



INFLUENCE OF SOWING DATES ON SYMBIOTIC ACTIVITY OF LENTIL VARIETIES IN SOWN AUTUMN

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Article history:	Abstract:
Received: 26 th October 2023	This article provides data on the effect of sowing dates on the symbiotic activity of lentil varieties. Sowing date were found to affect the symbiotic activity of lentil varieties. It was noted that the number and weight of nodules per plant decreased with increasing sowing date; it was observed that the number and weight of seedlings increased as the sowing date per hectare increased.
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INTRODUCTION

The standard of living of the country's population is assessed primarily by the fact that the members of society are provided with flour, bread, bakery products, pasta, cereals and confectionery from cereals. An alternative solution to this problem is the correct selection of crops based on their biological and economic potential in the cultivation of agricultural crops and the achievement of ecologically clean and high quality products, enriching the plant gene pool at the expense of new and forgotten agricultural crops with valuable characteristics. As a result of expanding the scope of creation of new varieties of crops, we have access to our own food products, which still replace the products entering our markets through imports.

According to the data, legumes differ from other groups of crops in their ability to fix atmospheric nitrogen and assimilate difficult-to-assimilate phosphorus compounds in the soil. Legumes absorb about 2/3 of the total nitrogen from the atmosphere and 1/3 from the soil when all living conditions are normal. Because legumes have the ability to fix atmospheric nitrogen, they are in great need of more phosphorus and potassium fertilizers [7].

Lentils are an annual herbaceous legume, the height of the stem is 15-75 cm. In terms of biological properties, spring, frost-resistant, shelf life 75-115 days, self-pollinating, used in food and fodder production. Green grass contains 8-10% protein, yield 15-25ts / ha [5; B.18].

Lentils root 1 m, stem 25-50 cm. The grains are round, flat, yellow, green, pink, gray, brown and black. Lentils are a long-lived plant, the seeds germinate at 3-4 OS, germinate quickly at 7-10 OS. Grows well in porous, loamy and gray soils, does not grow well in heavy, muddy and sandy soils [4; B.10-15].

According to S.E. Traubenberg, lentils are planted with 60-120 kg of seed, sowing depth is 4-6 cm during the period of mowing. After the lawn is dry, anti-plowing works are carried out. When the beans reach 50%, the crop is harvested, dried in a threshing floor and ground in combine harvesters, cleaned. Can be stored when the humidity reaches 14-15% [6; B.62-65].

According to H.N.Atabaeva, J.B.Khudaykulov, lentil varieties were tested in Uzbekistan in 1949 on dry lands. This work lasted 2-4 ears. The stem of the "local" variety is 25-28 cm, the 1st pod is 13-25 cm, 1000 grains weigh 25-38 g, the shelf life is 75-100 days, the number of pods is 10-20, the seeds are small, the yield is 21.3 c / ha [1; B.212].

According to Kurbanov A.A., Kh.N.Atabayeva, and S.Sh.Khayrullaev, the thickness of seedlings of lentils "Oltin don" and "Darmon" planted in autumn and spring has a significant impact on its growth, development and yield, reaching 3 million seedlings per hectare, and sowing at the expense of germinated seeds provides an increase in yield [2].

According to Kurbonov A.A., Atabayeva H.N., & Khayrullayev S.Sh, in Darmon variety of lentils, the height of the stem was 51.1-58.8 cm in autumn, 43.7-52.2 cm in spring, the leaf area was 23.2-35.8 thousand m³ in autumn and 22.2-33.7 thousand m³ in spring. As a result of symbiotic activity, the weight of nodules in the autumn was 3.17-4.52 c / ha, in the spring -2.82-3.98 c / ha, and per thousand grains -78.9 -81.9 grams in the autumn and 78.5-81.1 grams in the spring. And it was found that as the number of seedlings increased, the weight of thousands of grains on the options decreased due to lack and high demand of nutrients. The same pattern was observed in the location of the first pod in both periods, but in the spring due to external factors the location of the lower pod was slightly higher, the yield in the autumn was 24.3-27.4 c / ha, and in the spring -17.1-20.3 c / ha, and the best result was found to be obtained when seeds were sown on 3 million pieces / ha [3].

METHODS AND MATERIALS

Field experiments were conducted on the basis of methodological manuals "Methods of State sorting of agricultural culture" (1989), "Methods of conducting field experiments" (UzPITI, 2007). Statistical analysis of the obtained data was carried out using the program Microsoft Excel and on the basis of BD Dospekhov's manual "Methodology of field experience" (1985) by the method of analysis of variance.

