American Journal Of Agriculture And Horticulture Innovations

VOLUME Vol.05 Issue04 2025
PAGE NO. 10-14
DOI 10.37547/ajahi/Volume05Issue04-03

Influence of Sowing Dates and Norms on The Yield of Camelina Sativa Varieties

Zukhriddinov Mukhriddin Rakhmon ugli

PhD student of department of Plant Science and Oil Crops, Tashkent State Agrarian University, Uzbekistan

Khayrullaev Sardor Shamsiddin ugli

Doctoral student (DSc) of department of Plant Science and Oil Crops, Tashkent State Agrarian University, Uzbekistan

Received: 23 February 2025; **Accepted:** 20 March 2025; **Published:** 22 April 2025

Abstract: The article below explains the effect of the studied factors on the yield of camelina sativa varieties grown at different dates (autumn, spring and summer) and norms in the conditions of typical sierozem soils of the Tashkent province. According to this, when camelina sativa plants were planted at different dates and norms, the yield increased with increasing norm. It was found that the yield in the autumn and spring periods was higher than when planted as a repeated crop.

Keywords: Camelina sativa, sowing dates, sowing norms, yield.

Introduction: Camelina sativa L. belongs to the Brassicaceae Burnett family, genus Camelina Crantz. The pungent oil competes with sesame oil in terms of nutritional value. The oil is lower than sunflower oil, and is used in the paint and varnish industry, in soap making (green soap) when mixed with linseed oil (1:1). Brooms are tied from the stem. The oil is used for wounds, burns, eye infections, stomach ulcers, and is also used as lamp oil [1].

Camelina oil has unique properties. The oil contains approximately 64 percent polyunsaturated, 30 percent monounsaturated, and 6 percent saturated fatty acids. Importantly, camelina sativa oil is very high in alpha-linolenic acid (ALA), an omega-3 fatty acid, which is important in human and animal diets and for human health. [2, 3]. Camelina sativa oil is considered not only as a food oil but also as a new biofuel source in developed countries [4].

Camelina sativa meal (feed) is a valuable concentrated feed. It is rich in nitrogenous substances and fats. 100 kg of meal contains 115 nutrient units and 27 kg of digestible protein [5].

Compared with other oilseed crops, studies have shown that spring camelina sativa is more resistant to cold and drought, and is well adapted to semi-arid regions [3].

In the study of agroecological studies and productivity improvement of oilseed crops of the Brassicaceae family in the Middle Volga region, the highest average yield of plants over a three-year period was 1.85 c/ha for the winter camelina sativa variety Kozyr, 1.68 c/ha for the winter rapeseed variety Rohan, and 1.65 c/ha for the mustard variety Zlata. The highest oil content in seeds was 43.3% for the winter rape variety Severyanin [6]. According to Romansova et al., camelina sativa has a shorter growing season than spring rape in the same growing zones; accordingly, it can be grown as a second crop in areas with a shorter growing season, i.e. in the northern, high-mountainous regions, or in the southern regions [7].

METHODS

Our research was conducted in 2022-2023 in the conditions of typical sierozem soils of the Tashkent province, and the effect of sowing dates and rates on the yield of camelina sativa (Camelina sativa L.) varieties during the growing season was studied. In our research, sowing rates of camelina sativa in autumn, spring and summer were tested at 4.0, 6.0, 8.0, 10.0 million units/ha.

These field experiments included 20 options, each of

which occupied an area of 28 m2, of which 14 m2 was taken into account. They were carried out in four iterations.

The research was conducted in field and laboratory conditions, with field experiment layout, calculations and observations based on the "Methods of conducting field experiments", and plant analyses based on the "Methodology of state variety testing of agricultural crops" [8, 9, 10].

In the experiment, the "Kristall", "Karat" and "Penzyak" varieties of camelina sativa (Camelina sativa L.) were sown in the third decade of October in the fall, in the first decade of March in the spring, and as a repeated crop in the third decade of June at a rate of 4.0, 6.0, 8.0 and 10.0 million germinating seeds per hectare, to a depth of 1.5-2 cm.

RESULTS AND DISCUSSION

The technology of growing camelina sativa varieties affected not only many plant parameters, but also the formation of the yield.

