Effectiveness of the application of herbicides against pests in sunflower fields

Usman Norkulov[1,*], *Shavkat* Ahmurzayev[1], *Bakhtiyar* Nasirov[1], *Makhkam* Shodmanov[1], *Batir* Tukhtashev[1] and *Jamoliddin* Eshonkulov[1]

[1]Tashkent State Agrarian University, 2, University street, Tashkent, 100140, Uzbekistan

Abstract. This article investigates the impact of herbicides Pilot, Roundup, 36% se, and Sprut, 54% se on the growth, development, and productivity of soybean plants. The study examines how different application rates of these herbicides affect soybean crops when used to control the spread of sunflower fields. Additionally, the research includes an assessment of the economic efficiency associated with the use of these herbicides. The study aims to understand the effects of these herbicides on soybean plants, considering factors such as plant growth, development stages, and final yield. Different application rates of the herbicides are tested to determine their optimal dosages for effective sunflower field control while ensuring minimal impact on the soybean crop. Furthermore, the article presents an analysis of the economic implications of using these herbicides. This includes considerations of the cost-effectiveness and benefits associated with the use of each herbicide in soybean cultivation when compared to other weed control methods. By providing valuable information on the influence of these herbicides on soybean crops, the research aims to aid farmers and agronomists in making informed decisions about weed management strategies. The findings can contribute to the development of more efficient and sustainable approaches to control sunflower fields while maximizing soybean productivity and overall economic returns.
Keywords. Pilot, Roundup, herbicides, sunflower, yield.

1 Introduction

Currently, increasing the gross yield and quality of agricultural crops is becoming very important in meeting the needs of the population for food products in the world. 10-15% of Lalpi crop is lost due to weeds [1-3]. There are more than 3,000 types of weeds in world agriculture, and more than 40 types cause great damage. High results have been recorded in USA, Germany, China, Australia, Russia, South Korea, India, and other countries using combined agrotechnical and chemical control measures against them [4-6].

In many countries around the world, for example, in China, weed control, surface tillage and application of herbicides at planting, continuous application during the growing season, deep once every 2-3 years in the USA and India (32-35 cm) tillage and application of herbicides before planting, along with planting and during the growing season has been

* Corresponding author: 1992. jamoliddin@mail.ru

observed to give good results [7-9]. The use of herbicides is the most effective way to keep the fields where agricultural crops are grown free of weeds, it creates favorable conditions for the growth and development of crops and ensures an increase in productivity. But the chronic use of one herbicide in one field causes the proliferation of weed species that are resistant to that drug [10-14]. Based on this, in the conditions of Tashkent region in Uzbekistan, it is very important to use new herbicides.

Recently, the global climate change conditions in the world, the growth of the population of our country require the rational use of land resources [15, 16]. In recent years, special attention has been paid to the effective use of agricultural crops and food security of the population in Uzbekistan. Providing the growing population with ecologically clean and high-quality agricultural products, improving the phytosanitary status of products, preventing the entry of objects under quarantine into the republic, and sharply reducing the number of weeds in agricultural crops, including soybean fields, in Uzbekistan. in order to improve the chemical control measures, it is urgent to conduct research on the use of new herbicides, i.e., to increase the yield of vegetables as a result of updating the range of herbicides.

2 Materials and methods

In the context of the Tashkent region in Uzbekistan, this study investigates the spread, growth, and damage caused by wild plants in oil crop fields and field edges. The research aims to develop effective strategies for preventing the expansion of these wild plants into sunflower fields, field edges, ditches, and canals. To achieve this, the study focuses on implementing scientifically-grounded measures for control.

Figure 1. Phenological conditions in Jizzakh region observation activities.

A comprehensive approach is adopted, encompassing both agrotechnical and chemical control methods. The research explores soil cultivation techniques and mechanical measures

that inhibit the germination, growth, development, and dissemination of sorghum seeds. By incorporating these preventive strategies, the study seeks to curtail the establishment and spread of unwanted wild plants in key agricultural areas.

Furthermore, the research identifies and tests suitable herbicides for targeted application. The timing of herbicide application is crucial to ensure maximum efficacy in controlling the unwanted wild plants while minimizing any adverse effects on the desired crops. By conducting thorough tests, the study determines the most effective herbicides and establishes appropriate application standards for their use.

