Control of *Avena Fatua* Species (Wild Oat) - a Weed in Expansion in Banat Area

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ABSTRACT

Wheat is considered the largest agricultural crop acreage worldwide. More than 50% of human caloric needs is ensured by grain products. The presence of different species of weeds in cereals causes losses between 15 -20% and even 60-80% of the crop in the absence of control measures. The most dangerous monocotyledonous species present in this culture are *Apera spica - venti* (wind grass), *Avena fatua* (wild oat) and *Bromus* sp., they produce huge damage to both varieties for consumption and seed lots. Chirilă C. (2001), states that the species *Avena fatua* is one of the 132 species considered problem, namely: direct harm and high on production; has a high resistance to agro-chemical control measures; and the number or rapacity reduce the positive effect of some production factors. This study aims to provide new data on chemical control of *Avena fatua* in agroecosystems species of wheat. Research on chemical control of *Avena fatua* species were conducted in Teaching and Research Station, belonging to the University of Agricultural Sciences and Veterinary Medicine “King Michael I of Romania” in Timisoara. Experience included 12 variants, in three repetitions, placed after the randomized blocks method. Variants differ by herbicides applied. Efficacy of herbicides in control of species *Avena fatua* had values between 60-85%. The best herbicide used against *Avena fatua* proved to be Axial One EC (control rate 85%).

Keywords: control, herbicide, weed mapping, wheat, wild oat

INTRODUCTION

The main care work in wheat crop is weed control (Şarpe N., 1976). All weeds compete with crop plants, but insofar as they harm agricultural production varies greatly from one species to another (Berca M., 2004).

Wild oat (*Avena fatua*) is a weed problem in cereal crops (oats, wheat etc.), reducing plant growth, yield and quality (Carlson and Hill, 1985, Martin et al., 1987). The competition between cereals and *Avena fatua* begins when one or more of space resources (light, water and nutrients) are sufficient for both. Therefore, species that uses better the resources will succeed, between plants of wheat and wild oat and there is an interaction between inter-specific, but different species belonging to the family Poaceae (Stoklosa A. and Kiec J., 2006).

Adel D. et al. (2012), from the conducted researches have concluded that wild oat reduced winter wheat production by 17 to 62% depending on the variety cultivated. Increasing crop density could reduce wild oat competition may become a useful tool in an integrated weed management.

Data from the literature points out that wild oats is characterized by a wide range of resistance to graminicide herbicides (Mengistu et al., 2003), which is an important factor in increasing the number of plants.

Avena fatua produce both direct and indirect damage by the fact that the seeds produced by this species are found in the seeds mass of oats, and administrated to animals produce inflammation of the oesophagus. Once reached among cereals seeds are difficult to remove and only in special facilities. Scientific research has shown, and

farming has confirmed that “weed problem” *Avena fatua* is very difficult to control and therefore that further studies on the chemical control of this species need to go on.

MATERIAL AND METHOD

Researches regarding the chemical control of *Avena fatua* species were conducted in Teaching and Research Station, belonging to the University of Agricultural Sciences and Veterinary Medicine “King Michael I of Romania” in Timisoara. Experience included 12 variants, in three repetitions, placed after the randomized blocks method. The variants were different (non-treated controls 11 + 1 variant) by the herbicide applied: Tolurex 50 SC (clorotoluron 500 g/l), Stomp Aqua (pendimetalin - 455 g/l), Axial 050 EC (pinoxaden 50 g/l + cloquintocet - mexil 12.5 g/l), Axial One EC (pinoxaden 45 g/l + florasulam 5g/l + cloquintocet-mexil 11.25 g/l), Attribut 70 SG (propoxycarbazon-sodiu 700 g/kg), Foxtrot 69 EW (fenoxaprop-P-etil (enantiomer D) 69 g/l cloquintocet-mexil (safener) 34.5g/l), Hussar 400 OD (iodosulfuron-metil-Na 100 g/l mefenpir dietil (safener) 300 g/l), Legato Plus EC (diflufenican 100 g/l + isoproturon 500 g/l), Pallas 75 WG (piroxsulam 7.5 g/l + cloquintocet-metil (adjuvant) 7.5 g/l), Sekator Pogress SC (amidosulfuron 100 g/l+iodosulfuron-metil-Na 25 g/l+mefenpyr dietil 250 g/l (safener), Pelican Delta 606 WG (diflufenican 60 % + metsulfuron metil 6%).

