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TRIFLUSULFURON-METHYL – BASED HERBICIDES IN SUGAR BEET CROPS

In the given article the research results on studying new triflusulfuron-methyl-based herbicides providing with the effective control of such weeds as Amaranthus retroflexus L., Galeopsis tetrahit, Capsella bursa-pastoris, volunteer rape, Matricaria spp., Galium aparine and etc. are presented.

Keywords: *sugar beet, weed plants, number, herbicides, efficiency*

Introduction. Recently sugar beet weed infestation has essentially decreased. However, *Chenopodium album* infestation is still remained at the high level, in separate fields - *Amaranthus retroflexus* L., *Matricaria perforate* Merat. and *Polygonum lapathifolium* L., *Echinochloa crus-galli* and volunteer rape number increase is observed. Before 2001 coming, there was no *Viola arvensis* Murr.), starting with 2004-2005 *Galium aparine* L. and *Mentha arvensis* L. have appeared.

The most high-active and effective but at the same time the most expensive method in crops weed infestation decrease is a chemical method [1]. In the presented article the results of researches on studying the efficiency of new triflusulfuron-methyl - based herbicides: Triceps, WDG (750 g/kg triflusulfuron-methyl) + SAS Adew, L (Close-Stock Company (CSC) "Avgust", Russia) and Condor, WDG (500 g/kg triflusulfuron-methyl)) + SAS Satellite, L (CSC "Shchelkovo Agrochim", Russia); standard - Caribu, 50% w.p. (500 g/kg triflusulfuron-methyl, 500 g/kg) + SAS Trend 90 "Dupon International Operations Sarl ", Switzerland) are presented. This group preparations have got systemic and partially soil activity at low rate of application, they are high selective to sugar beet at any stage of development (if the crop is not in a stress condition), treatments can be carried out from seedlings emergence (cotyledon leaves in a horizontal position) up to rows closure. A majority of weed plants are controlled during the period from cotyledon and up to two true leaves stage, but some sensitive species such as *Sinapis arvensis*, volunteer sunflower are sensitive to preparation up to six true leaves stage [2]. In this connection the objective of our researches was to study the efficiency of new triflusulfuron-methyl based herbicides against not easily controlled weeds in sugar beet crops.

Materials and methods. Specific weed composition and weed plants number were determined during itinerary inspections according to the "Instruction on weed infestation determination of fields, perennial plantations, cultural hay fields and pastures" (1986) [3]. The researches on studying the herbicides efficiency were carried out in 2010-2012 at the RUE "Institute of plant protection" in accordance with the "Methodical Instructions on field herbicides testing in crop growing" (1981) [4] and the "Methodical instructions on carrying out the registration herbicides testing in agricultural crops in the Republic of Belarus" (2007) [5]. The agronomical practices for the crop cultivation – common for this zone. Soil – soddy-podzolic medium-loamy. Measures to take care after crops – in accordance with the intensive technology. Method of herbicides application - three-times plot spraying, working solution rate use – 250 l/ha, time of herbicides application – three-times crops spraying after sugar beet seedlings emergence at cotyledon-two leaves stage of weeds. Weed number records were done before spraying (initial weed infestation) and in 30 days after herbicides application. Yield harvesting was done plot-by plot, by hands. Root sugar content was determined in "Venema" line at the technological laboratory of the RUE "Experimental scientific sugar beet station".

Results and discussion. Before herbicide treatments in 2010 the prevalent weeds were *Chenopodium album* – 106,0 pcs/m^2 (89,5%), *Capsella bursa-pastoris*– 5,5 pcs./m^2 (4,6%), rape

and *Polygonum lapathifolium* L.– 2,5 pcs./m^2 (2,1%), *Galeopsis tetrahit* – 2,0 pcs./m^2 (1,7%). Total weed plants number has made 118,5 pcs./m^2.

In a month after the third treatment in a variant with the herbicides application *Capsella bursa-pastoris*, *Amaranthus tetrahit*, volunteer rape, *Galeopsis tetrahit* have died fully; *Polygonum lapathifolium* - for 84,5-100%; *Chenopodium album* – for 70,3-74,3%, *Polygonum convolvulus* and *Stellaria media* number has increased. Total weed plants number has decreased for 70,5-73,6% at number in the control 178,0 pcs/ m^2, the biological efficiency by their vegetative mass decrease has made 79,0-80,6% (at mass in the control 7 274 g/m^2). For this, there was no essential difference in efficiency between the tested herbicides.

Herbicides application has allowed to preserve root crop yield and by this to get 31,7-33,4 t/ha sugar beet in addition (at yield in the control 13,3 t/ha) and increase sugar output for 4,2-4,5 t/ha (at the calculated sugar output in the control 2,2 t/ha).