Ultimately, the findings from this research contribute to the development of practical and efficient strategies for managing wild plant proliferation in oil crop fields and surrounding areas. The implementation of these methods in production can help ensure the optimal growth and yield of sunflower crops and improve overall agricultural productivity in the region.

This groundbreaking study represents the first comprehensive investigation into the types, biological characteristics, and extent of damage caused to sunflower fields by wild plants. Additionally, the research delves into the impact of these wild plants on the edges of fields. By thoroughly examining these aspects, the study aims to provide a scientifically substantiated understanding of the interplay between sunflower crops and surrounding wild plant populations.

The research endeavors to develop effective agrotechnical methods for weed control in oil crops, encompassing strategies such as crop rotation, appropriate tillage practices, and mechanical removal techniques. These methods are tailored to efficiently combat weed proliferation while preserving the health and productivity of sunflower fields.

Furthermore, the study involves the rigorous selection of effective herbicides, considering their suitability for specific weed species and their compatibility with sunflower crops. The research evaluates the optimal norms, application methods, and timing of herbicide use to ensure the most efficient and eco-friendly weed control.

By integrating these research findings into practical applications, farmers and agricultural practitioners can adopt novel and effective approaches to manage weeds in sunflower fields and maintain the health and yield of their crops. The implementation of these insights can lead to increased agricultural productivity, reduced economic losses, and enhanced sustainability in oil crop production.

3 Results and discussion

The effect of the use of Pilot herbicide at different rates against the field of sunflower planted with 5 options and 4 replications at the experimental station of Tashkent State Agrarian University was continued in 2022. The plot of the variant is 84 m^2 . Along with the planting of sunflowers in the fields, safflower seeds were sown on the soil surface to a depth of 3-4 cm, then Stomp 33% ek of 1.5 l/ha as a standard and Pilot herbicide 0.5; It was sprinkled on the surface of the soil with a hand sprayer along with sowing at the rate of 1.0-1.5 l/ha. 300 l/ha of water from standard working solution was used for each application. Other agrotechnical activities were carried out on the basis of technological processes introduced in sunflower cultivation.

As shown in Table 1, all of the Pilot herbicide rates tested in the sunflower field showed good results against boll weevil. No seed germination was observed in the initial period in all the experimental variants and in the Stomp sprayed variant. In the case where Stomp 33% ek herbicide was used at the rate of 1.5 l/ha, the spread of sedum after 30 days was 3.8 %, and after 60 days it was 8.2%, Pilot, 10% sec 0.5 In the option used at the rate of l/ha, it was observed that the spread of the fungus was 1.5% after 45 days and 4.4% after 60 days. No seed germination was observed after 45 and 60 days in pilot, 10% sec 1.0 and 1.5 L/ha rates. The prevalence of measles after 75 days was 1.6 and 1.0% in these variants, respectively.

Before harvesting the sunflower crop, it was found that in the case of Pilot, 1.0 l/ha, the spread of sorghum was 2.0%. It was determined in the experimental results that the spread of this drug was 1.1% during sowing of soybeans when this drug was used at the rate of 1.5 l/ha.

Table 1. Herbicide against the cusp (*Cuscuta*) in the sunflower field (Kibray district, Tashkent region, 2021-2022).

#	Options	Herbicide, L	Date of sprinkling herbicide	Cusp spread in % Accounting received the date			Growth of the era At the end of sunflower seeds spread, %	Sunflower yield, quintals/ha
				May 30	June 15	June 30		
1	Control (herbicide not sprinkled)	-	-	16.0	38.5	52.2	60.4	23.7
2	Stomp, 33% ke (benchmark)	1.5	April 30	-	3.8	8.2	28.4	28.2
3	Pilot, 10 % sec	0.5	April 30	-	1.5	4.4	8.4	29.9
4	Pilot, 10 % sec	1.0	April 30	-	-	1.6	2.0	32.1
5	Pilot, 10 % sec	1.5	April 30	-	-	1.0	1.1	30.8

Pilot herbicide 0.5; 2 9 .9 respectively from sunflower in the options used in the norms of 1.0 and 1.5 l/ha; 32.1 and 30.8 quintals/ha yield was obtained. 30.8 quintals/ha was obtained in the control variant without herbicide spraying.