Herbicides used in this study were applied postemergence, exception has been recorded in variant treated with Stomp Aqua version that was applied preemergence. Doses of herbicides applied experimental variants were those recommended by producers.

Wheat variety used was Apache experience, the most cultivated variety in 2003 in France. It is an early variety, productive and easily adaptable to various conditions. In vegetation shows a good resistance to lodging and high protein content (11.5 – 12.5), MMB 42 - 45 g. Plants are healthier, better grain filling and ripening is early. Resistance to winter and the heat is medium. The potential is high 7000-9200 kg/ha. Under favourable conditions, the yield might exceed 7500 kg/ha (<http://gazetadeagricultura.info/advertorial/490-sorts-of-wheat-franceze.html>)

Before and after the treatment mapping were conducted.

RESULTS AND DISCUSSIONS

After mapping performed in the control variant (untreated) was observed the presence of following weed species: *Veronica hederifolia*, *Capsella bursa-pastoris*, *Viola arvensis*, *Stellaria media*, *Lamium purpureum*, *Galium aparine*, *Matricaria inodora*, *Papever rhoeas*, *Fumaria officinalis*, they represented a rate of 20%.

The number of *Avena fatua* plants recorded in the untreated variant was 86 plants/m².

Table 1 presents the results of treatments with herbicide used in the experiment, against species *Avena fatua*, compared to the untreated variant.

It is noted that the most effective herbicides in reducing wild oat weed degree were: Axial 050 EC - 0.9 l / ha (pinoxaden 50 g / l + cloquintocet - mexyl 12.5 g / l), with a percentage of 96.67% Axial One EC - 1 l / ha (pinoxaden 45 g / l + florasulam 5g / l + cloquintocet-mexyl 11.25 g / l), with a percentage of 95.00% control, Tolurex 50 SC - 3.0 l / ha (chlortoluron 500 g / l), with a percentage of 88.00% control, and Pallas 75 WG - 250 g / ha + 0.5 l / ha (7.5 g piroxsulam / l + cloquintocet-methyl 7.5 g / l) with a control of 83.00%.

Unsatisfactory results in the control of *Avena fatua* segetal species of winter wheat, having values below 50% or close to it, there were variants in which herbicides were applied: Legato Plus EC - 1.5 l / ha (diflufenican 100 g / l + isoproturon 500 g / l) - 53.00%, Stomp aqua - 2.9 l / ha (pendimethalin - 455 g / l) -50.00% Pelican Delta WG 606 - 0.1 kg / ha (metsulfuron-methyl + diflufenican 60% +6%) - 48.00% and Sekator Pogress SC - 0.15 l / ha (100 g amidosulfuron / iodosulfuron-methyl-l Na + 25 g / l + mefenpyr diethyl 250 g / l (safener)) - 45.33%.

All 11 herbicides tested were highly selective for Apache wheat variety grown in experience, without the symptoms of phytotoxicity (note 1.0 EWRS).

