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THE RESPONSE OF A NEW WHEAT LINE OBTAINED IN THE PEDOCLIMATIC CONDITIONS OF A.R.D.S. - ALBOTA

Marian-Robert Gheorghe [1,2*], Cristina Ghiorghe [1]

[1]Agricultural Research-Development Station (SCDA) Albota, commune Albota, 117030, Arges, Romania
[2]University of Agronomic Sciences and Veterinary Medicine of Bucharest, 59 Mărăşti Blvd., District 1, 011464, Bucharest, Romania

Abstract

Wheat is one of the most important cultivated plants of major importance in the food industry. Bread is obtained from its grains, which is a staple food for the world's population, as it provides many nutrients, being a rich source of carbohydrates, proteins and vitamins. The aim of this work was to compare the wheat line A4-10, obtained at the Agricultural Research Development Station Albota with 24 wheat genotypes, which are in the national list of varieties, in the pedoclimatic conditions of the station, in order to obtain a winter wheat variety with superior qualities. Winter wheat, of all cereals, has the longest growing season, covering all seasons, climatic conditions differ from one season to another. That is why the morphological characters of the A4-10 line, obtained in the crop year 2002, were analyzed, compared to the 24 varieties and lines, namely: plant height, length of spikelets, number of spikelets, number of grains in the spikelet, weight and production.

Keywords: *morphological characters, number of grains, plant height, wheat line, yield.*

1. INTRODUCTION

Global climate change, characterized by rising temperatures, prolonged drought, aridity but also other extreme climatic phenomena manifested in periods beyond the historical pattern of different ecological areas have posed a constant threat to the sustainability and stability of agricultural production (Hadasch et al., 2020; Zhang et al., 2021) and addressing food stability and security but also social stability in many regions of the world, including Europe and, of course, Romania. Common wheat (*Triticum aestivum* L.) is a species of great interest for Romanian agricultural production, occupying, on average, in the last twenty-five years, an area of approx. 2.1 million hectares annually, comprising a variety of soil and climate conditions. This diversity of ecological conditions, as well as the global climatic evolution of the last decades, impose a constancy in the researches aimed at the improvement of the wheat in order to ensure economically and ecologically sustainable varieties. Wheat genetic resources play a significant role in wheat improvement, contributing important sources of genes for increased productivity, quality, resistance and tolerance to environmental factors (Tadesse et all., 2016). Adaptation of agriculture is necessary to reduce the negative impact of climate change on yields and to maintain production (Tanaka et al., 2015).

*Corresponding author, E-mail address: gheorghemarianrobert@yahoo.com

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The main components of wheat yield and the number of grains per surface unit and the average weight of these grains (Acreche et all., 2006). A disadvantage of this approach is that these two components are frequently negatively associated (Slafer et al., 1996).

2. MATERIALS AND METHODS

The research was carried out in the experimental field of SCDA Albota during the vegetation cycle 2019-2020 (figure 1).

Figure 1. Wheat varieties fron the national culture

Climatically, the S.C.D.A. Albota is located in an area with a temperate continental climate, with an average annual temperature of 10.9 °C and an average annual rainfall of 671 mm. Their distribution is completely uneven, both from one year to the next and during the same year. The soil is acidic, with pronounced water deficits, which causes it to be periodically affected by excess moisture or drought. The general fertility characteristics of the soil are: about 1.5% humus, 1-1.5 mg/100g soil P2O5, 7-8 mg / 100g soil K2O and 0.1% nitrogen (N). The study included 24 varieties and lines from the national list and one line belonging to SCDA Albota, A4-10. The study aimed to evaluate the production components and the yield of all considered phenotypes.

3. RESULTS AND DISCUSSIONS

In general, the production components studied in line A4-10 were below the average of the varieties and lines in the national catalog except for plant height and ear length.

Thus, the A4-10 line is characterized by a plant height (figure 2) well above the average of the varieties and lines studied.

