ASSESSMENT OF THE COST-EFFECTIVENESS OF VARIOUS HERBICIDES USED IN WINTER WHEAT CULTIVATION

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Annatation: As we know, the result of any research is evaluated by the solution of a scientific problem, a new type of technology or the convenience and economic efficiency of the methods used. This article provides information on the economic efficiency of several selected types of herbicides when applied to weeds in the winter wheat field.

Key words: winter wheat, economic efficiency, herbicide, weeds, yield

Introduction: Because spiked grain crops are sown densely and are not subjected to special cultivation practices, weeds are able to grow freely among them. These weeds compete with wheat for water and nutrients, create shade, and provide favorable conditions for the spread of diseases, pests, and insects. As a result, grain yield and quality may decline by 40–50 percent, which inevitably leads to reduced overall economic efficiency.

Given these challenges, evaluating the performance of different herbicides—either applied individually or in combination, and at various application times—is of great importance. Studying their effectiveness allows for identifying the most economically beneficial strategies for weed management in winter wheat production.

Purpose of the Study: The aim of this research is to evaluate the effectiveness of Puma Super and Granstar herbicides against grass-type (spiked) and dicotyledonous weeds in several winter wheat varieties and to determine their impact on grain yield.

Research Object: The study was conducted on multiple winter wheat varieties grown under irrigated conditions in the Surkhandarya region. Various formulations of Puma Super and Granstar herbicides served as the primary research objects.

Research methods: In the course of the study, herbicides were applied to the weeds growing in the winter wheat field at different times, observation and comparison of the results was carried out.

Results: The results of our experiments demonstrated that the effectiveness of Puma Super and Granstar herbicides in controlling grass-type and dicotyledonous weeds in the Kroshka winter wheat variety increased by nearly twofold. However, assessing the economic efficiency of these herbicides is particularly important. Although such herbicides are both environmentally safe and highly effective, their cost is high due to their being imported. At the same time, weed infestations—causing 40–50% or more loss in grain fields—lead to a sharp decline in production efficiency.

In recent years, despite a noticeable increase in grass-type and dicotyledonous weeds in wheat fields, the use of appropriate herbicides for their elimination has significantly decreased. Meanwhile, the global demand for herbicides effective against these weed groups has continued to rise, largely because they offer high efficacy while remaining environmentally friendly.

As shown in Table 5.27, the average cost of Puma Super herbicide—used to completely eliminate wild oats and other grass-type weeds—was 25,000 soums per liter in 2005, 30,000 soums in 2006, and 32,000 soums in 2007, with one liter required per hectare. Likewise, the price of Granstar herbicide, applied at 15 g/ha against dicotyledonous weeds, increased from 4,800 soums in 2005 to 5,175 soums in 2006 and 5,280 soums in 2007. Due to these rising costs and limited access, many farmers were unable to purchase and apply these herbicides despite their proven effectiveness.***table -5.27***

Economic effectiveness of herbicides application against cereal and dicolytic weeds in winter wheat field. (when herbicides are applied on March 20)

№	Indicators	Experience options			
		I (st)	**II**	**III**	**IV**
2005 year					

1	Productivity s/ha	31,3	45,3	46,9	56,7
2	Total costs, in sums	329133	354133	333933	358933
	Herbicides, sum, ha	-	25000	4800	29800
3	Total income from the sale of grain, in sums	268210	388176	401886	485862
4	Net profit, sums	-60923	34043	67953	126929
5	Rate of return, %	-18,5	9,6	20,3	35,4
2006 year					
1	Productivity s/ha	34,4	50,1	49,5	57,3
2	Total costs, in sums	422073	452073	427248	457248
	Herbicides, sum, ha	-	30000	5175	35175
3	Total income from the sale of grain, in sums	394430	574447	567567	657002
4	Net profit, sums	-27643	122374	140319	199754
5	Rate of return, %	-6,5	27,1	32,8	43,7
2007 year					
1	Productivity s/ha	32,8	48,5	47,3	56,1
2	Total costs, in sums	588336	620336	593616	625616
	Herbicides, sum, ha	-	32000	5280	37280
3	Total income from the sale of grain, in sums	432927	670151	624312	740464
4	Net profit, sums	-155409	19819	30696	144848
5	Rate of return, %	-26,4	12,3	5,2	23,1

However, considering that each bush of some weeds sheds up to 0.5 million seeds on the ground every year and increases year by year, the price of such herbicides should be of little interest to our farmers.

At the same time, if we take into account the fact that it develops along with winter wheat and reduces the yield and quality of the crop, we witness the limitless damage caused by weeds. According to the results of our experiments (Table 5.27), the yield from winter wheat fields with a lot of spiky and dicotyledonous weeds does not exceed 29.8-34.4 s/ha, against spiky weeds Puma super (1 l/ha), when Granstar (15 g/ha) herbicides used against dicotyledonous weeds were mixed together and dissolved, it was observed that the grain yield was 56.1-61.2 s/ha.

As a result, there was a sharp increase in net income and profitability due to the increase in income from the sale of grain to the state. As a result, expenses spent on Granstar and Puma super herbicides, along with other expenses, were fully covered, and an increase in net profit was observed.

On March 20, when Puma super was applied separately against wild oats and other spiky weeds, the grain yield was 14.0 s/ha in 2005, 15.7 s/ha in 2006, and 15 s/ha in 2007. It was observed that it increased by 7 s/h.

When Granstar (15 g/ha) herbicide was applied against dicotyledonous weeds on March 20, grain yield was increased by 15.6 s/ha in 2005 compared to the herbicide-untreated control option, and this situation was 15.1 s/ha in 2006. /ha showed that in 2007 it will be more than 14.5 s/ha.

However, when Granstar herbicide was applied separately against dicotyledonous weeds, the grain yield when both herbicides were mixed together and dissolved and applied on March 20 was significantly higher than when the herbicide was applied to the control option and when the herbicides were applied separately. was observed.

When we compare and analyze the experimental options of this situation, we witness the following evidence. In 2005, compared to the control option without herbicides, the grain yield when both herbicides were mixed together was 56.7 s/ha, and it showed that the grain yield was 25.4 s/ha more than the control option.

The purpose of the analysis of data on grain yield in the economic analysis part of the dissertation was to show the high efficiency of the combined use of herbicides. If the grain yield when the herbicide Puma super (1 l/ha) was used

separately against spike weeds was 45.3 s/ha, the additional grain yield when both herbicides were used together, Puma super separately showed that it was 11 s/h higher than the one used. The same speed was observed in the effectiveness of the combined use of Puma super with the separate application of Granstar herbicide, and an additional grain yield of 9.8 s/ha was achieved.

According to the experiments of 2006-2007, the law of 2005 was repeated, showing that the combined use of Puma super (1 l/ha) and Granstar (15 g/ha) herbicides is more effective.

Conclusion: The results of the study indicate that applying Puma Super (1 L/ha) against grass-type weeds that develop concurrently with winter wheat, together with Granstar (15 g/ha) against dicotyledonous weeds—mixed and applied in early April, the period corresponding to active weed germination—is a highly promising weed-control strategy. This combined approach not only ensures effective suppression of both weed groups but also opens new opportunities for advancing grain production in the irrigated southern regions of our country.

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