

Effect of Different Planting Distance and Weight of Saffron Corms on Its Yield in Kabul and Maidan Wardak Provinces

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ABSTRACT

The experiment under was conducted in agro- climatic condition of Agriculture research farm of Faculty of Agriculture, Kabul University and Dorani of Maidan Wardak Province. With the objective to study the effect of planting distance and corm weight on the yield of growth of saffron. As a result, the number of flowers per plot in 5,10 and 15cm were product as 53,3, 42.2, and 38.2 respectively. The number of flowers were 24.1, 46.7 and 72.6 produced by corm weight 6,9 and 11 gr respectively. Same as above number of flowers per plot in 5cm cultivation distance (47.3), in 10cm cultivation distance (41.2), in 15cm cultivation distance (38.3) flowers per plot produced. Probably 99% significant difference is between different distances. Number of flowers per plot in different weight of saffron corms are significant difference in smallest weight 6gr weight produced (22.2) flowers, in 9gr weight produced (38.2) flowers and in 11gr weight produced (75.7) flowers per plot. Probably 99% significant difference is between different weights.

Keywords: Cultivation; Flower; Growth; Plant and Plot

Introduction

Saffron scientific name is *Crocus sativus*, belongs to the Iridaceae family. In some sources, for example, in the Americana Encyclopedia, it is mentioned that this word is derived from Corycus, the name of a region in Cilicia, located in the eastern Mediterranean (Alvishahri *et al.*, 1994). No one knows the exact origin of the saffron plant. Some authors think that this plant originated from the eastern part of the Mediterranean area, but it is possible that it originated from Afghanistan and Iran, which was formerly known as Khorasan, or from Kashmir or Mesopotamia. and later spread to the Mediterranean area and southern Europe (Akhondzadeh, 2005). But today, with the development of its production, it can be found in different areas. The saffron plant reaches a height of 10 to 30 cm and has a hard, round, fleshy bulb covered with thin, brown membranes (Ait-aubahou & El-otmani, 1999). From the middle of the saffron bulb, which is actually the base of the plant stem, a number of thin and long leaves emerge, the upper surface of which is dark green and the lower surface is light green (Bullitta *et al.*, 1996). From the middle of them, the flowers-producing stem comes out, which ends in one to three flowers-producing buds or panicles. These buds usually develop into flowers during the autumn months (Ali, 2005). The saffron flowers are narrow tubular in appearance and lead to 6 large parts, which can be seen in purple varieties. The number of stigmas) There are 3 of them and they are red and orange in color (Ait-aubagou & Elotmani, 1999). Saffron is one of the most important products and the most precious spices in the world, which plays a significant role in the economic and social situation of some dry and low-rain regions. Saffron is a semi-warm plant and grows well in places with mild winters and hot and dry summers (Aslami, 2007). Saffron resistance to high cold weather, but because its growth period coincides with autumn, winter and early spring, it naturally needs suitable and moderate weather in these seasons. During the resting period of this plant (summer), rain or irrigation is harmful for it. Its cultivation and production is widespread in Herat regions, but it is developing in the southern, eastern and northern provinces of the country. Sunny and Without shadow lands that are not exposed to cold winds are suitable for growing

saffron. However, in some areas, the maximum temperature for the growth of this plant is between 35 and 40 degrees Celsius and it grows well at an altitude between 1,300 and 2,300 meters above sea level (Asif, 2006).

Use of saffron

Saffron has been widely used and consumed in many cultures of the countries, including its use in various foods, preparation of cosmetics, perfumes, and textile dyes, and it also makes food easier to digest. Among the properties of its medicine, it can be said that it causes stimulation (sexual power), strengthens nerves and organs, abortion (excessive use), relieves back pain, stomach pain, eliminates insomnia, sputum and phlegm infections, strengthens the respiratory system and removes sadness, dysentery, fever, jaundice, enlarged liver and spleen, urinary tract infection and diabetes. In India, it is used for problems with pollens, liver, bladder and skin ulcers (Abdullaev & Freckle, 1999). It is worth mentioning that this plant has existed in Afghanistan for a long time, but it has not spread all over the country, but now due to the efforts of the people and the availability of cultivation grounds and the encouragement of farmers, its cultivation is increasing day by day. Currently, most of its cultivation has taken place in Herat province, and over time, it will expand to other provinces of Afghanistan. Saffron facilitates the digestion of pollen and has a stimulating effect on the nervous system. In terms of treatment, it has a sedative effect on the superficial nerves of the body. Saffron has a reciprocal effect of suppressing cough in chronic bronchitis. You use saffron to cure insomnia caused by brain stimulation, convulsive states and toothache (Dacaar, 2007). Since the distant past, this plant has been used as a flavor and seasoning for food. This plant is cultivation in Iran, Spain, Bangladesh, and India. It is the largest producer of saffron in Iran (قلوند و عبدالهيان، ۱۳۷۳).

Problem

1. Lack of sufficient information about saffron corm size, weight, planting distance and its agreement in different regions
2. Lack of sufficient information about the stigma process.
3. Not having information about the necessity of irrigation.
4. Lack of sufficient information about the saffron adaptation in different parts of the country.
5. Lack of market for selling saffron products.

Objectives

1. To observe the effect of saffron corm weight on saffron yield of *Crocus sativus*.
2. To find out the effect of planting distance on flower yield, of *C. sativus*
3. To observe the growth, development of *C. sativus* under the agro-climatic conditions.

MATERIALS AND METHODS

The design factorial was carried out in FRCBD, Kabul province (Research farm of the Faculty of Agriculture) and Dorany of Maidan Wordak Province. This study was carried out at two different place research Kabul University and Dorani of Medan Wordak Provence. With 9 treatments in 3 replications. In this study, saffron planting distance (20 cm between rows and 10,

15 and 20 cm between plants) and corm weight was (2-6 grams, 7-10 grams and 11-13 grams). It is under investigation on yield and physical growth.

