00	11.79	10.00	0.00	12.30	11.69	0.00	18.11	17.80	0.00	10.20	9.72	0.00	5.83	18.04
St. Dev.	0.00	3.54	0.79	0.00	13.04	0.50	0.00	27.39	0.42	0.00	4.47	0.74	0.00	5.48	1.44	0.00	0.45	0.00	4.47	0.42	0.00	0.00	7.07	1.14	0.00	8.37	1.20	0.00	13.04	1.67	0.00	8.37	0.76	0.00	5.48	1.24
Mean	98.00	95.00	7.00	100.00	112.00	5.00	95.00	100.00	4.90	88.00	83.00	6.60	80.00	74.00	7.80	72.00	58.00	10.70	70.00	58.00	10.60	76.00	60.00	11.40	76.00	68.00	10.30	78.00	72.00	9.40	86.00	82.00	7.80	96.00	94.00	6.90

**Price:** In ordinary usage, price is the quantity of payment or compensation given by one party to another in return for goods or services. In modern economies, prices are generally expressed in units of some form of currency. An

economic principle that describes a consumer's desire and willingness to pay a price for a specific good or service. Holding all other factors constant, the price of a good or service increases as its demand increases and vice versa. In this experiment significant differences were observed in respect of flower price in different month of the year and varied from Tk. 4.90 to 11.40 stick<sup>-1</sup> (Table 1 and Fig. 1). The highest price of gladiolus flower was observed in August (Tk. 11.40 stick<sup>-1</sup>). The lowest price was observed in March (Tk. 4.90 stick<sup>-1</sup>). Dadlani (2003) reported that returns from flower cultivation is 3.0 - 5.0 and 1.5 - 2.0 times more than rice and vegetable cultivation, respectively. Studies have established by Momin (2006) that income from gladiolus flower production is six times more the returns from rice.

**Price of different gladiolus flower genotype in different month of the year:** Significant differences were observed for price of gladiolus flower in different month of the year (Table 2). Average price of gladiolus flower varied from Tk. 5.10 to 11.30 on different month of the year. The average highest price was observed in August (Tk. 11.30) with CV was 46.58% and the lowest price was observed in March (Tk. 5.10) with CV was 40.66%. On the other hand, significant differences were observed in respect of price among the genotypes under investigation (Table 2). The average highest price was observed in white (Tk. 12.04) genotype and the CV was 25.44% which was closely followed by violet (Tk. 10.54) and yellow (Tk. 10.29) and the CV were 28.63 and 31.04%, respectively. The average lowest price was observed in orange (Tk. 2.92) genotype with 30.87% CV value.

**Table 2. Price of different gladiolus flower in different month of the year.**

Color	January	February	March	April	May	June	July	August	September	October	November	December	Mean	SD	CV (%)
White	10.00	8.00	7.00	10.00	12.00	15.50	15.00	16.00	15.00	14.00	12.00	10.0	12.04	3.06	25.44
Yellow	8.00	6.00	6.00	8.00	10.00	14.00	14.00	15.00	13.00	12.00	9.00	8.50	10.29	3.19	31.04
Orange	2.00	2.00	2.00	3.00	3.00	4.00	4.00	4.00	4.00	3.00	2.00	2.00	2.92	0.90	30.87
Violet	9.00	6.00	6.50	8.00	10.00	14.50	14.50	14.00	13.00	12.00	10.00	9.00	10.54	3.02	28.63
Red	6.00	4.00	4.00	5.00	5.00	6.50	6.50	7.50	6.50	6.00	5.00	5.00	5.58	1.08	19.41
Mean	7.00	5.20	5.10	6.80	8.00	10.90	10.80	11.30	10.30	9.40	7.60	6.90	-	-	-
SD	3.16	2.28	2.07	2.77	3.81	5.26	5.16	5.26	4.76	4.67	4.04	3.32	-	-	-
CV (%)	45.18	43.85	40.66	40.81	47.60	48.26	47.73	46.58	46.26	49.67	53.12	48.18	-	-	-

*SD = Standard deviation and CV (%) = Coefficient of variation in percent.*

**Price of different gladiolus flower genotype in different days of the week:** Significant differences were revealed in respect of gladiolus in different days of the week (Table 3). Average price of gladiolus flower varied from Tk. 4.90 to 7.50 in different days of the week. Average highest price was observed in both Thursday and Friday (Tk. 7.50) with the CV value was 40% which was closely followed by Wednesday (Tk. 6.70) with the CV value was 42.74%. The average lowest price was observed in Saturday and Sunday (Tk. 4.90), which was followed by Monday (Tk. 5.70). It was interesting that price was lowest in Saturday of the week and continuously increasing up to Friday and then the price down gradually. On the other hand, significant differences were in respect of price among the genotypes in different days of the week under investigation (Table 3). The average highest price was observed in white (Tk. 8.43) with 15.10% CV value which was followed by violet (Tk. 7.57) and yellow (Tk. 7.43) with 17.23 and 17.13% CV, respectively. The average lowest price was observed in orange (Tk. 1.93) genotype and its CV value was 23.33%.