Sowing dates and rates. Lentils are planted in autumn (late October, early November), spring (March) in areas free from repeated cereal crops (wheat, barley). Lentils are planted in seedbeds sowing cereals. 3 million seeds were used per hectare, sowing depth was 4-6 cm.

Taking into account the local conditions, the sowing date in the experiments was 3rd decade of october in the 1st variant, 1st decade of november in the 2nd variant, and 2nd decade ov november in the 3rd variant.

Crops were irrigated during the application period and fed with mineral fertilizers. Harvested when lentils are 60% ripe.

RESULTS AND DISCUSSION

Biological nitrogen-fixing plants accumulate more protein in their products. The protein formed in the presence of biological nitrogen is environmentally friendly, high quality and gives good results in food and animal husbandry. Increasing the amount of protein in the plant by providing it with a high amount of mineral nitrogen increases nitrate in the plant, reduces yield quality, alters nitrate metabolism and becomes the basis of many diseases, because nitrate alters the function of hemoglobin and deprives the body of oxygen. In the lentil plant, a symbiotic bacterial species, *Bradyrhizobium leguminosarum*, develops.

The studied sowing dates were found to affect the development of nodules in lentil varieties. When lentil varieties were planted in the fall, the number of nodules in the Oltin don variety decreased from 10.9 to 9.9 during the budding phase as the sowing date increased; Darmon variety decreased from 11.7 to 10.7.

Table 1

Dependence of the number of nodules on lentil varieties sown in autumn on the dates of sowing (average 3 ears)

№	Options		budding	flowering	podding
	Cultivars	Sowing dates			
1	Oltin don	21-31.X	10,9	17,8	20,6
2	Oltin don	01-10.XI	10,5	17,5	20,0
3	Oltin don	11-20.XI	9,9	17,0	19,6
4	Darmon	21-31.X	11,7	18,7	21,4
5	Darmon	01-10.XI	10,9	18,3	20,9
6	Darmon	11-20.XI	10,7	17,6	20,6

During the flowering phase, the number of nodules increased, but with the increase of sowing dates, the number of nodules decreased from 17.8 to 17.0 in the Oltin don variety and from 18.7 to 17.6 in the Darmon variety.

This pattern was repeated in both varieties during the period of podding, 20.6-19.6 pieces in the Oltin don variety and 21.4-20.6 pieces in the Darmon variety. An increase in the planting date at the end of the application period reduced the number of seedlings per bush, but it was found to be higher per hectare. A similar pattern is observed in the Darmon variety. The Darmon variety was found to have a higher number of nodules than the Oltin don variety (Table 1).

In areas where lentil varieties are planted, many nodules remain in the soil. In the experiments of lentils planted in the fall in 2013, 3.73-7.08 million units remained in the Oltin don variety, and 3.92-7.54 million units in the Darmon variety. In 2014, 4.20-7.96 million units of the Oltin don variety and 4.38-8.35 million units of the Darmon variety were collected.

In the third ear of the experiment, such a pattern was observed, and it was found that 3.84-7.16 million pieces were collected in the Oltin don variety and 4.09-7.76 grains in the Darmon variety (Table 2).

Table 2

Number of nodules of lentil varieties planted in the winter

№	Options		2013		2014		2015	
	Cultivars	Sowing dates	nodules/ bush	mln. pcs /ha	nodules/b ush	mln. pcs /ha	nodules/ bush	mln. pcs /ha
1	Oltin don	21-31.X	19,6	3,73	21,6	4,20	20,9	3,84
2	Oltin don	01-10.XI	18,9	5,39	21,0	6,09	21,0	5,67
3	Oltin don	11-20.XI	18,6	7,08	20,7	7,96	19,5	7,16
4	Darmon	21-31.X	20,4	3,92	22,3	4,38	22,0	4,09
5	Darmon	01-10.XI	20,0	5,77	21,9	6,40	21,1	5,85
6	Darmon	11-20.XI	19,6	7,54	21,5	8,35	20,9	7,76

When evaluating the symbiotic activity of lentil varieties, the weight of the bacteria in them is also taken into account. When lentil varieties were planted in autumn and reached the stage of budding, the weight of the nodules was 0.6-0.4 grams in the Oltin don variety and 0.71-0.40 grams in the Darmon variety.

