THE SUN FLOWERS CULTURE WEEDS AND THEIR DESTRUCTION WITH DIFFERENT HERBICIDE ASSOCIATIONS IN THE CONDITIONS OF THE BROWN LUVIC SOIL FROM ORADEA

Bucurean Eva, Popovici Mariana

*University of Oradea, Faculty of Environmental Protection, 26 Gen. Magheru St., 410048 Oradea, Romania, e-mail: evabucurea08@yahoo.com,

*University of Oradea, Faculty of Environmental Protection, 26 Gen. Magheru St., 410048 Oradea, Romania, e-mail: mariana_mediu@yahoo.com

Abstract

The researches carried out during 2009-2010 followed the efficacy and selectivity of new herbicides associations.Under the conditions of luvic brown soil from Oradea the herbicides assorement had a good selectivity for sunflower. Have been registered a light fitotoxicity phenomenous after Modown herbicide application but without any negative effect on yield level.

The herbicides Guardian, Frontier, Diburom, Trophy applied before sowing have a very good efficacy in annual monocotyledonous weed control.Using these herbicides associated with Modown 1,5 l/ha, treated postemergent it can be obtained a efficacy more than 95-98%.

The postemergent application with Modown and Gallant super, or Assertt and Select and Actipron achieved a efficacz ranging betwen 92-93%.The sunflowers zirld was strong corellated with herbicides efficacy and selectivity.

Key words: sunflower, herbicide,weeds,selectiviy, efficiency,production,

INTRODUCTION

The sun flower culture has a higher competitiveness in comparison with the weeds but, in the period of the 3-5 weeks since its rising, the weeds can compete with the sun flower plants. In this way the culture needs protection against the weeds because the production can be diminished by the weeds with 50-70% and because the weeds, through their plant mass can affect the quality of the ground works that endanger the post –coming works. In the conditions of a modern agriculture, having as an aim a high economical efficiency, the use of different simple and associated herbicides represent inevitable components in the integrated systems of weed destruction in what the sun flower is concerned.

The destruction of the annual dicotyledonous weeds, predominant in all the sun flower culture areas is still not totally solved. In order to bring new contributions to the integrated systems of weed destruction the current study presents new results obtained in field experiences on the brown luvic soil in Oradea.

MATERIAL AND METHOD

The current study presents results obtained in the years 2009 -2010 related to the use of new herbicides for the destruction of monocotyledonous and dicotyledonous weed existing in the sun flower culture. The soil that the experiences were placed on is a brown luvic soil, having a humus content of 2,32%, a pH (H_2O) of 5,5, a clay content of 31,55%, an environment supplied with phosphorus and mobile potassium. The plant previously planted had been the autumn wheat and the cultivated hybrid's name was Select with a density of 45.000 plants /hectares at sowing. In what the weather was concerned in the year 2009, during the vegetation period (IV –IX), 343,3 mm of rainfall have been registered with 17,8 mm less than the multi annual average and in the year 2010 333,9 mm, with 27,2 less than the multi annual average.

Tables 2–5 present the used herbicides the dose and the application period. During the vegetation period observations have been done at 7 , 30 and 60 days after the treatment in order to appreciate the high fidelity of the plants towards the herbicides as well as the weed destruction degree, these observations were performed following the EWRS scale and before harvesting variants of the not destructed weeds were weighed. The obtained production had been determined on variants and the results had been processed through the analysis of the variants.

RESULTS AND DISCUSSION

The degree of weed quantity during the two years of experiments shows that there is a predominant weeding with annual monocotyledonous weeds (a share of 65% or 68% respectively) and there is a less weeding with annual and perennial dicotyledonous weeds. The species of predominant weeds are presented in table 1.

