THE INFLUENCE OF CROP ROTATION, FERTILISATION LEVEL AND HERBICIDES ON SEVERAL PRODUCTIVITY ELEMENTS IN WINTER WHEAT CULTIVATED ON LUVOSOILS, IN CRIŞURILOR PLAIN

ArdeleanIleana, Bandici Gheorghe, Domuţa Cornel, Lazăr Andra Nicoleta

[*] *University of Oradea, Faculty of Environmental Protection, 26 General Magheru St., 410048 Oradea,Romania, e-mail: gbandici@yahoo.com*

Abstract

The crop rotation is a decisive factor influencing growth and development of wheat. The role of forerunner plant on wheat growth and development is stressed out by several authors:Popescu (1980).The choice of an appropriate crop rotation, plant-legumes, for instance maintains a normal C/N ratio of 40-70 (assimilative C versus assimilative N – (Popescu,1980). Bacterial N fixation in soil and a normal C/N ratio are conditions that confer to the forerunner plant ameliorative properties.

Key words: crop rotation, fertilisation level, herbicides, productivity elements, winter wheat

INTRODUCTION

Crop rotation together with other appropriate agricultural practices contribute to the favourableness of growth and development conditions of wheat root system, to an improved synthesis of specific organic compounds and their improved translocation to plant's organs (Lazany, 2000; 2003; Bandici, 1997; 2001).

Finally, all the enumerated conditions lead to improved efficiency per area unit (Bîlteanu, 1993).

Productivity elements which permit to justify yield differences between averages of research years (Zăhan, Zăhan, 1989). Thus, main productivity element, was the number of ears/m^2 that influenced very significantly the yield level and at a lesser extent the rest of studied productivity elements (Zamfirescu, 1977; Dincă, 1982).

MATERIAL AND METHODS

During 2004-2006, at S.C.D.A. Oradea, was set up a multifactorial experiment (the subdivided stand's method) on a substrate of brown luvic soil. Climatic conditions we favourable during 1996 and marked by drought during 1997, productivity elements was assessed differentially for forerunner plant under different climatic conditions.

The utilised wheat race was DELIA and the production was expressed as g. of q/ha. The results of comparisons were analysed with ANOVA (analysis of variance).

RESULTS AND DISCUSSION

Tables 1 and 2 present several productivity elements which permit to justify yield differences between averages of research years. Thus, main productivity element, was the number of ears/m^2 that influenced very significantly the yield level and at a lesser extent the rest of studied productivity elements.

We present several data in order to illustrate later affirmation concerning the influence of the crop rotation plant and created agrofund on yield level in ears'number/m^2 (table 1).

Thus, in wheat monoculture this productivity element reached 260 ears/m^2 in wheat monoculture and between 358-491 ears/m^2 in crop rotations, in created agrofund as compared to unfertilized alternative, 354 ears/m^2. Mineral fertilization determined an increment between 401-425 ears/m^2.

An important contribution in productivity level played the number of grains/ear that increased from 31 in wheat monoculture to 40 grains/ear in fertilized alternatives, both mineral and mixed. Concerning the weeding, the most important role played MMB that influenced positively the yield level as depending on herbicide type and combination.

Table 2 shows the role of investigated factors on weeding level of wheat crop, an important issue as referred to biological or chemical control of weeds. It is a remarkable fact, the crop rotation causes reduction of weeds/m^2 as judged with reference to factors that favor weed infestation which determine, due to their rapacity, to the compromise of plants' development and growth.

Data from table 2 show a great number of weeds in wheat monoculture, 158 weeds/m^2, and a significant decrease in 4year. crop rotation (12 weds/m^2). Concerning created agrofund one must remark that compared to unfertilized alternative, the number of weeds increases after fertilization reaching values that are superior to blank alternative with 11.4-40.9%.

Certainly, if one considers only weeds level, may conclude that fertilization increases weeding and decreases crop level. The stimulation determined by fertilization in productivity elements, induces a raise in yields.

