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RESEARCH REGARDING WEED CONTROL IN WHEAT

Gheorghe PASCU

University of Agronomic Sciences and Veterinary Medicine of Bucharest, 59 Mărăşti Blvd, District 1, 011464, Bucharest, Romania, Phone: +40 21 318 25 64/232, Fax: + 40 21318 28 88, E-mail: ggeorge_pascu@yahoo.com

Corresponding author e-mail: ggeorge_pascu@yahoo.com

Abstract

Management control and weeding status play an important role in the tehnological sequence of wheat crop. Despite systematic and sustained fight against weeds, the latter continue to cause low production quality and quantity. Under conditions of modern agriculture, the studies on integrated weed management should be based on an elaborated program that combines herbicide use with culture-specific agrotechnical methods, closely connected with the type of weed infestation. Herbicide application is the best method of all the complex measures of integrated control. The intelligent use of herbicides involves an investment of scientific knowledge in different domains. Given the high percentage of chemical control methods within the integrated control system (biological control having no concrete support), proper application of herbicides should be given special attention. The need for further research on wheat weeding is real as chemical industry provides farmers with new herbicides; on the other hand, no herbicide has been created to destroy the entire weed range existing in a crop. This paper presents a series of measures (crop rotation, tillage, fertilizer and herbicide) aimed at increasing efficient weed control in wheat crop in a dynamic analysis covering the years 2010-2012. The results of this paper are the subject of doctoral theme.

Key words**:** *integrated control system, management, weeds.*

INTRODUCTION

Management control and weeding status play an important role in the tehnological sequence of wheat crop [6].
Despite systematic and sustained fight against weeds, the latter continue to cause low production quality and quantity [1].
Under conditions of modern agriculture, the studies of integrated weed management should be based on an elaborated program that combines herbicide use with culture-specific agrotechnical methods, closely connected with the type of weed infestation [4].
Herbicide application is the best method of all the complex measures of integrated control.
The intelligent use of herbicides involves investment of scientific knowledge in different domains [3].
This paper presents a series of measures (crop rotation, tillage, fertilizer and herbicide application), aimed at increasing efficient weed control in wheat crop in a dynamic analysis covering the years 2010-2012.

MATERIAL AND METHOD

Between the period 2010 and 2012, an experiment based on herbicide application was performed on chernozem-grown wheat at S.C. ORGANIC PROD LTD, the Mihail Kogălniceanu area, Constanţa county.
Six variants were studied: untreated control, Rival Star 75 GD (25 g/ha), Dicopur D (1 l/ha), Dicopur Top 464 SL (1 l/ha), Granstar Super 50 SG (40 g/ha) and Sekator Progress OD (150ml/ha).
Application was implemented for Dicopur D, Dicopur Top and Sekator Progress, elongation of the first internode (early phase of growing wheat J) [5], and for Rival Star 75 GD and Granstar Super 50 SG the phenophase of four internodes (middle phase of growing wheat J).
The area of the experimental plots was 25 square meters.
We worked in four repetitions, in Latin rectangle.
In terms of rainfalls during the growing season, 2010 was very favorable, 2011 favorable and 2012 less favorable, especially towards the end

of vegetation, as reflected by the yields obtained. The agrophytotechnical measures applied to the soil by the time of harvesting were the same in all variants.

In 2012, wheat followed wheat in plot A 462. It was ploughed at 28 cm in depth. Fertilization consisted in the application of a complex $N_{20}P_{20}K_0$ – 200 kg/ha fall under the plough, and urea – 120 kg/ha and foliar fertilizer with Green last – 10 l/ha were administered in spring.

In 2011, wheat followed rape.

Ploughing was done at 30 cm in depth. Fertilization consisted in the application of a complex $N_{18}P_{46}K_0$ – 150 kg/ha fall under the plough, and ammonium nitrate – 120 kg/ha in spring.

In 2010, wheat followed rape in plot A 515. Ploughing was done at 30 cm in depth. Fertilization consisted in the application of a complex $N_{12}P_{56}K_0$ – 150 kg/ha fall under the plough, and ammonium nitrate – 200 kg/ha in spring. The variety was De la Brad.

RESULTS AND DISCUSSIONS

The weeding level, herbicide application before and immediately after harvest were measured in each of the three years of research.

In 2010, the most favourable in terms of rainfall and medium in terms of weeding, compared with the other two years of research, the highest increase production (2.6 q/ha) was recorded in the variant treated with Rival Star 75 GD (Table 1).

Significantly distinct differences in production were recorded in nearly all the variants investigated, except the variant treated with Dicopur D, which recorded the lowest, i.e. statistically significant yield (1.3 q/ha).

In 2011, favourable in terms of precipitation and lowest weeding, in decreasing order, the highest increase production (1.8 q/ha) was recorded in the variant treated with Granstar Super 50 SG (Table 2).

2011 also recorded the highest wheat production out of the three years studied.

