

Effect of Cumin Planting on Saffron Performance in First Year

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Abstract. To study the effect of cumin (*Cuminum*) planting on saffron (*Crocus Sativus*) performance in the first year of intercropping the experiment was conducted in Complete Randomized Block Design with three replication with saffron as a main plant and the cumin was planted between the saffron row with different plant density (50, 75 and 100 plant per m²) at the Research Farm of College of Agriculture Islamic Azad University of Khorasgan located at Khatoon- Abad. The measured characteristics was yield of flower and stigma, biological yield, number of corm in area and its depth for saffron and grain yield and its component for cumin respectively. The result showed that the different treatments of cumin wasn't significant for measured characteristics in saffron, but this effects was significant for cumin grain yield and its components ($p = 0.01$). The decrease of number of umber per plant, number of grain per umber and 1000 grain weight was obtained in increase of Plant per m² for cumin. in this study planting of cumin in saffron rows wasn't the negative effect on saffron yield and result showed that the planting of cumin with normal density (75 plant per m²) with sow broadcast In saffron rows produced the highest grain yield.

Keywords: *Cuminum*, *Crocus Sativus*, Plant density, Yield component.

1. Introduction

Agriculture started as an activity for supplying human's food in natural resources.

Now a day in same progressed countries, producing in Agriculture or yield increasing in area is not important but protecting of environment is necessary. So today sustainable Agriculture and Sustainable Resource Agriculture are regarded.

We can increase producing in primary agriculture in two methods:

Increasing in farming area.

Increasing in yield per area

There is a more important method for us to use the time and it includes polyculture and intercropping, it is means planting some crops in one farm during one year. The most important use of intercropping is increasing yield per area in comparative with single planting method. According to the above text, it is tried to examine intercropping with cumin and saffron. Because the yield of saffron is not enough in the first year of its planting and the use cumin instead of it and also what is the effect of plant density and planting pattern of cumin on saffron performance.

2. Materials and Methods

This experiment was conducted to the effect of cumin planting on saffron performance in first year at the Research farm of College of Agriculture Islamic Azad University of khorasgan located at Khatoon – Abad. Planting of saffron as a main plant done in rows at the end of summer and Cumin with the plant density (50, 75 and 100 plants per m²) planted after harvesting of saffron flower.

3. Experimental Design and Measuring

The experiment was conducted in Complete Randomized Block Design with three replications. Each block contains 11 treatments and 6 plant rows performed one treatment and they are Control of saffron and cumin and 9 treatments of intercropping between both plants such as:

- A1 – Intercropping with 50 plants per m² of Cumin
- A2 – Intercropping with 75 plants per m² of Cumin
- A3 – Intercropping with 100 plants per m² of Cumin
- A4 – Planting of cumin between saffron rows with 50 plants
- A5 – Planting of cumin between saffron rows with 75 plants
- A6 – Planting of cumin between saffron rows with 100 plants
- A7 – Planting of cumin between two rows of saffron with 50 plants
- A8 – Planting of cumin between two rows of saffron with 75 plants
- A9 – Planting of cumin between two rows of saffron with 100 plants

And the following characters were measured:

- Biological yield in saffron.
- Yield of flowers in saffron.
- Yield of stigma in saffron.
- The number of corm in saffron.
- The depth of corm in saffron.
- Grain yield and components in cumin.

4. Concludes and Discussions

4.1 Saffron

The results of analysis variance for saffron characteristics are shown in table 1. The results

Table 1: Analysis of variance for saffron characteristics

M.S					d.f	S.O.V
Stigma yield	Flower yield	Biological yield	Corm depth	Number of corm		
573269.81	50.57	774947.47	0.23	1000	2	Rep
111866.46 ^{ns}	159.17 ^{ns}	146002.74 ^{ns}	6.08 ^{ns}	520.70 ^{ns}	9	Treatment
139529.64	157.48	278007.50	5.67	0.001	18	Error

Showed the effects of different treatments on measured characteristics in saffron were no significant. Because, in this study, the saffron base plant and planted with fixed plant density. The results showed according to the conditionals of intercropping, its didn't have any effect on the saffron by cumin.

