THE WEEDS MANAGEMENT FROM WINTER WHEAT CROP IN AGROECHOSYSTEMS FROM NORTH-WESTERN PART OF ROMANIA

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Abstract

Cultivating wheat in monoculture and practicing a short rotation determine a proliferation of some specific weeds like Apera spica-venti with a gravity about 67% beside specific dicotyledonous species like: *Matricaria inodora, Cirsium arvense, Anthemis arvensis, Raphanus raphanistrum, Consolida regalis, Polygonum convolvulus, Stellaria media*, etc.

If the winter wheat was cultivated in a rotation by three years the ratio between weed species is changed, so the annual and perennial dicotyledonous weeds became predominant weeds.

Using specific herbicides (Axial, Trasos, Atlantic, Pallas, Hussar active) for control of annual monocotyledonous weeds, the weeds cover rates is decreasing from 67% in untreated variant to 3,1-4,6% in wheat monoculture. Where wheat was cultivated after soy crop in a three years rotation, the weeds cover rates had a significant decreasing after the herbicides were used. In untreated wheat crop the weeds cover rates was 100% and after were used adequate herbicides (Rival Super Star, Gold, Sekator OD, Lancelot) decreased at 5,0-6,3%.

The control of weeds assure a significant yield spores about 675-720 kg/ha in the wheat monoculture, respective 890-900 kg/ha in a rotation by three years when winter wheat was cultivated after soy crop.

Key words: infestation degree, weeds control, herbicides, efficacy, crop rotation, winter wheat

INTRODUCTION

The winter wheat infestation with different species of weeds depends on cultivation area, the technologies used and the annual climatic conditions.The cultivation area had a specific natural background and determined the seeds reserve which are different every year. Through the application of all the specific technologies measures (crop rotation, fertilization, etc.) the battle with weeds is more easier in comparison with the minimum technologies measures, because of that the weeds growth in the same time with the crop plant and the control of weeds is more difficult to be done.

The wheat represents the higher weight in the crops structure from our country, and the frequently participation of wheat in the crops structure and using of monoculture was favorised the increasing of specific annual and perennial monocotyledonous and dicotyledonous weeds.

The big diversity of crops conditions and the higher complexity of weeds species which exists in this crop, lead to the assurance of weeds control through the crop rotation activities or using herbicides.

This paper presents the researches carried out along two years of winter wheat crop at the Agricultural Research and Development Station from Oradea and the main objective is establishing of the most adequate herbicides for control of monocotyledonous and dicotyledonous weeds, with a good effect on yields results.

MATERIAL AND METHODS

The reasearches was made in long term field experimental, in the preluvosoil conditions with humus content by 2.32%, phosphorus content by 150,8 ppm and a higher content in assimilated potassium (124,5 ppm) and a pH by 6,8 in the arable horizont.

The winter wheat were cultivated in monoculture respective in a three years crop rotation (soy-wheat-maize).

The technologies used were those usually for the wheat crop and the variety used was Crişana.

The infestation degree was determined in spring, before the herbicides application with one month before harvesting using quantity number method.

The experiments was monofactorials set up using the latin rectangle method with 12 variants in four replications, with 25 m^2 plot size. The experimental variants were: A_1- untreated; A_2- Axial + Rival Super Star 75 GD 0,9 l/t + 20 g/ha (Pinoxaden + tribenuron+clorsulfuron); A_3- Traxos + Rival Super Star 75 GD 0,8l/ha + 20 g/ha (clodinafop propargil + pinoxaden + cloquinoat mexil); A_4 – Hussar active 1,0 l/ha (iodosulfuron metil sodium + mefempir dietil - safener); A_5 – Atlantis 0,6 l/ha (mesomaxx + iodosulfuron); A_6 – Pallas 75 mg + Aqnique 110 g/ha + 1 l/ha (piroxsulam + cloquinocet); B_1 – untreated ; B_2 – Esteron extra 0,8 l/ha (Acid 2,4D dietiletil - ester); B_3 – Rival Super Star 75 GD 20g/ha (tribenuron metil + clorsulfuron metil), B_4- Sekator OD + Mero – 0,150 l/ha + 1,0 (amidosulfuron + iodosulfuron – metil+ mefempir dietil); B_5 – Gold 1,25 l/ha (fluroxipir + acid 2,4 D); B_6 – Lancelot 33g/ha (acid pirielin carboxylic + florasulam).

RESULTS AND METHODS

The floristically composition of weeds species in winter wheat crop in monoculture and short crop rotation like wheat – maize determined the proliferation of monocotyledonous weeds respective of *Apera spica-venti* with some dicotyledonous species like: *Matricaria inodora, Stellaria media, Cirsium arvense, Raphanus raphanistrum, Consolida regalis* etc. The weight of annual monocotyledonous weeds are between 55,5% and 67,9% with a number of species/m^2 between 120-144 and dicotyledonous weeds between 32,1-44,5% wth a density between 66-96 species/m^2 (Table 1).