Research Area

Two locations (Kabul and Maidan wordak province)

A) Saffron corm planting distance factor:

- (1) - 10 cm X 20 cm
- (2)- 15 cm x 20 cm
- (3)- 20 cm x 20 cm

b) Weight of saffron corm factor:

- (1). 2-6 grams
- (2).7-10 grams
- (3). 11-13 grams

3. Treatments

- T₁: (10 cm + 2-6 grams).
- T₂: (15 cm + 2-6 grams).
- T₃: (20 cm + 2-6 grams).
- T₄: (10 cm + 7-10 grams).
- T₅: (15 cm + 7-10 grams).
- T₆: (20 cm + 7-10 grams).
- T₇: (10 cm + 11-13 grams).
- T₈: (15 cm + 11-13 grams).
- T₉: (20 cm + 11-13 grams).

RESULTS AND DISCUSS

In this research, the effects of corm weight and their planting distance on saffron yield in different areas of Kabul and Maidan provinces have been shown, and the research results are compared in the following tables. The collection of the number of flowers collected in one square meter (Kurd) after statistical analysis is shown in the table below.

Table 1: The effect of saffron corm planting distance on the production of the number of flowers in both locations per one square meter (plot) (October to 19 November 27)

Location	Planting distance			Average number of flowers
	5cm	10cm	15cm	
	Number of flowers /plot			
Kabul	53.3a	43.2b	38.2c	44.9
Maidan Wordak	47.3a	41.2b	38.3c	42.3
Average planting	50.3a	42.2b	38.3c	43.6

LSD: 3,4

Kabul's experience in table (1) shows that the average flowers production at a distance of 5 cm is 53.3 flowers and at a distance of 10 cm it produces 43.2 flowers, while at a distance of 15 cm it produces 38.2 flowers per plant. plots have produced that there is a 99% probability that a significant difference change can be seen in them.

Maidan experience in table (1) shows that the average flowers production at a distance of 5 cm is 47.3 flowers and at a distance of 10 cm it produces 41.2 flowers, while at a distance of 15 cm it produces 38.3 flowers per plant. Kabul area produced an average of 44.9 flowers while Maidan area produced an average of 42.3 flowers. A significant difference change has been seen in two areas.

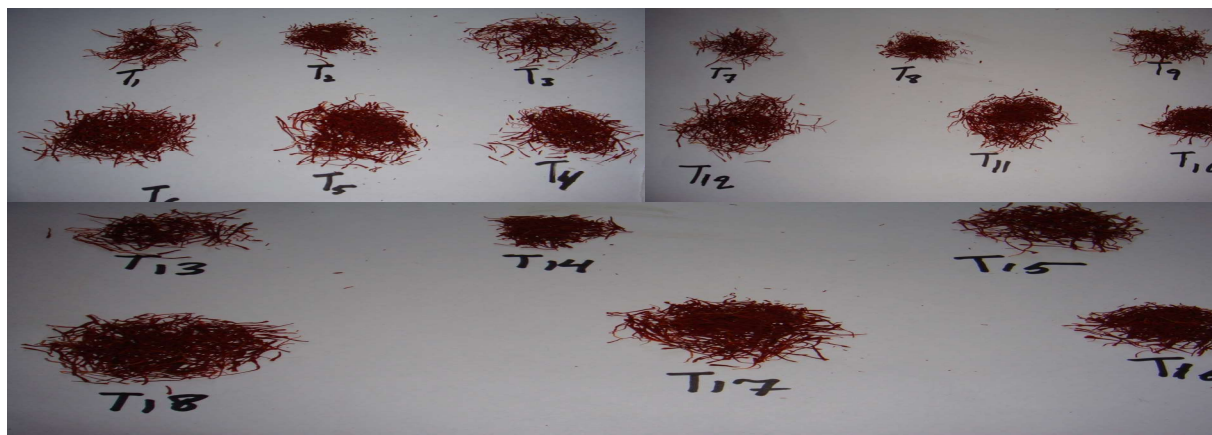


Figure 1. The yield of saffron treatments

Table 2: The effect of saffron corm planting distance on the production of flowers per plant in both locations (October to 19 November 27)

Location	Planting distance			Average number of flowers
	5cm	10cm	15cm	
	Number of flowers /plot			
Kabul	1.1bc	1.1b	1.4a	1.2
Maidan Wordak	0.6c	1b	1.4a	1
Average planting	0.8c	1.1b	1.4a	1.1

(LSD): 0.2

Flowers production in table (2) in Kabul experience produced 1.1 flowers at a distance of 5 cm and 1.1 flowers at a distance of 10 cm, while at a distance of 15 cm it produced 1.4 flowers per plant. No significant difference was seen in the distance of 5 and 10 cm, but there is a significant difference in the distance of 15 cm. In the field experiment, it produced 0.6 flowers per plant at a distance of 5 cm, 1 flowers at a distance of 10 cm, and 1.4 flowers at a distance of 15 cm. Kabul area produced 1.2 flowers on average, while Maidan area produced 1 flowers on average. According to the probability of 99%, a significant difference change has been seen in both areas.

Table 3: The effect of saffron corm weight on flowers production per plant in both locations (from October to 19-November 27)

Experiment location	saffron corm weight/gr						Average weight every one
	6	7	8	9	10	11	
	Number of flowers /plot						
Kabul	0.6f	0.8de	0.9e	1.3c	1.07b	1.9a	1.2
Maidan Wordak	0.6ef	0.6de	0.7e	0.9c	1.5b	1.8a	1
Average of both location	0.6	0.7	0.8	1.1	1.6	1.9	1.1

LSD: 0.2

Kabul's experience in table (3) shows that flowers production shows that 0.6 flowers per plant were obtained in 6 grams of corm weight. However, 1.9 flowers per plant were produced in 11 gram weights, and a significant difference difference can be seen in them with 99% probability, but no difference was seen between 7 and 8 gram weights.

