

WHEAT PROTECTION AGAINST ANNUAL AND PERENNIAL MONO AND DICOTYLEDONOUS WEEDS IN THE CRISURILOR PLAIN CONDITIONS

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Abstract

In the preluvosoil area the winter-wheat it's infesting in different level in every year. The weight and number of weeds is in correlation with rotation applicated and background used. In the stationary experience with crop rotation (mode in 1983), in the wheat monoculture and in rotation of two years in the floristical structure predominant are annual monocotyledonous weeds (Apera) with weight between 66 - 79%, and in the rotation of three and four years predominant are dicotyledonous weeds (74 - 80%). The practicing of this rotations contribute to the decreasing of wheat infestation with 35 - 45% in the rotation of two years, with 90 - 91% in the rotation of four years, and with infestation Apera spica venti from 47-51% to 98%. Using of specific herbicides in the control of weeds is necessary every year in the monoculture and in the rotation of two or three years and once to two and three years in the rotation of four years.

Key words: annual and perennial weeds, mono and dicotyledonous weeds, wheat

INTRODUCTION

The successive of crops and typical technologies of every crop as part of a crop rotation it influenced the different level of infestation. The participation of wheat crop as part of the crop rotation had a strong influence on weeds development. The applications of fertilizers especially that with nitrogen, contribute to a strong differentiate level of weed infestation, of floristical structure and of resistance of crop in the struggle with weeds.

In this paper is presented the infestation of wheat crop with weeds in different crop rotation and chemical control of annual and perennial mono and dicotyledonous weeds.

MATERIAL AND METHOD

The researches carried out in the stationary long term experience at SCDA Oradea (set up in 1983) on a preluvosoil with humus content by 2,32 %, clay content by 32.5 % and pH (H₂O) 5,5. was studied the infestation with weeds of wheat and floristical structure in comparison with wheat in monoculture the influence of three type of crop rotation: wheat – maize; pea

– wheat - maize; pea – wheat – maize - maize and three level of fertilization: N_0P_0 , $N_{120}P_{80}$, $N_{100}P_{80}$, manure (in different rates: 10 t/ha applicated annual at wheat, 20 t/ha applicated at two years on maize in the rotation of two years, 30t/ha at maize in rotation of four year). The establishing of level of infestation and the floristically structure was made at the end of spring, in the earlier stage of development and before harvesting, by numbering and gravimetrical methods (was estimated the dominated weeds with a weight > 60%).

The efficacy and selectivity of herbicides was determined by EWRS scale.

Work over and results interpretation was made through variation analysis method.

RESULTS AND DISCUSSION

The long influence of crop rotation and fertilizer on floristical composition of wheat infestation.

In the monoculture of wheat had a specific infestation with dicotyledonous weeds like: *Matricaria*, *Raphanus*, *Chenopodium*, *Polygonum*, *Cirsium*, *Stellaria* and monocotyledonous wheat like *Apera*.

Along the analyzed period (2003-2005) a higher level of infestation is registered in wheat monoculture with a total number of weeds by 253/m² at unfertilized wheat, 286 weeds/m² on the $N_{120}P_{80}$ background, respectively 313 weeds/m² on organo-mineral background, with weight of *Apera* specie between 77-79 %. The dominated dicotyledonous weeds are: *Matricaria*, *Raphanus*, *Chenopodium*, *Polygonum*, *Cirsium*, *Stellaria*.(table 1).

In the rotation of two years wheat-maize total number of weeds is decreasing in comparison with monoculture by 1,6 times and was registered the lowest value in the unfertilized variant 140 weeds/m², and bigger one by 188 weeds/m² on the organo-mineral background with $N_{100}P_{80}$ + 20t/ha manure. The weight of *Apera* species was 66 - 70%, depending on background used, respectively 9 - 11%.

The rotation of 3 years, pea-wheat-maize determined a modification of ratio between species, because the dominated weeds are the dicotyledonous weeds with a weight by 75 - 83% and the monocotyledonous weeds are reduced in comparison with monoculture crop with value of 17-25%. The decreasing of total number of weeds in comparison with monoculture is 4,1 times and it's increasing the weight of weeds like: *Matricaria* (21-22%), *Raphanus* (16-17%), *Polygonum* (16-17%).

