

## THE EFFECT OF SOME HERBICIDES UPON WEEDS FROM THE SUNFLOWER CULTURE

Bucurean Eva\*

\*University of Oradea, Faculty of Environmental Protection, 26 General Magheru St., 410048  
Oradea, Romania, e-mail: [evabucurean08@yahoo.com](mailto:evabucurean08@yahoo.com)

### **Abstract**

*The paper presents the experimental results obtained in the year 2019 regarding the individual effect of five weed killers, used for the control of weeds at the sunflowers crops, as well as that action in association with two other herbicides: Sencor applied in a quantity of 0,4 kg/ha and Gesagrade 50 applied in a quantity of 3 kg/ha.*

*As concerns the effect of the individual application of each weed killer, on the first place we can put Alachlor with an average production increase of 6,95 q/ha or by Treflan with an average production increase of 6,80 q/ha, or 33,0% as compared to the witness.*

*The weed control by use of herbicides, is a very effective method, this way eliminating the hand hard work used for maintaining the growing.*

**Key words:** herbicide, weeds, sunflower, individual effect, association, production, dosage.

### **INTRODUCTION**

The increase of the mechanization and amendments, the increase of the production potential of the less productive soil, the application of the herbicides and pesticide the use of new types with a higher biological value, all these represent important factors for a permanent growth of the agricultural production.

In the field of modern agriculture, capable of economic efficiency, produced with a lower price and a higher productive level, together with some other ways of billing the weeds, the herbicides play an important and irreplaceable part until now

Taking into account the urgent necessity of using the herbicide in controlling the weeds in the agricultural crop, and on the other hand, the fact that these are toxic substances; it is necessary for people to know well their properties the usage rules and the work security technique.

Weeds chemical control is a main element in the modern technology of the sunflower growing which amplifies extremely quickly because of the increase in number of the herbicides and their diversity as well as by the advance of the sunflower growing on larger and larger surfaces.

## **MATERIAL AND METHOD**

For the experiment of weeds control at the sunflower growing by was of herbicides, taken in the year 2019 in Oradea region, we followed the individual effect of 5 herbicides, as well as their action when associated to some other herbicides, Sencor applied in 0,4 kg/ha dosage and Gesagrade 50 , 3 kg/ha.

The variants studied as follows: No herbicide witness and twice hand hoeing; Treflan 4l/ha; Treflan + Sencor 4l/ha + 0,4kg/ha; Treflan + Gesagrade 50 4l/ha + 3kg/ha; Eradicane 4 l/ha; Eradicane + Sencor 4l/ha + 0,4kg/ha; Eradicane + Gesagrade 50 4l/ha + 3kg /ha; Dual 500 4l/ha; Dual 500 + Sencor 4l/ha + 0,4kg/ha; Dual 500 + Gesagrade 50 4l/ha + 3kg/ha; Alachlor 7l/ha; Alachlor + Sencor 7l/ha + 0,4kg/ha; Alachlor + Gesagrade 50 7l/ha + 3kg/ha; Frontier 2l/ha; Frontier + Sencor 2l/ha + 0,4kg/ha; Frontier + Gesagrade 50 2l/ha + 3kg/ha.

The experiment was placed following the method of randomized blocks, in 4 repetitions. The hybrid used was select, which was sed on the 10<sup>th</sup> of April, with a thickness of 40.000 plants/ha and harvesting was made during the first decade of September.

The forerunner plant was the autumn barley.

The preparing stage of the field for the experiment comprised the following: autumn ploughing, preparing the germination bed starting up the growing of the plant, booking after the crops, harvesting.

## **RESULTS AND DISCUSIONS**

The results obtained in 2019 are presented in table no 1, table no 2.

The chemical control of the weeds represents a main element of the modern technology of sunflower growing which increase rapidly, because of the increase of the number of herbicides and their diversification, and the impetus that the sunflower growing on larges surfaces has shown.

For the actual experiment, in 2019, there were used 5 herbicides (Treflan, Eradicane, Dual, Alachlor and Frontier), as an individual effect and their action in association with Sencor and Gesagrade 50, a dosage of 0,4 kg/ha for Sencor and 3 kg/ha for Gesagrade 50. The administration of the herbicides was made when preparing the germination bed.

The research proved a high level of phytotoxicity for the Sencor product with 0,4 kg/ha dosage, for all the variants the use of this herbicide produced the destruction of 70/ of the sunflower plants.

It can also be noticed the phytotoxicity of the Gesagrade 50 product, 3 kg/ha, in the year 2019. for the lots where Gesagrade 50 was used, the sunflower plants were yellowish when beginning to grow. This phenomenon appeared more often at the lots treated with Dual 500+, Gesagrade 50 and Frontier + Gesagrade 50.

