

## THE INFLUENCE OF SOIL UPON PRODUCTION OF WINTER WHEAT IN THE REGION OF CAREI, SATU MARE COUNTY

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### **Abstract**

*The present paper aims to analyze the behavior of wheat (*Triticum aestivum*) under varying soils in the region of Carei, Satu Mare county, Romania in the agricultural years, 2017-2018, 2018-2019. The climatic years were excellent due to the fact that sowing was done late in autumn, and the emergence of the plants occurred in early spring, that determined the specific reactions of the wheat varieties, expressed in the productions as well as in morphological characters. The average production of wheat was between 5400-6750 kg/ha.*

**Key words:** winter wheat, soil, production

### **INTRODUCTION**

Wheat is one of the oldest cultivated plants and the most important food plant. Wheat is an important food crop and is by far the most popular cereal in Europe, Romania being among the six important producers.

Wheat flour bread is a basic food for the world's population, representing food for 35-40% of the world's population (Szekely et al., 2010).

Wheat is of great importance as a food, providing much of the carbohydrates and proteins needed to man and more than half of the calories consumed by mankind. The forms under which wheat is used in human food are very diverse, the most widespread being bread, followed by pasta and pastry (Szekely et al., 2010).

Wheat quality is not constant from one year to another, from one field to another, due to variety of varieties (genetic potential) and climate change yearly. Wheat production and quality indices are influenced by technological factors, variety, meteorological conditions and interactions between them (Racz et al., 2013).

Nowadays, not only yield amount but also the quality of the produced grain is important, because the quality of the grains determines their direction of use. That is why farmers are trying to get high grain yields in line with food (accepted for bread baking) quality, while minimize production costs and using environmentally friendly technologies.

Optimal nutrient provision is an important factor to get high yield with grain quality. Nitrogen is one of the most important elements of plant

nutrition, which often to a great extent determines not only wheat yield level, but especially grain baking quality. It is also one of the most mobile plant nutrients in the soil.

## MATERIAL AND METHOD

The present paper aims to analyze the behaviour of eight winter wheat varieties (Glosa, Falado, Akteur, Combin, Sorrial, Exotic, Renan, Lorenzo) in the region of Carei, Satu Mare county, on the basis of a comparative crop test. The observations were made in crop years 2017-2018, 2018-2019, the plot is of 8 ha each type of wheat was sowed on 1 ha in each year of the study the wheat varieties were adapted to the specific climatic conditions with a normal fertilization without excesses.

The experimental soils were: Cambic chernozem, poorly gleissed, rich in humus and with a normal content in total nitrogen, low in phosphorus and mediocre in potassium. The other soil types here a typical clay soil with normal contents of clay and humus, histosol that was rich in organic content, so it was a nutrient rich soil. There were other two types of soil: rendzinas and loam soil that were cultivated in this region. The statistical processing of the production results was made by variance analysis. The variance analysis revealed differences between the eight varieties studied, the different soil types and the climatic conditions having significant effects on the behaviour of studied wheat varieties.

## RESULTS AND DISCUSSION

In the experimental years 2017-2018, 2018-2019, the production differences between the studied varieties were due to a significant extent both to the genetic potential of the varieties and the location conditions the level of fertilization, the level of applied technologies and last but not least the types of soil. Grain weights (production), had a mean variation so there are significant differences between the 8 variants studied.

*Table 1*

Grain yields obtained from the 8 wheat varieties in the years 2017-2018

| Nr. crt | Variant | Type of soil / Production (kg/ha) |          |      |           |      |
|---------|---------|-----------------------------------|----------|------|-----------|------|
|         |         | chernozem                         | histosol | loam | rendzinas | clay |
| 1       | Glosa   | 6750                              | 6010     | 5800 | 6220      | 5710 |
| 2       | Falado  | 6420                              | 5750     | 5650 | 6110      | 5680 |
| 3       | Akteur  | 6310                              | 5600     | 5570 | 6070      | 5590 |
| 4       | Combin  | 6580                              | 5930     | 5640 | 6120      | 5670 |
| 5       | Sorrial | 6120                              | 5590     | 5510 | 5970      | 5400 |
| 6       | Exotic  | 6230                              | 5840     | 5620 | 5850      | 5450 |
| 7       | Renan   | 6270                              | 5760     | 5490 | 5910      | 5550 |
| 8       | Lorenzo | 6360                              | 5590     | 5580 | 5980      | 5610 |

Analyzing the efficacy of typical chernozem, we obtained the highest efficacy, this was followed by histosol, loam soil, rendzinas and clay soil.

So the wheat crops are linked to all these mentioned before.

From Table 1 where we analyzed the influence and Table 2 of soil types over the wheat production, it was found that significant differences were achieved on typical chernozem in comparison with the other soil types.

Table 2

Grain yields obtained from the 8 wheat varieties in the years 2018-2019

| Nr. crt | Variant   | Type of soil / Production (kg/ha) |          |      |           |      |
|---------|-----------|-----------------------------------|----------|------|-----------|------|
|         |           | chernozem                         | histosol | loam | rendzinas | clay |
| 1       | Glosa     | 6650                              | 6000     | 5700 | 6120      | 5610 |
| 2       | Falado    | 6310                              | 5650     | 5550 | 6200      | 5560 |
| 3       | Akteur    | 6220                              | 5400     | 5400 | 5910      | 5490 |
| 4       | Combin    | 6480                              | 5730     | 5540 | 6010      | 5590 |
| 5       | Sorrial   | 6020                              | 5490     | 5410 | 5730      | 5410 |
| 6       | Exotic    | 6130                              | 5740     | 5570 | 5580      | 5410 |
| 7       | Renan     | 6160                              | 5560     | 5410 | 5670      | 5440 |
| 8       | Laurenzio | 6220                              | 5490     | 5430 | 5710      | 5520 |

Regarding the production results on each studied type of soil, significant production increases were obtained in the variant Glosa on chernozem soil and there is also a slight difference in production on the other soil types. The prospective line of winter wheat oscillated between 6650 kg/ha in the Glosa perspective wheat variety and Exotic perspective wheat variety.

From the all soil types, the best efficacy was obtained by Glosa on cambic chernozem soil followed by the other types as you can see in the tables.

## CONCLUSIONS

In the agricultural year 2017-2018, 2018-2019, climatically exceptional, the sowing took place in late autumn, late November and the emergence of the plants was made in early spring, which determined the specific reactions of the wheat varieties, expressed in the produced production, as well as morphological characters.

Research was carried out on five soil types in wheat crops. The experiments were located in Satu-Mare county, Carei region on a basis of comparative crop test.

The varieties under study differently reacted to the environmental conditions, the climatic conditions and the types of soil they were sown in each year of the study.

Results show a very significant yield increase of certain types of wheat (Glosa and Combin) in some types of soils and also the favourable climatic conditions of these two years.

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