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TANCHYK S.P., Doctor of Agricultural Sciences
MYHLOVETS O.P., graduate student
National University of Life and Environmental Sciences of Ukraine
e-mail: o.myglovetz@ukr.net

EFFECT SOIL HERBICIDES ON THE OVERALL LEVEL OF WEED-INFESTED AT DIFFERENT FARMING SYSTEMS IN CROPS OF SOY IN THE RIGHT-BANK FOREST-STEPPE UKRAINE

The results of studies of the impact of soil herbicides on weedines total soya crops in different farming systems (Industrial and No-till). It was established that under traditional farming systems and No-till highest efficiency of soil herbicides and weed-infested marked the lowest level in tank mixtures applied at sowing to germination, which affects the formation of the soybean crop.

Keywords: *Farming systems, soil herbicides, weeds, soybeans, productivity, effectiveness, agrophyticintoze*

Introduction. An important reserve for the production of vegetable protein in Ukraine is to increase the yield of legumes, including soy. It – one of the most popular in the world of high-protein and oil crops that grow more than 70 countries on five continents in temperate, subtropical and tropical zones.

Soya is endowed with low competitive ability towards weeds. Soybean yield losses from weeds constitute 15–40 %, sometimes they can be as high as 89% (or die altogether[2]..

Carrying only farming practices to control weedy component does not provide a significant reduction in the number of crops. Therefore, more efficient weeding is necessary to apply herbicides, especially groundwater, in the early stages of organogenesis. Much more difficult to solve this problem if it is related to the cultivation of her farming No-till, where there is no any tillage.

Modern herbicides endowed predominantly narrow spectrum of activity on the species composition of weeds. Only a few of the herbicides effectively acting annual monocots and bipartites wide range of species, but their complete destruction, especially in mixed weed-infested, is not achieved. Expanding the range of action of soil herbicides can be achieved by mixing. So important is the study of interference competition in agrophyticintoze soya herbicides and biological efficiency of the separation and their use is compatible with the development of new herbicidal compositions have exhibited synergy and high selectivity to culture [4,5].

The purpose of research – to determine the effect of soil herbicides on weed-infested crop formation, depending on the species and norms in making herbicides alone and in tank mixtures and their impact on soya crops.

Materials and methods. Experimental studies were carried out in a stationary experiment NUBiP of Ukraine "Agronomic Research Station" (Kyiv region) and the Scientific Laboratory of the Department of Agriculture and herbology during 2012-2013 year.

Accounting weed constantly performed on fixed platforms size 0,5 m × 0,5 m [6], yield according to the general - to adopt methodical recommendations [3].

Crop rotation scheme in short rotary 3 corresponds to the rotation of the fields zoned forest-steppe conditions: soya - spring barley - corn for grain.

The research program was supposed to establish the influence of herbicides and their mixtures on the overall level of weed-infested crop and weed species composition on the background of different farming systems in agrophyticintoze soya, which was the precursor of maize.

Graduation factor - farming systems composed on the basis of the precursor or absence of tillage, herbicide in volving continuous and soil herbicides and their mixtures:

1. industrial (control) - the use of tillage (primary - disking after harvest precursor to a depth of 6–8 sm, plowing to a depth of 20–22 sm, Premulching with physical maturity of the soil to a depth of 2–3 sm, presowing cultivation in depth of 4–5 sm seed, industrial use of agricultural chemicals (according to the scheme of the experiment, Table 1).

2. No-till – the rejection of tillage, crop protection is carried out by using soya herbicides (according to the scheme of the experiment, Table 1).

