# INFLUENCE OF CLIMATIC CONDITIONS ON PRODUCTION OF TRITICALE (TRITICOSECALE WITTMACK)

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***Abstract:*** *Cereals (wheat, triticale, rye, barley, oats, corn, sorghum, millet, rice, etc.) represents the group of plants growing importance to human existence and activity. They are irreplaceable in human food and animal feed due to the chemical composition of grains containing: carbohydrates (60%), protein substances (10-16%), minerals, fats, vitamins. Grain foods can be consumed daily is appropriate and appreciated the human body needs both in terms of taste and nutrition of their value. Cereals are widely used in many industry goods food: bread and pasta (wheat, triticale, rye, etc.). Invented the manufacture of sugar and vegetable oil (corn) preparation of juices and sweet substances (sorghum) production meal, millet flakes and barley (millet, barley, oats, etc.). Manufacture of starches (wheat, rice, corn, etc.) canning (rice) production of glucose, dextrin (wheat, corn, etc.). Cereal grains is the raw material and for other industries such as alcoholic beverages industry (manufacture of spirits and beer from maize, triticale, barley, rice, etc.), pharmaceuticals (the manufacture of scleroţii antihemoragice substances obtained from the rye fungus Claviceps purpurea of some medicines rice, etc.). Straw (stems) are used in cereals straw pulp and paper industry, in small industry (knitting) and other manufacturing activities. Cereals are the main raw material for production of meat, milk and eggs. No concentrate feed intake can not be deprived of corn, oats, barley, etc. triticale. The most effective succulent forage is obtained from corn, even feed fibers are made up of a cereal mash straw. As occupation, cultivation of cereals (especially straw) technology is simple, requires no special systems for cars, is mechanized and efficient (lower cost cernd). Cereals are important in terms of plant growing: there are good and very good preceding crops, enrich the soil by stimulating processes of nitrification (by harvesting early grain straw) protects the land against soil erosion in hilly areas if seeding be made on contour direction, recover the land on which other cultures are not productive (triticale). As a general rule, triticale combines the high potential of wheat production and quality with disease resistance and tolerance to environmental factors stepchildren (including soil) from rye. Due to advances in genetic improvement of triticale varieties have been developed commercially viable (the production potential and high stability) competitive with other cereals and even corn, especially for hilly areas with infertile soils and low pH. New varieties of triticale are equal or superior to other cultures for grain yield, forage and biomass production for human food, animal feed or industrial applications. As important as forage crop triticale is used mainly in feed concentrate monogastricelor food (pigs and poultry) due to its higher that of other cereals in protein, lysine and tryptophan and high carbohydrate digestibility and protein substances. Recent research shows that protein energy ratio is generally higher when obtained from forage triticale forage than the traditional focus. Triticale protein has higher value as that of wheat, being rich in potassium, phosphorus, sodium, magnesium and zinc. From this conclusion it is necessary and an adaptation of the milling and bakery industry, is noted for processing triticalei that all techniques used to date have been made for wheat. Triticale grains have a composition that allows their use in the production of malt for brewing beans triticale quality. Din extract alcohol can be done in the average 400 l / t grain. Experience has been located in specific climatic conditions Răcasdia commune, Caras Severin, on a brown ground, I-mezogleizat moderate slope deposits formed from decomposition and alteration of basic metamorphic rocks. Experience is bifactorial type, so that the annual. Repeat the cycle terminates the experimental field we have experience in first year, second year and third year. Biological material have been used varieties: Cascade, Haiduc, TITAN, Style, Gorun. Mineral fertilizers applied to crop triticale, increased grain production. Variation in grain production in triticale (Triticosecale Wittmack) vary depending on variety and the influence of fertilization. The results of this study*

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***Key words:*** *triticale, variety, fertilization, production.*

## INTRODUCTION

Although triticale species had a short development being created by a man recently became an important cereal in the world occupying about 4 million ha, of which over 70% in Europe. New varieties of triticale are equal or superior to other cultures for grain yield, forage and biomass production for human food, animal feed or industrial applications. Cereal grains for feeding humanity provides 55-60% of total calories consumed, 60% protein, 15% from fat and 70% from carbohydrates. In human nutrition it provides over 90% of calories from 30 species of cultivated plants. Products food grains can be consumed daily is appropriate and appreciated the human body needs both in terms of taste and nutrition of their value. Cereal grains is the raw material for other industries such as alcoholic beverages industry manufacture of spirits and beer from maize, triticale, barley, rice, etc.), pharmaceuticals (the manufacture of scleroții antihemoragice substances produced by the fungus *Claviceps purpurea* rye, rice, etc. of drugs). Straw (stems) are used in cereals straw pulp and paper industry, in small industry (knitting) and other manufacturing activities.