Tabel 1

The types of weed existent in the sun flower cultures

Species of present dominant types of weed	Specification	Percentage (%) 2009	Percentage (%) - 2010
Echninochloa crus galli	Annual monocotyledonous	65	68
Setaria sp.	Annual monocotyledonous	65	68
Raphanus raphanistrum	Annual dicotyledonous	26	24
Amaranthus retroflexus	Annual dicotyledonous	26	24
Matricaria inodora	Annual dicotyledonous	26	24
Chenopodium album	Annual dicotyledonous	26	24
Polygonum persicaria	Annual dicotyledonous	26	24
Polygonum convolvulus	Annual dicotyledonous	26	24
Cirsium arvense	Perennial dicotyledonous	9	8
Convolvulus arvensis	Perennial dicotyledonous	9	8

Results obtained in 2009. The high fidelity and efficiency of the herbicides is presented in table 2. It is noticed that the sun flower plant shows a good tolerance for the majority of the tested herbicides. At high doses of Gesagard (6kg/ha) and high doses of Trophy (3.0 l/ha) in the first steps of the plant's development slight growing problems had been noticed.

In what the degree of the weed destruction was concerned it was different according to the type of the herbicide, to the applied dose, and it was appreciated through EWRS notices and it was determined with the help of the gravimeter (table 3). It comes out that the herbicides: Mecloran -48, Frontier-900, and Trophy have destroyed very well the annual monocotyledonous weeds. The herbicide Gesagard 50 WP has destroyed the weeds in a percentage of 86-94% and when it was combined with Mecloran -98 they destroyed the weeds in a percentage of 98%, and when it was combined with Dual -960 they destroyed the weeds in a percentage of 99%. For the destruction of the annual dicotyledonous weeds an efficiency of 98% has been obtained treating the vegetation with Modown (1.0l/ha).

Table 2

The selectivity and the efficiency of the herbicides in destroying the weed existent in the sun flower cultures in Oradea, in 2009.

Applied herbicides	Dose kg and l /ha	Application period	EWRS notes Selectivity	EWRS notes Efficiency
First witness: 3 mechanical hoeing and manual hoeing	-	-	1	1
Second witness: 2 mechanical hoeing	-	-	1	6
Third witness: not hoed	-	-	1	9
Mecloran 48	6	Before sowing by incorporation	1	3,5
Gesagard 50 WP	4	Pre emergently	1	2
Gesagard 50 WP	6	Pre emergently	1,8	1,3
Mecloran 48+ Gesagard 50 WP	6+6	Before sowing by incorporation+ Pre emergently	1	1
Mecloran 48+ Modown	8+1	Before sowing by incorporation+ Pre emergently	1	1
Frontier 900	1,1	Before sowing by incorporation	11	2,5
Frontier 900+Assert	1,1+1,5	Before sowing by incorporation+ Pre emergently	1	1,8
Dual 960+ Gesagard 50 WP	2+6	Before sowing by incorporation+preem	1	1
Dual 960+ Afalon	2+2,5	Before sowing by incorporation	1	2
Assert+Select+Actipron	1+0,5+2	Post emergently	1	2,5
Trophy	2	Pre emergently	1	2,5
Trophy	3	Pre emergently	1,8	1,8

Selectivity - grade 1: without plant toxicity symptoms ; grade 9 : destroyed plants. Efficiency – grade 1: weed destruction 90 – 100%; grade 9: without efficiency

Good results of destruction (93%) have been obtained by using herbicides only on vegetation with Assert+Select+Actipron (1+0,5+2).

Analyzing the sun flower seed production (table 3) it can be noticed that in the variants with classical herbicides like Gesagard -50 associated with Mecloran-48 or with Dual-960 productions of 1980-1990 kg/ha were obtained just like for the first witness classically maintained which had a production of 1980kg/ha. The disadvantage of the Desagard -50 herbicide , in a dose of 6,0 kg/ha, remains the risk of plant toxicity in the years with very rainy springs.

