Effectiveness of using herbicides against *Cuscuta* in soy field

Usman Norkulov[1], *Shavkat* Ahmurzayev[1], *Bakhtiyar* Nasirov[1], *Jamoliddin* Eshonkulov[1,*] and *Nodira* Kamalova[1]

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

Abstract. This research delves into the repercussions of employing pilot and zeta herbicides at varying application rates to counteract the growth of common sorghum within soybean fields. The investigation is conducted within the specific environmental context of irrigated typical gray soils prevalent in the Tashkent region. The central focus of this study is to gain a comprehensive understanding of the multifaceted impacts these herbicides exert on the growth trajectory, developmental milestones, and eventual yield of soybean plants. By assessing the influence of pilot and zeta herbicides across different dosage levels, this study contributes to elucidating the potential benefits or challenges that arise from their application in this agricultural setting. Furthermore, this research endeavors to provide critical insights into the economic efficiency of employing these herbicides, thereby offering a holistic perspective on the viability of incorporating such chemical interventions within soybean cultivation practices in the Tashkent region. The implications of this study extend beyond agronomic parameters, delving into the intricate interplay between herbicide application, crop growth, and economic considerations. The findings are poised to offer valuable guidance to farmers, researchers, and policymakers who are vested in optimizing agricultural practices while considering both the ecological and economic dimensions. Ultimately, this investigation strives to enrich the body of knowledge concerning herbicidal interventions and their potential repercussions in the realm of soybean cultivation within distinct agro-ecological contexts.

Keywords. *Sorghum, pilot, zeta, herbicide, soybean, cuscuta*.

1 Introduction

Today, increasing the gross yield and quality of agricultural crops is of great importance in meeting the needs of the population for food products in the world. However, 10-20% of the total yield is lost due to weeds [1, 2]. There are more than 3,000 types of weeds in the world's agriculture, and more than 40 types cause significant damage. High results have been achieved in USA, China, Germany, Russia, Australia, South Korea, India and other countries by using agrotechnical and chemical control measures against them [3, 4].

* Corresponding author: 1992. jamoliddin@mail.ru

In many countries around the world, including China, weed control is followed by surface tillage and herbicide application, or during the growing season, and in the USA and India, deep plowing (32-35 cm) and herbicide application every 2-3 years [5, 6]. it has been found to give good results when used before planting, along with planting and during the growing season [7].

The use of herbicides is the most effective way to keep the fields where agricultural crops are grown free from weeds, which creates favorable conditions for the development of crops and ensures an increase in productivity. However, repeated use of one herbicide in one field leads to the proliferation of weed species resistant to that drug. Based on this, in the conditions of the Tashkent region (Uzbekistan), methods of tillage processing and the use of new herbicides are considered to be very urgent issues [8-10].

In recent years, the change in the global climate conditions in the world and the growth of the population of Uzbekistan require the rational use of land resources. In recent years, special attention has been paid to the effective use of agricultural crops and food security of the population in Uzbekistan [11-14].

Providing the growing population with cheap and high-quality agricultural products, improving the phytosanitary status of products, preventing the entry of quarantined objects into Uzbekistan, and sharply reducing the number of weeds in agricultural crops, including soybean fields, in Uzbekistan [15, 16]. It is important to conduct research on the improvement of chemical control measures for the use of new herbicides, that is, to increase the yield of vegetables as a result of updating the range of herbicides.

2 Materials and methods

In the conditions of Tashkent and Jizzakh provinces of Uzbekistan, the spread, growth and damage level of sorghum in the fields of oil crops and wild plants on the edges of the fields are studied and scientifically substantiated. Effective methods of agrotechnical and chemical control measures are developed to prevent the spread of weevils in soybean and sunflower fields, field edges, ditches and canals.

Land cultivation and mechanical loss methods that prevent the germination, growth, development and spread of the seeds of sorghum, application periods of effective herbicides selected as a result of testing, and convenient standards will be determined and introduced into production.

For the first time, the types, biological characteristics, and levels of damage to wild plants in the fields of soybeans, sunflowers and field edges are studied and scientifically substantiated; effective agrotechnical methods (rotation, tillage, mechanical removal) of weed control in oil crops and wild plants on field edges will be developed; Effective herbicides are selected and convenient norms, methods and periods of their use are determined and introduced into production.