Table 4: Summary of the average number of flowers per plant in both experiments in Kabul and Maidan Wardak

Treatments	Number of Flowers /plot in Kabul	Number of Flowers /plot in Maidan Wordak	Average number of flowers /plot Kabul and Maidan
1	0.7	0.41	0.5
2	0.8	0.4	0.6
3	0.9	0.5	0.7
4	1	0.5	0.7
5	1.6	0.8	1.2
6	0.5	1	1.4
7	0.7	0.5	0.5
8	0.7	0.7	0.7
9	0.7	0.7	0.7
10	1.3	1	1.1
11	1.5	1.5	1.1
12	1.8	1.9	1.9
13	0.7	0.6	0.7
14	0.9	0.8	0.9
15	1	0.9	0.9
16	1.5	1.2	1.4
17	1.9	2.1	2
18	2.1	2.5	2.3
Average	1.2	1	1.1

Maidan experiment, 0.5 flowers were produced in 6-gram corm weights and 1.8 flowers in 11-gram corm weights, which has a significant difference with 99% probability, but no difference was seen between 6 and 7, 7 and 8 gram weights. But in the experience of Kabul, the average number of flowers per plant (1.2) has been more than the experience of Maidan produce one flowers. In both experiments, weights of 6 grams produced an average of 0.6 flowers and weights of 11 grams produced 1.9 flowers, which shows a significant difference.

Table (4) shows that the experience of Kabul in the treatment of 18 had produced the most 2.1 flowers. While in treatment 7, it had produced the lowest flowers of 0.5 and a significant difference between the distance and the weight of the corm can be seen with a probability of 99%. In treatment 5, it produced 1.6 flowers, which was significantly different from treatment 18, but treatment 12 produced 1.8 flowers. In summary, the weight of corm in treatments 6, 12, 18, which had the largest weight, produced the highest yield, and the smallest weight, such as treatments 1, 7, and 13, which had the lowest weight of 6 grams, produced the lowest yield.

Maidan experiment, treatment 18 produced 2.5 flowers, that is, the highest number of flowers. While in treatment 7, it produced the lowest flowers of 0.7, and a significant difference between the distance and the weight of the corm can be seen with a probability of 99%. In treatment 5, it produced 0.8 flowers, which had difference in treatment 18, but treatment 12 produced 1.9 flowers. In summary, the weight of corm in treatments 6, 12, 18, which had the highest weight, was 1.8 grams on average, and the smallest weight, such as treatments 1, 7 and 13, which had the lowest weight, was 6 grams, and the lowest result was 0.5 grams had produced ,However, a significant difference can be seen in the average of both locations in Kabul and Maidan Wardak. In treatment 6, it produced 1.4 flowers on average, that is, the most flowers. While in treatment 13, it had produced the least number of 0.7 flowers and a significant difference between the distance and weight of corm can be seen with 99% probability. In treatment 5, it produced 1.2 flowers, which was significantly different from the first battery treatment, but there was no significant difference with treatment 12, which produced 1.9 flowers. In summary, the corm weight in treatments 6, 12, 18, which had the largest weight, was 1.9 grams on average, and the smallest weight, such as treatments 1, 7 and 13, which had the lowest weight, which was 6 grams, had a low result, on average, 0. It had produced 6 flowers. The production of flowers in table (5) in the experience of Kabul produced 789.4 grams at a distance of 5 cm and 639.5 grams at a distance of 10 cm, while at a distance of 15 cm it produced 565.3 grams per Jerab. Maidan experiment, it produced 700.4 grams per Jerab at a distance of 5 cm, 610.7 grams at a distance of 10 cm, and 568 grams at a distance of 15 cm. Kabul area produced 664.7 grams on average, while Maidan area produced 624.6 grams on average. Therefore, a significant difference change can be seen in both areas with a probability of 99%.

Table 5: The effect of saffron corm planting distance on the yield of saffron in one jereb in both locations (from October to 19- November 27).

Location	Planting distance			
	5cm	10cm	15cm	Average number of flowers
	Saffron yield (gr) /J			
Kabul	789.4 a	639.5 b	565.3 c	664.7
Maidan Wordak	700.4 a	610.7b	568 bc	626.4
Average planting	744.9 a	625.1 b	566.7 c	645.6
LSD: 50.3				

The production of flowers in table (6) in the experience of Kabul shows that 357.1 grams of saffron per Jerieb were obtained in 6 grams of corm, but 1074.8 grams of saffron were produced per Jerieb in weights of 11 grams, which is a significant difference. It is 99% likely to be seen in them.

Table 6: The effect of saffron corms weight on saffron yield in one Jereb in both locations (from October to 19- November 27)

Experiment location	saffron corm weight/gr						Average weight
	6	7	8	9	10	11	
	Saffron yield (gr) /J						
Kabul	357.1 f	449.4 df	482.3 e	691.3c	933.4 b	1074.8 a	664.7
Maidan Wordak	329.2 f	395.1df	439.7 d	566.2c	907b	1121a	626.4
Average of both location	343.2	422.3	461	628.8	920.2	1097.9	645.6
LSD: 50.3							

Wardak experiment, 6 grams of corm produced 329.2 grams of saffron and 11 grams of corm produced 1121 grams, which is a significant difference with a probability of 99%. However, in the experience of Kabul, it has produced an average of 664.7 grams of saffron per Jerab, and Maidan experience, it has produced 626.4 grams. In both experiments, the weights of 6 grams produced an of 11 grams of corm produced 1097.6 grams of saffron, which shows a significant difference. No difference was seen in the weights of 7 and 8 grams in both experiments.