In crop rotation of 4 years, pea-wheat-maize-maize, the infestation of wheat with weeds is reduced because of dicotyledonous weeds and

annual monocotyledonous weeds, the total number of weeds were between $10/\text{m}^2$ in unfertilized variant and $27/\text{m}^2$ in variant with organo-mineral fertilization. The role of crop rotation is distinguished in the decreasing weight of Apera species which had outrunning 20%. The dominated dicotyledonous weeds are: Matricaria, Raphanus, Polygonum, Chenopodium.

The influence of crop rotation and fertilizers on number of weeds.

The analysis of weeds infestation establishing an increasing of number of weeds in the wheat monoculture, but the phenomenon is noticed in the rotation of two years, wheat-maize.

The number of weeds from wheat monoculture is increasing from the unfertilized variant ($253/\text{m}^2$) to variant with organo-mineral fertilization ($313/\text{m}^2$). In the rotation of two years is reducing number of weeds with 35 – 40%. The number of Apera spica venti in comparison with monoculture is reducing with 47-51%. (Table 2)

The rotations of three and four years had the most important role in decreasing of total infestation the three background with values between 74-77%, respectively 90-96%.

The influence of crop rotation of fertilizers and herbicides on weeds control and wheat yield.

In the case of preluvosoil from north-western part of the country, at once with the increasing of wheat weight in crop rotations, with monoculture practicing and of cereals agriculture, with short rotations, was selected in the wheat crop specific weeds, dominated especially by annual monocotyledonous weeds, in this case, Apera spica venti.

Table 1

Floristical structure of weeds (%) from wheat crop cultivated in different rotations, Oradea 2003 - 2005

Weeds	Wheat monocrop			Wheat - maize			Pea - wheat - maize			Pea - wheat – maize - maize		
	N ₀ P ₀	N ₁₀₀ P ₈₀	N ₁₀₀ P ₈₀ + 10 t/ha*	N ₀ P ₀	N ₁₀₀ P ₈₀	N ₁₀₀ P ₈₀ + 20 t/ha*	N ₀ P ₀	N ₁₀₀ P ₈₀	N ₁₀₀ P ₈₀ + 30 t/ha*	N ₀ P ₀	N ₁₀₀ P ₈₀	N ₁₀₀ P ₈₀ + 40 t/ha*
Apera	79	74	79	70	66	68	25	19	21	20	18	19
Matricaria	7	8	7	11	9	11	22	21	22	30	21	21
Raphanus	4	5	4	6	6	6	17	16	17	20	18	15
Chenopodium	3	3	2	3	5	5	12	12	8	10	11	11
Polygonum	4	6	5	6	8	7	17	17	17	20	18	19
Cirsium	2	3	2	4	4	3	5	11	10	9	13	11
Other species	1	1	1	0	2	0	2	4	5	1	1	4

Table 2.

Influence of the crop rotation and fertilization on number of weeds in wheat from preluvo soil, Oradea 2003 – 2005

Crop rotation	Background	Number of weeds/m ²			% decrease vs. monocrop		
		Total	APESP	DA+DP	Total	APESP	DA+DP
Wheat monocrop	N ₀ P ₀	253	199	54	100	100	100
	N ₁₂₀ P ₈₀	286	211	75	100	100	100
	N ₁₀₀ P ₈₀ + 10 t/ha *	313	243	70	100	100	100
Wheat - maize	N ₀ P ₀	140	98	42	45	51	22
	N ₁₂₀ P ₈₀	185	125	60	35	49	20
	N ₁₀₀ P ₈₀ + 20 t/ha *	188	129	59	40	47	16
Pea - wheat - maize	N ₀ P ₀	58	14	44	77	93	19
	N ₁₂₀ P ₈₀	75	14	61	74	93	19
	N ₁₀₀ P ₈₀ + 30 t/ha *	77	16	61	75	93	13
Pea - wheat – maize - maize	N ₀ P ₀	10	3	7	96	98	87
	N ₁₂₀ P ₈₀	28	5	23	90	98	69
	N ₁₀₀ P ₈₀ + 40 t/ha *	27	5	22	91	98	69

* Manure; DA – annual dicotyledonous weeds; DP – perennial dicotyledonous weeds

To contribute at decreasing of negative effect of monoculture and of rotations of two or three years regarding to wheat infestation is necessary the utilization of specific herbicides (for the *Apera spica venti* control) in the same time with the control of annual and perennial dicotyledonous weeds.