In the first year of the experiment, the Kristall variety of camelina sativa planted in the fall yielded 21.1 c/ha when 4 million seeds were used per hectare. When the sowing rate was increased to 6 million, the yield was 21.6 c/ha, which is 0.5 c/ha or 2.4% more than the previous option. When the sowing rate was 8 million seeds per hectare, the seed yield was 22.3 c/ha, which is 1.2 c/ha or 5.7% more than the option with 4 million seeds per hectare. At the highest sowing rate, the yield was 20.1 c/ha, which is a decrease of 2.2 c/ha or 9.9% compared to the variant with 8 million seeds per hectare.

The Karat variety of camelina sativa, when planted in the fall at the lowest sowing rate, yielded 20.0 c/ha. In the variants with a sowing rate of 6 million seeds per hectare, the average yield was 23.3 c/ha. When the sowing rate was set at 8 million seeds per hectare, the yield increased to 25.4 c/ha, which is an increase of 5.4 and 2.1 c/ha or 27.0 and 9.0% compared to the previous sowing rates. When the sowing rate was increased to 10 million seeds per hectare, the yield was 22.0 c/ha, which was 3.4 c/ha or 13.4% less than the option with 8 million seeds per hectare.

The Penzyak variety, when planted at the lowest sowing rate during the same period, yielded 22.5 c/ha. In the variants with a sowing rate of 6 million seeds per hectare, the average yield was 25.1 c/ha. When the sowing rate was set to 8 million seeds per hectare, the yield increased to 26.3 c/ha, which was 3.8 and 1.2 c/ha or 16.9 and 4.8% more than the previous sowing rates. When the sowing rate was increased to 10 million seeds per hectare, the yield was 22.9 c/ha, which was a decrease of 3.4 c/ha or 12.9% compared to the option with 8 million seeds per hectare.

The yield of the Camelina sativa variety Kristall was 21.3 c/ha when the sowing rate was 4 million seeds per hectare in the spring period. When the sowing rate was increased to 2 million seeds, the average yield was 22.2 c/ha, which was an increase of 0.9 c/ha or 4.1% compared to the previous option. It was found that when the sowing rate was 8 million seeds per hectare, the yield was 21.8 c/ha, and at the highest sowing rate, this indicator was 21.7 c/ha.

The yield of the Camelina sativa variety Kristall was 7.5 c/ha when the sowing rate was 4 million seeds per hectare as a repeated crop. When the sowing rate was set at 6 million units per hectare, the yield was 8.9 c/ha, which was 1.4 c/ha or 18.7% higher than the sowing rate of 4 million units/ha. When the sowing rate was increased to 2 million units, the yield was 8.4 c/ha, and when the sowing rate was increased to another two million units, it was 8.0 c/ha.

In the experiments of 2023, the Kristall variety of camelina sativagrass sown in the fall yielded 19.8 c/ha when 4 million seeds were used per hectare. When the sowing rate was increased to 2 million, the yield was 21.5 c/ha. When the sowing rate was 8 million units per hectare, the yield was 22.1 c/ha of seed yield, which was an increase of 2.3 and 0.6 c/ha or 11.6 and 2.8% over the previous options. The yield at the highest seeding rate was 20.9 c/ha, which is a decrease of 1.2 c/ha or 5.7% compared to the variant with 8 million seeds per hectare.

The Karat variety of camelina sativa, when planted at the lowest seeding rate in the autumn period, yielded 20.5 c/ha. The average yield at the variant with a seeding rate of 6 million seeds per hectare was 23.6 c/ha. When the seeding rate was set at 8 million seeds per hectare, the yield increased to 24.6 c/ha, which is an increase of 4.1 and 1.0 c/ha or 20.0 and 4.2% compared to the previous seeding rate. When the sowing rate was increased to 10 million seeds per hectare, the yield was 23.0 c/ha, which was 1.6 c/ha or 7.0% less than the variant with 8 million seeds per hectare.

The Penzyak variety, when planted at the minimum sowing rate during the same period, yielded 20.3 c/ha. In the variants with a sowing rate of 6 million seeds per hectare, the average yield was 25.3 c/ha. When the sowing rate was set to 8 million seeds per hectare, the yield increased to 26.2 c/ha, which was 5.9 and 0.9 c/ha or 29.1 and 3.6% more than the previous sowing rates. When the sowing rate was increased to 10 million seeds per hectare, the yield was 22.9 c/ha, which was 3.3 c/ha or 14.4% less than the option with 8 million

seeds per hectare.