The data obtained show that the application of Pilot 10% .ec herbicide at the rate of 1.0 l/ha has given good results. Therefore, the use of Pilot solution at the rate of 1.0 l/ha provides an opportunity to get a high yield of sunflower by effectively reducing the sorghum.

The impact of the use of Pilot herbicide at different rates against the sunflower field was carried out in the "Manas" farm of the Dostlik district of the Jizzakh region in 5 variants and 4 replications. Each option plot was taken as 84 m^2 . Sunflower seeds were sown on the calculated areas of the plots at a depth of 3-4 cm on the surface of the soil. Stomp 33% ek rate of 1.5 l/ha was taken as benchmark. In the next three options, Pilot herbicide is 0.5; At the rate of 1.0-1.5 l/ha, it was sprinkled on the soil surface with the help of a manual sprinkler. The working solution was obtained at the rate of 300 l/ha of water. All other agrotechnical activities were carried out based on technological processes introduced in sunflower cultivation.

From the data presented in Table 2, it can be seen that all tested application rates of Pilot herbicide in the sunflower field have good results. In all of the experimental options, the germination of the seeds of sorghum was not observed in the initial period of observations. In the variant where Stomp 33% ek herbicide was used at the rate of 1.5 l/ha, the spread of sorghum after 60 days was 3.25 %, and after 60 days it was 11.2%.

In the pilot, 10% sec at 0.5 l/ha, it was observed that there was no spread of weevil after 45 days and 5.50% after 60 days. No seed germination was observed after 45 days in variants sprayed with this herbicide at rates of 1.0 and 1.5 l/ha.

Table 2. Pilot, the effectiveness of 10% sec herbicide against *Cuscuta* in sunflower field (Dostlik District, Jizzakh Region, 2021-2022).

#	Options	Herbicide , L	Date of sprinkling herbicide	Cusp spread in %			Growth of the era At the end of sorghum seeds spread, %	Sorghum yield, quintals/ha
				Accounting received the date				
				May 30	June 15	June 30		
1	Control (herbicide not sprinkled)	-	-	9.25	43.5	59.2	66.6	22.1
2	Stomp, 33% ke (benchmark)	1.5	April 25	-	3.25	11.2	30.5	27.0
3	pilot, 10 % sec	0.5	April 25	-	1.50	5.50	9.25	28.1
4	pilot, 10 % sec	1.0	April 25	-	-	0.75	1.75	31.1
5	pilot, 10 % sec	1.5	April 25	-	-	0.5	1.5	29.4
HCP $_{05}$ = 1.60 quintals/ha								

After only 60 days, the prevalence of sporulation in these variants was 0.75 and 0.5%, respectively. During the harvest period of sunflower, the spread of sorghum was 1.75% in the case of Pilot, 1.0 l/ha. 0.5 along with planting pilot preparation; In the variants used in the norms of 1.0 and 1.5 l/ha, the sunflower yield is 2 8 .1, respectively ; 31.1 and 29.4 quintals/ha yield was obtained. In the control variant without herbicide spraying, the yield was 22.1 quintals/ha. Therefore, the use of Pilot herbicide at the rate of 1.0 l/ha provides a high yield of sunflower by effectively reducing the weeds.

4 Conclusions

In the conditions of typical gray soils of Tashkent region, in the field of sunflower, in the variants that were sprayed with Pilot, 10% sec herbicide at the rate of 1.0 and 1.5 l/ha, no seed germination was observed after 30 and 45 days. In these variants, after 60 days, the prevalence of sporulation was 2.1 and 1.0%, respectively. During the harvesting period of sunflower, the spread of sorghum was 2.3% in the case of Pilot, 1.0 l/ha, and the biological efficiency was 96.8%.

In the conditions of Dostlik district, the spread of the psyllid during the harvesting period of the sunflower crop Pilot, 1.75% of the plants were infected with the psyllium in the option applied at the rate of 1.0 l/ha, and the efficiency was 96.0% compared to the control option. organized.

Roundup, 36% se and Sprut, 54% se herbicides were used at rates of 6.0 and 3.7 l/ha against common sedum and other weeds against common sedum and other weeds in field margins. kills 96-99% of weeds.

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