Cereals are the main raw material for production of meat, milk and eggs. No concentrate feed intake can not be deprived of corn, oats, barley, etc. triticale. The most effective succulent forage is obtained from corn, even feed fibers are made up of a cereal mash straw. Among cereals are good honey plants (corn). Debris from the manufacture cereals (bran, marcs, etc.) is an excellent feed and not least the secondary production of cereals (straw, stems) is used as bedding or even feeding. Recently gaining worldwide cultivation of cereals in the energy (sorghum as energy mass green ), and the cultivation of grain for biofuels production (triticale, corn, etc.). Cereals are a rich source of trade. Physical and chemical characteristics of grains allow their transport over long distances and keeping them without much difficulty. You can eat in the harvest, or after several years without spoiling or significantly change their nutritional qualities. Interaction strongly influences fertilization variety production.

## MATERIAL AND METHODS

Experience has been placed in specific climatic conditions Caras Severin Răcasdia village. Experimental field was located on a brown soil type, I-mezogleizat moderate slope deposits formed from decomposition and alteration of basic metamorphic rocks. Experience is trifactorial type, with annual repetition. Varieties: Cascade, Haiduc, TITAN, style, experience Gorun were used, density and following fertilization systems.

Factor A - varieties of triticale used for zoning and their influence on grain production.

A1-CASCADE
A2-Haiduc
A3-TITAN
A4-STYLE
A5-Gorun

Factor B - planting density and its influence on grain production.

B1-250 bg / $m^2$
B2-500 bg / $m^2$
B3-750 bg / $m^2$

Factor C - influence fertilization system
C1-unfertilized (N0P0K0)
C2-N80P60K60
C3-N160P60K60

**RESULTS AND DISCUSSIONS**

Răcăşdiei climate is moderate continental, with Mediterranean influences (table and figure 1.).

Located in south-west of the country, not far from the Adriatic Sea, sheltered by the Carpathian Mountains, the village is within the temperate continental climate, subtype Banat, with Mediterranean colors, the annual average temperature of 110C, and the seasonal average temperatures satisfy requirements of most crop plants.

*Table 1.*

Average monthy temperatures (° C) at the Meteorological Station in Oravița compared to multiannual averages

| Specification | I. | II | III | IV | V | VI | VII | VIII | IX | X | XI | XII |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Year 2011 | -0,4 | -0,8 | -0,1 | 12,9 | 13,1 | 19,2 | 18,7 | 23,5 | | | | |
| Multiannual averages | - 0,7 | 2,03 | 6,67 | 14,2 | 16,5 | 19,8 | 23,15 | 24,6 | 19,9 | 14,8 | 10,0 | 5,6 |

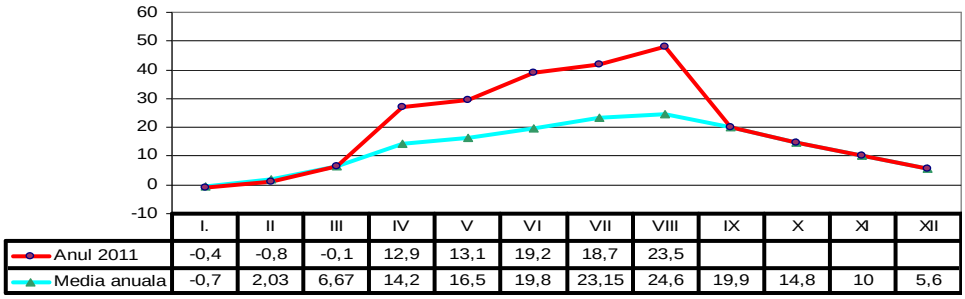



Figure 1. Variation of monthly average temperatures (° C) recorded in 2011 Oravita resort weather compared to multiannual averages

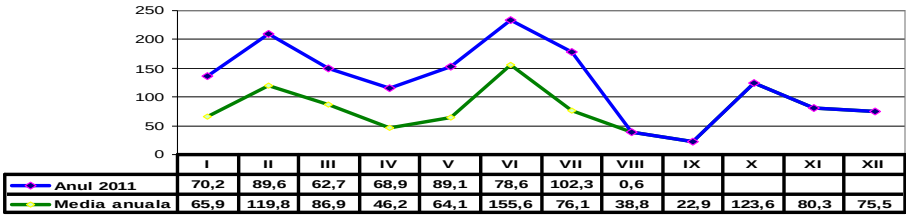
Rainfall, characterized by a value of 680 mm average annual rainfall varies with relief, lower values being recorded in the meadow, and the highest in the crossing of the high plains and hills, satisfying, in general, requirements of crop plants, additional water intake is necessary only in vegetable crops (table and figure 2.).

Regarding the wind regime, the dominant winds blow from the V-SW, is reported the presence of wind Cosava's (hairdryer), reaching in some very fast times, being a negative factor for crops and emphasizing integrity of surface erosion soil cover.