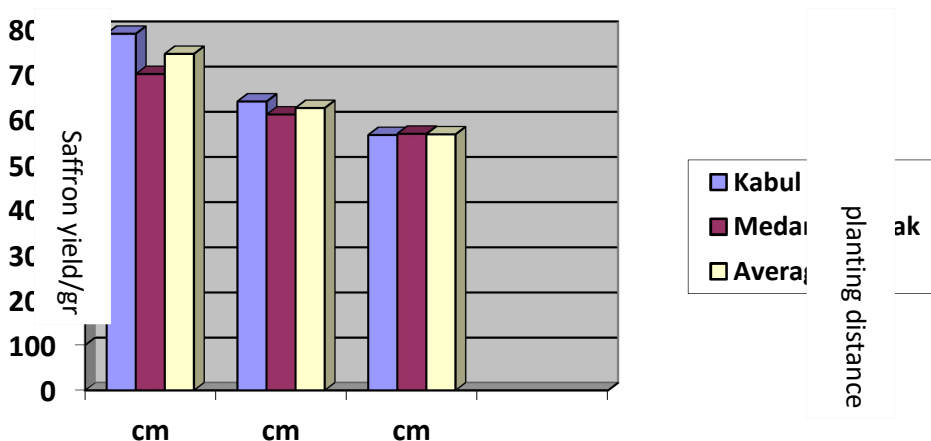


Figure2: The yield of saffron based on the planting distance per Jereb

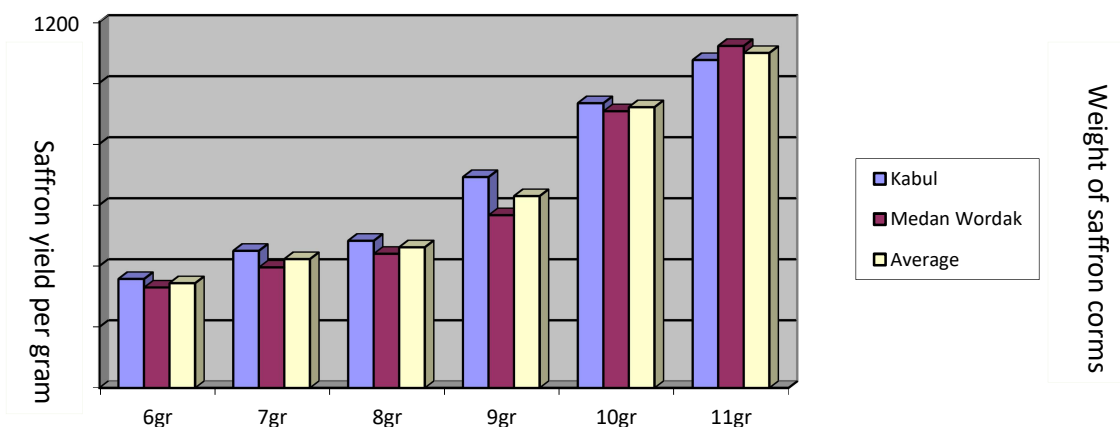


Figure 3: Saffron yield based on corms weight per Jerieb

In the experiment of graphs 1 and 2 below, it can be seen that the yield of saffron is significantly different based on different weights of saffron corm. So, by cultivating the smallest weight of corm (6 grams) in one Jerieb of land, 357.1 grams was produced, while with the cultivation of 8 grams of corm, the weight of saffron per Jerieb reached 482.3 grams. The maximum weight of 10 grams of corm is produced 933.4 grams and the largest weight of corms (11 grams) is produced 1074.8 grams of saffron. Also, the planting distance between the corms has a great effect on the yield, and as at a distance of 5 cm between the corms, the yield per Jerieb is 789.4 grams, and at a planting distance of 10 cm, the yield per Jerieb is 639.5 grams. at a planting distance of 15 cm, the yield per Jerieb is 565.3 grams. 565.3 grams per Jerieb was obtained in the distance between the corms that were planted at 15 centimeters.

Maidan Wordak experience

Here, a significant difference in the yield per Jereeb has been obtained in different weights, so that in corms whose weight is 6 grams, the lowest yield has produced an average of 329.2 grams of saffron per Jereeb. The weight of 8 grams of saffron corm is 439.7 grams, the weight of 10 grams of corm is 907 grams, and the highest yield of saffron per Jereeb is 1121 grams in corms that weigh 11 grams. While the distance of cultivation also had a significant effect on the yield of saffron. At a distance of 5 cm between saffron corms, the yield is 700.4 grams, while with a distance of 10 cm between the corms, the yield per Jereeb is 610.7 grams. At the planting distance of 15 cm between the corms, the yield per Jereeb has reached 568 grams.

Table 7: Saffron yield (gr) per Jerab in both experiments in Kabul and Maidan Wardak

Treatments	Yield of saffron /J in Kabul	Yield of saffron /J in Maidan Wordak	Mean
1	474	414.7	444.3
2	559.3	454.3	506.3
3	627.3	543.3	585.3
4	686.7	607.3	647
5	1121	997.7	1059.3
6	1269	1185	1227
7	311	306	308,5
8	400	385.3	392.7
9	419.7	395.3	407.5
10	570.7	582.7	666.7
11	889	869	879
12	1067	1126	1096.3
13	286.3	267	276.7
14	390	345.7	367.8
15	400	380.3	390.2
16	636.7	380.3	572.7
17	790.3	854.3	822.3
18	888.7	1052	970.3
Average	664.7	626.4	645.6

Table (7) shows that Kabul experiment produced 888.7 grams per Jerab in treatment 18. While in treatment 7, it produced the lowest yield of 311 grams and a significant difference between the distance and corm weight can be seen with a probability of 95%. In treatment 5, it has produced 1121 grams. But treatment has 18 significant differences, but treatment 12 which produced 1066.6 grams. In summary, the corm weight in treatments 6, 12, 18, which had the largest weight, produced an average of 1074.8 grams, and the smallest weight, such as treatments 1, 7, and 13, which had the lowest weight of 6 grams, produced a result of 357.1 grams. Had done Maidan experimentit had produced 1185 grams in treatment 6. While in treatment 13, it produced the lowest yield of 267 grams and no significant difference can be seen between the combination of distance and corm weight. In summary, the weight of corm in treatments 6, 12, 18, which had the largest weight, produced an average long yield of 1121 grams, and the smallest weight, such as treatments 1, 7, and 13, which had the lowest weight of 6 grams, produced a low yield of 329.2 grams. had done But in the average of both Kabul and Maidan Wardak, a significant difference can be seen with a probability of 99%.