The variant treated with Dicopur D provided a significant yield increase of 0.7 q/ha, while all other variants separately provided a distinct significant increase ranging between 2.3 q/ha and 2.6 q/ha.

In the last year studied, 2012 respectively, unfavourable in terms of rainfall and highest weeding level, that the highest increase production (2.2 q/ha) was recorded in the variant treated with Rival Star 75 GD (Table 3).

As in the previous years, an almost similar behaviour of herbicides was recorded.

Thus, the Dicopur D variant achieved a significant yield increase of 1.3 q/ha while in the other variants increases ranging between 1.7 q/ha and 2.2 q/ha were distinctly significant.

In 2012 the lowest wheat productions were recorded, compared with the other years of research.

Concerning the weed species identified at the end of vegetation in the variants treated with herbicides applied in 2012, we have identified the following species: *Cirsium arvense* and *Galium aparine* in the untreated variants and in those treated with Dicopur D; the last species was found in the variant treated with Dicopur Top and *Chenopodium album*, *Polygonum aviculare*, *Polygonum convolvulus* and *Setaria* sp. in the all experimental variants (Table 4).

Weeding decreased in all the experimental variants, with values between 11.1% and 50.0% at the end of vegetation in the experimental variants that were treated with herbicides, compared with the untreated variant.

Table 1. Wheat yield (variety De la Brad) using herbicides applied in 2010

Variants	Dose l (kg)/ha	Yield		Difference (q/ha)	Significance
		q/ha	%		
Untreated	-	45.6	100	-	Witness
Dicopur D	1	46.9	102.9	1.3	*
Dicopur Top 464 SL	1	47.9	105.0	2.3	**
Sekator Progress OD	0.150	48.0	105.3	2.4	**
Rival Star 75 GD	0.020	48.2	105.7	2.6	**
Granstar Super 50 SG	0.040	48.0	105.3	2.4	**
DL 5% = 1.3 q/ha		DL 1% = 2.3 q/ha		DL 0.1% = 2.8 q/ha	

Table 2. Wheat yield (variety De la Brad) using herbicides applied in 2011

Variants	Dose l (kg)/ha	Yield		Difference (q/ha)	Significance
		q/ha	%		
Untreated	-	50.2	100	-	Witness
Dicopur D	1	50.9	101.4	0.7	*
Dicopur Top 464 SL	1	51.6	102.8	1.4	**
Sekator Progress OD	0.150	51.8	103.2	1.6	**
Rival Star 75 GD	0.020	51.9	103.4	1.7	**
Granstar Super 50 SG	0.040	52.0	103.6	1.8	**
DL 5% = 0.7 q/ha		DL 1% = 1.4 q/ha		DL 0.1% = 2.1 q/ha	

Table 3. Wheat yield (variety De la Brad) using herbicides applied in 2012

Variants	Dose l (kg)/ha	Production		Difference (q/ha)	Significance
		q/ha	%		
Untreated	-	34.9	100	-	Witness
Dicopur D	1	36.2	103.7	1.3	*
Dicopur Top 464 SL	1	36.6	104.9	1.7	**
Sekator Progress OD	0.150	36.8	105.4	1.9	**
Rival Star 75 GD	0.020	37.1	106.0	2.2	**
Granstar Super 50 SG	0.040	37.0	106.0	2.1	**
DL 5% = 1.4 q/ha		DL 1% = 1.7 q/ha		DL 0.1% = 2.3 q/ha	

Table 4. Weed species identified at the end of vegetation after herbicides application (no./m^2 – 30.06.2012)

Weed species	Variant					
	Untreated	Dicopur D	Dicopur Top 464 SL	Sekator Progress OD	Rival Star 75 GD	Granstar Super 50 SG
Cirsium arvense	4	4	-	-	-	-
Chenopodium album	20	16	12	4	4	4
Galium aparine	8	8	4	-	-	-
Polygonum aviculare	4	4	-	-	-	-
Polygonum convolvulus	4	4	4	4	4	4
Setaria sp.	32	28	30	30	28	30
Total weeds	72	64	50	38	36	38
Difference (%)	-	11.1	30.5	47.2	50.0	47.2

Setaria sp. was dominant at the end of vegetation because herbicides included no annual monocotyledonous in their weed control range.

Other species were reported after rainfalls and herbicide application.

CONCLUSIONS

Wheat weed control by herbicide application as a sequence in a complex integrated control measures ensures yield increases between 0.7 q/ha and 2.6 q/ha statistically and varies depending on weather conditions.

Research showed that in two out of the three years of research, the variant treated with the herbicide Rival Star 75 GD definitely recorded the highest production.

Our results showed that the most effective treatments were obtained in the variants treated with the herbicides Rival Star 75 GD, Granstar Super 50 SG and Sekator Progress OD.

The variant treated with the herbicide Dicopur D recorded the lowest production.

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