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The influence of norms of sowing seeds and rates on grain yield in combination sowing of forage crops

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Abstract: The article presents data on the effect of seeding rates and ratios on grain yield when intercropping vetch, barley, and triticale in the conditions of pasture gray soils of the Andijan region. Intercropping triticale with vetch provided a higher grain yield of 6.1-9.7 q/ha compared to the option planted alone, intercropping barley with vetch provided a higher grain yield of 4.0-7.1 q/ha compared to the option planted alone, and intercropping vetch with barley provided a higher grain yield of 3.1-5.4 q/ha compared to the option planted alone.

Keywords: Barley, vetch, triticale, seed, sowing norm and rate, grain yield.

Introduction: In order to obtain the highest yield when the same plant is grown continuously, it is necessary to create the most favorable conditions for the growth and development of the crop. If several crops are planted together, a slightly better soil is created for the harvest. As a result of unfavorable conditions for one type of crop, favorable for the second type of plant, it is possible to obtain a crop that can replace one of the other [2].

The level of study of the problem. In intercropping, two or more crops are planted in a row, in a row, or in a strip in the same plot. In this method, the seeds are not mixed before planting, but are planted separately. For example, when intercropping with soybeans, they are planted in separate seedbeds or in separate boxes in the same seedbed. This method is also called intercropping. The purpose of intercropping is to increase food quality and productivity [1, 2, 4, 5]. According to many scientists, intercropping is considered to have begun after intercropping. Plants were originally naturally mixed, and then, as people began to live in groups, they were planted separately. Also, when planting several crops together, it is possible to get a good harvest even in years with unfavorable weather conditions. Continuous planting of the same crop in the same field for several years does not always yield the desired yield. Because when planting several crops together, the ground is created for the desired yield [6].

METHODS

Our research was conducted in the Andijan region in 2021-2023 in the conditions of old-fashioned irrigated pastures of gray, medium-grained, with a depth of 4-5 meters, and non-saline soils.

Our experiments aimed to determine the effect of seeding rates and ratios on grain yield when intercropping barley, vetch, and triticale, and included 15 options. The experimental options were arranged in 4 replications and the options were arranged in 4 tiers. The total area of each option was 60 m2, of which 30 m2 was used. The total area of the experiment was 0.36

hectares.

The research was conducted in field and laboratory conditions, and the field experiment layout, calculations, and observations were based on the methodological manuals “Methods of conducting field experiments” and “Methodology of the State Variety Testing of Agricultural Crops” [3, 7]. The following mineral fertilizers were used in crop cultivation: ammonium nitrate (N 33-34%), ammophos (N 11-12%, P2O5-46%), and potassium chloride (K2O-60%).

RESULTS AND DISCUSSION

Our studies have shown that the seeding rates and ratios of barley, vetch and triticale have an effect on grain yield. According to the data obtained from the studies, the grain yield was 52.0 q/ha from the option where triticale was planted alone at a rate of 150 kg per hectare, 40.9 q/ha from the option where barley was planted alone at a rate of 150 kg per hectare, and 28.4 q/ha from the option where vetch was planted alone.

It was found that in the options where different seeding rates and ratios of barley, vetch and triticale were used in our studies, grain yield increased compared to the options where the crops were planted alone, and in the options where triticale and vetch were planted together, grain yield was 6.1-9.7 q/ha higher than the option where triticale was planted alone. In the variants planted with triticale and vetch, the highest grain yield indicators were obtained from the variant planted with 150 kg/ha triticale + 75 kg/ha vetch (2:1) and amounted to 61.7 q/ha, while the grain yield was obtained from the variant planted with 150 kg/ha triticale + 100 kg/ha vetch (3:2) and 60.7 q/ha, and the grain yield was obtained from the variant planted with 150 kg/ha triticale + 50 kg/ha vetch (3:1) and 58.1 q/ha (Table 1).

