CHEMICAL PROTECTION AGAINST THE WEEDS OF THE WINTER WHEAT IN THE WESTERN PLAIN CONDITIONS

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Abstract

Obtaining high productions with corresponding indexes of quality for bakery, for the agricultural potential of the West area requires the ensurance of a culture technology specific to the fall wheat in which the chemical destruction of the weeds has got a decisive role.

The chemical destruction of the weeds has in view the establishing of the latter composition, the types of predominant weeds: monocotyledonous, annual or evergreen dicotyledonous and the culture's degree of weed infestation.

In order to realize an increased efficiency of the herbicide action some, combined herbicides must be used or some new ones which contain more elements with a large spectrum of destruction.

The study related to the chemical control of the weeds from the winter wheat culture has been done at the agricultural farm from Les-Bihor, on a brown-luvic soil over the period 2010-2012.

Key words: weeds, herbicides, weeding degree, winter wheat

INTRODUCTION

Weeds represent an important factor that reduce the wheat production due to the competition between them and the wheat plants in their fight for water, light and nutritious elements (Ionescu, 2000).

The chemical control of the weeds from the winter wheat culture represents an important step in the culture technology of this species because the weeds greatly compete with the wheat plants' nutrition and as a consequence reduce the production potential(Csep, 2006, 2010).

The chemical control of the weeds must be performed having in view a complex of measures in which the chemical control must be combined with physical, biological, agricultural and sanitary measures: the soil works, ensuring the crop rotation (Popescu at all., 1983, Manoliu et al., 1996).

The efficient destruction of the weeds through chemical treatments, through application of herbicides requires complying with certain requests (Berca, 2001, 2004, Oancea 2005):

- knowing the predominant species of weeds, largely spread in the area;
- knowing the structure and texture of the soil;
- establishing the degree of weed infestation, fact which shall determine the herbicide dose;
- knowing the biology of the weed;

- the weed's development stage correlated with the wheat's development stage;
- establishing the optimum periods to apply the herbicides;
- knowing the features and particularities of the herbicides: selectivity, destruction spectrum, remanence, application technology, etc.

The pedo-climate conditions from the North-West area of the country present a favorable production potential for the winter wheat culture, but at the same time different types of weeds are also present and the latter have got a high degree of infestation for the winter wheat culture, for which they represent a great competition (Blaga et all., 1996).

The damage produced by the weeds, unless they are efficiently destroyed, are between 10 and 20% and they can reach up to 60-80% of the crop (Şarpe et all., 1981).

The utilisation of the herbicides contributes to the direct control of the weeds from the wheat culture, but in different degrees which also determine the production level of the culture (Bîlteanu et all., 2003,Muntean, 2001).

In order to make the application of the herbicides efficient, one must take into account the utilization of some combined herbicides in order to realize a large spectrum of action (Borcean et all., 2006, Soare, 2006).

MATERIAL AND METHODS

The study related to the chemical control of the weeds from the winter wheat culture has been done at the agricultural farm Les-Bihor, on a brown-luvic soil over the period 2010-2012.

The establishment of doses had in view the spectrum of weeds and the applied quantity of solution was of 300 l/water/hectare spread uniformly all over the surface of the field.

The herbicide application period has been established according to the weeds' development stage and to the herbicide's action spectrum.

The analyzed factors were:
- the weeding degree;
- the obtained production increase.

In order to analyse the above mentioned factors, combined and simple herbicides have been used as well as a new type of herbicide, the latter containing three active elements:
- SDMA 600 (salt of dimetylamine 600g/l);
- Buctril Universal (bromoxynil 280g/l+acid 2,4D 280g/l);
- Tomigan 250EC (fluroxypir 250g/l);
- Tomigan 250 EC + SDMA600;
- Sekator Progress OD (iodosulphurone 25g/l+ amidosulphurone 100g/l + meferpyr dietil 250g/l (safener)).