Table 1

Scheme of experiment

Factor A (farming systems involving herbicide continuous action and soil-applied)	Factor V (applying herbicide insurance)
Industries (absolute control)	Without insurance herbicides
industries (without soil herbicides)	Tifen-S 8 g/ha ... Kvin Star Maks 0,8 l/ha
	Flagman 2,3 l/ ha ... Kvin Star Maks 0,8 l/ha
	Tifen-S 6 g/ha + Flagman 2,0 l/ha ... Kvin Star Maks 0,8 l/ha
	Tifen-S 8 g/ha + Kvin Star Maks 0,8 l/ha
	Flagman 2,3 l/ha + Kvin Star Maks 0,8 l/ha
	Tifen-S 6 g/ha + Flagman 2,0 l/ ha + Kvin Star Maks 0,8 l/ha
	Without insurance herbicides
industries from Hortus 2,5 l/ha	//-//-//-//*
industries from Hortus 1,8 l/ ha + Selefit 1,8 l/ha	//-//-//-//*
No-till, no Glifovit and soil herbicides	Without insurance herbicides
No-till with Glifovit 3,0 l/ha but without soil herbicides	Tifen-S 8 g/ha ... Kvin Star Maks 0,8 l/ha
	Flagman 2,3 l/ ha ... Kvin Star Maks 0,8 l/ha
	Tifen-S 6 g/ha + Flagman 2,0 l/ha ... Kvin Star Maks 0,8 l/ha
	Tifen-S 8 g/ha + Kvin Star Maks 0,8 l/ha
	Flagman 2,3 l/ha + Kvin Star Maks 0,8 l/ha
	Tifen-S 6 g/ha + Flagman 2,0 l/ ha + Kvin Star Maks 0,8 l/ha
	Without insurance herbicides
No-till with Glifovit 3,0 l/ha and Hortus 2,5 l/ha	//-//-//-//*
No-till with Glifovit 3,0 l/ha and Hortus 1,8 l/ha + Selefit 1,8 l/ha	//-//-//-//*

Note: *// - // - // - // * - use similar options making insurance herbicides.*

Soil research areas - black soil typical medium loam humus layer 0–30 sm in 3,95% saline pH - 6,9–7,3 content easily hydrolyzed nitrogen Kornfildom – 160 mg/kg soil phosphorus by rolling Machyhinym – 58 mg/kg soil exchangeable potassium by Machyhinym – 204 mg/kg soil.

The climate is temperate zones – continental medium to long-term air temperature is 6,8° C. The average annual rainfall of 550 mm, falls during the growing season averaged 309 mm.

Based on the data in the studied variants set the total number of weedy component 1 m^2 at 30 and 60 days after spraying herbicide soil (Table 2). The results of the studies found that the lowest number of weeds in cropping system marked by No-till featuring Glifovit + Selefit + Hortus, 30 days after spraying smaller 53,9 items/m^2 and 60 days at 60,3 items/m^2 compared with controls.

The highest number segetal vegetation obtained of No-till farming involving herbicide Glifovit but without soil preparations: 59,0 items/m^2 30 days and 66,0 items/m^2 60 days, according to the control.

The method of mathematical calculations and statistical analysis these data, we determined the effectiveness of soil herbicides and their mixtures on the overall level of weed-infested soya.

Effectiveness of soil herbicides on the above accounting periods were calculated by conventional method: a unit minus the number of weeds in herbicide option divided by the number of weeds in control, multiplied by 100. [2]

The highest herbicidal activity of drugs and their mixtures manifested against the background of No-till farming for the application of the mixture (Hortus 1,8 l/ha + Selefit 1,8 l/ha). This is due to higher rates of soil moisture which largely depends on the effectiveness of drugs, as well as lower losses total reserves of soil moisture in the upper soil layer over existing mulch. But for the industrial farming system, which used mechanical tillage, the effectiveness of herbicides and their mixtures was slightly lower compared to the No-till.

