

## RESEARCH ON THE PRODUCTIVITY AND QUALITY OF SOME WHEAT VARIETIES IN THE PEDOCLIMATIC CONDITIONS OF EAST BOTOSANI COUNTY, ROMANIA

Ioan PUIU<sup>1</sup>, Carmen Simona GHIȚĂU<sup>1</sup>, Teodor ROBU<sup>1</sup>, Denis ȚOPA<sup>1</sup>, Adrian NAZARE<sup>1</sup>,  
Lucian HARAGA<sup>1</sup>, Costel SAMUIL<sup>1</sup>, Constantin LUNGOCI<sup>1</sup>

e-mail: constantinlungoci@uaiasi.ro; csamuil@uaiasi.ro

### Abstract

The main purpose of the research was to test the productive and qualitative potential of 20 Romanian and foreign wheat varieties, from seven seed producers: Axereal, INCDA Fundulea, ITC Seeds, KWS, Lidea, Limagrain and RWA. The studies were carried out in the 2021/2022 agricultural year, in the vegetable farm belonging to the Samis Urban SRL company, from Mihălașeni, Botoșani county, under non-irrigated conditions. The main parameters monitored were production, MMB, MH, protein content and wet gluten. After centralizing the data, we can see that the highest production was obtained with the Absalon variety and was 6189 kg/ha; The highest MH was determined in the Ursita variety, this being 86 kg/hl; the highest protein content was obtained in the Voinic variety (14.3%), which also has the highest amount of wet gluten (36.9%). From the comparative analysis of the data we find that there is no positive correlation between the analyzed parameters.

**Key words:** protein, gluten, yield, *Triticum aestivum* L.

Wheat (*Triticum aestivum* L.) is one of the most important cultivated plants, in our country being one of the most cultivated cereals with multiple uses (Mogârzan A., 2012). Wheat is grown in over 100 countries and is an important source of trade. The quantities of wheat produced each year and its trade represent significant components of the trade balance for national economies (Pintilie S. *et al.*, 2022). Wheat grains are mainly used for the production of flour, intended for the manufacture of bread - a staple food for a large number of people (30-40% of the world's population) and provide about 20% of the total calories and over 25% of the total protein consumed in the diet human worldwide. Due to the fact that cereals play an important role in human and animal nutrition, the tendency is to increase the production of these plants (Melucă C. *et al.*, 2018). The increase in wheat production is a desired goal, the achievement of which is contributed by a series of biotic and abiotic factors that manifest a variable influence over time, both due to numerous interactions and the evolution of some agricultural factors (Oltean V. *et al.*, 2019; Troțuș E. *et al.*, 2022). The main factors that influence wheat production are the soil, the chosen variety, the cultivation technology, but also the climatic conditions. Cultivation of varieties with

wide adaptability to environmental and technological conditions can reduce the risks of reduced wheat production in unfavorable years. (Săulescu N. N. *et al.*, 2006; Roman V. G. *et al.*, 2012).

### MATERIAL AND METHOD

The main purpose of the research was to test the productive and qualitative potential of 20 Romanian and foreign wheat varieties, from seven seed producers: Axereal, INCDA Fundulea, ITC Seeds, KWS, Lidea, Limagrain and RWA. The research was carried out in the 2021/2022 agricultural year, in the vegetable farm belonging to the company Samis Urban SRL, from the place. Mihălașeni, Botoșani county, under non-irrigated conditions. The experiment was arranged in the form of randomized blocks, in 3 repetitions, each variant having a harvestable area of 1,000 m<sup>2</sup>. Predecessor plant: corn. The applied technology was conventional: Horsch Tiger cultivator (30 cm).

Fertilization ensured an agrofund of 170 kg nitrogen/ha active substance (a.s.), 90 kg phosphorus/ha a.s. and 180 kg potassium/ha s.a. Germination bed prepared with the Sapack 500 combiner from Vogel&Noot. The seed was treated with Austral Plus (tefluthrin 40 g/l+ fludioxonil 10 g/l) – 5 l/to. The distance between the rows when sowing was 25 cm. The sowing rate was 170 kg/ha

<sup>1</sup> Iasi University of Life Sciences, Romania

of seed (400 germinating grains/square meter). Sowing was carried out on October 8, 2021 with an IDEA XL seeder (Unia).