Table 3

The influence of the herbicides upon the sun flower production, Oradea 2009

Applied herbicides	Dose kg/ha	Application period	Weed destruction (%)	Production		
				kg/ha	%	Difference
First witness: 3 mechanical hoeing and manual hoeing	-	-	99	1980	100	-
Second witness: 2 mechanical hoeing	-	-	59	1130	57	-850
Third witness: not hoed	-	-	0	870	44	-1110
Mecloran 48	6	Before sowing by incorporation	62	1450	73	-530
Gesagard 50 WP	4	Pre emergently	86	1860	93	-120
Gesagard 50 WP	6	Pre emergently	94	1760	89	-220
Mecloran 48+ Gesagard 50 WP	6+6	Before sowing by incorporation+ Pre emergently	98	1990	100	+10
Mecloran 48 Modown	8+1	Before sowing by incorporation+ Pre emergently	98	1880	95	-100
Frontier 900	1,1	Before sowing by incorporation	76	1630	82	-350
Frontier 900+Assert	1,1+1,5	Before sowing by incorporation+ Pre emergently	90	1860	94	-120
Dual 960+ Gesagard 50 WP	2+6	Before sowing by incorporation+ Pre emergently	99	1980	100	-
Dual 960+ Afalon	2+2,5	Before sowing by incorporation	90	1740	88	-240
Assert+Select+Actipron	1+0, 5+2	Post emergently	93	1850	93	-130
Trophy	2	Pre emergently	87	1830	92	-150
Trophy	3	Pre emergently	89	1790	90	-170

The Modown herbicide associated with Mecloran -48 has productions of 95% from the witness' production. In the variants treated with Frontier-900+Assert or Dual-960+Afalon the productions are of 1740kg – 1860 kg/ha

representing 88% - 95% from the first witness production. Treating the sun flower only on vegetation in the stage when the plant has got only 3 -4 leaves, and when the dicotyledonous weeds are in the rosette stage and when the monocotyledonous weeds are before the fraternity stage there are productions only with 7% less that the ones obtained for the first witness. The lowest levels of production have been obtained in the variants treated with only one type of herbicide (Mecloran, Frontier, Trophy), due to the non destruction of the dicotyledonous weeds. This year, due to the non destruction of the weeds 1110kg/ha and 750 kg/ha have been lost in the case when two mechanical hoeing have been done.

Results obtained in 2010. The selectivity and the efficiency of the herbicides appreciated through notes after the EWRS scale is presented in table 4. Slight plant toxicity phenomena have been noticed for the Modown herbicide applied post emergently, at 2-3 days some necroses appearing on the leaves but the respective phenomenon has gradually disappeared without affecting the seed production. The same phenomenon of plant toxicity has also appeared for the Modown herbicide after the sowing, this time it has manifested through a yellow color of the leaves and through stand bys in growing.

The destruction degree of the weed, gravimetrically appreciated was good (table 5). In the variants treated before sowing with Mecloran, Guardian, Triflurom, Diburom and on vegetation with Modown an efficiency of 96-98% is obtained as well as in the variants classically treated with Mecloran or Triflurom associated with Gesagard. A 92-94% destruction degree is realized by applying herbicides with Modown associated with Gallant Super, Modown applied pre emergently as well as post emergently.

The obtained productions (table 5) are in correlation with the efficiency in weed destruction, the losses due to the weeding being of 1300kg/ha at the not weeded witness. In comparison with witness I, (3 manual weeding+3mechanical weeding) the highest production levels have been obtained in the variants with associated herbicides Mecloran, Guardian, Triflurom, Diburom, applied before sowing and followed on vegetation with Modown or after sowing with gessard, productions of 2040-2220 kg/ha while at the 1st witness a production of 2260kg/ha was obtained.

Table 4

The selectivity and the efficiency of the herbicides in destroying the weed existent in the sun flower cultures in Oradea, in 2010.