It means that the period of saffron flowering and its harvest obtained before cumin planting between saffron rows. This is the reason on decreasing competition between two plants. On the other hand the depth of planting and root development are different, it causes to decrease competition for absorbing sunlight and soil moisture.

According to the obtained results it is necessary to irrigate cumin at the decreasing stress for picking flowers; in this research the use of different cumin plant density did not have any effect on saffron biological yield (table 1).

Because the saffron plants are hard against coldly winter and cumin germination in cold weather caused the vegetative growth not to relate to each other. The one of the factors that caused two plants complete each other was the different in life cycle.

4.2 Cumin

In this study the effect of different plant density on umber in plant was significant ($P= 0.01$) (Table2).

The highest and the lowest mean for umber in plant related to control and planting of cumin between two rows of saffron with 100 plants per m^2 to amount 35 and 17.6 respectively. The results of means comparison showed when the plant density increased; the umber in plant decreased because of the same distribution of plants on area in intercropping method in compare with planting of cumin between saffron rows, the umber in plant was increased.

In this study the increase of plant density made the competition between plants increase and the umber in plant decreased. The other researchers reported as above results, too (4, 6, 7 and 8).

Table 2: Analysis of variance for seed yield and yield component in cumin

M.S				d.f.	S.O.V.
Grain yield	1000 Grain weight	Seed in UMBER	UMBER in plant		
7821.79	0.07	0.01	0.03	2	Rep
692458.52 **	0.14 **	30.89 **	124.28 **	9	Treatment
3691.97	0.001	0.13	0.51	18	Error

4.3 Number of Grain in UMBER

The effect of different of plant density on number of grain in umber was significant ($p=0.01$) (table2).

The highest and the lowest means for number of grain in umber related to control and planting of cumin between two rows of saffron with 100 plants per m^2 to amount 16 and 7.4 respectively. According to the results increasing in plant density caused number of grain in umber decrease. The number of grain in umber depends on plant density and number of umber in plant and also conditional environment in pollination period.

4.4 1000 Seed Weight

The differences between treatments of plant density regard to 1000 seed weight were significant at 0.01(table2).

The highest and the lowest mean for 1000 seed weight related to Intercropping with 50 plants per m^2 of Cumin and Planting of cumin between two rows of saffron with 100 plants per m^2 to amount 3.10 and 2.50 respectively.

The results showed increasing in plant density caused 1000 seed weight decrease. Because increasing in plant density caused the competition between plants for environmental factors increase.

In this study the 1000 seed weight was from 2.5 to 3.1 gr according to the different plant density had no significant effect on 1000 seed weight with different planting methods.

4.5 Grain Yield

The effect of different plant density on grain yield was significant in 0.01(table2). The comparison of means for grain yield showed the highest and the lowest related to control and planting of cumin between two rows of saffron with 100 plants per m^2 to amount 1571 and 324.7 kg/ha respectively.

Results showed that increasing in plant per m^2 had a strong effect on grain yield as in plant density (100 plants per m^2) with planting of cumin between two rows of saffron weren't observed. In this study the plant per m^2 was less than normal plant density couldn't produce a normally yield. Because conditional environment was not used in less plant density. In spite of their this competition, on the other hand in high plant density (100 plant per m^2) with planting method like planting of cumin between two rows of saffron, increase the competition among the plants and decreased cumin grain yield. This competition causes the

decreasing in 1000 seed weight, number in plant and grain in number. These results were reported by the other researchers.

4.6 Results

In this study analysis of data showed that intercropping between saffron as a main plant and cumin as a secondary plant for Ecological characteristics, conditional growth and environment had a high yield and we can use this method for cumin yield in first year till economical yield of saffron in other years. In this method growth cycle of both plants hadn't competition and in harvest of cumin the saffron hadn't any flower and yield. On the other hand the planting of cumin after the saffron is useful to this plant because cumin Irrigation for germination caused to decrease of deflowering stress on saffron.

The vegetative growth cycle of cumin had no negative effect on saffron because this plant in growth cycle of cumin is at end of the term of its growth.

According to the text and results of this study the intercropping between cumin and saffron with 75 plants per m² is useful because it is impossible to use the machinery row planting of cumin.

5. References

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