As a result of the development of effective protection measures against sorghum, the yield lost in oil crops (20-30%) is saved, as well as foreign a clean product is grown from the seeds. Laboratory and field experiments were conducted to develop enhanced control strategies targeting quarantine weeds affecting oil crops, specifically sunflower and soybeans. These strategies were devised based on rigorous scientific research and aimed at effectively managing the presence of these problematic weeds. The study encompassed both controlled laboratory settings and real-world field conditions, ensuring a comprehensive evaluation of the proposed control measures. The ultimate goal was to provide practical and evidence-based solutions for combating the spread of these quarantine weeds in oil crop cultivation, contributing to the overall sustainability and productivity of sunflower and soybean farming practices.

3 Results and discussion

In the conducted experiments, the study of the effect of the use of Pilot herbicide at different rates against the soya sown field was continued in 2022 at the experimental station of the Tashkent State Agrarian University in 5 variants and 4 repetitions. Each option plot was taken as 84 m^2. Along with sowing of soybeans in the fields, sorghum seeds (200 pieces) were sown on the surface of the soil to a depth of 3-4 cm (Figure 1), then Stomp 33% ek of 1.5 l/ha as a standard and Pilot herbicide 0.5.

Figure 1. Fields affected by the projectile and surrounding areas.

Along with planting at the rate of 1.0-1.5 l/ha, it was evenly sprinkled on the soil surface with a manual spreader. 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 soybean cultivation. From the data in Table 1, it can be seen that all application rates of Pilot herbicide tested in the soybean field against the weevil gave good results.

Table 1. Pilot, 10% sec herbicide against soybean field cusp (Cuscuta)
(Kibray district, Tashkent region, 2021-2022).

#	Experiments	Herbicide, l/ha	Date of herbicide application	Prevalence of cusp, in %			Spreading of seeds before harvesting, in %	Soy harvest, q/ha
				Date of registration				
				May 30	Jun 15	Jun 30		
1	Control (no herbicide applied)	-	-	14.4	50.5	67.6	72.4	22.1
2	Stomp, 33% ke (benchmark)	1.5	Apr 30	-	4.3	15.5	30.2	28.2
3	Pilot, 10 % sec	0.5	Apr 30	-	2.2	6.2	10.4	26.1
4	Pilot, 10 % sec	1.0	Apr 30	-	-	2.1	2.3	30.3
5	Pilot, 10 % sec	1.5	Apr 30	-	-	1.1	2.1	28.5
HCP_{O5} = 1.34 q/ha; HCP_{O5} = 4.99%								

All the experimental options and Stomp's consumption rate obtained did not show germination of sorghum seeds in the initial period. In the variant where Stomp 33% ek herbicide was used at the rate of 1.5 l/ha, the spread of sorghum after 45 days was 4.3 %, and after 60 days it was 15.5%. In this variant, the spread of seeds before harvesting was equal to 30.2%. In the pilot, 10% sec at 0.5 l/ha rate, it was observed that the spread of weevil was 2.2% after 45 days and 6.2% after 60 days. Pilot, 10% sec at 1.0 and 1.5 l/ha rates did not show seed germination after 45 days as last year. The prevalence of measles after 60 days was 2.1% and 1.2% in these variants, respectively. Pre-harvest spread of coya was found to be 3.2% in the case of Pilot, 1.0 l/ha. In the case where this drug was used at the rate of 1.5 l/ha, the spread of this drug during soybean harvest was 2.1%.

The study of the effect of the Zeta herbicide at different rates on soybean field was conducted in the experimental station of the Tashkent State Agrarian University in 6 variants and 4 repetitions. Each option plot was taken as 84 ^{m2}. Along with sowing of soybeans in the fields, zaperechak seeds (400 pieces) were also planted to a depth of 3-4 cm on the soil surface. Zellek-super, 104 g/l ek 1.0 l/ha was taken as standard. Zeta herbicide 0.5; 0.8; After the first irrigation of soybeans at the rate of 1.0-1.2 l/ha, it was evenly sprayed with a manual sprinkler. 300 l/ha of water from standard working solution was used for each application.

Other agrotechnical activities in the field were carried out based on the technological processes introduced for soybean cultivation. From the obtained data, it can be seen that on June 5, the prevalence of sorghum in the experimental field was 15.0-18.4% (Figure 2).