In all variants, the nodule bacteria weight decreased as the sowing date increased. At the time of flowering, the weight of the varieties in the Oltin don variety was 1.21-0.80 grams, depending on the sowing norm, and in the Darmon variety - 1.32-0.91 grams. During the growing season, this figure is 1.61-1.20 g in the Oltin don variety; in the Darmon variety, it was observed that in all variants, when the sowing date increased to 1.72-1.21 grams, the weight also decreased due to the decrease in the number of nodules (Table 3).

Table 3
Nodules weight of lentil varieties planted in Winter, grams (average 3 ears)

№	Options		budding	flowering	podding
	Cultivar	Sowing dates			
1	Oltin don	21-31.X	0,60	1,21	1,61
2	Oltin don	01-10.XI	0,51	1,02	1,42
3	Oltin don	11-20.XI	0,40	0,80	1,20
4	Darmon	21-31.X	0,71	1,32	1,72
5	Darmon	01-10.XI	0,52	1,10	1,40
6	Darmon	11-20.XI	0,40	0,91	1,21

When legumes are harvested, much organic matter accumulates in the soil in return for the stalks. At the end of the praxis period when sown in the winter, 3.0 c / ha in 2013 experiments when the Oltin don variety was sown on one hectare at the latest date for ears;

Table 4
The weight of the nodule bacteria of lentil varieties planted in the winter and the volume collected per hectare

№	Options		2013		2014		2015	
	Cultivar	Sowing dates	gr/bush	c/ha	gr/bush	c/ha	gr/bush	c/ha
1	Oltin don	21-31.X	1,55	2,95	1,71	3,31	1,64	3,00
2	Oltin don	01-10.XI	1,31	3,73	1,45	4,20	1,38	3,78
3	Oltin don	11-20.XI	1,10	4,17	1,23	4,71	1,15	4,21
4	Darmon	21-31.X	1,63	3,13	1,78	3,49	1,72	3,19
5	Darmon	01-10.XI	1,39	4,01	1,52	4,44	1,45	4,01
6	Darmon	11-20.XI	1,16	4,45	1,27	4,92	1,23	4,55

In the Darmon variety, 3.13 c / ha was collected. When the sowing date exceeded 1st decade of november, the yield of Oltin don was 3.73-4.17 c / a, Darmon-4.01-4.45 c / ha. This means that the same amount of organic matter accumulates in the soil. When planted at the latest date, 4.21 c / ha was harvested in the Oltin don variety and 4.55 c / ha in the Darmon variety. Experiments were conducted in 2014 on the Oltin don variety at 4.71 c / ha; In the Darmon variety, 4.92 c / ha was collected.

When lentil varieties were planted in the winter, in three ears the Oltin don variety accumulated organic matter in the form of nodules at 4.21 c / ha and the Darmon variety at 4.55 c / ha (Table 4).

CONCLUSION

Sowing date were found to affect the symbiotic activity of lentil varieties. It was noted that the number of nodules and weight per plant decreased with increasing sowing date; it was observed that the number and weight of nodule bacteria increased as the sowing date per hectare increased.

REFERENCES

1. Atabaeva H.N., Khudoykulov J.B.-Botany, Science and Technology, 2018, P.212
2. Kurbanov, A. A., Kh N. Atabayeva, and S. Sh Khayrullaev. "Influence of sowing dates and norms on harvest of lentils varieties." *ACADEMICIA: An International Multidisciplinary Research Journal* 10.10 (2020): 1343-1348.
3. Kurbonov A.A., Atabayeva H.N., & Khayrullayev S.Sh. (2021). Effect Of Sowing Norms On Biometric Indicators, Yield And Grain Quality Parametres Of Darmon Variety Of Lentil Sown In Autumn And Spring . *The American Journal of Agriculture and Biomedical Engineering*, 3(08), 9–13. <https://doi.org/10.37547/tajabe/Volume03Issue08-02>
4. Возделвание зернобобовых и крупяных культур в Акмолинской области (Рекомендатсии).Акмолинск, ТОО «Заречный», 2008, 26 с.
5. Технология весеннего сева зерновых, зернобобовых и масличных культур: //www.агросектор.кз./ресоммендационс-сциентистс. 2010, п.18.
6. Траубенберг С.Е. Ферментативный гидролиз как инструмент для повышения пищевой ценности продуктов растениеводства. // Хранение и переработка селхозсырья. 2005. №7. С. 62-65.
7. "Чечевица, семена и посев, сорта -//хттп.чудо-огород.ру, 2010.