**Table 3. Price of different gladiolus flower in different days of the week.**

Color	Sun	Mon	Tues	Wed	Thurs	Fri	Sat	Mean	SD	CV (%)
White	7.00	8.00	8.00	9.00	10.00	10.00	7.00	8.43	1.27	15.10
Yellow	6.00	7.00	7.00	8.00	9.00	9.00	6.00	7.43	1.27	17.13
Orange	1.50	1.50	2.00	2.00	2.50	2.50	1.50	1.93	0.45	23.33
Violet	6.00	7.00	7.50	8.50	9.00	9.00	6.00	7.57	1.30	17.23
Red	4.00	5.00	5.00	6.00	7.00	7.00	4.00	5.43	1.27	23.44
Mean	4.90	5.70	5.90	6.70	7.50	7.50	4.90	-	-	-
SD	2.19	2.59	2.46	2.86	3.00	3.00	2.19	-	-	-
CV (%)	44.71	45.41	41.69	42.74	40.00	40.00	44.71	-	-	-

*SD = Standard deviation and CV (%) = Coefficient of variation in percent.*

**Price of different genotypes of gladiolus flower in different special days of the year:** Marked differences were for price of gladiolus in different special days of the year (Table 4). The average highest price was observed in both Valentine's Day and Bengali New Year's Day (Tk. 10.60) with CV value 43.03% which was followed by English New Year day (Tk. 9.80) with CV value 39.78%. The average lowest price was observed in National Independent Day (Tk. 7.50) and coefficient of variation was 52.07%, which was closely followed by both International Mother Language Day and National Victory Day (Tk. 8.00) with 50% CV. On the other hand, significant differences were in respect of price among the genotypes in different special days of the year under investigation (Table 4). The highest price was observed in white (Tk. 13.33) with 11.29% CV which was followed by violet (Tk. 11.67) and yellow (Tk. 10.50) with the CV value 16.85 and 14.44%, respectively. The average lowest price was observed in Orange (Tk. 3.00) genotype and the CV value was 36.51%.

**Table 4. Price of different gladiolus flower in different special days of the year.**

Color	VD	IMLD	ID	BNYD	NVD	ENY	Mean	SD	CV (%)
White	15.00	12.00	12.00	15.00	12.00	14.00	13.33	1.51	11.29
Yellow	12.00	10.00	8.00	12.00	10.00	11.00	10.50	1.52	14.44
Orange	4.00	2.00	2.00	4.00	2.00	4.00	3.00	1.10	36.51
Violet	14.00	10.00	10.00	14.00	10.00	12.00	11.67	1.97	16.85
Red	8.00	6.00	5.50	8.00	6.00	8.00	6.92	1.20	17.36
Mean	10.60	8.00	7.50	10.60	8.00	9.80	-	-	-
SD	4.56	4.00	3.91	4.56	4.00	3.90	-	-	-
CV (%)	43.03	50.00	52.07	43.03	50.00	39.78	-	-	-

VD = Valentine's Day (14<sup>th</sup> Feb), IMLD = International mother language day (21<sup>st</sup> Feb), ID = Independent day (26<sup>th</sup> March), BNYD = Bengali new years day, NVD = National Victory day (16<sup>th</sup> December), ENY = English new year, SD = Standard deviation and CV (%) = Coefficient of variation in percent.