As a result of the application of these herbicides, the level of weeds turned very low, even succeeding a level of 96% weed controlling for some lots. The use of Alachlor and Gesagrade 50 was the most useful and the application of Treflan and Gesagrade 50 destroyed the weeds in a proportion of 93%.

Taking into consideration the herbicides applied without anything else, the best effect was proved by Alachlor, followed by Treflan and Eradicane.

*Table 1.*

The production of sunflower, with variants and repetitions, during the experiment with herbicides in 2019

Variant	Repetition				Average
	I	II	III	IV	
1.	22.0	21.5	21.0	21.6	86.1
2.	27.2	27.0	27.5	27.3	109.0
3.	-	-	-	-	-
4.	28.0	27.3	27.5	28.8	11.6
5.	27.0	26.5	27.2	27.4	108.1
6.	-	-	-	-	-
7.	28.0	27.0	27.4	28.0	110.4
8.	26.0	26.0	25.0	26.2	103.2
9.	-	-	-	-	-
10..	26.9	26.5	26.0	27.0	106.4
11.	29.0	29.0	28.0	28.7	114.7
12.	-	-	-	-	-
13.	28.5	28.0	28.4	28.5	113.4
14.	26.1	27.0	27.5	27.0	107.6
15.	-	-	-	-	-
16.	26.0	26.5	25.8	26.3	104.6
Average	294.7	292.3	291.3	296.8	1175.1

The treatment with Dual 500 and Frontier showed a 75% higher degree of weed controlling. At this treatment, the production increase was smaller, that is 4,27 g/ha for Dual 500 and 5,36 g/ha for Frontier.

With the exception of the variant treated with Sencor, all the other herbicides used, alone or mixed with Gesagrade 50, were effective for weed

controlling and assured better crops than the witness variant which was hold twice, by hand.

During vegetation, the variants treated with weed killers showed better development, quickly covering the soil after rising, not being disturbed by the weeds.

However, the behaviour of the weeds was different. In the experimental lots treated with Treflan, the following weed appeared. *Rubus caesius* (blackberry bush), *Cirsium arvense* (horse thistle), *Cynodon dactylon* (couch grass), *Matricaria inodora* (camomile) from the perennial plants and from the yearly ones: *Polygonum aviculare* (knot grass), *Amaranthus retroflexus* (amaranth), *Sinapsis arvensis* (wild mustard), *Capsela bursa pastoris* (shepherd's purse), *Viola arvensis* (three spotted brothers), *Xanthium strumarium* (mouse ear).

For the lots treated with Eradicane there were present the same weeds but some of them were more numerous, especially the *Cirsium arvense* (horse thistle).

For the lots treated with Dual 500 and frontier, all the types of weeds existing on the lots treated with Treflan appeared, but more frequently.

The treatment with Alachlor proved the best effect. On these lots, the weeds almost disappeared with the exception of *Rubus caesius*, which was present with the same rate as in the lots treated with Sencor. The presence of weeds was very small, only *Rubus caesius* appeared, very late and in a very small percentage. On these lots there was also present the phytotoxicity upon the sunflower, together with the one upon the weeds, about 70% of the plants dying, compromising the growing.

Analyzing the data in Table no.2, it can be noticed that the variant treated with Alachlor, 7 l/ha dosage of commercial product gave the biggest production of sunflower 28.67 g/ha with an extra quantity of 7.41 g/ha, that is 33,1% more than herbicides but it was treated as usual, with two hoeing by hand.

The second in terms of production quantity is the variant treated with Alachlor + Gesagrade 50.7 l/ha + 3 kg/ha, obtaining 28.35 g/ha, and compared to the witness representing a bigger quantity with an extra of 31.6%, that is 6.82 g/ha.

The result is that, by combining Alachlor with the second, herbicide Gesagrade 50, the production does not increase, compared to the production obtained, only at the treatment with Alachlor, but it decreases with 0,32 g/ha.

On the lots treated with Alachlor combined with Gesagrade 50, applied 7 l/ha + 3 kg/ha a dosage, even if there were few weeds the degree

of weed destruction going up to 96% related to a smaller production, and a phytotoxic effect appeared at the sunflower plants, because of the Gesagrade 50, 3 kg/ha dosage, for the conditions of the year 2019.

