

# **ANALYSIS OF THE INFLUENCE OF GENOTYPE, SOIL TYPE AND CROP YEAR FACTORS ON THE PRODUCTION AND QUALITY OF THE SPRING BARLEY HARVEST**

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**Keywords:** *spring barley, yield, quality indices*

## **ABSTRACT**

*This paper proposes an analysis of the influence of genotype, soil type, crop year and the interaction between these factors on the yield and on the main quality indices of spring barley. The research was conducted on four spring barley varieties (Annabell, Thuringia, Cristalia and Tunika) grown on two soil types (typical chernozem and calcaric aluviosoil) in the Vădeni area, Brăila County, in 2008-2010.*

## **INTRODUCTION**

The quality of barley as raw material for the malt and beer industry is determined by genetic (variety of barley) and pedoclimatic (weather, soil) factors and by elements regarding the growing technology, such as: crop rotation, fertilization, soil works, and the phytotechnical and technological elements of sowing, maintaining and harvesting of this species.

Knowing the contribution of genotype and environmental conditions (soil conditions and weather conditions), and especially the contribution of interactions between these factors in achieving quantitative phenotypic traits, is of particular importance for finding the most valuable varieties of barley that can be grown in a certain geographic area (1).

## **MATERIAL AND METHOD**

The research was conducted between 2008-2010 in Vădeni area, Braila county, on four varieties of spring barley (Annabell, Thuringia, Cristalia and Tunika) grown on two different soil types (typical chernozem and calcaric aluviosoil).

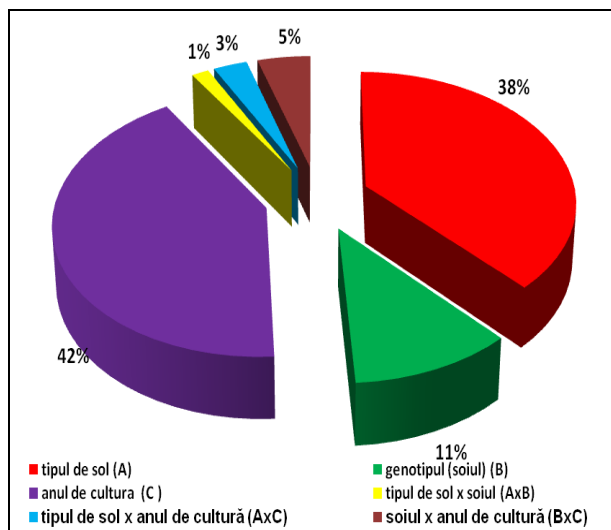
Following to the specific objectives of this paper, we studied the influence of the pedological factor (soil type), the genotype factor (variety) and the climatic conditions, and also the interactions between the three studied factors on the yield and quality indices of the grains of spring barley.

To illustrate suggestively the complex influence of the studied factors and of their interactions on the production and the analyzed quality indices, we performed with the help of variance analysis (3), an estimate of the percentage share of each element involved in the making of the phenotypic expression of a certain attribute.

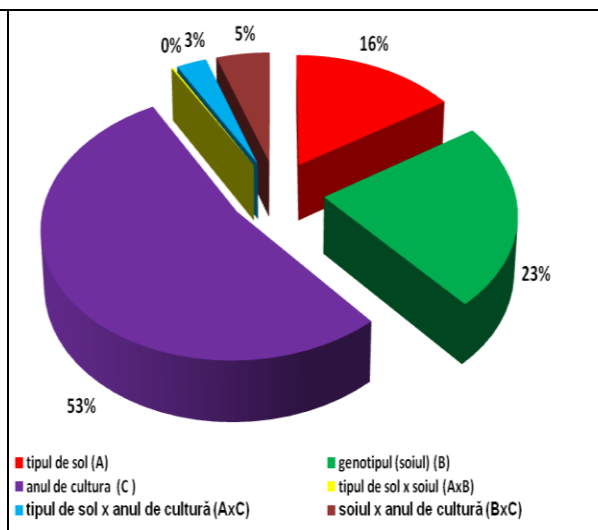
## **RESULTS AND DISCUSSIONS**

The analysis of the variance permitted the establishment of the percentage share of the three studied factors (soil type, variety, crop year) and their interactions in regard to the yield and the main quality indices of the spring barley grown in Vădeni area, Braila county, in 2008-2010.

