THE INFLUENCE OF THE CROP ROTATION AND OF THE FERTILIZATION LEVEL ON THE NUMBER OF THE SIBLINGS AND ON THE NUMBER OF SPIKES IN WINTER WHEAT ON THE PRELUVOSOIL FROM ORADEA CONDITIONS

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Abstract

The growth of the number of harvestable spikes to at least 600 pe m^2, is not determined only by the density per m^2, but also by the ensuring of all phytotechnical measures, starting with crop rotation and going on with the preparation of the soil and the respecting of the period of seeding, to which we must add a proper fertilization of the soil.

The density per hectare of wheat spikes represents an important element of produciton. The large number of spikes, a premise for a high production, must be obtained from more less twinned plants, than from less plants, but with a larger number of siblings. Under normal vegetation conditions of autumn wheat are formed 1,5-2, more rarely 3 or more siblings.

Key words: crop rotation, regime nutrition, sibilings, spikes, phenophase, grains.

INTRODUCTION

Productivity elements permit the justification of yield differences between the average of the researched years. Thus, the main productivity element was the number of spike/m^2 that significantly influenced the yield level and at a lesser extent the rest of the studied productivity elements (Domuța, 2008).

10-12 days after sprouting, the growth in length of the strain of the wheat stops, and in the soil near the surface *the twinning knot* is formed, of which new shoots emerge, that are named *siblings*, and the vegetation stage, when these shoots are formed – *twinning* (Bandici, 1997).

Besides the fact that of it are formed new shoots, of the *twinning knot* are formed many coronary, adventives, fasciculate roots, much longer and very branched. The wheat species with a powerfully developed radicular system have proved to be more productive and more resistant to drought than the species with a more reduced radicular system (Bandici, Guş, 2001; Dincă, 1982).

The shoots that are formed of the *twinning knot* have their own individuality, forming other knots of which new siblings and new coronary roots emerge (Bîlteanu, 1993).

The twinning of the wheat plants continues until the drop in temperature under 5^{0}C; the plants can form siblings also during winter, even during spring if the temperatures are higher, but the later do not reach fructification if they do not form early (Soltner, 1990; Domuța, Bandici, 2007).

The number of siblings that a plant can form represents *the twinning capacity*, that is an hereditary feature, but that varies a lot with the vegetation conditions and on which the size of the grain, the earlier period of seeding, the nutrition regime of the plants, the nutrition space act positively, etc. (Pârjol, Picu, 1977; Zamfirescu, 1977).

The twinning of the plants is stimulated by the optimum moisture as well as by the presence in proper quantities and proportions of nourishing elements, especially nitrogen and phosphorus (Lazany, 2000; Lazany, 2003).

It is not desirable that a plant forms many siblings, because not all fructificate, and the non-productive siblings consume water and nourishing substances (Zăhan, 1989b).

The twinning capacity of the plants does not represent an important element of productivity. Through twinning, the plants can make up for some gaps that would form in the fields, securing a proper density of harvestable spikes. The density of the plants of autumn wheat is determined at maturity by the number of spikes per m^2 (Zăhan, 1989a; Salisbury, Ross, 1995).

MATERIAL AND METHODS

At Agricultural Research and Development Station Oradea, on a brown luvic soil, in the period 2011-2012, an experiment was carried out regarding the influence of rotation, of the mineral and organic-mineral nutrition regime on the number of siblings/10 plants, of the number of spikes/10 plants, of the number of spikes/m^2 and of the number of grains in a spike. The experiment was carried out on the species of autumn wheat Delia. The research method that was used was the counting of the siblings, of the spikes and of the grains.

RESULTS AND DISCUSSION

Analysing the data in table 1, we notice the fact that both the rotation, and the nutrition regime have influenced the number of siblings resulting for 10 plants. Thus, if in the monoculture 14 siblings/10 plants were obtained, in the case of the crop rotation of 2 years (W-M), the number of siblings has increased to 18, and in the case of the crop rotation of 3 and respectively 4 years, the number of siblings was of 22 in the case of the crop rotation of 3 years (precursory to wheat, peas) and respectively of 20 siblings/10 plants in the case of the crop rotation of 4 years – precursory to wheat being also peas.