*Table 2.*

Monthly rainfall (mm) at the Meteorological Station in Oravita during 2011 compared with multiannual averages

| Specification | I | II | III | IV | V | VI | VII | VIII | IX | X | XI | XII |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Year 2011 | 70,2 | 89,6 | 62,7 | 68,9 | 89,1 | 78,6 | 102,3 | 0,6 | | | | |
| Multiannual averages | 65,9 | 119,8 | 86,9 | 46,2 | 64,1 | 155,6 | 76,1 | 38.8 | 22,9 | 123,6 | 80,3 | 75,5 |




| | I | II | III | IV | V | VI | VII | VIII | IX | X | XI | XII |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Anul 2011 | 70,2 | 89,6 | 62,7 | 68,9 | 89,1 | 78,6 | 102,3 | 0,6 | | | | |
| Media anuala | 65,9 | 119,8 | 86,9 | 46,2 | 64,1 | 155,6 | 76,1 | 38,8 | 22,9 | 123,6 | 80,3 | 75,5 |

Figure 2. Variation of mean monthly rainfall (mm) recorded at the resort weather Oravita in 2011 compared with multiannual averages

*Table 3*

Triticale production obtained under the influence of variety, density and fertilization in the experimental field from Răcăşdia

| | | Factor C Fertilization | | | A Factorial averages | | | |
|---|---|---|---|---|---|---|---|---|
| Factor A Variety | Factor B Density bg/m$^2$ | N0P0K0 | N80P60K60 | N160P06K60 | Production Kg/ha | % | Diference | Significance |
| CASCADOR | 250 | 2890 | 4156 | 5026 | 4492 | 100 | - | |
| | 500 | 3372 | 4689 | 5367 | | | | |
| | 750 | 4100 | 4870 | 5960 | | | | |
| HAIDUC | 250 | 3801 | 4652 | 5163 | 4785 | 107 | 293 | |
| | 500 | 3942 | 4965 | 5398 | | | | |
| | 750 | 4223 | 5050 | 5876 | | | | |
| TITAN | 250 | 3837 | 4786 | 5231 | 5045 | 112 | 553 | xx |
| | 500 | 4625 | 5100 | 5766 | | | | |
| | 750 | 4807 | 5265 | 5984 | | | | |
| STIL | 250 | 4256 | 4996 | 5575 | 5302 | 118 | 810 | xxx |
| | 500 | 4487 | 5325 | 5990 | | | | |
| | 750 | 4950 | 5900 | 6236 | | | | |
| GORUN | 250 | 3785 | 4298 | 4688 | 4529 | 101 | 37 | |
| | 500 | 3968 | 4762 | 4976 | | | | |
| | 750 | 4056 | 4978 | 5247 | | | | |

Dl 5% - 326kg/ha;Dl 1% -469 kg/ha;Dl 0,1% - 711kg/ha;

C Factorial averages

| | N0P0K0 | N80P60K60 | N160P06K60 |
|---|---|---|---|
| Producion Kg/ha | 3803 | 4919 | 5499 |
| % | 100 | 129 | 145 |
| Diference | - | 1116 | 1696 |
| Significance | | xxx | xxx |

Dl 5% -202kg/ha;Dl 1% -385 kg/ha;Dl 0,1% - 605kg/ha;

B Factorial averages

| | 250 bg/m$^2$ | 500 bg/m$^2$ | 750 bg/m$^2$ |
|---|---|---|---|
| Producion Kg/ha | 4476 | 4849 | 5167 |
| % | 100 | 108 | 115 |
| Diference | - | 373 | 691 |
| Significance | | x | xxx |

Dl 5% -211 kg/ha;Dl 1% -387kg/ha;Dl 0,1% -606 kg/ha;

Table 3. production are presented results obtained from the interaction of variety with planting density and fertilization level considered. Among the three factors, variety and density play a role in increasing the triticale grain production in 2010 at Răcăşdia experimental Caras-Severin.

In Style has been a variety 5302kg/ha production is 18% higher than the production version is made witness to a production increase of 810kg/ha provided statistically very semnifivativ.

The variety was a Titan production 5045kg/hacare made a positive difference in production compared to the control being provided statistically significantly distinct. Sowing density on the analysis of results shows that differences in production between variants is small.

Thus by increasing the density from 250 to 500 bg/m$^2$ production increased by 373

kg/ha increase being provided statistically significant and increasing density to 750 bg/$m^2$ production of 5167 kg/ha more than the production version control with 691 kg/ha provided statistically very significant increase.

Analysis of the production potential of the two variants fertilized production compared with control variant (N0P0K0) shows that all variants are considered superior to that witness.

The version N160P60K60 5499kg/ha achieved a production with a production increase of 1696kg/ha, being provided statistically very significant. Production increase obtained in the variant fertilized with 80Nkg/ha (1116kg/ha) is provided ststistic to witness the very significant production.

Analysis results from the interaction of variety with planting density and fertilization level indicates that the highest grain yield in triticale varieties are obtained from the density 750bg/m2 Style on fertilization N160P60K60 - 5302kg/ha.

## CONCLUSIONS

Having only one year of research results can not yet draw conclusions knowing that triticale generally react differently to the climatic conditions of the culture.

In the experimental field of Caras-Severin Răcăşdia there were good results in the production of triticale grains.

Climatic conditions during sowing and harvest were largely favorable influence on the level of grain yield in triticale.

The soil that was placed for nutritional support experience ensure good plant growth and development of triticale.

Triticale grain production to vary the influence of the factors taken into study (variety, density and fertilization).

Plant density interaction, strongly influences fertilization in experimental production.

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