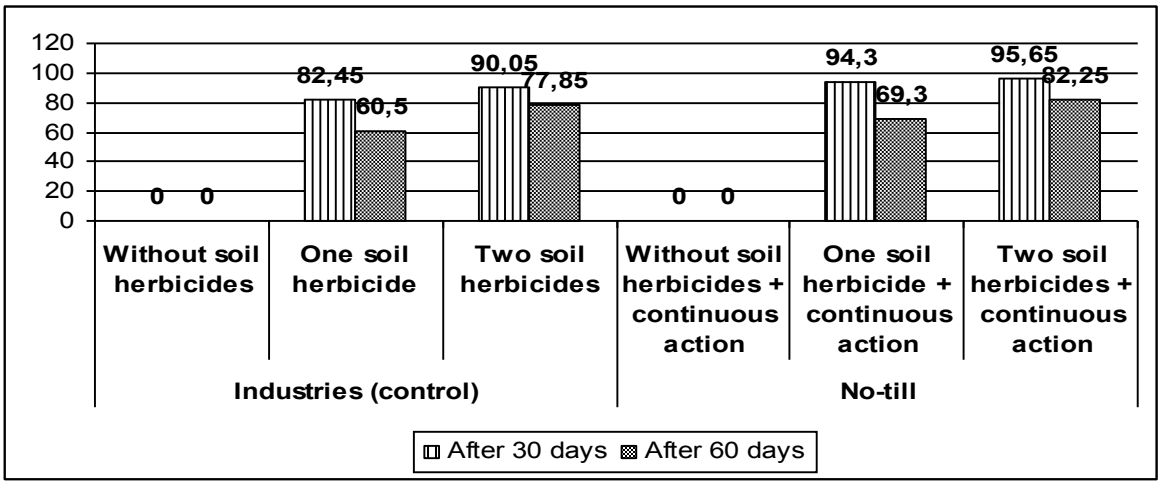
The decline is caused by the action holding preplant tillage, resulting in decreased amounts of moisture in the upper soil layer.

Table 2

Changes in the general level of weed-infested depending on farming systems involving continuous action of the herbicide and soil, items/m^2 (2012–2013 years).

Farming systems involving herbicide continuous action and soil-applied	The total number of weeds items/m^2							
	2012		2013		Average 2 years		Deviation (±)	
	After 30 days	After 60 days	After 30 days	After 60 days	After 30 days	After 60 days	After 30 days	After 60 days
Industries without soil herbicides (control)	54,9	72,3	115	129	85,0	100,7	0,0	0,0
Industrial + Hortus	38,9	46,4	42,0	51,8	40,5	49,1	–44,5	–51,6
Industrial + Hortus + + Selefit	25,1	32,7	27,0	36,2	26,1	34,5	–58,9	–66,2
No-till without soil herbicides + continuous action	124	152	164	181,3	144	166,7	+59,0	+66,0
No-till + Glifovit + Hortus	41,7	56,6	46,0	60,4	43,9	58,5	–100,2	–108,2
No-till + Glifovit + Hortus + Selefit	28,5	37,1	33,6	43,7	31,1	40,4	–113	–126,3
LSD_{05}							35,00	30,34

Increase in the number of weeds 60 days after spraying in comparison to the number after 30 days in all subjects variations caused by the advent of the stairs late spring weed species and end of the protective action of soil herbicides, and in versions without them – their absence.