The wheat crop was protected by the use of herbicides, fungicides and insecticides, according to the technological norms used in the farm. The harvest was carried out with a New Holland combine on July 20, 2022. The climatic conditions of the area, monitored by the nearby weather station, we can see that, in the case of temperatures, in most months they recorded values much lower than the multi-year average.

An exception is the month of January where the average is 0.7 higher than the perennial and February, where the difference is 1 °C. The results are presented in *figure 1*.

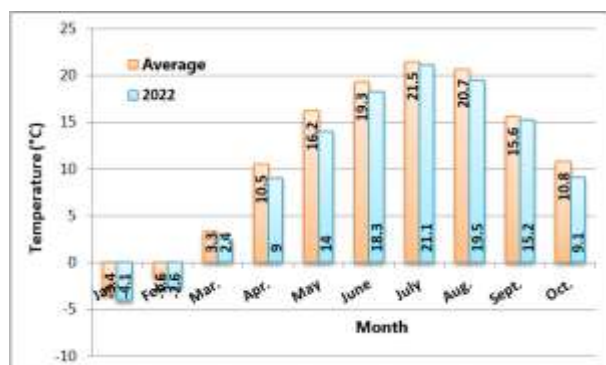


Figure 1 Monthly temperatures recorded in 2022

The rainfall regime recorded values between 25.5 mm in February and 65.5 mm in September. We encounter a positive deviation in September, the difference compared to the multi-year amount being 20 mm. In the other months,

the values are close to the multiannual amount. The data are presented in *figure 2*.

The rainfall system recorded values between 25.5 mm in February and 65.5 mm in September. We encounter a positive deviation in September, the difference compared to the multi-year amount being 20 mm. In the other months, the values are close to the multiannual amount. The data are presented in *figure 2* (Puiu I. et al., 2023).

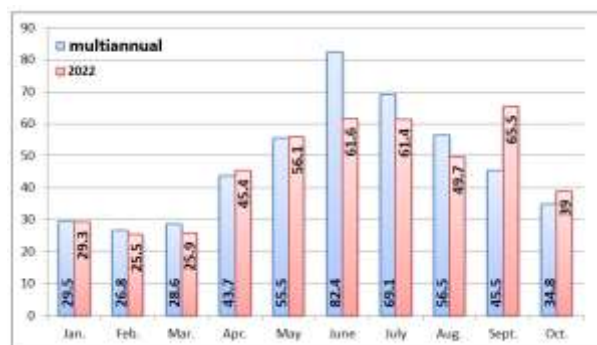


Figure 2 The monthly amount of precipitation, in the year 2022

## RESULTS AND DISCUSSIONS

From the analysis of the hectoliter mass, it can be seen that it had the highest value in the varieties of national origin, respectively Ursita (81.6 kg/hl), Pitar (80.6 kg/hl) and Voinic (79.4 kg/hl), and the lowest values were recorded for varieties of foreign origin, respectively Winner 12 (kg/hl), Klima (kg/hl), Sosthene (74.9 kg/hl).

