

## PRODUCTION PERFORMANCE OF SOME WHEAT VARIETIES IN THE PEDOCLIMATE CONDITIONS FROM SCDA CARACAL

**ELENA ROȘCULETE<sup>(1)</sup>, ROȘCULETE C.A.<sup>(1)</sup>, PETRESCU EUGEN<sup>(2)</sup>,  
GABRIELA PĂUNESCU<sup>(2)</sup>**

(1) University of Craiova, Faculty of Agronomy, 13 Libertății Street, Craiova, e-mail: rosculeta2000@yahoo.com; catalin\_rosculete@yahoo.com

(2) University of Craiova, SCDA Caracal, 106 Vasile Alecsandri Street, Caracal, e-mail: e.petrescu@yahoo.com; paunescucraiova@yahoo.com

**Keywords:** wheat culture, productions, environmental conditions

### ABSTRACT

Knowing the particularities of the reaction of the new varieties and hybrids of the crop plants, under different conditions of experimentation is one of the basic activities of the experimental agricultural research and its aim is their judicious choice for cultivation in certain areas.

The paper presents the production results obtained from two Romanian varieties of autumn wheat grown under pedoclimatic conditions at SCDA Caracal, under non-irrigation regime, during three years of experimentation.

Taking into consideration the variations of the climatic conditions over the years of experimentation, at the same level of fertilization, the productions obtained for the two varieties of wheat recommend their cultivation in the area of the Caracal Plain.

### INTRODUCTION

Wheat production is dependent on the general genetic potential of the plant, which is based on the productivity elements. The productivity is dependent on the hereditary factor, on which, in phenotypic expression, a major role is played by the environmental conditions, as well as the genotype-environment interaction (Knežević, 2008). Wheat production is therefore a quantitative character with high variability, which is given by numerous components of the production, by their development under the influence of environmental conditions (Kraljevic-Balalic et al., 2001).

Over the years, we have witnessed extreme climatic phenomena (years with a strong manifestation of drought, years with excessive amounts of precipitation, years with very harsh winters, years with mild winters, years with very high temperatures) that negatively influence the production of hail cereals, causing a high fluctuation from one year to another (Mustățea, 2008).

The growth in stability of wheat production is possible by creating and introducing into cultivation, varieties that combine high production potential and good resistance to biotic and abiotic stress conditions (Săulescu et al., 2006).

The cultivation of varieties with wide adaptability to the environmental conditions can reduce the decreasing risks of wheat production in the unfavorable years (Mustățea et al., 2008).

The pedoclimatic conditions available at SCDA Caracal are favorable for the cultivation of hail cereals, as they possess a soil of baticalcric cambic cernoziom type with a high potential for fertility and a good production capacity. In general, chernozems do not pose any particular problem in terms of cultivation with a comprehensive assortment of agricultural plants.

In this paper we aimed to characterize the adaptability and the stability of the production of Romanian varieties of autumn wheat, under pedoclimatic conditions of Caracal's Plain, in order to re-

commend them to the farmers in the area.

### MATERIAL AND METHOD

This study analyzed the productivity of two Romanian varieties of autumn wheat (*Glosa* and *Izvor*), which have been successfully cultivated in recent years in the southern part of the country, due to their good ability to adapt to the increasingly drier climate of Caracal's Plain.

Specialists say the secret of big productions lies in the use of varieties adapted to the pedoclimatic conditions. The soil on which the experimentation was carried out is of the batocalcaric cambic cernoziom type, very deep, with a light-argillaceous / lutoargillous texture, with a weak acid reaction (pH = 6.5) in

the surface horizon, medium supplied with humus and nitrogen and well supplied with phosphorus and potassium. The testing under non-irrigation conditions, was performed at the same level of N134P50 fertilization, using 250 kg / ha of complex fertilizers 20-20-0 for the basic fertilization and NH<sub>4</sub>NO<sub>3</sub> with 33.5% N, in the early spring.

The weather conditions of the experimental years showed a great variability, with periods of pronounced drought, manifested differently during the three years, the crops being affected by drought in different phenophases (table 1). Particularly noticeable is the agricultural year 2018-2019, in which the humidity deficit during the autumn-winter period affected the plant emergence, which occurred in February.