Table 2

The production results obtained for the sunflower in the experiment with herbicides, applied alone and in association, in the year 2019

No.	Herbicides applied	Herbicide dosage applied per ha	Production (q/ha)	%	Difference (q/ha)	Significance	Phytotoxicity (%)	Degree of weed control (%)
1.	Witness with no herbicide	Application of two hosing by hand	20,6	100	-	-	-	-
2.	Treflan	4 l	27.40	133.0	6.80	xxx	-	85
3.	Treflan + Sencor	4 l+0.4 kg	-	-	-	-	70	98
4.	Treflan + Gesagrade 50	4l + 3 kg	27.95	135.7	7.35	xxx	-	94
5.	Eradicane	4 l	26.10	126.7	5.50	xxx	-	80
6.	Eradicane + Sencor	4 l + 0.4 kg	-	-	-	-	70	98
7.	Eradicane + Gesagrade 50	4 l + 3 kg	26.70	129.6	6.10	xxx	-	90
8.	Dual 500	4 l	25.30	125.8	4.70	xxx	-	73
9.	Dual 500 + Sencor	4 l + 0.4 kg	-	-	-	-	70	98
10.	Dual 500 + Gesagrade 50	4 l + 3 kg	26.30	127.7	5.70	xxx	-	86
11.	Alachlor	7 l	27.55	133.7	6.95	xxx	-	86
12.	Alachlor + Sencor	7 l + 0.4 kg	-	-	-	-	70	98
13.	Alachlor + Gesagrade	7 l + 3 kg	27.90	135.4	7.30	xxx	-	94
14.	Frontier	2 l	25.80	125.2	5.20	xxx	-	77
15.	Frontier + Sencor	2 l + 0.4 kg	-	-	-	-	70	98
16.	Frontier + Gesagrade 50	2 l + 3 kg	26.4	126.4	5.44	xxx	-	86
Average			26.15					
Difference					5.55			
%				126.9				
Significance			xxx					

LSD 5% = 0.45 q/ha    LSD 1% = 0.62 q/ha    LSD 0.1% = 0.83 q/ha

The variant treated with Treflan 4 l/ha dosage, produced an average sunflower crops of 27.24 g/ha seeds, this representing a percentage of 26.5%, or an extra quantity of 26.5%, or compared to the witness variant.

For the variant treated with Treflan combined with Gesagrade 50, 4l/ha and 3 kg/ha a dosage, the production was 27.90 g/ha, with an extra quantity of 6.37 g/ha, that is 29.6% more than the witness variant.

The increase benefit of the production for the variant treated with Treflan combined with Gesagrade 50, compared to the one treated only with Treflan, is 0.66 g/ha sunflower seeds. These results make us notice that the efficiency of Gesagrade 50 3 kg/ha dosage combined with Treflan is not so high, even if the degree of weed control is 93%, following the lots treated with Alachlor + Gesagrade 50, where the weed control was 96%.

Analyzing the next part of Table no. 2 it can be noticed that the Eradicane product shows a good behaviour in weed controlling for sunflower growing. For the lots treated with Eradicane 4 l/ha a dosage the average production was 27.03 g/ha, that is an extra quantity of 5.50 g/ha seeds, 25,5% more than the one of the witness.

When Eradicane is mixed with Gesagrade 50.4 l/ha + 3 kg/ha a dosage, the average production was 27.6 g/ha, representing an extra quantity of 6.07 g/ha or 28,1% compared to the witness.

The increase benefit of the production obtained for the variant treated with Eradicane mixed with Gesagrade 50 compared to the one treated only with Eradicane, is only 0.57 g/ha sunflower seeds. As concerns the weed controlling level, this combination of Eradicane and Gesagrade 50 destroyed 90% of the weeds compared to 80% of them, when only Eradicane was used.

The treatment with Dual 500 and Frontier gave smaller production of sunflower an a hectare, but, compared to the witness, the production is good.

The results presented above prove that, in case the herbicide chose can not be found it is better to use any of the analyzed herbicide than to have the soil with no weed killer or work it by hand or mechanically.

## CONCLUSIONS

Following the examination and the data obtained, concerning the efficiency of the 5 herbicides used, for weed controlling at the sunflower growing, applied alone and in combination with Sencor 0.4 kg/ha a dosage and Gesagrade 50 3 kg/ha a dosage there can be pointed out the following conclusions:

- the chemical weed control is a main element in the technology of sunflower growing, assuring an average production increase of 5.5 g/ha, that is 26.9 %;

- the efficiency of the Treflan, Alachlor, Eradicane, Dual 500 and Frontier combined with Gesagrade 50 is more secure and higher, because it assures the highest increase of production per hectare;
- out of the herbicides applied in combination, it can be remarked the Treflan variant applied 4 l/ha + Gesagrade 50 3 kg/ha a dosage
- out of the herbicides applied alone, it can be remarked the very good effect of the Alachlor with an average production increase of 6,95 g/ha, that is 33.7% compared to the witness, followed by the Treflan, with an average production increase of 6,80 g/ha and 33,0% compared to the witness;
- the Sencor weed killer, applied 0,4 kg/ha a dosage, combined with the other herbicides (Treflan, Eradicane, Dual 500, Alachlor and Frontier) succeeds a 98% weed controlling percentage but it also presents 70% phytotoxicity upon the sunflower plants;
- herbicides weed control is a very efficient method the level of weed controlling using herbicide is expanded between 73 – 96%, so that the sunflower growing can became fully mechanized, excluding the high quantity of effort for maintaining the crops by hand hoeing.

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