

ASSESSMENT OF THE QUANTITATIVE AND QUALITATIVE YIELD OF THE WINTER WHEAT VARIETY „MELEAG” IN POLYFACTORIAL FIELD EXPERIMENTS

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Abstract

In polyfactorial field experiments, under the effect of three factors, the common winter wheat variety „Meleag” provided a statistically significant positive increase of +1418.3 kg/ha the LD being 146.0 kg after the forerunner sunflower compared to the forerunner grain maize, after which the caryopses yield constituted 3161.3 kg. Performing drilling on acceptable and late sowing dates at different sowing densities did not provide any increase in the yield compared to the recommended sowing dates for common winter wheat. Statistical processing of caryopses quality did not show a significant positive increase in the studied variants.

Key words: Common winter wheat, forerunner, yield, sowing dates, sowing density

Climate changes over the past decade, which significantly affected the growth and development of autumn cereals, determined the scientists in this field to study thoroughly the technological elements of winter wheat cultivation in order to mitigate the adverse effects of water and heat stress. For these reasons, we decided to study the influence of forerunners, sowing dates and densities on the productivity level of the local winter wheat variety “Meleag”.

MATERIAL AND METHODS

In the polyfactorial field experiments, it was studied the winter wheat variety “Meleag”, which was created at the Field Research Institute „Selectia”. This variety belongs to erythrosperrum step type varieties. Drilling was performed after the forerunners grain maize and sunflower (Factor A), on the recommended, acceptable and late sowing dates (Factor B), at the sowing density of 3, 5, 6, 7 and 8 million of viable seeds per hectare (Factor C) on a typical low humiferous chernozem with ahumus content of 3.07 - 3.52% in the arable layer. Cation exchange capacity in the same layer constitutes 25.1 - 30.4 meq/100 g of soil. Ca²⁺ cations predominate considerably over Mg²⁺ cations in the proportion of 10 - 6: 1. The carbonates occur at a depth of 30-50 cm in small amounts of 1.4-1.2%. The reaction of the soil solution in the arable layer is neutral (pH 6.9 - 7.3).

The experiment was carried out using the randomized block design in 4 repetitions (3

repetitions to determine the yield and the 4th repetition was performed for phenological observations and biometric measurements.) Plot area was of 25 m².

RESULTS AND DISCUSSIONS

As a result of studying the yield level of “Meleag” variety in the polyfactorial field experiments, it was recorded a statistically significant positive increase in the yield, which was obtained after the forerunner sunflower +1418.3 kg/ha, the LD being off 146.0 kg compared to the forerunner grain maize, where caryopses yield was of 3161.3 kg. Under the conditions of the agricultural year 2016-2017, increasing sowing density up to 8 million viable seeds per hectare as well as the sowing of 3 million viable seeds per hectare on different sowing dates did not provide a production increase compared to the control variant – 5 million viable seeds per ha.

Protein content in the grains of the common winter wheat variety „Meleag” ranged from 10.9% to 13.3% with an average of 12% after the forerunner grain maize and 10.4% -12.9% with an average of 11.5% after the forerunner sunflower. Protein content in the caryopses of „Meleag” variety was by

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0.5% higher after the forerunner grain maize compared to the forerunner sunflower.

Gluten content ranged from 19.2% to 25.1% with an average of 22.4% after the forerunner sunflower, while after the forerunner grain maize, gluten content constituted 20.3% - 25.1% the average being

of 23.0%. The highest gluten content - 25.1% - was obtained after the grain maize sown on acceptable sowing dates at the density of 3 million viable seeds per hectare and after the forerunner sunflower at the density of 7 million viable seeds per hectare.

