

RESULTS OF THE EXAMINATIONS OF SOME HERBICIDES USED IN TOMATO AND PEPPER GROWN AS SUMMER CROPS IN GREENHOUSES**Dragica Spasova, D. Spasov, Biljana Atanasova, M. Ilievski***

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ABSTRACT

During 2007 and 2008 examinations with some herbicide variants (Pendimetalin, Trifluralin, Metribuzin and Metribuzin+Quizalofop-p-ethyl) and one control variant (untreated) were conducted on the experimental field of UGD, Faculty of agriculture – Strumica, to determine the efficacy of some herbicides (Pendimetalin and Trifluralin) in destroying weeds in pepper, and some herbicides (Pendimetalin, Metribuzin and Metribuzin+Quizalofop-p-ethyl) in destroying weeds in tomatoes, grown as summer crops in greenhouses.

The weed vegetation in the experiment was consist of eight species, of which dominant were: *Portulaca oleracea* L. with 47, 5 plants/m², *Echinochloa crus galli* L. (32, 5) and *Galinsoga parviflora* Cav. With 9,5 5 plants/m². The weeding on the experiment is relatively high and is in average, 108 plants/m². The efficacy of the herbicides in destroying the weeds in the two year of the examinations in all herbicides and herbicide combinations is relatively high, and the coefficient of efficacy at the most variants is more than 92 %. Although used in greenhouses, neither one of the herbicides showed phytotoxic effect on the crops.

Key words: weed; herbicide; tomato; pepper.

РЕЗУЛТАТИ ОД ИСПИТУВАЊАТА НА НЕКОИ ХЕРБИЦИДИ ВО ДОМАТ И ПИПЕРКА ОДГЛЕДУВАНИ КАКО ЛЕТНО ПРОИЗВОДСТВО ВО ПЛАСТЕНИЦИ**Драгица Спасова, Д. Спасов, Билјана Атанасова, М. Илиевски***

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КРАТОК ИЗВАДОК

Во текот на 2007 и 2008 година во опитното поле на УГД, Земјоделски факултет-Струмица беа изведени испитувања со неколку хербицидни варијанти (Pendimetalin, Trifluralin, Metribuzin и Metribuzin+Quizalofop-p-ethyl) и една контролна варијанта (нетретирана), со цел да се утврди ефикасноста на некои хербициди (Pendimetalin и Trifluralin) во уништувањето на плевелите во пиперка и некои хербициди (Pendimetalin, Metribuzin и Metribuzin+Quizalofop-p-ethyl) во уништувањето на плевелите во домати, одгледувани како летно производство во пластеници.

Плевелната вегетација во опитот ја сочинуваа осум вида од кои беа доминантни: *Portulaca oleracea* L. со 47,5 растенија /m², *Echinochloa crus galli* L. (32,5) и *Galinsoga parviflora* Cav. со 9,5 растенија /m². Заплевеленоста на опитот е релативно висока и во просек за две години изнесува 108,5 растенија /m². Ефикасноста на хербицидите во уништувањето на плевелите во двете години од испитувањата кај сите хербициди и хербицидни комбинации е релативно висока, при што коефициентот на ефикасноста кај најголем број варијанти е преку 92%. Иако употребувани во пластеници, ниту кај еден од испитуваните хербициди не е забележано фитотоксично дејство.

Клучни зборови: Плевели; хербициди; домати; пиперка.

INTRODUCTION

In the last decade tomato and pepper production in greenhouses, in Macedonia, and especially in Strumica region is very increased. Because of their quality characteristics tomato and pepper are one of the most precious and most outspread vegetable crops.

The most intensive form of production is production in greenhouses, and has very big advantage economically, as well as in sense of providing meaning components in the feeding in the period of deficit of these crops.

Areas planted with tomatoes and peppers vary each year, depending from more factors.

One of the most important factors in growing tomato and pepper as summer crops in greenhouses is weeds. For decreasing the competition of the weeds, besides use of prevention and agrotechnical measures, also herbicides are used. But, destroying weeds with herbicides in greenhouses is very complex problem, which must be based on previous examinations for each agroecological place. Opposite, the damages caused by irregular and inexpert use of herbicides could be bigger than those caused by the weeds.

Having this insight, two year examinations were conducted of few herbicides, with aim to study the efficacy of some herbicides in destroying the weeds in tomato and pepper summer crops in greenhouses.

MATERIAL AND METHODS

The examinations were conducted in during the years 2007 – 2008, in the examination field of the Faculty of Agriculture in Stumica. The following variants were examined:

Table 1. Variants of the experiment

Variants	Dosage (l/ha, kg/ha)	Herbicide	Usage
1. Control	/	/	/
2. Pendimatalin	5 l/ha	Stomp 330E	Pre planting
3. Trifluralin	2 l/ha	Treflan 48 EC	Pre planting
4. Metribuzin	0,70 kg/ha	Sencor WG 70	Post planting
5. Metribuzin + Quizalofop-p-ethyl	0,70 kg/ha + 1 l/ha	Sencor WG 70 + Leopard 5 EC	Post planting

The experiments were set by the method of randomized block systems in four repetitions, and each experiment parcel was on area of 10 m² (2 x 5 m). Treating with herbicides number 2 and 3 was done before planting, and treating with herbicides number 4 and 5 was done 14 days after planting of tomato with 500 l/ha water.