For the analysis of the weeding degree and of the production obtained by applying herbicides, we have used the control variant, on which no herbicides have been used.

The application of herbicides for the control of the dicotyledonous weeds is done in spring when the air temperature is over 10^{o}C, and the weeds are in a stage when they have got 2-4 leaves and the winter wheat is in the interval: tillering stage – until the formation of the first internode.

In order to destroy the monocotyledonous weeds, the application of the herbicides is done in spring when the weeds have grown at about 50 % already before the wheat gets into the tillering stage.

RESULTS AND DISCUSSIONS

The floral structure of the weeds from the wheat culture is varied, being influenced by the pedo-climate conditions, by the participation of the straw cereals in the crop rotation, by the fertilization level, by the level of the applied technologies, by the destruction measures, etc.

For the period 2010-2012 on the brown-luvic type of soil from Les-Bihor, the structure of the weeding is made up of dicotyledonous weeds, the predominat ones being the following: *Cirsium arvense, Matricaria inodora, Thalpsi arvense, Raphanus raphanistrum, etc.,* and from the monocotyledonous weeds the highest frequency belonged to: *Apera spica venti, Agropyron repens*.

The influence of the herbicides on the weeding degree

The control of the weeds from the winter wheat crop through herbiciding follows the reduction of the weeding degree for the wheat already found in the crop, as well as for the coming and future crops (sun flower, sugar cane, corn, etc.). Choosing the herbicides must have in view the monocotyledonous or the dicotyledonous weeds predominant in the crop and their selectivity because their application represents an investment for the years to come.

The herbicides used to destroy the weeds from the winter wheat crop (table 1) have determined the reduction of the total number of weeds/m^2 from 150 weeds/m^2 at the non-treated control variant to 105 weeds/m^2 to the variant where SDMA 600 has been applied, 16 weeds/m^2 through the application of the combined herbicides Tomigan 250 EC + SDMA600, and up to 10 weeds/m^2, for the variant treated with Sekator Progress OD, and obviously the reduction of the total degree of weeding with values between 30% when using the herbicide SDMA 600 and it reaches 94% in case we have used the Sekator Progress OD herbicide.

Table 1

The influence of the herbicides on weeding degree in winter wheat

Variant	Dose	No. of weeds						Differences					
		Total		Dicotyle-donous		Monocoty-ledonous		Total		Dicotyle-donous		Monocotyle-donous	
		weed /m^2	%	wee d/m^2	%	weed /m^2	%	weed /m^2	%	weed /m^2	%	weed /m^2	%
Non-treated - control	-	150	100	45	100	105	100	-	mt	-	mt	-	mt
SDMA 600	1 l/ha	105	70	25	55.5	80	76.2	-45	30	-20	44.5	-25	23.8
Tomigan 250 EC	0.8 l/ha	37	24.6	10	22.2	27	25.7	-113	75.4	-35	77.8	-78	74.3
Tomigan 250 EC + SDMA600	05+ 1 l/ha	16	10.6	4	8.8	12	11.4	-134	89.4	-41	91.2	-93	88.6
Buctril Universal	1 l/ha	25	16.6	8	17.7	17	16.2	-125	83.4	-37	82.3	-88	83.8
Sekator Progress OD	0.15 l/ha	10	6.6	2	4.4	8	7.6	-140	93.4	-43	95.6	-97	92.4

The influence of the herbicides on winter wheat yield

The aim of the research related to the control of the weeds from the winter wheat crop is the utilisation of new herbicides characterized through superior qualities; high efficiency through the appearance of combined herbicides, based on 2-3 active substances, which on the basis of the sinergy existent between them ensure the increase of the control degree; the utilisation of smaller doses for one hectare through the appearance of sulphonyle uraeic herbicides which stop the development of the weed from the first days after it has been applied and which completely destroys the weed in 4-6 weeks after it has been applied as well as the higher flexibility related to the application period.