Table 8: Number of leaves per plant in both locations (210 days after planting)

Location	Cultivation distance in (cm)			Average number of leaf
	5cm	10cm	15cm	
	Number of leaves per plant			
Kabul	11, 8A, J	10.3b	12.2 A	
Maidan Wordak	11.7 c	21.8b	30.3 A	
Average planting	11.8 c	16.1b	21.3 A	

In treatment 6, it produced an average of 1227, which is the highest result. While in treatment 13, it produced the lowest number of 276.7 flowers and there is no significant difference between the distance and corm weight. In summary, the corm weight in treatments 6, 12, 18, which had the largest weight, was 1097.9 grams on average, and the smallest weight, such as treatments 1, 7, and 13, was 343.2 grams on average. The lowest difference between Kabul and Maidan Wordak, (LSD) with a probability of 0.9=5% In Table-8, the number of leaves in the Kabul experiment based on 5 cm planting distance was 11.8 leaves, 10 cm planting distance produced 10.3 leaves per plant, while at 15 cm distance it produced 12.2 leaves.

These have a 99% probability of significant difference, but there is no difference between the cultivation distance of 5 and 15 cm. In the Maidan Wordak field experiment, at a distance of 5 cm, 11.7 leaves were produced, at a distance of 10 cm, 21.8 leaves, and at a distance of 15 cm, 30.3 leaves were produced. has said that there is a 99% probability of a significant difference. In the Kabul area, an average of 11.4 leaves were produced, while in the Maidan area, an average of 21.3 leaves were produced, so a significant has been seen in the two areas.

Table 9: The number of leaves per saffron plant in two places according to the weight of corms (210 days after planting)

Experiment location	saffron corm weight/gr						Average leaves/plants
	6	7	8	9	10	11	
	Number of leaves per plant						
Kabul	7,9 r	10.3d, z	10.3 d	12.2b, c	12.7b	15.1 a	11.4
Maidan Wordak	7,7 r	15, 8 d, z	15.4 d	25 c	29.7b	34.1 a	21.3
Average of both location	7.8	13.1 d	12, 9 d, z	18.6 c	21.2b	24.6 a	16.4

The lowest difference between Kabul and Maidan Wordak, (LSD) with a probability of 5% = 1.2 In table-9, the number of leaves per plant, in the experience of Kabul, it shows that in the weight of 6 grams' corms, produced 7.9 leaves per plant, but in the weight of 11 grams, 15.1 leaves were produced per plant, which is a significant difference 99% probability is seen in them. No difference has been seen in the planting distance of 7 and 8 cm and also between the planting distance of 9 and 10 cm. In the experiment of Maidan, it shows that in the weight of 6 grams' corms, produced 7.7 leaves weighing and in the weight of 11 grams' corms, produced 34.1 leaves, which is a significant difference with a probability of 99%. But there is no difference in the planting distance of 7-8 cm. But in the experience of Kabul, it has produced an average (11.4) leaves and in the Maidan experience produce (34.1) leaves. In both experiments, weights of 6 grams' corms on average produced 7.8 leaves and 11 grams' corms produced 24.6 leaves.

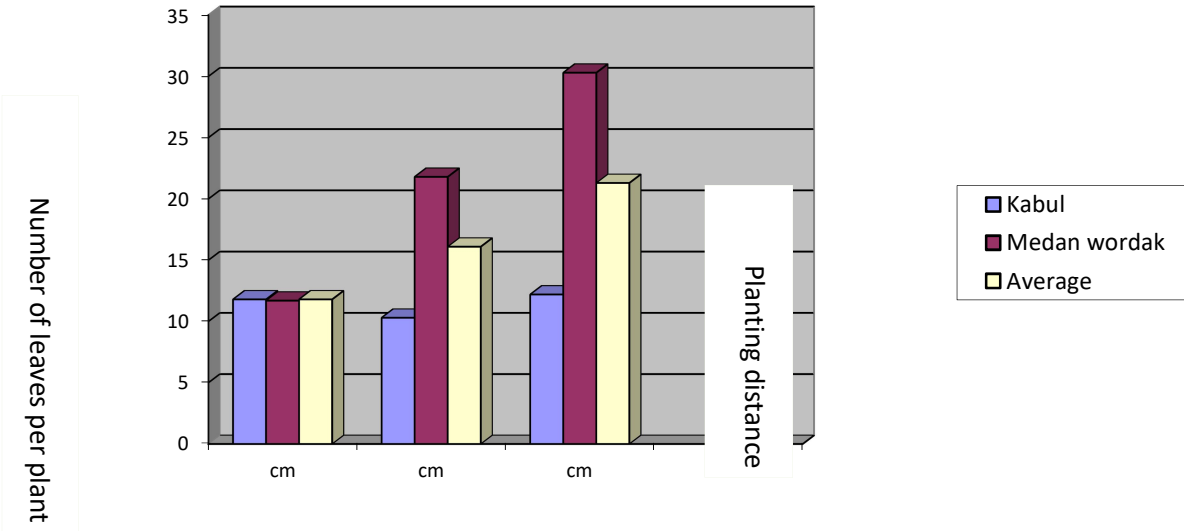


Figure4: The number of leaves per plant based on the planting interval (210 days after planting)

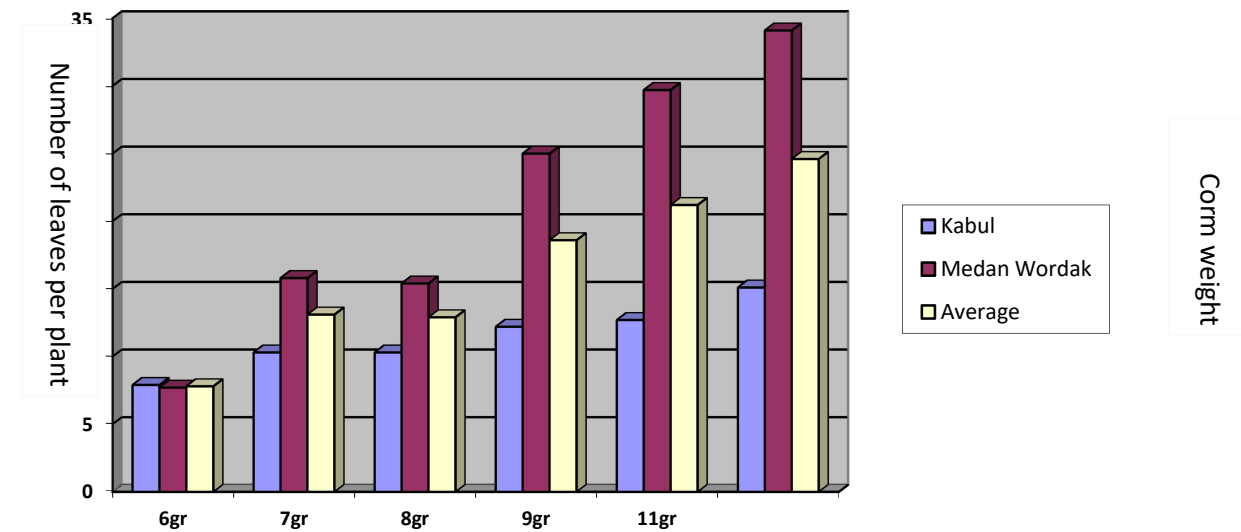


Figure5: The number of leaves per plant according the weight of the corms (210 days after planting)