In 2011 г. before herbicides spraying the prevalent weeds were:
Chenopodium album – 56,0 pcs./m^2 (75,7%), *Matricaria perforate* Merat. – 6,0 pcs./m^2 (8,1%), *Stellaria media*– 4,0 pcs./m^2 (5,4%), rape – 3,0 pcs./m^2 (4,0%), *Capsella bursa-pastoris* and *Galeopsis tetrahit* –2,5 pcs./m^2 (3,4%). Total weeds number has made 74,0 pcs./m^2.

In a month after treatment in variants with herbicides application volunteer rape, *Capsella bursa-pastoris*, *Galeopsis tetrahit* have died fully; *Matricaria perforate* Merat.–for 90,0–100%; *Chenopodium album* – for 62,5–73,8%; *Stellaria media* number was at the level of control or increased. Total weeds number has decreased for 66,7-71,3% at number in the control 108,0 pcs./m^2, their vegetative mass –for 69,1-76,1% (at mass in the control 6305 g/m^2). As in the previous year, there was no essential difference in the efficiency of tested preparations.

Herbicides application has allowed to preserve root crop yield and by this to get 18,6-21,0 t/ha sugar beet in addition (at yield in the control 21,1 t/ha and increase sugar output for 2,9-3,2 t/ha (at the calculated sugar output in the control 3,5 t/ha).

In 2012 before treatment with herbicides the dominated weeds were: *Chenopodium album* – 27,0 pcs/m^2 (52,9%), *Viola arvensis* – 9,0 pcs/m^2 (17,6%), *Gallium aparine* – 7,0 pcs/m^2 (13,7%), *Polygonum convolvulus* – 5,0 pcs/m^2 (9,8%). Total weeds number has made 51,0 pcs/m^2.

In a month after the herbicides spraying *Gallium aparine* number has decreased for 100 %, *Chenopodium album* - for 66,7-69,2 %, *Polygonum convolvulus* – for 70,0–73,3 %, *Sonchus arvensis* – for 50,0–60,0 %, *Viola arvensis* – for 54,5–56,4%. It is also necessary to point out, that in sugar beet crops there were *Capsella bursa-pastoris*, *Thlaspi arvense*, volunteer rape (the number has made 2–3 pcs/m^2) and single plants of *Amaranthus retroflexus*, all weeds species kill has made 100%. The weeds total number has decreased for 65,6-66,0% at number in control 72,0 pcs/m^2, their vegetative mass – for 70,4-72,5 % (at mass in the control 4548 g/m^2).

The herbicides application has allowed to preserve the root crops yield and, thus, get 18,1-20,3 t/ha of sugar beet in addition (at yield in the control 38,9 t/ha) and increase sugar output for 3,5-3,6 t/ha (at the calculated sugar output in the control 6,4 t/ha).

Thus, the application of herbicides Triceps, WDG (750 g/kg triflusulfuron-methyl) + SAS Adew, L and Condor, WDG (500 g/kg triflusulfuron-methyl) + SAS Satellite, L three times after sugar beet seedlings emergence at cotyledon-two leaves of weeds stage gives an opportunity to control efficiently such weeds as *Amaranthus retroflexus*, *Galeopsis tetrahit*, *Capsella bursa-pastoris*, rape volunteer, *Matricaria perforate* Merat, *Gallium aparine* and others , preserve root crop yield and by this to get 18,1-33,4 t/ha sugar beet in addition and increase sugar output for 2,9-4,5 t/ha.

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Анотація

Гаджиєва Г.І.

Гербіциди на основі трисульфурон-метилу у посівах цукрових буряків

Наведено результати досліджень з вивчення ефективності нових гербіцидів на основі трисульфурон-метилу, що дозволяють ефективно контролювати чисельність таких бур'янів як щириця звичайна, пікульник звичайний, грицики польові, падалиця ріпаку, види ромашки, підмаренник чіпкий та ін.

Ключові слова: *цукрові буряки, бур'яни, чисельність, гербіциди, ефективність*

Аннотация

Гаджиева Г.И.

Гербициды на основе трифлусульфурон-метила в посевах сахарной свеклы

Приведены результаты исследований по изучению эффективности новых гербицидов на основе трифлусульфурон-метила, позволяющих эффективно контролировать численность таких сорняков как щирица запрокинутая, пикульник обыкновенный, пастушья сумка, падалица рапса, виды ромашки, подмаренник цепкий и др.

Ключевые слова: *сахарная свекла, сорные растения, численность, гербициды, эффективность*