The average, for the 11 variants treated, of the percentage of *Avena fatua* control was 69.39%. In contrast to this, herbicides: Axial 050 EC - 0.9 l / ha (pinoxaden 50 g/l + cloquintocet - mexil 12.5 g/l), Axial One EC - 1 l/ha (pinoxaden 45 g/l + florasulam 5g/l + cloquintocet-mexil 11.25 g/l), Tolurex 50 SC - 3,0 l/ha (clorotoluron 500 g/l) and Pallas 75 WG - 250 g/ha + 0.5 l/ha, (piroxsulam

Tab. 1. The efficacy and selectivity of herbicides used to control the species *Avena fatua* in winter wheat compared to the untreated variant

No. var.	Herbicide	Dose	Selectivity (note EVRS)	% control sp. <i>Avena fatua</i>	Controlled weeds/m ²	Diference (%)	Signification
1.	Tolurex 50 SC	3 l/ha	1.0	88.00	75.68	88.00	xxx
2.	Stomp Aqua	2.9 l / ha	1.0	50.00	43.00	50.00	xxx
3.	Axial 050 EC	0.9 l/ha	1.0	96.67	83.14	96.67	xxx
4.	Axial One EC	1 l / ha	1.0	95.00	81.17	95.00	xxx
5.	Attribut 70 SG	0.100 kg/ha	1.0	68.33	58.76	68.33	xxx
6.	Foxtrot 69 EW	1.1 l/ha	1.0	75.33	64.78	75.33	xxx
7.	Hussar 400 OD	0.1 l/ha,	1.0	60.67	52.18	60.67	xxx
8.	Legato Plus EC	1.5 l/ha	1.0	53.00	45.58	53.00	xxx
9.	Pallas 75 WG	250 g/ha + 0.5 l/ha	1.0	83.00	71.38	83.00	xxx
10.	Sekator Pogress SC	0.15 l / ha	1.0	45.33	38.98	45.33	xxx
11.	Pelican Delta 606 WG	0.1 kg/ha	1.0	48.00	41.28	48.00	xxx
12.	Martor netrnat	-	1.0	0.00	0.00	-	-

DL5% 3.7793%

DL1% 5.1487%

DL0.1% 6.9197%

Tab. 2. The effectiveness of herbicides in contyrol of *Avena fatua*, compared with the average of experience

No. var.	Herbicide	Dosis	Control % of sp. <i>Avena fatua</i>	Relative Difference	Absolute Difference	Significance
3.	Axial 050 EC	0.9 l/ha	96.67	139.31	27.28	xxx
4.	Axial ONE EC	1 l / ha	95.00	136.91	25.61	xxx
1.	Tolurex 50 SC	3 l/ha	88.00	126.82	18.61	xxx
9.	Pallas 75 WG	250 g/ha + 0.5 l/ha	83.00	119.61	13.61	xxx
6.	Foxtrot 69 EW	1.1 l/ha	75.33	108.57	5.94	xx
12.	Average of experience	-	69.39	100.00	0.00	-
5.	Attribut 70 SG	0.100 kg/ha	68.33	98.48	-1.06	-
7.	Hussar 400 OD	0.1 l/ha,	60.67	87.43	-8.72	000
8.	Legato Plus EC	1.5 l/ha	53.00	76.38	-16.39	000
2.	Stomp Aqua	2.9 l / ha	50.00	72.06	-19.39	000
11.	Pelican Delta 606WG	0.1 kg/ha	48.00	69.17	-21.39	000
10.	Sekator Pogress SC	0.15 l / ha	45.33	65.33	-24.06	000