Regarding the influence of the nutrition regime on the number of siblings, we notice that compared to the unfertilized variant (16 siblings/10 plants), mineral and organic-mineral fertilization bring a growth of the number of siblings (19 and 21, respectively).

Table 1

The influence of crop rotation and nutrition regime on the number of siblings and spikes/10 plants, on brown luvic soils (Oradea 2011-2012)

Investigated factor	Number siblings/ 10 plants	%	Number spikes/ 10 plants	%
a. Rotation				
Monoculture (Control)	14	100	13	100
Crop rotation 2 years (W-M)	18	128	15	115
Crop rotation 3 years (P-W-M)	22	157	18	138
Crop rotation 4 years (P-W-M-M)	20	143	17	131
b. Fertilisation level				
N_0P_0	16	100	15	100
$N_{120}P_{80}$	19	119	17	113
$N_{100}P_{80}$+10 t/ha #	21	131	18	120

Regarding the influence of the precursory plant and of the fertilization level on the number of siblings per phenophases (table 2), we notice the fact that, if at the beginning of winter there is a number of 14 siblings/10 plants (1.4 siblings per plant), at the end of winter, the number of siblings was of 1,6/plant and of 2.2 siblings/plant for the elongation of the straw.

From the data of the same table it results that the number of spikes at the formation of spike, was of 21 siblings/10 plants, and at full maturation there is a number of 12 siblings/10 plants (1.2 siblings/plant).

Table 2

The influence of crop rotation and nutrition regime on the number of siblings and spikes on phenophases of autumn wheat, cultivated on brown luvic soils (Oradea 2011-2012)

Phenophase	Number siblings/ 10 plants	Number spikes/ 10 plants
At winter beginning	14	-
At the end of winter	16	-
Beginning of the vegetation	18	-
Formation of the first interned	21	-
Elongation of the straw	22	-
The formation of spike	-	21
Beginning of the formation of the grains	-	20
Maturation in milk	-	17
Maturation in ripening	-	15
Full maturation	-	12

From the data in table 3 results the influence of the precursory plant and of the created fertilization level on the level of the harvests from the point of view of the number of spikes/m^2. Thus, if in the monoculture of wheat this element of productivity was numbered at 260 spikes/m^2, in the investigated rotations (crop rotation of 2, 3, 4 years) has varied between 358-491 spikes/m^2.

In the case of the created fertilization level, compared to the unfertilized one with a number of 354 spikes/m^2, mineral or organic-mineral fertilization determined a growth between 401-425 spikes/m^2.

Table 3

The influence of crop rotation and nutrition regime on some elements of productivity of autumn wheat cultivated on brown luvic soils (Oradea 2011-2012)

Investigated factor	Spikes/m^2	%	Grains/ spike	%
a. Rotation				
Monoculture (Control)	260	100	34	100
Crop rot. 2 years (W-M)	358	138	36	106
Crop rot. 3 years (P-W-M)	473	182	38	112
Crop rot. 4 years (P-W-M-M)	491	189	36	106
b. Fertilization level				
N_0P_0	354	100	31	100
$N_{120}P_{80}$	401	113	38	123
$N_{100}P_{80}$+10 t/ha #	425	120	40	129

The number of grains in a spike had a special contribution regarding the level of production, which, compared to the monoculture (34 grains/spike) has increased in the case of the crop rotations of 2, 3 and 4 years to 36-38 grains/spike, and in the case of the fertilization level factor, compared to the unfertilized one (31 grains/spike), the number of grains has increased in the variant with mineral and organic-mineral fertilization to 38 and 40 grains/spike, respectively.

CONCLUSIONS

We consider that the present short presentation of the data illustrates the participation of all plant's components at the realisation of biomass, most of it belonging to the number of spikes/m^2 and to the number of grains in a spike.

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