In the both years of the examinations wheat was the first crop. Planting was done on 31.05.2007 and 08.06.2008. Treating with the variants with number 2 and 3 was done 1 – 2 days before planting and with variants 4 and 5 after planting, respectively on 14.06.2007 and 22.06.2008, when tomato took good roots.

Estimation of the efficacy of the herbicides was made 30 days after treating by the method of quadrates, i.e., with counting the weeds on 1 m² of each repetition of each variant, and then the average of all repetitions is taken, and the coefficient of the efficacy of the herbicides (K.E.), by the formula of Dodel et al. (1967), was counted:

$$K.E. = (P_k - P_t) / P_k * 100, \text{ where:}$$

K.E. – efficacy coefficient

P_k – average weed number on m² of control (untreated);

P_t – average weed number on m² of treated variant.

RESULTS AND DISCUSSION

Floral structure of the weed vegetation in the experiment

In the experiment, and in all area where the experiment was located, following weeds were noticed (Table 2):

Table 2. Weed vegetation in the experiment (in control variant) number/m²

Weed species	Year		Average
	2007	2008	
1. <i>Portulaca oleracea</i>	50,0	45,0	47,5
2. <i>Echinochloa crus gali</i>	33,5	31,5	32,5
3. <i>Galinsoga parviflora</i>	9,5	9,5	9,5
4. <i>Sorghum halepense</i>	6,0	3,5	4,75
5. <i>Solanum nigrum</i>	5,5	5,0	5,25
6. <i>Amaranthus retroflexus</i>	4,5	4,0	4,25
7. <i>Chenopodium album</i>	5,5	1,5	3,5
8. <i>Convolvulus arvensis</i>	2,5	/	1,25
Total on m ²	117	99,2	108,5
Total species	8	7	8

From this table, it could be seen that in the two years of the examinations, weeding in the control variant is relatively high and is 108,5 plants/m². From spike-like weeds (fam. Poaceae) in both years of examinations two species are present: *Echinochloa crus gali* with 32,5 plants/m² and *Sorghum halepense* with 4,75 plants/m². From wide-leaves weeds dominant are *Portulaca oleracea* with 47,5 plants/m² and *Galinsoga parviflora* with 9,5 plants/m². This means that when using herbicides it should be considered both groups of weeds (spike-like and wide-leaves weeds).

Herbicide efficacy

Results of the examinations are presented in table 3. All variants showed relatively high efficacy in destroying weeds. In average (2007/2008), coefficient of the efficacy is around 91,2% at Pendimetalin to 95,4% at the combination Metribuzin + Quizalofop-p-ethyl.

At the variant aimed for destroying only the wide-leaves weeds, the efficacy is only 83,6%.

Although used in greenhouses, no one of the examined herbicides showed phytotoxicity on the plants. Theoretically Pendimetalin is not used in greenhouses (t. Kostov, 2006), practically the two year usage of Pendimetalin on tomato and pepper grown in greenhouses as summer production, did not show phytotoxicity.

CONCLUSIONS

From the obtained results from the examination the following conclusions could be brought:

1. The weed vegetation is consist of 8 species, from which dominant were: *Portulaca oleracea* L. with 47,5 plants/m², *Echinochloa crus gali* L. with 32,5 plants/m² and *Galinsoga parviflora* Cav. with 9,5 plants/m². Weeding of the experiment is relatively high and is 108,5 plants/m².

2. The efficacy of the herbicides in destroying weeds in both years of examination, at all herbicides and herbicide combinations is relatively high, and the coefficient of the efficacy at most variants are over 92%.

3. Although used in greenhouses, no one of the examined herbicides showed phytotoxicity on the plants.

Tab.3. Herbicide efficacy in destroying weedsr at tomato and pepper in the years 2007/2008

Weed species	V a r i a n t s										
	Control (untreated)	Pendimetalin Pepper		Trifluralin Pepper		Metribuzin Tomato		Pendimetalin Tomato		Metribuzin+Quiz alofop-p-ethyl Tomato	
	plants/m ²	plants/m ²	K.E.	plants/m ²	K.E.	plants/m ²	K.E.	plants/m ²	K.E.	plants/m ²	K.E.
<i>1.Portulaca oleracea</i>	47,5	3,5	92,6	3	93,7	/	100	2,5	94,7	/	100
<i>2.Echinocloa crus gali</i>	32,5	/	100	/	100	10,0	69,2	/	100	/	100
<i>3.Galinsoga parviflora</i>	9,5	/	100	/	100	/	100	/	100	/	100
<i>4.Sorghum halepense</i>	4,75	1,5	68,4	2	57,9	4,0	/	2,0	57,9	1,0	78,9
<i>5.Solanum nigrum</i>	5,25	4,5	/	3,5	/	3,0	/	3,5	/	3,5	/
<i>6.Amaranthus retroflexus</i>	4,25	/	100	/	100	/	100	/	100	/	100
<i>7.Chenopodium album</i>	3,5	/	100	/	100	/	100	/	100	/	100
<i>8.Convolvulus arvensis</i>	1,25	/	100	/	100	0,75	40	/	100	0,5	60
Total weeds plants/m²	108,5	9,5		8,5		17,75		8,0		5,0	
Coefficient of efficacy (K.E.) in %	/	91,2		92,2		83,6		92,6		95,4	

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