It was found that the grain yield in the variants planted with vetch and triticale was 4.7-7.8 q/ha higher than the variant planted with triticale alone. The highest grain yield in the variants planted with vetch and triticale was obtained from the variant planted with 120 kg/ha vetch + 60 kg/ha triticale (2:1) and amounted to 59.8 q/ha, while the grain yield in the variant planted with 120 kg/ha vetch + 80 kg/ha triticale (3:2) was 58.7 q/ha, and the grain yield in the variant planted with 120 kg/ha vetch + 40 kg/ha vetch (3:1) was 56.7 q/ha.

It was found that the grain yield in the variants planted with barley and vetch was 4.0-7.1 q/ha higher than the variant planted with barley alone. In the variants planted with vetch in combination with barley, the highest grain yield indicators were obtained from the variant planted with 150 kg/ha barley + 75 kg/ha vetch (2:1) and amounted to 48.0 q/ha, while the variant planted with 150 kg/ha barley + 100 kg/ha vetch (3:2) yielded 47.1 q/ha, and the variant planted with 150 kg/ha barley + 50 kg/ha vetch (3:1) yielded 44.9 q/ha. It was found that the grain yield in the variants planted with vetch and barley was 15.6-17.9 q/ha higher than in the variant planted with vetch alone.

Table 1

Effect of seeding norms and rates on grain yield in intercropping with fodder crops, q/ha (2021-2023 year)

No. Var.	Crop types	Seeding norms and rates	2021	2022	2023	Average
1	Triticale	150 kg/ha	49.3	52.6	54.0	52.0
2	Barley	150 kg/ha	39.2	41.4	42.0	40.9
3	Vetch	120 kg/ha	27.1	28.2	29.9	28.4
4	Triticale + Vetch	150 kg/ha triticale+50 kg/ha vetch (3:1)	55.5	58.7	60.1	58.1
5		150 kg/ha triticale+75 kg/ha vetch (2:1)	59.6	62.2	63.2	61.7
6		150 kg/ha triticale+100 kg/ha vetch (3:2)	58.3	61.4	62.5	60.7
7	Vetch + triticale	120 kg/ha vetch+40 kg/ha triticale (3:1)	54.0	57.1	58.9	56.7
8		120 kg/ha vetch+60 kg/ha triticale (2:1)	57.5	60.0	62.0	59.8
9		120 kg/ha vetch + 80 kg/ha triticale (3:2)	56.1	58.6	61.3	58.7
10	Barley + vetch	150 kg/ha barley + 50 kg/ha vetch (3:1)	43.2	45.5	46.0	44.9
11		150 kg/ha barley +75 kg/ha vetch (2:1)	46.4	48.3	49.4	48.0
12		150 kg/ha barley + 100 kg/ha vetch (3:2)	45.2	47.5	48.5	47.1

13	Vetch + barley	120 kg/ha vetch+40 kg/ha barley (3:1)	42.0	44.6	45.4	44.0
14		120 kg/ha vetch+60 kg/ha barley (2:1)	45.5	46.2	47.2	46, 3
15		120 kg/ha vetch+80 kg/ha barley (3:2)	44.0	45.0	46.7	45, 2

In the variants planted with barley in combination with vetch, the highest grain yield indicators were obtained from the variant planted with 120 kg/ha vetch + 60 kg/ha barley (2:1) and amounted to 46.3 q/ha, while the variant planted with 120 kg/ha vetch + 80 kg/ha barley (3:2) yielded 45.2 q/ha, and the variant planted with 120 kg/ha vetch + 40 kg/ha vetch (3:1) yielded 44.0 q/ha. It was found that the grain yield in the variants planted with vetch and barley was 3.1-5.4 q/ha higher than in the variants planted with barley alone.

CONCLUSION

It was found that the seeding norms and rates of forage crops affect grain yield, and each crop type was higher than the variants planted alone. Triticale and vetch intercropping provided a higher grain yield of triticale plants by 6.1-9.7 q/ha compared to the variant planted alone, barley and vetch intercropping provided a higher grain yield of barley plants by 4.0-7.1 q/ha compared to the variant planted alone, and barley and vetch intercropping provided a higher grain yield of barley plants by 3.1-5.4 q/ha compared to the variant planted alone.

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