The experience of Kabul can be seen in graphs 11 and 12 below: the production of leaves based on different weights of saffron corms can be seen with a 99% probability of significant difference. So, by cultivating the smallest weight of corms (6 grams) in the area of one plant, an average number of 7.9 leaves produced. While with the cultivation of the largest corms weight of 11 grams, the maximum number of leaves is 15.1 in one plant, which can be seen with a 99% probability of significant, and also the distance between the corms has a great effect on the production of leaves, as in the distance of 5 cm between the corms It produced an average of 11.8 leaves per plant. The planting distance between the corms was 10 cm produced 10.3 leaves per plant. While the planting distance between the corms that were planted 15 cm they produced 12.2 leaves per plant and showed the highest number of saffron leaves.

Maidan Wordak experience

Here, a significant difference in the production of leaves in different weights has been obtained, so that in the corms whose weight was 6 grams, on average 7.7, the least number of leaves was produced per plant and in the corms with a weight of 11 grams, it has produced the highest number of leaves 34.1 leaves per plant. At the planting distance of 5 cm between the corms, saffron produced 11.7 leaves per plant. While with the planting distance of 10 cm between the corms, it produced 21.8 leaves. But at the planting distance of 15 cm between the corms, it produced 30.3 leaves that produce the most leaves.

Table 10: The average number of leaves per saffron plant (210 days after planting)

Treatments	The average number of leaves per plant in the experience of Kabul	The average number of leaves per plant in the experience of Maidan Wordak	Average number of leaves per plant in both experiments
1	9,7	6,7	8.2
2	11	7.3	9.2
3	11.3	8.3	9.8
4	11.3	11.7	11.5
5	12.7	14.3	13.5
6	14.7	22	18.3
7	5.3	6	5.7
8	7, 7	10.3	9
9	9, 7	14.3	12
10	12.7	25.3	19
11	12	35.3	23.7
12	14.3	39,7	27
13	8, 7	10.3	9.5
14	12.3	29.7	21
15	10	23.7	16, 8
16	12.7	38	25.3
17	13.3	39,3	26.3
18	16.3	40.7	28.5
Average	11.4	21.3	16.4

In Table-10, it can be seen that in Kabul's experiment, it produced 16.3 leaves per plant in treatment 18, but the lowest number of leaves was 5.3 in treatment 7. In treatments 6, 12, 18, which had the largest corm weight, an average of 15.1 leaves, and the smallest corms weight, such as treatments 1, 7 and 13, which had the lowest weight, 6 grams, produced an average of 7.9 leaves.

Table 11: Leaf length in both locations according to the planting distance per saffron plant (215 days after planting)

Location	Planting distance between two plants in (cm)			Mean
	5cm	10cm	15cm	
	Leaf length per plant (cm)			
Kabul	24,1 b,c	24.4b	25,1 b,c	25.5
Maidan Wordak	25.9b	24,9b,c	28.9b	26.6
Average	25b	24.45b,c	27b	25.48

LSD) with a probability of 5% = 1.7

In the Maidan Wordak experiment in treatment 18, it produced the most number of 40.7 leaves. While in treatment 7, it produced the least number of 6 leaves, which is a significant difference with a probability of 99%.

Between the combination of planting distance and corms weight, there is a significant difference with 99% probability. In summary, the weight of corms in treatments 6, 12, 18, which had the largest corms weight, was which produced on average 34.1 leaves, and the smallest weight, such as treatments 1, 7 and 13, which produced on average the lowest number, 7.7 leaves.

But in the interaction of both Kabul and Wardak field, a significant difference can be seen with a probability of 99%. In the weight of 6 grams, it had produced the lowest number of 7.8

leaves on average. While in the weight of 11 grams, on average, it had produced 28.5 leaves, and a significant difference can be seen between the distance and the weight of the corms. In summary, largest corms weight in treatments 6, 12, 18, produced more leaves, and the smallest weight, such as treatments 1, 7, and 13, produced the lowest average of 7.8 leaves. The lowest difference in Kabul field experience (LSD) with a probability of 5% = 1.7 In table-11, in the experience of Kabul, the length of leaves has reached 24.1 cm at 5 cm planting distance, 24.4 cm at 10 cm planting distance, and 25.1 cm at 15 cm planting distance. And with 99% probability, a significant difference can be seen. No difference was seen between the planting distances of 5 and 10 cm. In the Maidan Wordak experiment, at a distance of 5 cm, the leaves were 25.9 cm long, and at a planting distance of 15 cm, they were 28.9 cm, which is 99% probability, a significant difference can be seen. There was no difference between the distance of 5 and 10 cm, and in the Kabul area, the average leaf length was 25.5 cm, while in Maidan Wardak, the length of the leaf was 26.6 cm, so there was no significant in the two areas.