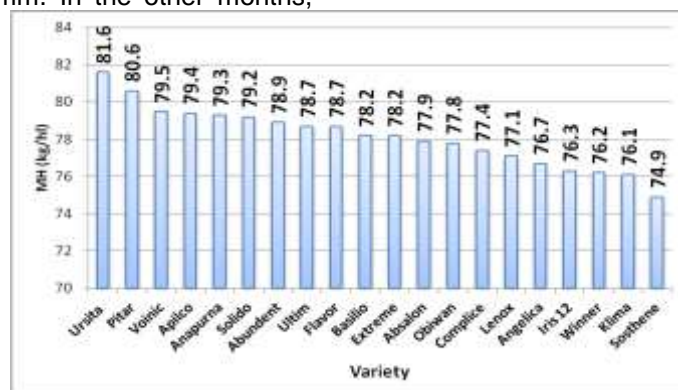


Figure 3 The MH variation in the studied varieties

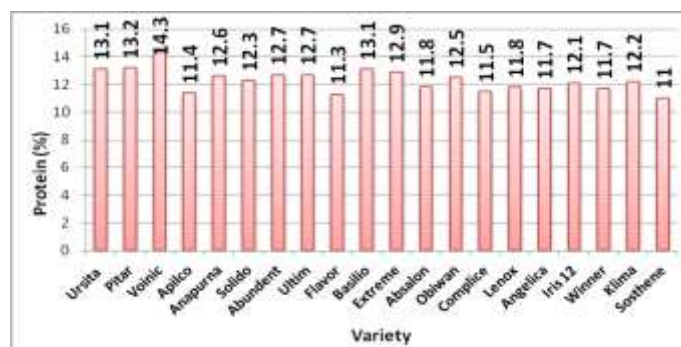


Figure 4 Variation of protein content in the varieties studied

The protein content broadly followed the same variations as the hectoliter mass. The highest values were obtained for the Romanian varieties (Ursita, Pitar, Voinic), and the lowest percentages for the Flavor, Sosthene and Apilco varieties. From the analysis of the hectoliter mass, it can be

seen that it had the highest value in the varieties of national origin, respectively Ursita (81.6 kg/hl), Pitar (80.6 kg/hl) and Voinic (79.4 kg/hl), and the lowest values were recorded for varieties of foreign origin, respectively Winner 12 (kg/hl), Klima (kg/hl), Sosthene (74.9 kg/hl).

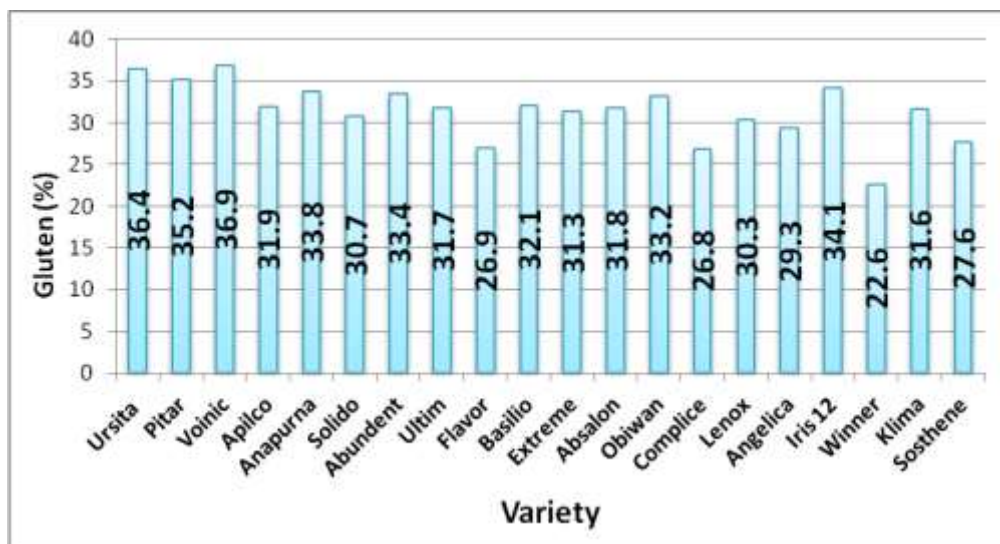


Figure 5 Variation of gluten content in the varieties studied

The gluten content varied between 36.9 – 22.6 %. The highest content is found in the Voinic (36.9%), (Ursita) 36.4% and Pitar (35.2%) varieties, and the lowest content in the Winner (22.6%), Complice (26.8%) and Flavor (26.9%)

varieties. From the analysis of the interaction between protein and gluten, it can be found that there is a positive correlation, the square regression being  $r^2=0.568$ .