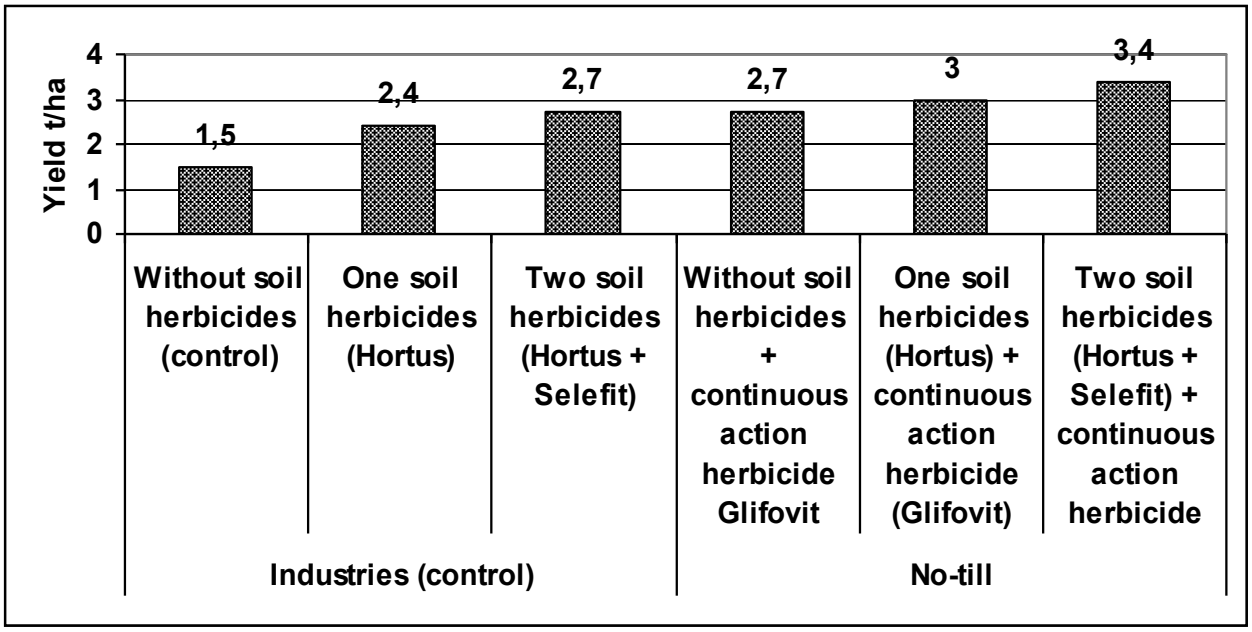


30 days after spraying		60 days after spraying	
LSD_{05} Factor A (farming systems involving herbicide continuous action and soil-applied)	2,23	LSD_{05} Factor A (farming systems involving herbicide continuous action and soil-applied)	2,23

Fig. 1. Effectiveness of soil herbicides in crops of soya, % (2012-2013 years)

In general, in both farming systems the most efficient action within 30 days after spraying 90%, showed a mixture of herbicides Hortus and Selefit that controlled a wide range of cereal and dicotyledonous weed species.

Mathematical calculations and statistical analyzes indicate that the greatest impact on the effectiveness of soil herbicides and their mixtures in soya planting a farming system – No-till.



LSD_{05} Factor A (farming systems involving herbicide continuous action and soil-applied)	0,74

Fig. 2. Soya yield, t/ha (average for 2012–2013 years)

The main summary measure of comparison of farming systems involving herbicide continuous action and ground is the yield of soybean (Fig. 2.). A comparison and statistical analysis of data trend of significant increase in productivity by using soil herbicides to soybean

emergence, particularly when using tank mixtures (Hortus + Selefit). Due to the reduction of weed-infested that adversely affect the yield.

Conclusions. For the formation of high yields of soya cultivation is appropriate for its protection circuit herbicide against weeds in the early stages of growth and development, both in industrial and systems for No-till. The highest increase of yield, namely 1,9 t/ha under control obtained of No-till farming involving herbicides (Glifovit 3,0 l/ha + Hortus 1,8 l/ha + Selefit 1,8 l/ha).

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Аннотация

Танчик С.П., Мигловець О.П.

Влияние почвенных гербицидов в посевах сои на общий уровень засоренности при различных системах земледелия в правобережной Лесостепи Украины

Приведены результаты исследований влияния почвенных гербицидов на общую засоренность посевов сои при различных системах земледелия (Промышленная и No-till). Установлено, что при обеих системах земледелия, наиболее высокая эффективность действия почвенных гербицидов и, соответственно, наименьший уровень засоренности посевов культуры, были отмечены при применении их баковой смеси в период до появления всходов.

Ключевые слова: *система земледелия, почвенные гербициды, сорняки, соя, урожайность, эффективность действия, агрофитоценоз*

Анотація

Танчик С.П., Мигловець О.П.

Вплив грунтових гербіцидів у посівах сої на загальний рівень забур'яненості за різних систем землеробства в правобережному Лісостепу України

Приведені результати досліджень впливу грунтових гербіцидів на загальну забур'яненість посівів сої за різних систем землеробства (Промислова та No-till). Встановлено, що за традиційної й системи землеробства No-till найбільша ефективність дії грунтових гербіцидів та найменший рівень забур'яненості відмічений при застосуванні бакової суміші в посіві до появи сходів, що впливає на формування врожаю сої.

Ключові слова: *Система землеробства, ґрунтові гербіциди, бур'яни, соя, урожайність, ефективність дії, агрофітоценоз*