Table 12: Leaf length per plant on the weight of saffron corms in two places (215 days after lanting)

Experiment location	saffron corm weight/gr						Average weight
	6	7	8	9	10	11	
	Leaf length per plant						
Kabul	12.2 r	15.8 Z	18.2 d	29, 1 c	37.1b	40.7 a	25.5
Maidan Wordak	11 r	19.3 d, z	21.3 d	31,9 c	36.6b	39, 4a	26.6
Average of both location	11.6r	17.6 d	19.8 d	30.5 c	36.8b	40.1 a	26,1

LSD) with a probability of 5% = 2.4

The lowest difference in the experience of Kabul and Maidan Wardak (LSD) with a probability of 5% = 2.4 The length of the leaves in Table-12 in the experience of Kabul shows that corms with a weight of 6 grams produced leaf length of 12.2 cm, but with a weight of 11 grams, they reached a length of 40.7 cm, which is a significant difference with a 99% probability. In the Maidan Wordak experiment, the length of the leaves by corms weight 6 grams is 11 cm and the corm weight 11 grams are 39.4 cm long, which is a significant difference with 99% probability. But in the Kabul experience, it has grown to an average length (25.5 cm) and in the Maidan

Wordak experience (26.6 cm). In both experiments, the weights of 6 grams have grown an average of 11.6 cm and the weights of 11 grams have grown 40.1 cm.

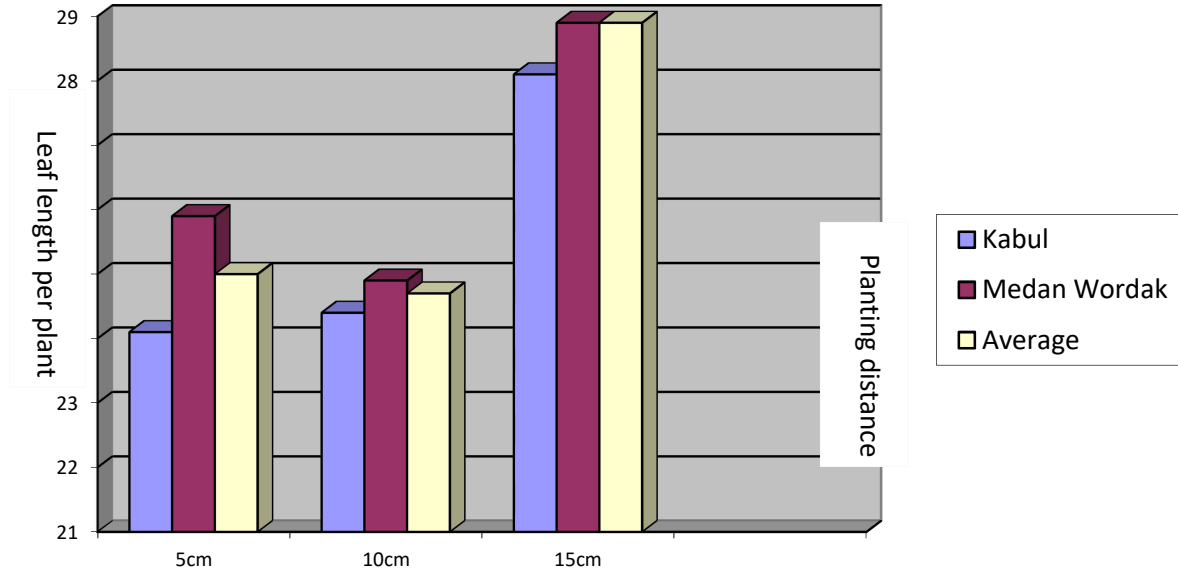


Figure 6: The length of leaves per plant based on the distance between saffron corm cultivation (215 days after planting)

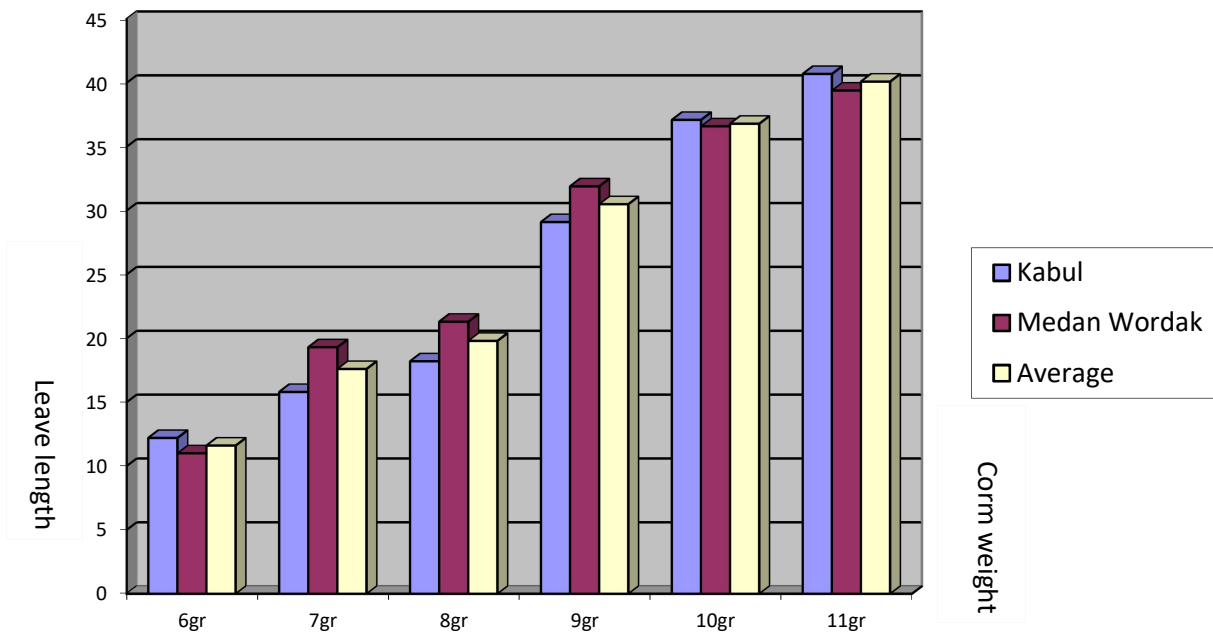


Figure 7: The length of leaves per plant based on the weight of saffron bulbs (215 days after planting)

Kabul's experience is shown in graphs 17 and 18 below: the length of leaves varies significantly based on different weights of saffron corms. So that by cultivating the smallest weight of corms (6 grams) average leaf length of 12.2 cm was produced, while with the cultivation of the largest weight of corms (11 grams), the leaf length was 40.7 cm and with a probability of 99 A significant difference can be seen in it. Cultivation distance between corm effect on the length of the leaves, and at a distance of 5 cm between corms, 24.1 cm was long. The planting distance between saffron corm is 10 cm and the length of the leaves is 24.4 cm. While the planting distance between the corms was 15 cm, its leaf grew to 28.1 cm per plant and it shows the longest leaf of saffron, and it has a significant difference with 99% probability.