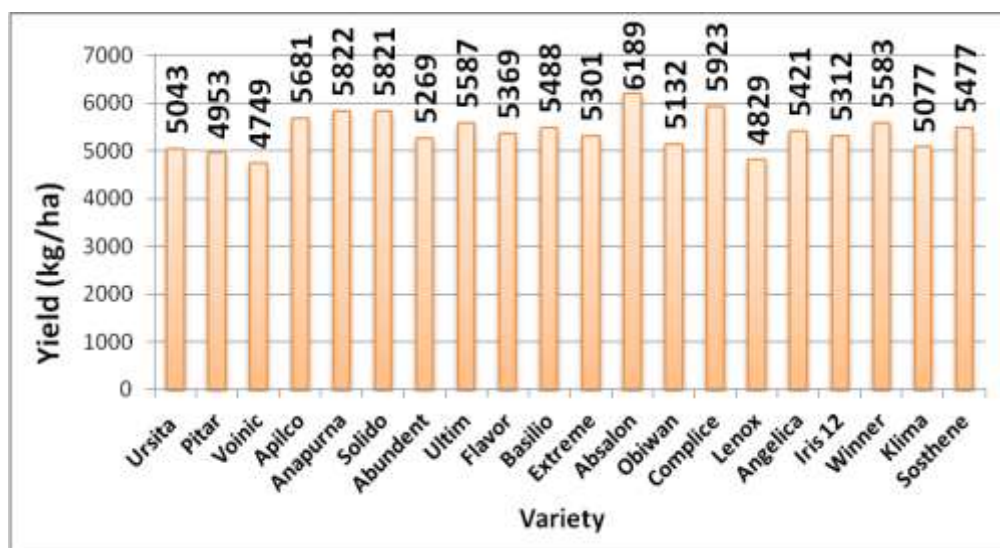


Figure 6 Production variation in the studied varieties

The production value is inversely proportional to the analyzed quality parameters. If the Romanian varieties Ursita, Voinic, Pitar obtained the best quality parameters, in the case of production this was lower compared to the other varieties. Quantities varying between 4749 kg/ha for the Voinic variety and 5043 kg/ha for the Ursita variety. Among the biggest productions,

they were recorded for Absalon, Complice, Anapurna varieties.

## CONCLUSIONS

The highest production of wheat was recorded for the Absalon variety (Limagrain) being 6,189 kg/ha and for the Complice (Axereal) variety

– 5,923 kg/ha. The lowest wheat production - Voinic (4,749 kg/ha).

Regarding the quality of wheat production, two varieties from INCDA Fundulea are on the first two places: Voinic with 14.3% protein and 36.9% wet gluten and Pitar with a protein content of 13.2% and a percentage of 35.2% gluten. The lowest quality was recorded for the Sosthene (Lidea) variety - 11.0% protein, respectively 27.6% gluten.

## ACKNOWLEDGMENTS

Project "The influence of the Ecofertel P biofertilizer product on agricultural production", no. 20045 of 15.11.2022.

## REFERENCES

- Oltean V., Deac V., Russu F., Simon A., 2019** - *Fertilization and rotation important factors in increasing winter wheat production. SCDA Turda, Aricultura Transilvană, Cultura plantelor de câmp*, Buletin informativ, nr. 31, Ed. SC Ela Design SRL, Turda, pag 28-33.
- Melucă C., Sturzu R., Cojocaru J. M., Paraschiv A. Ș., 2018** – *The behavior of some varieties of common winter wheat under thermal and water stress conditions at S.C.D.A. Teleorman. Analele Fundulea*, vol., LXXXVI.

- Mogârzan A., 2012** – *Fitotehnie*. Ed. Ion Ionescu de la Brad, Iași, pag. 39-95.
- Pintilie S., Isticioaia S.F., Buburuz A. A., Bărcan M. D., 2022** – *Research on the behavior of some winter wheat genotypes in the pedoclimatic conditions of central Moldova*. Stațiunea de Cercetare – Dezvoltare Agricolă Secuieni, Neamț (1962-2021) – 60 de ani de cercetare – dezvoltare – volum omagial. Editura „Ion Ionescu de la Brad”, Iași, 2022.
- Puiu I., Robu T., Ghițău C. S., Lungoci C., 2023** – *Contributions to the development of the cultivation technology of castor hybrids (Ricinus communis L.)*. Scientific Papers. Series A. Agronomy, Vol. LXVI, No. 1, 2023.
- Roman V. G., Tabără V., Robu T., Pîrșan P., Axinte M., Ștefan M.** – *Fitotehnie – Cereale și leguminoase pentru boabe*. Editura Universitară, vol. 1, București, 2011.
- Săulescu N. N., Ittu Gh., Musteață P., Păunescu G., Stere I., Nistor G., Rîncișă L., Voinea I., 2006** – *Comportarea unor soiuri de grâu de toamnă românești în condițiile contrastante de aprovizionare cu apă*. Probleme de genetică teoretică și aplicată, XXXVIII, 1-2: 21-29.
- Trotuș E., Amarghioalei R. G., Pintilie L. P., 2022** – *The productivity of some Romanian and foreign wheat varieties in the pedoclimatic conditions of central Moldova*. Stațiunea de Cercetare – Dezvoltare Agricolă Secuieni, Neamț (1962-2021) – 60 de ani de cercetare – dezvoltare – volum omagial. Editura „Ion Ionescu de la Brad.