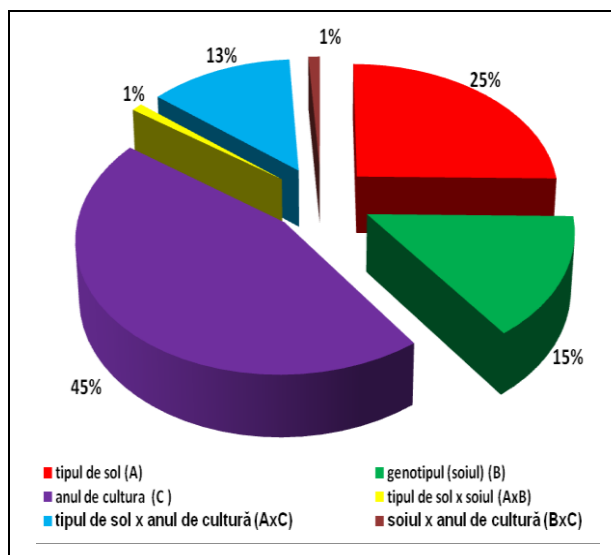
*The participation quotient of the soil conditions, has influenced in a similar proportion the assortment (16%) (figure 2), the hectolitr mass (19%) (figure 4) and the starch content (17%) (figure 5) and in a higher proportion the protein content (23%) (figure 6), the mass of 1000 grains (MMB) (25%) (figure 3) and the yield (38%) (figure 1).*



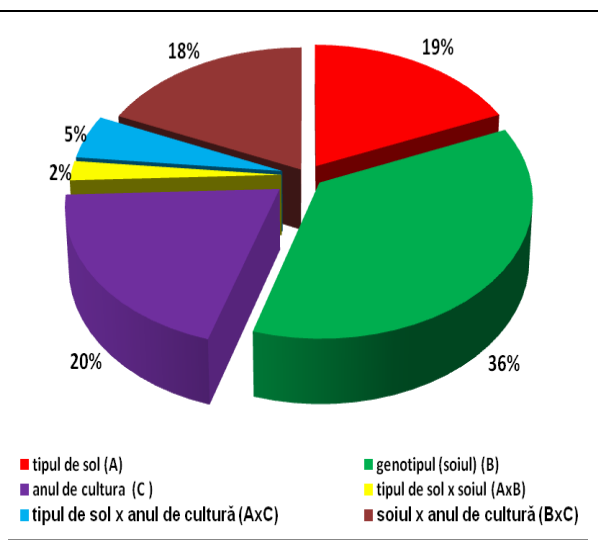
**Figure 1. Participation shares of the studied factors and the interaction between them in regard to the yield**



**Figure 2. Participation shares of the studied factors and the interaction between them in regard to the assortment**



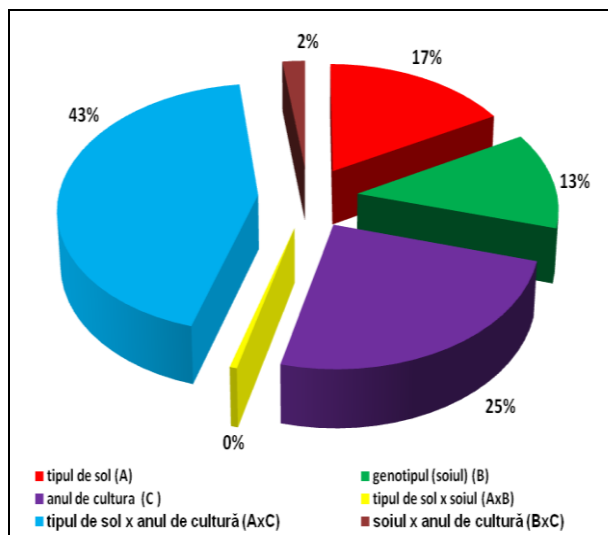
**Figure 3. Participation shares of the studied factors and the interaction between them in regard to the MMB**



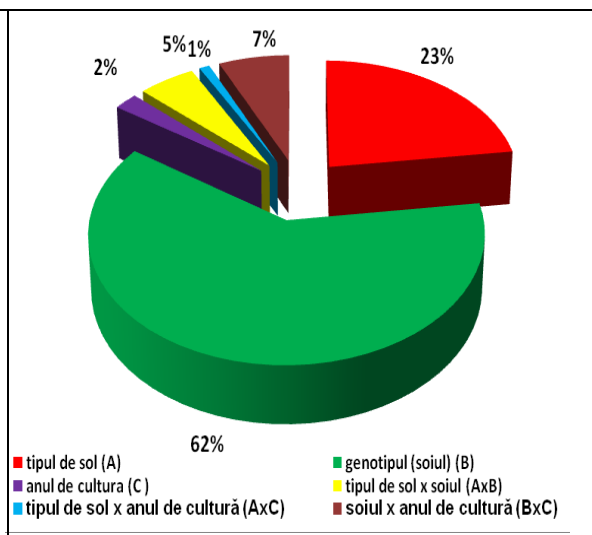
**Figure 4. Participation shares of the studied factors and the interaction between them in regard to the hectolitic mass (MH)**