Was used the following herbicides: Puma Super (Fenoxapropil-etil 75g/l), Assert (Imazabeta-benz 250g/l) and Attribut 70 WG, (Propoxycarbazan 70%) in association with Glean 75 DF (Clorsulfuron 750g/kg), Rival Super Star (37,5% triberuron + 37,5% Clorsulfuron), Oltisan M (100g/l dicamba + 325 g/l 2,4 D ester).

The herbicides, the rates and the application time are presented in table 3. The herbicides applicated was selective for the wheat from Dropia variety (EWRS note-1,0). The result obtained regarding to the control of annual and perennial dicotyledonous weeds and annual monocotyledonous weeds (*Apera*) realizing that the applicated treatments had a efficacy over 90%. The best degree of control was realized using herbicides like Puma Super + Glean (96-98%) followed by Assert + Rival Super Star (95 - 96%), respective by Attribut + Oltisan M.

Regarding of obtained yield, in the wheat monoculture, the herbicides brings on yield gain by 15 - 17%, in the rotation of two years 12 - 13%, and in crop rotation of three years and four years de yield gains are of 9 – 10% and 4 – 5% respectively due positive effect of the crop rotation on weeding.

Table 3.

Influence of the herbicides use on yield wheat from different crop rotation in the conditions of preluvosoil, Oradea 203 - 2005
LSD 5% = 211 kg/ha; LSD 1% = 298 kg/ha; LSD 0.1% = 376 kg/ha

Crop rotation	Herbicides	Rate/ha	Perido of application	Yield		Efficacy %
				Kg/ha	%	
Wheat monocrop	1. Puma super + Glean	0,8 + 20 g	Preem	3020	117	98
	2. Assert + Rival super star	2,0 + 20 g	Preem	2980	115	96
	3. Attribut + Oltisan M	0.100+ 1,0	Preem	2970	115	95
	4. Untreated	-	-	2590	100	0
Wheat – maize	1. Puma super + Glean	0,8 + 20 g	Preem	3860	112	96
	2. Assert + Rival super star	2,0 + 20 g	Preem	3900	113	95
	3. Attribut + Oltisan M	0.100 + 1,0	Preem	3850	112	94
	4. Untreated	-	-	3440	100	0
Pea – wheat – maize	1. Puma super + Glean	0,8 + 20 g	Preem	4400	110	98
	2. Assert + Rival super star	2,0 + 20 g	Preem	4380	109	95
	3. Attribut + Oltisan M	0.100 + 1,0	Preem	4400	110	96
	4. Untreated	-	-	4010	100	0
Pea – wheat – maize – maize	1. Puma super + Glean	0,8 + 20 g	Preem	4140	105	98
	2. Assert + Rival super star	2,0 + 20 g	Preem	4130	105	96
	3. Attribut + Oltisan M	0.100+1,0	Preem	4090	104	95
	4. Untreated	-	-	3930	100	0

CONCLUSIONS

- The weight and number of weeds from wheat crop is in correlation with the rotation practiced and background used.
- In the wheat monoculture and in the rotation of two years on three background used, the weight in the floristical structure is taken by Apera species (66 - 79%) and in the rotation of three and four years by dicotyledonous weeds (74 - 80%).
- The total number of weeds is decreasing in the rotation of two years in comparison with monoculture, with values between 35 - 45%, in the rotation of three years with value between 74 - 77% and in the rotation of four years with values between 90 - 91%.
- The decreasing of herbicides for the control of monocotyledonous weeds (Puma S, Attribut, Assert), in association with anti dicotyledonous, is necessary in every years in the wheat monoculture and brings yield gain by 14-17%, in the rotation of two year da in by 12 - 13% and in the rotation of three years by 8-10%. In the rotation of three years is necessary the application of herbicides once to 3 - 4 years in correlation with climatic conditions favorable for infestation.

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