**Precipitation (mm) recorded at SCDA Caracal during 2016-2019**

**Table 1**

Years / phenophase	Sowing period - sunrise (IX-X)	Winter period (XI-III)	Period of intense growth - flowering (IV-V)	Bean filling period (VI)
2016 – 2017	118,8	134,2	138,8	17,6
2017 – 2018	154,2	313,4	66,2	134,2
2018 – 2019	14,2	178,2	113,4	285,8
YEARS' AVERAGE	95,73	208,6	106,13	145,86
MULTIANNUAL AVERAGE (for the last 30 years)	44,75	33,48	53,2	69,7

### RESULTS AND DISCUSSIONS

As a result of the contrasting environmental conditions, in the last years, there has been a great variability of wheat production from year to year. Varieties with adaptability to unfavorable environmental conditions were identified, as well as varieties with wide adaptability to contrasting environmental conditions. The varieties *Izvor*, *Delabrad*, *Glosa*, *Gruia* and *Faur* showed a higher consistency of the production under contrasting envi-

ronmental conditions (Mustățea P. et al., 2008).

Given that climate change is becoming more frequent, the main bread-making cereal, wheat, seems to have reached the maximum limit in terms of the possibility of producing high-quantity and high-quality production and coping with the more frequent anomalies of the environment. From a climatic point of view, the area of the argic chernozem within the SCDA Caracal's sphere of influence

is, according to Koppen, in the climate formula C<sub>fax</sub>. The De Martone aridity index has values of 24-30 (silvostepe climate). In general, the thermic resources meet the requirements of the main crop plants in the area.

Regarding the pluviometric regime, the average realized in the area is around 554 mm, with a non-uniformity of quantity and frequency of precipitations during a year. Therefore, we can conclude that the studied area presents periods of humidity deficit during a calendaristic year, which coincides as amplitude with the maximum requirements of the cultivated agricultural plants.

The research carried out during three years of experimentation focused on the behavior of the *Glosa* and *Izvor* wheat varieties during the agricultural year, depending on the climatic conditions. For the studied varieties we followed the timing of the dawn, the timing of the seasoning, the waist, the humidity at harvest MH and the obtained production.

Although the climatic conditions were extremely varied, the drought posing serious problems, in the year 2018 even at emergence, the obtained productions were above the average productions specific to the analyzed varieties (table 2).

### Technological data and the obtained production results

**Table 2**

Year	Variety	Date of sown / emergence	Date of earing	Waist (cm)	U% (harvest)	MH	Production STAS (Kg/ha)
2016-2017	GLOSA	25.10.2016/5.11.2016	6.05.	97	12	80	6700
	IZVOR		5.05.	96	11	81.2	6805
2017-2018	GLOSA	16.10.2017/30.10.2017	1.05.	74	12,5	72,7	5047
	IZVOR		1.05.	82	13,1	74	3951
2018-2019	GLOSA	10.10.2018/1.02.2019	4.05.	87	16	76,2	6202
	IZVOR		4.05.	90	15,4	79,1	7014

Under non-irrigation conditions at the same level of fertilization, the two varieties of wheat experienced were directly influenced by the weather conditions of the years of experimentation, but they had an extraordinary capacity to adapt to the dry periods, finally the obtained productions being near the average ones specific to the variety.

We must take into consideration a very interesting thing in the agricultural year 2018-2019, in which the two varieties had a very late emergence (1 February) due to the drought of the autumn - winter period, but with the best productions obtained on account of the fallen precipitations (113.4 mm during the intense growth period - flowering and 285.8 mm during the berry filling period). Also, the productions obtained in 2019 (6202 kg / ha for *Glosa* and 7014 kg / ha for *Izvor*) demonstrate the good ability to adapt to the contrasting environmental conditions of these varieties.

*Izvor* variety obtained the largest and most consistent amount of productions during the three years of experimentation, regardless of the weather conditions, due to its high osmoregulation capacity.

Although analyzed from a climatic point of view, the agricultural year 2017-2018 seems much more favorable to the crops, the productions obtained from the two varieties are

inferior to those of the previous and following years. This demonstrates the very good ability to adapt to the environmental conditions of the varieties analyzed.