Table 1.

Number of weeds/ m^2 before treatment in winter wheat crop, 2007-2008

Variant	APSP	MATIN	CIRAR	RAPRA	STEME	VERHE	CONRE	Total	% Participation	
									Grass	BreaLSDeaf
A1	134	14	2	12	18	12	10	202	66,3	33,7
A2	144	26	6	8	16	8	4	212	67,9	32,1
A3	126	16	6	10	22	10	2	192	65,6	34,4
A4	120	24	12	18	18	18	6	216	55,5	44,5
A5	130	16	8	16	12	16	8	206	53,1	36,9
A6	134	28	6	18	14	18	10	228	58,8	41,2

APSP = Apera spica-venti; MATIN = Matricaria inodora; CIRAR = Cirsium arvense; RAPRA = Raphanus raphanistrum; STEME = Stellaria media; VERHE = Veronica hederifolia; CONRE = Consolida regalis; ANTAR = Anthemis arvensis; POLCO = Plygonum convolvulus

At cultivated winter wheat involved in a three years crop rotation, the number of weeds were about 58,7 species/m^2 and dominated were weeds like: *Matricaria inodora, Raphanus raphanistrum, Cirsium arvense, Gallium aparine*, etc. (Table 4).

In the case of winter wheat infested with a combination of monocotyledonous and dicotyledonous weeds the specific herbicides like: Axial, Traxos, Atlantis, Pallas, assure a good control of Apera spica-venti between 95,4-96,9% and in case of combinated herbicide Hussar active assure an efficacy about 96,1%, respective a total control by 94,1% on the annual and perennial dicotyledonous weeds. The total control of weeds through the association with dicotyledoneic herbicide Rival Super Star were about 95,2-95,7%.The herbicides Atlantis and Pallas with a lower spectrum regarding of broaLSDeaves weeds had a total efficacy between 83,3-84,8% and untreated weeds were *Cirsium arvense, Consolida regalis, Polygonum convolvulus, Veronica hederifolia,* etc. Using simple herbicides like: Axial, Traxos associated with Rival Super Star and combinated herbicide Hussar active were obtained a decreasing semnification of weeds cover rates with *Apera spica-venti* and annual and perennial dicotyledonous weeds. In this case from weeds cover rates with *Apera* by 62,1% (in untreated variant) were registered a decreasing to 3,1-4,6%, respective a infestation degree by 95,4-96,9% and dicotyledonous weeds cover rates decreased from 37,3% to 7,5 – 9,4 %, respective 92,5 – 92,8%. The specific herbicides like Atlantis and Pallas used for control of monocotyledonous and some dicotyledonous weeds lead to a decreasing of infestation with *Apera spica-venti* values between 3,1-4,6% and had a efficacy by 95,4-96,9%, respective 60,6 - 67,2% at dicotyledonous weeds a results after the control of these weeds(Table 2).

Table 2.

The efficacy of herbicides on decreasing infestation degree in winter wheat, 2007-2008

Number of weeds /m^2 at harvesting									Infestation degree%		
Variant	APSP	MATIN	CIRAR	RAPRA	STEME	VERHE	CONRE	Total	Grass	BreaLSDeaf	Total
A1	128	18	4	16	10	10	18	204	62,1 (0)	37,3 (0)	0
A2	4	0,1	-	0,2	-	2,2	3,2	9,7	96,9	92,5	95,2
A3	4	0,6	-	-	-	1,8	2,4	8,8	96,9	93,7	95,7
A4	5	0,1	-	0,3	-	2,4	4,4	12,2	96,1	92,8	4,1
A5	6	1,2	1,2	2,2	3,2	7,2	10	31	95,4	67,2	84,8
A6	4	0,8	1,5	3,3	4,2	8,2	12	34	96,9	60,6	83,3

In the winter wheat crop infested only with annual and perenial dicotyledonous weeds the control were between 75,8% and 95% (Table 3). The untreated variant had a natural infestation by 58,7 species/m^2 and weeds cover rates by 100% and after using adequate herbicides were establishing a decreasing of weeds cover rates by 5,0-5,4% (herbicides like Gold, Rival Super Star, Lancelot) and 6,3% (Sekator OD). In the case of herbicide Esteron extra, the weed cover rates were 22,5% because of resistant uncontrolled weeds like *Matricaria inodora, Anthemis arvensis, Gallium aparine*, etc. The biggest control degree 95,0% were obtained through using of herbicides Gold followed by herbicides like: Rival Super Star and Lancelot (94,6%) respective Sekator OD (93,7%). At herbicide Esteron extra the control degree is low (77,5%) because of rezistent weeds like: *Matricaria inodora, Anthemis arvensis, Gallium aparine, Convolvulus arvensis* etc.