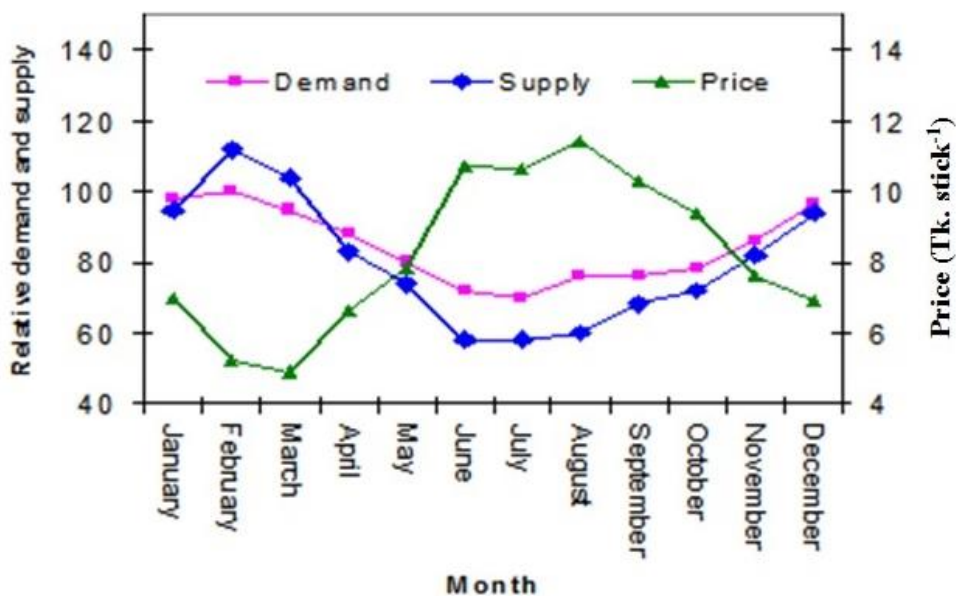
**Correlation matrix of demand, supply and price of five gladiolus genotypes:** Actual data on demand and supply of gladiolus flowers were not available in the market. However, information on relative demand and supply in different months in the year 2013 - 2014 with demand in relation to the month of February and also the price of five genotypes of gladiolus were collected from five whole sellers and farmers who came to market for buying their own produced flower. The demand 100% was considered as base line and average demand, supply and price of five genotypes of gladiolus were determined and are presented in Table 1 and Fig. 1. The result showed that average demand, supply and price were highly fluctuating across the month. Both demand and supply were the highest in the month of February (100%) after which the demand decrease gradually, reaches a minimum in July (79%) and then starts increasing. While there is a sharp decrease in supply, reaches a minimum in July (58%) and then starts increasing at a slower rate compared to demand. It was observed that the supply of flower superseded the demand in the month of February and March. On the other hand, price of flower was the lowest in the month of March (Tk. 5.10), increased sharply to a maximum in August (Tk. 11.30) and then showed sharp decreasing trend. It was interesting to note that price of flower decreased with the increase of demand due to huge supply of flower and the relationship between price and demand was negatively significant (-0.90\*\*) (Table 5) that does not follow the economic norm that price increases with the increase of market demand. Price of flower, on the other hand, showed negative relationship with the supply (-0.94\*\*) (Table 5), which is consistent with the economic law that price decrease with the increase in market supply. It was concluded from the study that when the supply superseded the demand, the price was down significantly because of huge supply of flower caused unstable market. Significant positive correlation was shown between demand and supply (0.96\*\*). Results of Table 5 revealed that there is a combined effect of demand and supply on the price of flower in different months. Regression analysis (Fig. 2) revealed that price of flower is a function of the ratio of relative supply to relative demand and the relationship is clearly linear and negative. The relationship between price (y) of flower to the ratio of relative supply to relative demand (x) was obtained as  $Y = 27.373 - 20.494x$  ( $R^2 = 0.88$ ).

The findings of the experiment indicated that the demand, supply and price of gladiolus flower varied in different month of the year, different days of the week and different special days (viz. 31<sup>th</sup> December, 16<sup>th</sup> December, 26<sup>th</sup> March, Pahela Baishakh, Valentine's Day, 21<sup>th</sup> February, etc.) of the year. When the supply superseded the demand, the price decrease significantly because of the huge supply of gladiolus flower.

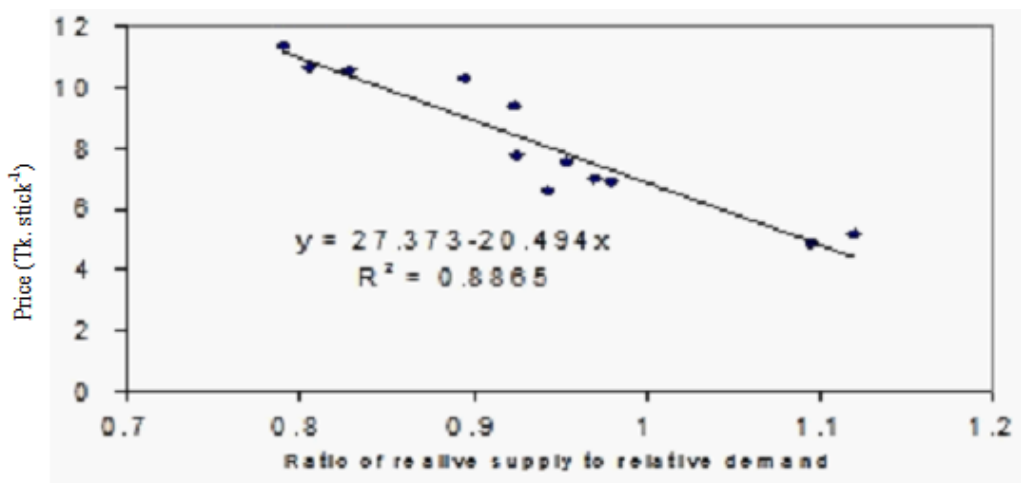
**Table 5. Correlation matrix of demand, supply and price (average of five genotypes of gladiolus).**

	Relative Demand	Relative Supply	Price
Relative Demand	1		
Relative Supply	0.96**	1	
Price	-0.90**	-0.94**	1

\*\* denotes significant at 1% level of probability.



**Fig. 1. Monthly (2014) relative demand supply and price of flowers (average of five genotypes of gladiolus) in wholesale market at Dhaka city.**



**Fig. 2. Regression of price of flower (y) on the ratio of relative supply to relative demand (x).**

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