Maidan Wordak experience: Here is a significant difference in the length of the leaves based on different weights. Corms have a weight of 6 grams and an average leaf length was 11 cm per plant. Corms weight was 11 grams have grown the longest leaf length, which is an average of 39.4 cm per plant. So, at a distance of 5 cm between saffron corms, the average leaf length is 25.9 cm per plant. While with a planting distance of 10 cm between the corms, its leaves grow to a length of 24.9 cm. But at a distance of 15 cm between the corms, it reaches a length of 28.9 cm, which produces the longest leaves.

Table 13: The length of the saffron leaf in both locations (210 days after planting)

Treatments	Average leaf length per plant in Kabul	Average leaf length per plant in Maidan Wordak	Average leaf length per plant in Kabul and Maidan
1	12.3	11	11.7
2	13.3	18.3	15.8
3	14	18.7	16.3
4	29.3	33	31.2
5	35.7	36,7	36,2
6	39,7	38	38,8
7	12	11.3	11.7
8	15.3	18	16.7
9	17	21.7	19.3
10	25	26.3	25.7
11	36,7	32.7	34.7
12	40.7	39,7	40.2
13	12.3	10.7	11.5
14	18.7	21.7	20.2
15	23.7	23.7	23.7
16	33	36.3	34.7
17	39	40.3	39,7
18	41.7	40.7	41.2
Average	25.5	26.6	26,1

In table 13, it can be seen that in the experience of Kabul, the longest leaf per plant was in treatment 18, which reached 41.7 cm in length. But the minimum length of the leaf was 12 cm in treatment 7. In summary, in treatments 6, 12, 18, which had the largest corm weight, the average length of leaves was 40.7 cm, and the smallest corms weight was in treatments 1, 7, and 13, which had the lowest weight of 6 grams, which averaged 12.2 cm long.

In the Maidan Wardak experiment, the longest leaf was reached in treatment 18 with a length of 40.7 cm. While in treatment 1, it produced the lowest length of 11 cm, which is a significant difference with 99% probability. A significant difference can be seen between the combination of planting distance and weight with a probability of 95%. In summary, the corms weight in treatments 6, 12, 18, which had the largest corm weight, was 39.4 cm on average, and the smallest weight was in treatments 1, 7, and 13, which produced the lowest leaves length, 11 cm on average. But in the interaction of the Kabul, a significant difference can be seen with a probability of 95%. But in the interaction of both experiences, there is a 99% probability of significant difference. At a weight of 6 grams, the average length of leaves was 11.6 cm. While weight 11 grams, he had produced an average length of 40.1 cm. A significant difference can be seen between the distance and corms weight of both experiments. In summary, corms weight in treatments 6, 12, and 18 of both experiments, which had the largest corm weight, produced more leaf length, and the smallest weight, such as treatments 1, 7, and 13, produced the lowest leaf length on average.

SUMMARY

There is a significant difference in the production of flowers in the experience of Kabul and the experience of Maidan based on different weights of saffron corms. As the cultivation of the largest weight of corm produces the most flowers and the cultivation of small corms produces the least flowers, perhaps based on the fact that the corm is large, it has more food reserves. It produces more flowers than it produces bulbs in the first stage of the flowers and it has no leaves and cannot produce food. Based on the stored food, he uses and the spacing between the corms has not had much effect on the production of flowers, maybe because it does not have leaves. Maidan experiments than Kabul, fewer flowers have been produced, possibly based on the fact that saffron likes the mild climate more. It is giving better results.

CONCLUSION

Kabul experiment: Effect of cultivation distance on number of flowers per plant in 5cm cultivation distance (1.1), in 10cm cultivation distance (1.1), in 15cm cultivation distance (1.4) flowers per plant produced. Probably 99% significant is between different distances. Number of flowers per plant in different weight of saffron corms are significant in smallest weight 6gr weight produced (0.6) flowers, in 9gr weight produced (1.3) flowers and in 11gr weight produced (1.9) flowers per plot. Probably 99% significant difference is between different weights. Maidan wordak experiment: Number of flowers per plant in 5cm cultivation distance (0.6), in 10cm cultivation distance (1), in 15cm cultivation distance (1.4) flowers per plant produced. Probably 99% significant is between different distances. Number of flowers per plant in different weight of saffron corms are significant in smallest weight 6gr produced (0.5) flowers, in 9gr weight produced (0.9) flowers and in 11gr weight produced (1.8) flowers per plant. Probably 99% significant difference is between different weights. Estimated yield/J: Kabul experiment: Yield/J differed significantly due to dry saffron weight per jereb in 5cm cultivation

distance produce (789.4gr), in 10cm cultivation distance produce (639.5gr), in 15cm cultivation distance produce (565.3gr) dry saffron per jereb. Probably 99% significant difference is between different cultivation distances. Yield per jereb in different weight of saffron corms are significant difference. In smallest 6gr weight produced (357.1gr), in 9gr corms weight produced (691.3gr) and in 11gr weight produced (1074gr) saffron. Probably 99% significant difference is between different weights, (Mastro & Ruta, 1993) found the same result. Maidan wordak experiment: Yield/J differed significantly due to dry saffron weight per jereb in 5cm cultivation distance produce (700.4gr), in 10cm cultivation distance produce (610.7gr), in 15cm cultivation distance produce (568gr) dry saffron per jereb. Probably 99% significant difference is between different cultivation distances. Yield per jereb in different weight of saffron corms are significant difference. In smallest 6gr corms weight produced (329.2gr), in 9gr corms weight produced (566.2gr) and in 11gr weight produced (1121gr) saffron. Probably 99% significant difference is between different weights, (Ghulam sarwar et al.,2024) found the same result.

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