Table 3.

The efficacy of herbicides on the decreasing infestation degree in winter wheat crop, 2007-2008

Variant	Total numbers of weeds/ variant		% decreasing of infestation degree	Dominated weeds
	Weeds/ m^2	% of participation		
B1	58,7	100	Untreated	MATIN, RAPRA, CIRAR, ANTAR, POLCO, GALAP, STEME, CONAR
B2	13,2	22,5	77,5	MATIN, ANTAR, GALAP, CONAR
B3	3,16	5,4	94,6	CIRAR, CONAR
B4	3,71	6,5	93,7	ANTAR, STEME, CONAR
B5	2,95	5,0	95,0	POLCO, CONAR
B6	3,19	5,4	94,6	CIRAR, VERHE

In winter wheat monoculture in untreated variant were realized a yield by 3450 kg/ha (Table 4) and in the wheat crop in rotation for three years the yield was 3760 kg/ha (Table 5).

Table 4.

The efficacy of herbicides on the decreasing infestation degree in winter wheat crop, 2007-2008

Variant	Yield kg/ha	Relative yield kg/ha	Difference of yield kg/ha	Difference semnification
A1	3450	100	-	-
A2	4125	119,6	+675	***
A3	4165	120,7	+715	***
A4	4170	120,9	+720	***
A5	4005	116,1	+555	**
A6	3890	112,8	+440	**

LSD 5% = 310 kg/ha
LSD 1% = 420 kg/ha
LSD 0,1% = 559 kg/ha

Table 5.

The influence of herbicides on yield at winter wheat crop, 2007-2008

Variant	Yield kg/ha	Relative yield kg/ha	Difference of yield kg/ha	Difference semnification
B1	3760	100	-	-
B2	4150	110,3	+390	-
B3	4660	123,9	+900	+++
B4	4590	122,1	+830	++
B5	4650	123,7	+890	+++
B6	4515	120,1	+755	++

LSD 5% = 436 kg/ha
LSD 1% = 632 kg/ha
LSD 0,1% = 859 kg/ha

The highest yield spores by 675 – 720 kg/ha were obtained after the control of monocotyledonous and dicotyledonous weeds and were statistical assured with significant values obtained in the variants treated with Axial, Traxos associated with Rival Super Star, respective Hussar active. An significant yield spores was also registered at variants where were used herbicides like Pallas and Atlantis (440-555 kg/ha).

In the case of infested winter wheat only with dicotyledonous weeds, the herbicides used assured very significant yield spores with values between 890-900 kg/ha respective distinct significant yield spores by 755 -830 kg/ha (Lancelot, Sekator OD).

CONCLUSIONS

Cultivating wheat determine proliferation of some specific monocotyledonous and dicotyledonous weeds and dominated was monocotyledonous weeds with a gravity species by 55,5 – 67,9% respective 32,1- 44,5% of dicotyledonous weeds like *Matricaria inodora, Cirsium arvense, Raphanus raphanistrum, Consolida regalis, etc.*

In winter wheat crop cultivating in a rotation of three years (soy-wheat-maize) the ratio between weeds it is changing in the way that some dangerous dicotyledonous weeds became dominated, and this weeds were: *Matricaria inodora, Raphanus raphanistrum, Cirsium arvense, Gallium aparine, Anthemis arvensis, Polygonum sp.* etc.

Using simple herbicides like: Axial, Traxos, Atlantis, Pallas and combinated like Hussar active, were obtained a significant decreasing of cover rates with *Apera spica-venti* from 62,1% in untreated variant to 3,1-4,6%, respective an control with values between 95,4-96,9%. When the herbicides Axial and Traxos are associating with Rival Super Star were registered a decreasing of annual and perennial dicotyledonous weeds cover rates from 37,3% (in untreated variant) to 6,3-9,4%, an efficacy by 92,5-93,7%.

The specific herbicides for *Apera* and for some dicotyledonous weeds are decreasing the *Apera* gravity from 3,1-4,6% and decreased the control degree for dicotyledonous weeds at 60,6 – 67,2%.

In a three years crop rotation when was cultivating after soy crop the dominated weeds species were: *Matricaria inodora, Cirsium arvense, Raphanus raphanistrum, Anthemis arvensis, Gallium aparine* etc. The weeds cover rates were decreased after herbicides were used at 5,0 – 6,3%, from 58,7 species/m^2 (untreated variant) to 2,95 – 3,71 species/m^2 with a control degree about 93,7 – 95,0%.

Through the control of monocotyledonous and dicotyledonous weeds was created conditions for very significant yield spores in wheat monoculture with values between 675-720 kg/ha and in the wheat crop cultivated after soy crop the yield spores had values by 890 – 900 kg/ha.

The results obtained can establishing differentiate measures for the weed control depending on the structure of infestation with weeds in each plot.

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