Table 1

Yield of the winter wheat variety „Meleag” in polyfactorial field experiments, kg/ha

Sowing density. mil./ha – Factor „C”	Forerunner crop – Factor „A”						Average per Factor „C” LD ₀₅ = 230.9 kg	± compared to the Control
	Grain maize (Control)			Sunflower				
	Sowing dates - Factor „B”							
	Recommended (Control)	Acceptable	Late	Recommended (Control)	Acceptable	Late		
3	3303.2	3488.3	2914.1	4588.3	4650.7	4038.2	3830.5	-170.9
5 (Control)	3488.3	2914.1	3453.8	5019.5	4917.0	4215.5	4001.4	-
6	3362.5	3538.9	3090.2	4885.6	4771.0	4622.7	4045.2	+43.8
7	2896.1	2979.8	2970.2	4660.5	4581.0	4642.6	3788.4	-213.0
8	3230.8	2918.2	2870.2	4327.4	4468.5	4305.3	3686.7	-314.7
Average per Factor „A”	3161.3			4579.6				
LD ₀₅ A = 146.0 kg	+1418.3							
Average per Factor „B”	3256.2	3167.9	3059.7	4696.3	4677.6	4364.8		
LD ₀₅ B = 178.9 kg		-88.3	-196.5		-18.6	-331.4		
LD ₀₅ of the experiment. kg	565.6							
P %	5.15							

Table 2

Protein content in the caryopses of common winter wheat variety „Meleag”. %

Sowing density. mil./ha – Factor „C”	Forerunner crop – Factor „A”						Average per Factor „C” DL ₀₅ = 2.1%	± compared to Control
	Grain maize (Control)			Sunflower				
	Sowing dates - Factor „B”							
	Recommended (Control)	Acceptable	Late	Recommended (Control)	Acceptable	Late		
3	11.4	11.9	10.9	12.7	11.1	11.4	11.6	-0.2
5 (Control)	10.9	12.7	12.7	12.9	10.4	11.0	11.8	
6	13.3	10.7	12.6	12.1	10.8	12.1	11.9	+0.1
7	12.4	13.3	12.1	11.5	12.0	10.9	12.0	+0.2
8	11.7	11.5	12.0	11.2	11.2	11.7	11.5	-0.3
Average per Factor „A”	12.0			11.5				
LD ₀₅ A = 1.3%	0.5							
Average per Factor „B”	11.9	12.0	12.1	12.1	11.1	11.4		
LD ₀₅ B = 1.6%		+0.1	+0.2		-1.0	-0.7		
LD ₀₅ of the experiment. %	5.2							
P%	1.82							

Table 3

Gluten content in the caryopses of common winter wheat variety „Meleag”. %

Sowing density. mil./ha – Factor „C”	Forerunner crop – Factor „A”						Average per Factor „C” LD ₀₅ = 1.2%	± compared to Control
	Grain maize (Control)			Sunflower				
	Sowing dates - Factor „B”							
	Recommended (Control)	Acceptable	Late	Recommended (Control)	Acceptable	Late		
3	21.8	25.1	21.4	24.1	23.1	20.3	22.6	+0.3
5 (Control)	20.2	24.3	21.3	24.6	22.5	21.1	22.3	
6	24.5	22.1	19.2	23.4	24.3	23.7	22.9	+0.5
7	23.8	21.3	24.6	21.5	25.1	24.1	23.4	+1.1
8	23.2	24.1	19.8	20.9	24.3	22.3	22.4	+0.1
Average per Factor „A”	22.4			23.0				
LD ₀₅ A = 0.8%	+0.6							
Average per Factor „B”	22.7	23.4	21.2	22.9	23.9	22.3		
LD ₀₅ B = 0.9%		+0.7	-2.2		+1.0	-0.6		
LD ₀₅ of the experiment. %	3.0							
P %	1.04							

CONCLUSIONS

Analyzing the influence of the forerunners, sowing dates and densities on the yield level of the common winter wheat variety „Meleag”. it was proved the superiority of the forerunner sunflower after which a yield of 4579.6 kg/ha was obtained compared to the forerunner grain maize when it was recorded a yield of 3161.3 kg/ha or by 1418.3 kg/ha less.

The forerunners, sowing dates and densities did not provide a significant positive increase in the protein and gluten content.

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