Applied herbicides alone or in combinations of different ratios, under experimental conditions may reduce weeds' level from 100% in alternatives with no herbicides to 22.8-47.0% concerning weeds' level/m^2.

Table 1

The influence of.factors: crop rotation plant, fertilisation level and herbicides on several productivity elements in winter wheat cultivated on luvosoils, Oradea 2004 – 2006

Investigated factor	Productivity elements							
	ears / m^2		grains / spic		MMB		M.H.	
	no.	%	no.	%	g	%	kg	%
a.Crop rotation plant								
Wheat monoculture (Mt.)	260	100	37	100	33.9	100	71.5	100
2 years crop rotation (W-C)	358	137.6	36	97.3	35.2	103.8	72.4	101.2
3 years crop rotation (P-W-C)	473	181.9	37	100	35.2	103.8	72.7	101.7
4 years crop rotation (P-W-C-C)	491	188.8	36	97.3	34.4	101.5	72.6	101.5
b. Fertilisation level								
N_0P_0 (Mt.)	354	100	31	100	38.2	100	72.8	100
$N_{120}P_{80}$	401	113.3	40	129	34.3	89.8	72.1	99.0
$N_{100}P_{80}$ + 10 t/ha manure	425	120.0	40	129	34.8	91.1	71.8	98.6
c.Weeding								
No herbicidest (Mt.)	438	100	36	100	33.8	100	71.9	100
Arelon super 2l/ha	395	90.2	38	105.5	35.4	104.7	72.3	100.5
Assert + Icedin super 2.5+1 l/ha	364	83.1	36	100	34.8	102.9	72.0	100.1
Puma super + Icedin super 1+1 l/ha	376	85.8	36	100	34.9	103.2	72.7	101.1

Table 2

The influence of.factors: crop rotation plant, fertilisation level and herbicides on plant development, weeds' level and grains wilt in winter wheat cultivated on luvosoils, Oradea 2004- 2006

Investigated factor	Plant'development				Wilting level (%) :				weeds	
	height		ears'length		No. grains/ ear		grains weight/ eart		No / m^2	%
	cm	%	cm	%	nr.	%	g	%		
a. Crop rotation plant										
Wheat monoculture (Mt.)	65.6	100	7.2	100	9.3	100	0.7	100	158	100
2 years crop rotation (W-C)	67.1	102.3	6.9	95.8	9.3	100	0.7	100.0	36	22.8
3 years crop rotation (P-W-C)	71.0	108.2	7.4	102.8	6.7	72.0	0.7	100.0	23	14.5
4 years crop rotation (P-W-C-C)	73.0	111.3	7.5	104.2	9.2	98.9	0.9	128.6	12	7.6
b. Fertilisation level										
N_0P_0 (Mt.)	61.0	100	6.6	100	6.0	100	0.6	100	44	100
$N_{120}P_{80}$	71.3	116.9	7.4	121.1	7.1	118.3	0.7	117.7	62	140.9
$N_{100}P_{80}$ + 10 t/ha manure	52.3	85.7	7.8	118.2	7.3	121.7	0.8	133.3	49	111.4
c. Weeding										
No herbicides (Mt.)	72.0	100	7.1	100	1.4	100	0.5	100	119	100
Arelon super 2 l/ha	72.5	100.7	7.5	105.6	20.1	193.3	0.9	180.0	41	34.4
Assert + Icedin super 2.5+1 l/ha	72.5	100.7	7.4	104.2	15.3	147.1	0.6	120.0	56	47.0
Puma super + Icedin super 1+1 l/ha	75.2	100.7	7.4	104.2	17.1	164.4	0.5	100.0	27	22.8

CONCLUSION

Certainly, if one considers only weeds level, may conclude that fertilization increases weeding and decreases crop level. The stimulation determined by fertilization in productivity elements, induces a raise in yields.

Applied herbicides alone or in combinations of different ratios, under experimental conditions may reduce weeds' level from 100% in alternatives with no herbicides to 22.8-47.0% concerning weeds' level/m^2.

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