The yield of the Camelina sativa variety Kristall was 20.4 c/ha when the sowing rate was 4 million seeds per hectare in the spring. When the sowing rate was increased to 2 million seeds, the average yield was 23.4 c/ha, which was 3 c/ha or 14.7% more than the previous option.

Table 1

Influence of sowing dates and norms on the yield of camelina sativa varieties

No	Options		Years			
	Varieties	Sowing norm mln. piece/ha	2022	2023	2024	Avarage
Autumn period						
1	Kristall	4	21.1	19.8	19.3	20.1
2		6	21.6	21.5	21.1	21.4
3		8	22.3	22.1	21.7	22.0
4		10	20.1	20.9	19.7	20.2
5	Karat	4	20.0	20.5	20.1	20.2
6		6	23.3	23.6	23.5	23.5
7		8	25.4	24.6	24.0	24.7
8		10	22.0	23.0	22.7	22.6
9	Penzyak	4	22.5	20.3	20.5	21.1
10		6	25.1	25.3	24.3	24.9
11		8	26.3	26.2	25.2	25.9
12		10	22.9	22.9	21.8	22.5
	MLD_{05}, c/ha, %		0.91 4.01	0.93 4.13	0.71 3.24	-
	Factor A-varieties, c/ha %		0.18 0.79	0.18 0.81	0.14 0.64	-
	Factor B-sowing norms, c/ha %		0.24 1.05	0.24 1.09	0.19 0.85	-
Spring period						
13	Kristall	4	21.3	20.4	18.9	20.2
14		6	22.2	23.4	21.4	22.3
15		8	21.8	22.6	20.7	21.7
16		10	21.7	21.4	20.3	21.1
	MLD_{05}, c/ha, %		0.81 3.75	0.43 1.98	0.39 1.93	-
Summer period (as secondary crop)						
17	Kristall	4	7.5	7.1	7.7	7.4
18		6	8.9	8.8	9.4	9.1
19		8	8.4	8.2	8.8	8.5
20		10	8.0	8.0	8.4	8.1
	MLD_{05}, c/ha, %		0.26 3.15	0.29 3.65	0.33 3.47	-

It was found that when the sowing rate was 8 million seeds per hectare, the yield was 22.6, and at the highest sowing rate, this indicator was 21.4 c / ha.

When the camelina sativa variety Crystal was sown as a repeated crop at 4 million seeds per hectare, the yield was 7.1 c / ha. When the sowing rate was set at 6 million seeds per hectare, the yield was 8.8 c / ha, which was 1.7 c / ha or 23.9% higher than the sowing rate of 4 million seeds / ha. When the sowing rate was increased to another 2 million seeds, the yield was 8.2 c / ha, and when the sowing rate was increased to another 2 million seeds, the yield was 8.0 c / ha.

In the last year of the experiment, the camelina sativa variety Crystal, sown in the fall, yielded 19.3 c / ha at 4 million seeds per hectare. When the sowing rate was increased to 2 million, the yield was 21.1 c/ha. When the sowing rate was 8 million units per hectare, the yield was 21.7 c/ha of seed yield, which was an increase of 2.4 and 0.6 c/ha or 12.4 and 2.8% compared to the previous variants. At the highest sowing rate, the yield was 19.7 c/ha, which was a decrease of 2 c/ha or 10.2% compared to the variant with 8 million units of seeds planted per hectare.

The Karat variety of camelina sativa, when planted at the lowest sowing rate in the autumn period, yielded 20.1 c/ha. In the variants with a sowing rate of 6 million units/ha, the average yield was 23.5 c/ha. When the sowing rate was set at 8 million seeds/ha, the yield increased to 24.0 c/ha, which was an increase of 3.9 and 0.5 c/ha, or 19.4 and 2.1%, compared to the previous sowing rates. When the sowing rate was increased to 10 million seeds/ha, the yield was 22.7 c/ha, which was a decrease of 1.3 c/ha or 5.7% compared to the option with 8 million seeds/ha.

