

## **STUDIES RELATED TO THE DESTRUCTION OF WEEDS WITH THE HELP OF HERBICIDES IN BEARING AND RUNNER STRAWBERRY PLANTATIONS**

**Bucurean Eva**

University of Oradea, Faculty of Environmental Protection, 26 Gen. Magheru St., 410048 Oradea;  
Romania

### ***Abstract***

*One of the basic agrotechnical links that needs a high labour volume is the weed destruction. These weeds are real competitors for the strawberry plant in what the water and nutritious substance consumption from the soil is concerned but at the same time the weeds represent a good host for the pests and for a series of diseases, especially for the strawberry viruses and unfortunately these weeds contribute to a decrease of production or to its total destruction.*

*The observations related to the use of herbicides applied alone or in different combinations in order to destroy the weeds from the strawberry plantations have led to results that emphasize the fact that all the tested herbicides can be successfully used at this culture, regardless of their association way.*

**Key words:** herbicides, strawberry, weeds, efficiency

### **INTRODUCTION**

The strawberry plant is spread all over the globe its fruits being appreciated for their fine and specific flavour, for their richness in vitamins and in mineral substances.

The production and the quality of the strawberry type of fruit are greatly influenced by : ecophysical factors, photosynthesis period, temperature, the duration of the rest period, resistance to illnesses, tolerance to the conditions on the ground, resistance to frost, and tolerance to high temperature and they are also influenced by agricultural and technical factors like: food, age, maintaining a weedless area. As an answer to these requests a type of strawberry can be cultivated in a satisfactory way in another area where the weather conditions are different. From this point of view the chemical destruction of the weeds from the strawberry plantations is one of the fewest common technological links which can be successfully applied regardless of the culture area. The destruction of the weeds requests a great volume of labour.

The weeds constitute a powerful competitor for the strawberry bushes both in what the consumption of water and nutritious substances from the soil are concerned as well as through the fact that the majority of

the weeds exceeds in height the strawberry plants, competing with them for light.

The technology of ground preparation and of culture setting having as a main link the previous organic fertilization favors the size of the seed reserve from the soil increasing the risk of weed infestation.

The fight against the weeds must be fought permanently by all means: mechanically, manually and chemically in order to obtain high productions of very good quality. The chemical destruction of the weeds is a modern method in a continuous extension being economically and technically efficient.

As we were looking for an answer to the problem of the chemical destruction of the weeds, in 2015 – 2016 a herbicide experience had been set in a strawberry plantation in Salard area, in Bihor county.

## MATERIAL AND METHOD

The experience has been set on a chernozem bill soil with a heavy middle texture. In the grainmeter composition the clay has a predominant place in a percent of over 40%.

The soil is loose on the surface due to agricultural works and it is pressed well deep, it is well supplied with mobile potassium and phosphorus and it has a slightly acid reaction on the surface and an alkaline one deep inside.

After the research study has been done, the following structure and frequency of the weeds has been noticed:

*Table 1*

The structure and the frequency of the weeds in the analyzed period 2015-2016

Family	Scientific name	Frequency
	Dicotyledonous yearly	
Amaranthaceae	Amarantus retroflexis	F
Caryophyllaceae	Stellaria media	F
Chenopodiaceae	Chenopodium album	FF
Polygonaceae	Polygonum aviculare	F
Cruciferae	Lepidium draba	F
Monocotyledonous yearly		
Gramineae	Setaria viridis	F
Gramineae	Digitalia sanguinalis	F
Gramineae	Sorghum halepense	F
Gramineae	Echinochloa crusgalli	F

In the period 2015-2016 a number of 17 combinations or simple herbicides were experimented. Each variant had four repetitions, the size of a lot being of 100 m<sup>2</sup>. The Eliany type was used.

## RESULTS AND DISCUSSIONS

The used herbicides, the doses, the efficiency and the residues determined in fruit are presented in table 2 (one herbicide), in table 3 (combinations of herbicides).

All the herbicides applied either independently or in combination showed a selectivity for the strawberry and in what the efficiency and the moment of application are concerned the following have been noticed: in the bearing strawberry plantations the previously applied herbicides in the period 12<sup>th</sup> – 28<sup>th</sup> April, according to the vegetation evolution and to the weather conditions, on a well worked field, leveled and crumbled, cleaning away the vegetal rests have given good results against the yearly weeds remaining only the evergreen species: the Convolvulus, Cirsium and Cynodon.

The duration of the efficiency was of 4 – 6 months. During the summer the weeding of the evergreen weeds that escaped the herbicide effect was applied as a supplementary work.

All the variants where only one herbicide was used alone (see table 2) register a good and very good efficiency being also the most efficient from an economical point of view.

In summer, immediately after harvesting the fruit the old leaves are cut without cutting the central bud of the strawberry bush, the cut leaves and the hay that helped with the mulching are eliminated, the soil is mobilized, the weeds that appear between the rows are destroyed and only then the herbicide or the herbicide combination is applied. After this application an irrigation must be done with

200 – 250 m<sup>3</sup> of water /hectare which ensures the formation of a herbicide layer at the surface of the soil for a good efficiency.

Excellent results can be obtained if the herbicidation is done in early spring and if repeated in summer after harvesting, using different products.

In what the fruit residues are concerned for the majority of the doses used we have not registered residues bigger than 1ppm except Venzar used in a higher dose of 2kg/hectare. So Venzar can be used with other herbicides but it must not exceed 1,5 kg/hectare.