## CONCLUSIONS AND RECOMMENDATIONS

1. The production results obtained during the three years of experimentation show that the argic chernozem soil, by its natural fertility, represents an important ally for the agricultural producers in the area.

2. The application of balanced doses of fertilizers to the wheat culture, represents the basic technological link for obtaining high productions on argic chernozem soils in Caracal's Plain.

3. Knowing the particularities of the reaction of the new varieties of autumn wheat, both Romanian and foreign, for the environmental conditions, is important for a judicious zoning of them in the territory, but also to specify the place that they must occupy in the structure of the varieties for each area.

4. The extension in cultivation of Romanian autumn wheat varieties, by increasing the confidence of the cultivators in the Caracal Plain area and not only, based on the obtained economic efficiency.

## BIBLIOGRAPHY

1. **Babeanu, C., Constantin, C., Paunescu, G., Popa, D.**, 2010 - *Effects of drought stress on some oxidoreductase enzymes in five varieties of wheat*, Journal of Environmental Protection and Ecology, 11, No 4, 1280-128.

2. **Babeanu, C., Paunescu, G., Popa, D., Badita, A. A.**, 2008 - *Changes of some antioxidant enzyme activities in leaves of drought tolerant varieties of wheat from Oltenia during vegetation stages*, Buletinul USAMV-Cluj Napoca, Seria Agricultura, 65, 30-33.

3. **Bonciu Elena**, 2012 - *Agricultural biotechnologies, balance factor for the sustainable development of the socio-economic system*, Analele Universitatii din

Craiova, Seria Biologie, Horticultură, Tehnologia prelucrării produselor agricole, Ingineria Mediului, Vol. 17(1): 69-74.

4. **Bonciu Elena**, 2015 - *Resources, elements of quality and prices for some assortment of ecological products*. Annals of the University of Craiova-Agriculture, Montanology, Cadastre Series, Vol. 45(1): 39-44.

5. **Bonciu Elena**, 2016 - *Basic raw materials used in processing of the snack food (ecological/non ecological) and their expanding capacity*, Annals of the University of Craiova - Agriculture, Montanology, Cadastre Series. Vol. 46(1): 42-47.

6. **Knežević, D., Veselinka Zečević, Nvena Đukić and D. Dodig**, 2008 - *Genetic and phenotypic variability of grain mass per spike of winter wheat genotypes (Triticum aestivum L.)*, Kragujevac J. Sci. 30: 131-136.

7. **Kraljevic-Balalic, Marija, Worland, A.J., Porceddu, E., Kuburovic, M.**, 2001 - *Variability and gene effect in wheat*. In: *Monograph Genetic and Breeding of Small Grains*, (eds. S. Quarrie et al.) pp. 9-49.

8. **Mustățea, P., Săulescu, N.N., Ittu, GH., Păunescu, G., Voinea, L., Stere, I., Mîrlogeanu, S., Constantinescu, E., Năstase, D.**, 2008 – *Comportarea unor soiuri de grâu în condiții contrastante de mediu*, Analele INCDA Fundulea, LXXVII: 7-15.

9. **Petrescu E., C. Roșculete, Ghe. Matei, Elena Roșculete**, 2008 - *Necesarul de apă al culturii de grâu în condițiile pedoclimatice ale Câmpiei Caracalului*, Vol. II, Lucrări științifice cu tema: Agricultură și Inginerie – armonizare cu cerințele europene, nr. 24, pg.243.

10. **Rosculete Elena, Catalin Aurelian Rosculete**, 2018 – *The influence of the interaction of some mineral fertilizers on the accumulation of some nutritive elements in wheat grains*, Scientific Papers,

Series A, Agronomy, Volume LXI., Issue 1, pg.387-391

11. **Săulescu, N. N., Ittu, G., Mustățea, P., Păunescu, Gabriela, Stere, Ioana, Nistor, G., Rinchita, L., Voinea, I.**, 2006 – *Comportarea unor soiuri de grâu de toamnă românești în condiții contrastante de aprovizionare cu apă*, Probleme de genetică teoretică și aplicată, 1-2 : 21-29.