The Penzyak variety, planted at the lowest sowing rate during this period, yielded 20.5 c/ha. In the options with a sowing rate of 6 million seeds/ha, the average yield was 24.3 c/ha. When the planting rate was set at 8 million units/ha, the yield increased to 25.2 c/ha, which was an increase of 4.7 and 0.9 c/ha, or 22.9 and 3.6%, compared to the previous planting rate. When the planting rate was increased to 10 million units/ha, the yield was 21.8 c/ha, which was a decrease of 3.4 c/ha, or 15.6%, compared to the option with 8 million units/ha.

The Kristall variety of camelina sativagrass had a spring planting rate of 4 million units/ha, with a yield of 18.9 c/ha. When the planting rate was increased to 2 million units, the average yield was 21.4 c/ha, which was an increase of 2.5 c/ha, or 11.7%, compared to the previous option. It was found that when the sowing rate was 8 million seeds per hectare, the yield was 20.7 c/ha, and at the highest sowing rate, this indicator was 20.3 c/ha.

When the Camelina sativa variety Crystal was sown as a repeated crop at 4 million seeds per hectare, the yield was 7.7 c/ha. When the sowing rate was set at 6 million seeds per hectare, the yield was 9.4 c/ha, which was 1.7 c/ha or 22.1% higher than the sowing rate of 4 million seeds per hectare. When the sowing rate was increased to 2 million seeds, the yield was 8.8 c/ha, and when the sowing rate was increased to another two million, it was 8.4 c/ha.

CONCLUSION

The effect of sowing dates and standards on the seed yield of camelina sativa varieties was determined, and it was observed that the yield of the Kristall variety sown in the autumn period increased by 0.6-1.9 c/ha, the Karat variety by 1.2-4.5 c/ha, and the Penzyak variety by 1.0-4.8 c/ha compared to the other sowing standards. It was found that the optimal sowing rate increased the yield of the Kristall variety by 2.7-8.6%, the Karat variety by 4.9-18.2%, and the Penzyak variety by 3.9-18.5%. When planted in the spring period, the yield of the Kristall variety increased by 0.6-2.1 c/ha, or 2.7-9.4%, and when planted as a repeated crop by 0.6-1.7 c/ha, or 6.6-18.7%.

REFERENCES

Atabayeva X.N., Yuldasheva Z.N. Moyli ekinlar biologiyasining ilmiy asoslari va etishtirishda innovatsion texnologiyalar. Darslik. T.: “Navro‘z” nashriyoti, 2019. – 108-109 b.

Mcvay, K. A., & Lamb, P. F. Camelina Production in Montana. Montana State University Extension ‘MontGuide’. Revised March 2008 1000-308SA. 1-8 p.

Augustine K Obour, Henry Y Sintim, Eric Obeng, Valtcho D Jeliazkov. Oilseed Camelina (Camelina sativa L Crantz): Production Systems, Prospects and Challenges in the USA Great Plains// Advances in Plants & Agriculture Research. Volume 2 Issue 2 – 2015. 1-10 p.

Bernardo, A., Howard-Hildige, R., O’Connell, A., Nichol, R., Ryan, J., Rice, B., Roche, E., Leahy, J.J. (2003). Camelina oil as a fuel for diesel transport engines. Industrial Crops and Products, 17(3), 191–197. doi:10.1016/S0926-6690(02)00098-5

Прахова Т. Я., Прахов В. А. Масличные культуры семейства Брассисасеае в условиях Среднего Поволжя. Монография. Пенза: РИО ПГАУ, 2018. 220 с

А.П.Крылов. Агроекологическое изучение и приемы повышения продуктивности масличных култур семейства Brassicaceae v условиях среднего поволжя// АВТОРЕФЕРАТ. 22 с.

Романсова С.В., Нагорнов С.А., Гаврилова В.А.,

Конкова Н.Г. Исползование масла рыжика для производства биодизелного топлива // Наука в сентралной России. 2014. № 4. С. 34–40.

Dala tajribalarini o‘tkazish uslublari – Toshkent. 2007. 180 b.

Доспехов, Б.А. Методика полевого опыта / Б.А. Доспехов. М.: Агропромиздат, 1985. – 351 с

Методика государственного сортоиспытания сельскохозяйственных культур. Зерновые, зернобобовые, масличные и кормовые культуры. – М.: Колос, 1971. – 240 с.