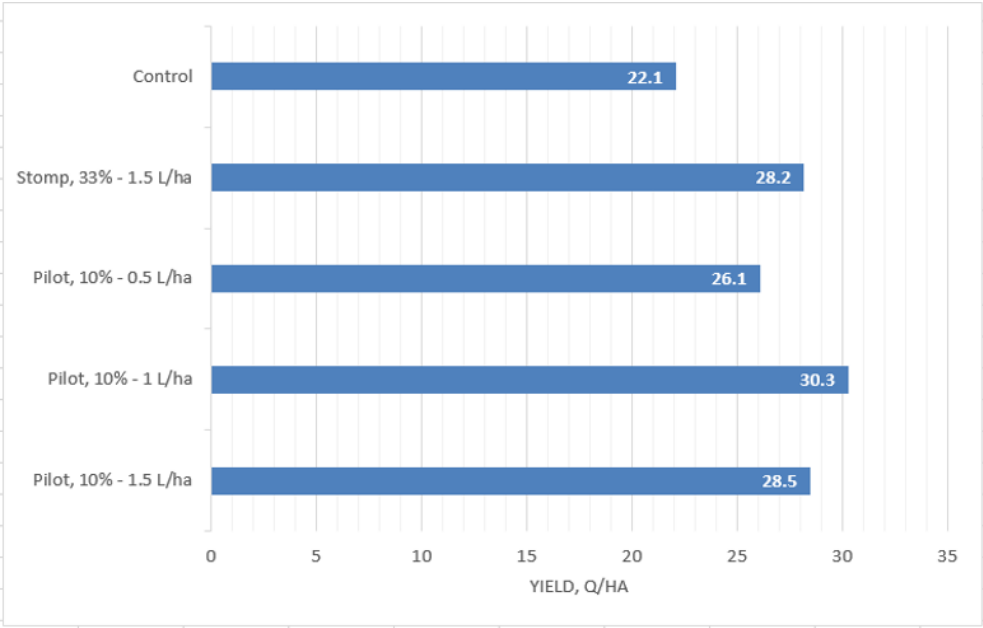

Figure 2. Soybean yield.

The first count was taken 15 days after herbicide application. In the Zellek-super sown variant, the damage of the soybean plant by aphids was 13.2%. This is an increase of 0.8% compared to the previous period. But compared to the control option, it was 10.3% less.

In the variant where Zeta herbicide was sprayed at the rate of 0.5 l/ha, 13.4% of soybean plants were infected with sorghum during the period of herbicide spraying. In the period of the first calculation, the pest infestation was 3.2% and the efficiency was equal to 81.2%. Compared to the control option, it was 82.6%. Zeta, 100 g/l herbicide at the rate of 0.8 l/ha

was used before spraying the herbicide, and 16.6% of the soybean plant was infected with the sorghum. The number of plants affected by scurvy was 1.25% during the first count taken fifteen days later. The efficiency was equal to 92.4%. Damage was 22.3% less than the control variant. The effectiveness of the herbicide was 94.7% and had 15.2% of soybean plants affected by the weevil before herbicide application. After 15 days of herbicide spraying, the number of infected plants was 0.80%. In this option, the efficiency was equal to 94.7%. The efficiency compared to the control variant without herbicide spraying was 96.6%, and the number of soybean plants affected by the weevil during herbicide spraying was equal to 15.0%. 15 days after spraying the drug, the number of infected plants was 0.60%. In this option, the efficiency was equal to 96.0%.

In the second counting period, which was taken 30 days after herbicide application, the number of plants infested by the weevil increased in all options. In the control option, 48.2% of the soybean plant was damaged by the beetle. Zeta, 100 g/l at the rate of 0.8 l/ha, the damage was equal to 2.25%. This indicator was equal to 1.0% when this herbicide was used at the rate of 1.0 l/ha, and 0.75% when it was used at the rate of 1.2 l/ha.

4 Conclusions

Pilot herbicide 0.5; 1.0 and 1.5 l/ha, respectively, from the shade in the options used in the norms 26 .1; 30.3 and 28.5 q/ha yield was obtained. Soybean yield of 2 1.1 s /ha was obtained from the control variant without herbicide application. Therefore, the use of Pilot herbicide at the rate of 1.0 l/ha provides high yields of soybeans by effectively reducing the weeds.

Zeta, 100 g/l at the rate of 0.8 l/ha, the damage of the soybean plant by the weevil was equal to 3.75% during the harvest period. In this option, the efficiency compared to the initial damage was 77.4%. It was determined in the results of the experiment that the efficiency was 94.9 percent compared to the control option

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