In comparison with the non-treated variant, the chemical control of the weeds leads to significant increases in the wheat production (table 2). The average increase for the period of three years of study (2010-2012) has been between 410kg/hectare in case of SDMA 600 herbiciding and 1260kg/hectare in case of using the Sekator Progress OD herbicide.

The combined herbicides Tomigan 250 EC + SDMA600 have had a high efficiency in what the control of the weeds was concerned, the destruction degree being of 89.4% in comparison with the non-treated variant and the production increase is of 128%, meaning 950kg/hectare in comparison with the non-treated control variant.

The production increase is relevant in case of using the Sekator Progress OD herbicide, due to its three active components (iodosulphurone 25g/l+amidosulphurone100g/l + meferpyr dietyl 250 g/l), which act on the annual and on the evergreen dicotyledonous weeds as well as on the monocotyledonous weeds. The efficiency of this herbicide manifests through a destruction degree of 93.4% and through a production increase of 136%, meaning 1260 kg/hectare.

Table 2

The influence of the herbicides on winter wheat yield (2010-2012)

No. crt	Variant	Dose l/ha	Degree of control	Annual yield kg/ha			Average yield			Significance
				2010	2011	2012	kg/ha	%	Diffe-rences	
1.	Non-treated	-	mt	3450	3500	3310	3420		-	-
2.	SDMA 600	1 l/ha	30	3840	3900	3750	3830	112	+410	*
3.	Tomigan 250 EC	0,8 l/ha	75.4	4150	4240	3970	4120	120	+700	**
4.	Tomigan 250 EC + SDMA600	05+ 1 l/ha	89.4	4450	4540	4120	4370	128	+950	***
5.	Buctril Universal	1 l/ha	83.4	4280	4350	3970	4200	123	+780	**
6.	Sekator Progress OD	0,15 l/ha	93.4	4750	4930	4360	4680	136	+1260	***

LSD 5%=410.4 LSD 1%=583.18 LSD 0.1%=828

The highest efficiency has been obtained by the sulphonyleureaic herbicide Sekator Progress OD followed by Tomigan 250 EC + SDMA600, Buctril Universal, Tomigan 250 EC and SDMA 600.

CONCLUSIONS

In the pedo-climate conditions of the Western Plain with a production potential favorable for the winter wheat culture, there is a diversity of monocotyledonous and dicotyledonous weeds that can highly infest winter wheat cultures and which represent an important obstacle for the realization of the production level.

The chemical control of the weeds through herbicidation represents an important step in the winter wheat's culture technology related to the control of the weeds specific to this culture and predominant in the Western Plain. This reflects itself in the obtained production increase in comparison with the non-treated variant but which presents pretty large variations according to the type of applied herbicide.

In order to realize an increased efficiency of the herbicidation we must use combined or newer herbicides which contain more elements that have a larger spectrum of control.

Herbicides used for the control of the weeds from the wheat crop have determined the reduction of the total number of weeds/m^2 from 150 weeds/m^2 at the non-treated variant to 16 weeds/m^2 by applying the combined herbicides Tomigan 250 EC + SDMA600 and it reaches 10 weeds/m^2, at the variant treated with Sekator Progress OD, a newer herbicide of sulphonyle ureaic type and as a consequence the weeding degree is significantly reduced with values between 30% when using the SDMA 600 herbicide and 94% in case of using the Sekator Progress OD herbicide.

The chemical control of the weeds leads to obtaining some significant increases of production in what the winter wheat is concerned. The average increase for the period of three years of study (2010-2012) has been between 410kg/hectare in case of using the SDMA 600 herbicide and 1260kg/hectare in case of using the Sekator Progress OD herbicide.

By applying the sulphonyleureaic herbicide Sekator Progress OD we have obtained the highest degree of weed destruction, that is 94% and as a consequence the highest level of production, that is 4680 kg/hectare.

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