This fact cannot be considered as beneficial from the point of view of the plant's relationship with the environmental factor as the plants can be more sensitive to the fall caused by the storm, especially during the period of maximum accumulation of biomass in the grains. On the other hand, a secondary production (straw) that is too high compared to the main production (grains) would not be economically satisfactory either. The length of the spike (figure 3) was slightly above the average of the other phenotypes, but the number of spikelets in the spike (figure 4) was by far the smallest compared to all other phenotypes.

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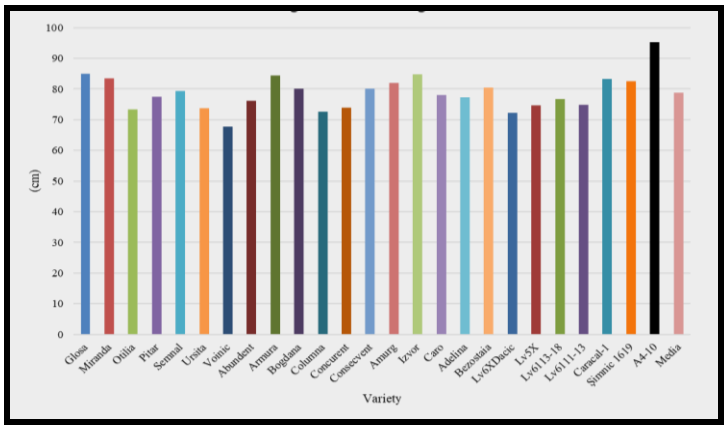

Figure 2. Plant height

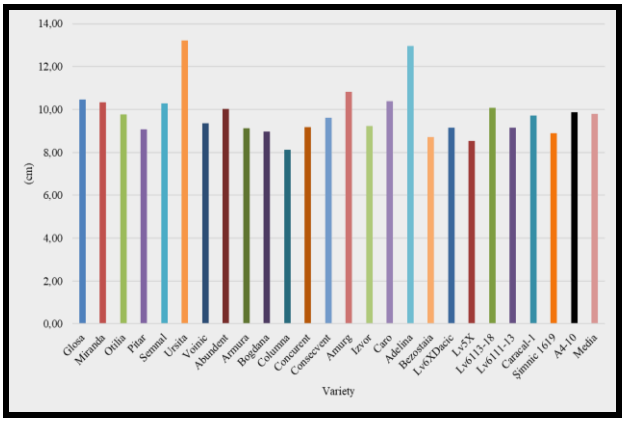

Figure 3. The lenght of the spike

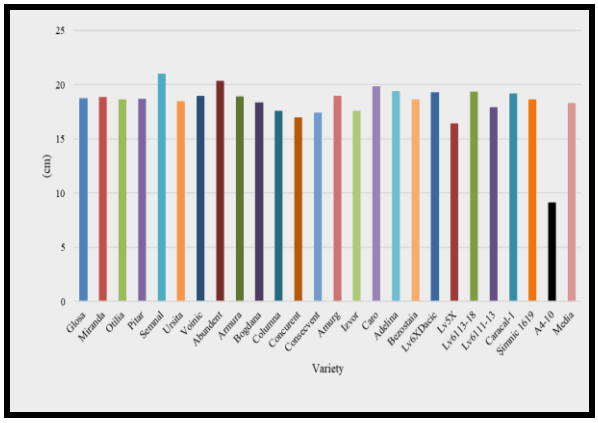

Figure 4. The number of the spikelets

The number of grains in the ear (figure 5) as well as the grain mass in the ear (figure 6) were also below the average of the varieties and lines in the national catalog.