DL5% 3.7730 %

DL1% 5.1400 %

DL0.1% 6.9081 %

Tab. 3. The experimental results regarding the production in wheat crop

Nr. var.	Herbicide	Dosis	Yield (q/ha)	Relative Yield(%)	Absolute Difference (q/ha)	Significance
4.	Axial One EC	1 l / ha	65.32	119.32	+10.58	xxx
1.	Tolurex 50 SC	3 l/ha	63.40	115.82	+8.66	xxx
3.	Axial 050 EC	0.9 l/ha	61.85	112.99	+7.11	xxx
9.	Pallas 75 WG	250 g/ha + 0.5 l/ha	58.76	107.68	+4.02	x
6.	Foxtrot 69 EW	1.1 l/ha	57.41	104.87	+2.67	-
	Average of experience	-	54.74	100.00	-	-
5.	Attribut 70 SG	0.100 kg/ha	54.65	99.83	-0.09	-
11.	Pelican Delta 606WG	0.1 kg/ha	51.86	94.73	-2.88	-
7.	Hussar 400 OD	0.1 l/ha	50.93	93.04	-3.81	0
2.	Stomp Aqua	2.9 l / ha	50.25	92.08	-4.49	0
8.	Legato Plus EC	1.5 l/ha	48.71	88.98	-6.03	00
10.	Sekator Pogress SC	0.15 l / ha	47.92	87.54	-6.82	000
12.	Control untreated	-	45.70	83.49	-9.04	000

DL5% 3.1346 q/ha

DL1% 5.2584 q/ha

DL0.1% 6.5104 q/ha

7.5 g/l + cloquintocet-metil 7.5 g/l) secured very significant positive difference in control, and product Foxtrot 69 EW -1.1 l/ha (fenoxaprop-P-etil (enantiomer D) 69 g/l cloquintocet-mexil (safener) 34.5g/l) a significantly positive distinct difference. The application of other herbicides tested resulted in significant negative differences from the average (Table 2.).

Wheat yields obtained in the experiment ranged between 45.70 q / ha in the control variant untreated V1 and 65.32 q / ha in variant V4 where has been used herbicide Axial EC One - 1 l/ha (pinoxaden 45 g/l + florasulam 5g/l + cloquintocet-mexil 11.25 g/l). Good yields of more than 60 q / ha were registered in the variants V₁ Tolurex 50 SC - 3.0 l/ha (clorotoluron 500 g/l) and V₃ Axial 050 EC - 0.9 l/ha (pinoxaden 50 g/l + cloquintocet - mexil 12.5 g/l), with the very significant positive difference. In V₉ treated with Pallas 75 WG - 250 g/ha + 0.5 l/ha, (piroxsulam 7.5 g/l + cloquintocet-metil 7.5 g/l) the yield increase was 4.02 q/ha, significant positive statistically assured (table 3.).

Production results were directly proportional with the performance of herbicides against dominant species *Avena fatua*, but also against

other segetal species identified in winter wheat. An important role was played by climatic conditions of the year 2013 in which the research took place.

CONCLUSION

Wild oat (*Avena fatua*) is a "weed problem" in cereals (oats, wheat etc.) reducing plant growth, yield and quality;

In control variant (untreated) following weed species were present: *Veronica hederifolia*, *Capsella bursa-pastoris*, *Viola arvensis*, *Stellaria media*, *Lamium purpureum*, *Galium aparine*, *Matricaria inodora*, *Papever rhoeas*, *Fumaria officinalis*, up to 20% from total/m². 86 plants *Avena fatua* /m² were identified;

The most effective herbicides in reducing the weed wild oats were: Axial 050 EC (96.67 %), Axial One EC (95.00 %), Tolurex 50 SC (88.00 %) and Pallas 75 WG (83.00 %);

Unsatisfying results in controlling of species *Avena fatua* in winter wheat, with values below 50% control or close to it, were recorded in variants that were applied herbicide products: Legato Plus EC (53.00 %), Stomp Aqua (50.00

%), Pelican Delta 606 WG (48.00 %) and Sekator Pogress (45.33 %);

All 11 herbicide tested were very selective for Apache wheat variety grown in the experience, without phytotoxicity symptoms (note 1.0 EWRS);

The highest yields were obtained in wheat variants V₄ Axial One EC 1 l/ha (65.32 q/ha), V₁ Tolurex 50 SC - 3.0 l/ha (63.40 q/ha) and V₃ Axial 050 EC - 0.9 l/ha (61.85 q/ha);

Production results were directly proportional with the performance of herbicides against dominant species *Avena fatua*, but also against other segetal species identified in winter wheat. An important role was played by climatic conditions of the year 2013 in which the research took place.

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