In the stolon cultures the same herbicides and combinations of herbicides have been used with the same results as in the case of the bearing strawberry culture.

Table 2

## Herbicides used alone in the strawberry culture

Name of the product	Application period	Used dose (kg or l/hectare)	Nota EWRS		Residues in the fruit (ppm)
			Efficiency	Phytotoxicity	
Trachephon CE	Pre-emergently	4	Good	1	under 0,05
Trachephon CE	Pre-emergently	6	Very good	1	under 0,05
Dacthal 75WP	Pre-emergently	10	Very good	1	under 0,05
Devrinol 50 WP	Pre-emergently	6	Very good	1	under 0,05
Devrinol 4 FEC	Pre-emergently	4	Very good	1	under 0,05
Fusilade	Pre-emergently	2x2	Very good	1	under 0,05
Venyar 80 WP	Pre-emergently	3	Very good	1	over 1,25

Name of the product	Application period	Used dose (kg or l/hectare)	Nota EWRS		Residues in the fruit (ppm)
			Efficiency	Phytotoxicity	
Simazin 50WP+ Dual EC	Pre-emergently	3+4	Good	1	under 0,1
Betanal 15 CE+ Devrinol 50 WP	Pre-emergently	6+4	Good	1	under 0,12
Karagard 75 + Betanal 45 CE	Pre-emergently	1+4	Good	1	under 0,15
Betanal 15 CE + Devrinol 50WP	Pre-emergently	8+4	Very good	1	-
Devrinol 50WP+ Dual 50CE	Pre-emergently	6+2	Good	1	under 0,12
Dual 50 CE+ Simazin 25 CE	Pre-emergently	4+4	Good	1	under 0,13
Simazin 50WP+Dual 50EC	Pre-emergently	2+4	Very good	1	under 0,13
Devrinol 50 WP+Dual CE	Pre-emergently	6+4	Very good	1	under 0,02
Duacil 5653 WP50	Pre-emergently	6	Good	1	under 0,01

Table 3

## Experimental parameters related to the culture plant

Variant	Dose	Production (t/hectare or thousand of pieces /hectare)	Chemical components			
			S.U.%	Sugar %	Acidity %	C Vitamin mg %
Untreated unprased witness	-	-	-	-	-	-
Witness bred 4-5 times	-	11,9	9,5	5,9	1,03	58,6
Trachephon CE	4	12,2	8,0	7,8	0,91	52,8
Trachephon CE	6	5,4	9,0	5,7	1,0	44,0
Dacthal 75 WP	10	5,5	9,0	5,7	1,02	58,0

Devrinol 50 WP	6	10,8	10,0	6,5	0,86	52,5
Devrinol 4 FEC	4	10,8	9,0	5,5	0,90	55,5
Fusilade	2x2	11,7	10,4	6,4	0,89	51,7
Simazin 50WP+Dual 50EC	3+4	11,0	12	4,7	-	74,8
Betanal 15 CE+ Devrinol 50 WP	6+4	12,1	11,0	4,9	-	74,8
Karagard 75 + Betanal 45 CE	1+4	9,0	11,0	5,2	-	70,4
Betanal 15 CE+ Devrinol 50 WP	8+4	9,4	8,5	5,5	1,08	46,2
Devrinol 50 WP+Dual CE	6+4	9,5	9,2	5,7	0,95	50,6
Devrinol 50 WP+Dual CE	6+2	5,3	9,0	6,7	1,09	61,2
Dual 50 CE+ Simazin 25 CE	4+4	12,8	9,0	5,8	0,83	51,0
Simazin 50WP+Dual 50EC	2+4	5,3	9,0	5,7	1,0	55,4
Duacil 5653 WP50	6	11,0	11,0	6,0	0,94	63,5

Table 4

Experimental parameters related to the culture plant (for stolons)

Variant	Dose	Thousand of pieces /hectare
Untreated unparasited witness	-	-
Witness bred 4-5 times	-	489
Trachephon CE	4	536
Trachephon CE	6	366
Dacthal 75 WP	10	366
Devrinol 50 WP	6	462
Devrinol 4 FEC	4	485
Fusilade	2x2	479
Simazin 50WP+Dual 50EC	3+4	390
Betanal 15 CE+ Devrinol 50 WP	6+4	395
Karagard 75 + Betanal 45 CE	1+4	392
Betanal 15 CE+ Devrinol 50 WP	8+4	730
Devrinol 50 WP+Dual CE	6+4	600
Devrinol 50 WP+Dual CE	6+2	660
Dual 50 CE+ Simazin 25 CE	4+4	600
Simazin 50WP+Dual 50EC	2+4	376
Duacil 5653 WP50	6	402

## CONCLUSIONS

In order to destroy the weeds from the strawberry plantations the following types of herbicides can be successfully used: Dual 50 CE 6l/hectare; Venzar 2,8 kg/hectare or the combinations: Dual 50 CE 4l+

Simazin 25CE 4 kg; Betanal 15 CE 8l+ Devrinol 50WP 4 kg; Dual 50 DE 4l+ Venzar 1,5 kg; Fusilade 2x2 l/ha postemergently.

In order to obtain an increased and good efficiency it is necessary to prepare Pre-emergently the land and the ground well before the application and to ensure the land humidity conditions by irrigation; then, after having done that, not any type of work will be done to the land for a period of two weeks so as not to interrupt the formed herbicide layer.

The application of the herbicides can be done in early spring and it can be repeated after the fruits had been harvested using another herbicide or a combination of herbicides other than the ones used in spring.

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