The participation share of the *climatic conditions* in the three experimental years is very high in the case of humidity (57%) (figure 7), assortment (53%) (figure 2), the mass of 1000 grains (45%) (figure 3) and the yield (42%) (figure 1) and only 2% in the case of protein content and germination capacity (figures 6 and 8).

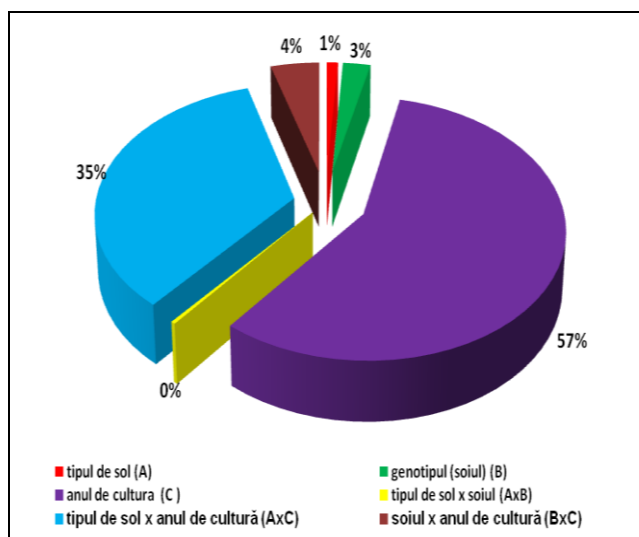
*The interaction between soil type and crop year* had an important influence share on the starch content (43%) (figure 5), humidity (35%) (figure 7), germination capacity (18%) (figure 8) and mass of 1000 grains (13%) (figure 3). In terms of the influence of the other interactions of the studied factors, it is observed that these have a low participation share (1-7%).



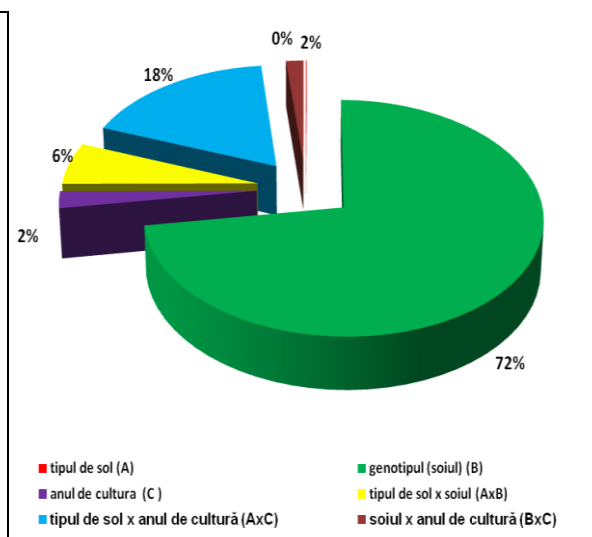
**Figure 5. Participation shares of the studied factors and the interaction between them in regard to the starch content**



**Figure 6. Participation shares of the studied factors and the interaction between them in regard to the protein content**



**Figure 7. Participation shares of the studied factors and the interaction between them in regard to the humidity**



**Figure 8. Participation shares of the studied factors and the interaction between them in regard to the germination capacity**

## CONCLUSIONS

1. The yield is influenced the most by the weather conditions of the crop year.
2. The assortment was influenced the most by the weather conditions.
3. The mass of 1000 grains was influenced, in the highest proportion, by the weather conditions.
4. The hectolitic mass was mostly influenced by the genotype factor (variety).
5. The starch content was mostly influenced by the interaction between soil type and crop year.
6. The protein contents was influenced, in the highest proportion, by the genotype factor (variety).
7. The humidity was influenced the most by the weather conditions.
8. The germination was influenced, in the highest proportion by the variety.
9. Very important in the case of this research is the striking influence on the yield and yield quality of the weather conditions, followed by the soil and soil type respectively.

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