Applied herbicides	Dose kg and l /ha	Application period	EWRS notes Selectivity	EWRS notes Efficiency
First witness: 3 mechanical hoeing and manual hoeing	-	-	1	1

Second witness not hoed	-	-	1	0
Gesagard 50 WP	4	Pre emergently	1	2,5
Gesagard 50 WP	6	Pre emergently	1,8	1,5
Mecloran 48+ Gesagard 50 WP	6+6	Pre emergently	1	1
Guardian	2	Before sowing by incorporation	1	3
Guardian +Modown	2+1,5	Before sowing by incorporation+ Post emergently	1,5	1,2
Mecloran 48+ Modown	8+1	Before sowing by incorporation+ Post emergently	1,5	1,2
Dual 960+ Afalon	2+2,5	Before sowing by incorporation	1	2,8
Triflurom 48	2	Before sowing by incorporation	1	3,5
Triflurom 48 +Modown	2+1,5	Before sowing by incorporation+ Post emergently	1,5	1,5
Triflurom 48 +Gesagard 50 WP	2+6	Before sowing by incorporation+ Pre emergently	1	1,5
Modown + Gallant super	1,8+0,5	Before sowing by incorporation+ Post emergently	1,8	1,3
Modown + Gallant super	1+0,5	Post emergently	1,5	1,5
Diburom + Modown	4+1,5	Before sowing by incorporation+ Post emergently	1,5	1,3

The Guardian or the Treflan-48 herbicides applied alone realize productions that represent 75 – 76% from the production of the first witness due to non destroyed dicotyledonous weeds. Analyzing the correlation between the

Table 5

The influence of the herbicides upon the sun flower production, Oradea 2010

Applied herbicides	Dose Kg/ha	Application period	Weed destruction (%)	Production	Production	Production
				Kg/ha	%	Difference
First witness: 3 mechanical hoeing and manual hoeing	-	-	99	2260	100	-
Second witness not hoed	-	-	0	960	42	-1300
Gesagard 50 WP	4	Pre emergently	81	2000	88	-260
Gesagard 50 WP	6	Pre emergently	97	2080	92	-180
Mecloran 48+ Gesagard 50 WP	6+6	Pre emergently	98	2220	98	-40
Guardian	2	Before sowing by incorporation	79	1690	75	-570
Guardian	2+1,5	Before sowing	98	2220	97	-60

+Modown		by incorporation+ Post emergently				
Mecloran 48+ Modown	8+1	Before sowing by incorporation+ Post emergently	99	2120	94	-140
Dual 960+ Afalon	2+2,5	Before sowing by incorporation	91	2010	89	-250
Triflurom 48	2	Before sowing by incorporation	79	1710	76	-550
Triflurom 48 +Modown	2+1,5	Before sowing by incorporation+ Post emergently	98	2100	93	-160
Triflurom 48 +Gesagard 50 WP	2+6	Before sowing by incorporation+ Pre emergently	99	2230	99	-30
Modown + Gallant super	1,8+0,5	Before sowing by incorporation+ Post emergently	94	1980	88	-280
Modown + Gallant super	1+0,5	Post emergently	92	1940	86	-320
Diburom + Modown	4+1,5	Before sowing by incorporation+ Post emergently	96	2040	90	-220

sun flower production and the total quantity of weed (figure 1) it comes out that there is a distinctly significant negative correlation coefficient with each q of weeds 0,14q/ha seeds being lost.

CONCLUSIONS

The tested herbicides have shown a good selectivity for the sun flower culture. The Modown herbicide applied post emergently registers slight phenomena of plant toxicity but without negatively influencing the realized production. Also, the Gesagard-50 (6,0kg/ha) and Trophy (3,0l/ha) have registered plant toxicity phenomena.

The efficiency of the herbicides has been according to the infestation degree, to the dominant weed and to the applied dose.

New herbicides like Guardian, Frontier – 900, Diburom, Trophy have had a very good efficiency for the annual monocotyledonous weeds at the level of the classical ones like Mecloran-48, Triflurom, Dual-960.

By the associated use of the above mentioned graminicid herbicides, with Modovan on the vegetation, the weed destruction degree registers values of 95-98%. An efficiency of 92 -93% destruction can be achieved if using herbicides only on vegetation, herbicides like Modown + Galant super or Assert+Select+Actipron.

The sun flower productions have been in a close relation with the weed destruction degree and with the selectivity of the herbicides upon the culture.

The most efficient weed destruction method and which ensures high productions is, beside the application on time and the application of superior quality agricultural and technical measures, the use of selective associated herbicides in optimum doses.

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