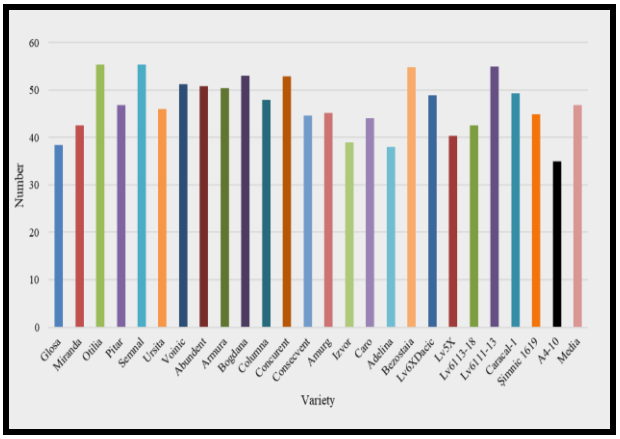

Figure 5. The number of grains in the ear

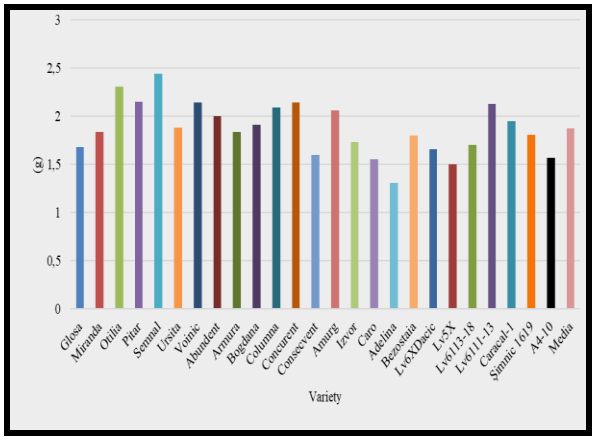

Figure 6. The grain mass in the ear

In contrast, the mass of one thousand grains (MMB) was above the average of the other phenotypes studied (figure 7).

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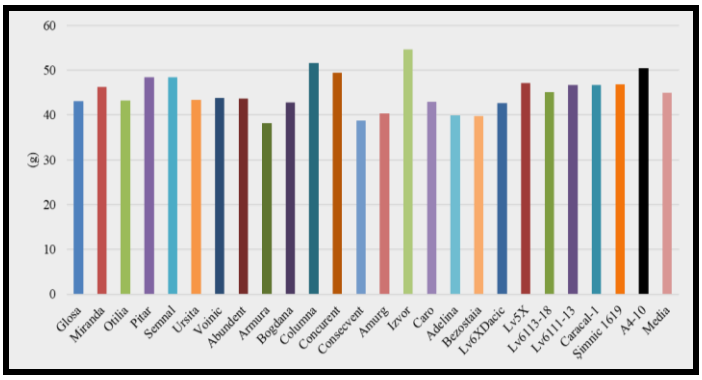

Figure 7. The mass of one thousand grains

Only two of them crossed the A4-10 line, respectively the Concurrent variety and the Lv5X line. The average yield per hectare (figure 8) obtained at line A4-10 was, in turn, below the average of the other phenotypes and, at the same time, the lowest recorded in the study.

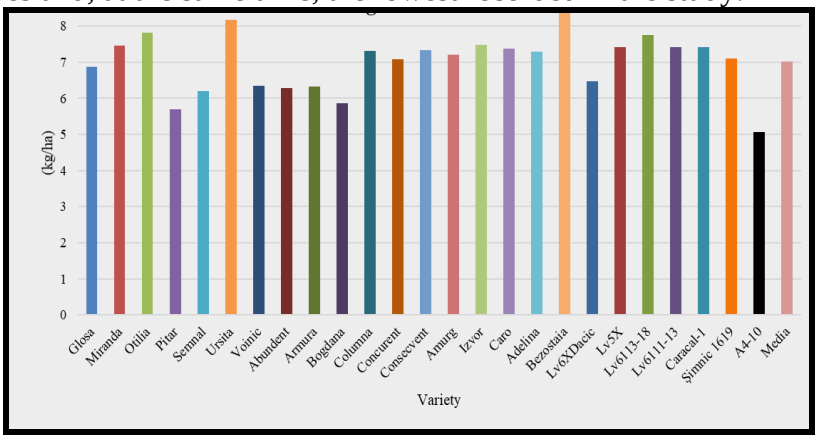

Figure 8. Yield

4. CONCLUSIONS

The length of the spike was slightly above the average compared to the 24 varieties.

The production components studied in line A4-10 were below the average of the varieties and lines in the national catalog except for plant height and ear length.

The data presented in this scientific communication are not sufficient to characterize the A4-10 line, which will be further studied and will be subject to improvement given some characteristics for which it is worthwhile to continue the improvement process.

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