STUDY ABOUT DYNAMICS OF CERTAIN QUALITY INDICATORS FOR 4 WINTER LOCAL WHEAT VARITIES UNDER THE INFLUENCE OF SOWING DENSITY IN CURTICI (ARAD COUNTY)

Crina SARB , V. TABARA

Banat's University of Agricultural Science and Veterinary Medicine Timişoara Calea Aradului no.119, 300645 Timişoara, Romania
E-mail: sarb_crina@yahoo.com

Abstract: *Attention given to quality improvement is evidenced by numerous researches and international meetings that have focused on wheat quality; however, the latest decades have shown that the progress made in obtaining varieties with a high protein content and superior baking characteristics are less obvious, which is due to the fact that the wheat amelioration work is directed especially towards increasing quantity and less towards improving quality (AHRENDTS J.,1995). To obtain the final consumption products for people, the wheat submitted to milling must meet certain standards of quality and food safety. Food safety is not negotiable and, together with quality, it is the essential condition for the acceptance and maintenance of food offer on the market. Food security means ensuring food hygiene throughout the entire production chain, from the raw materials until the final consumer, it is the responsibility of all those involved in the food chain and it can cause that the risk of contamination is minimized or eliminated (ALEXA ERSILIA, 2004). The milling industry producers are compelled to use only wheat which corresponds to the quality parameters required by standards, technical specifications and health rules in force. Checking food quality in all phases of the technological manufacturing process, from raw materials to finished product and its storage is mandatory and it is done by specialized personnel, in charge of quality control (BÂLTEANU GH.,1991). Planting density: sowing rates are usually within the range of 140 - 380 grains/m2 for winter wheat at respective row spacings of 13 - 20 cm for winter wheat. But ideally the planned plant density should be based on the expected plant available precipitation, optimum ear density and number of ears per plant for the variety in question and the intended grain yield per hectare, adjusted for the expectedpercentage emergence and, for winter wheat, the expected percentage winter survival. On the basis of the above, the present study has aimed to evaluate certain varieties of local autumn wheat in terms of yield quality and baking characteristics, under the influence of graduate mineral fertilization.*

Key words: *quality indicators, wheat, starch, protein, gluten*

INTRODUCTION

Because of complex nutritive value of the grain and its importance for the animal growing and soil fertility, the winter wheat it was and remains one of the most important cereals and for the agriculture too (BÂLTEANU GH., 2003).

The fluctuation in time and space, sometimes unusual great, of the wheat crop and/or of its quality (AHRENDTS J.,1995*)*.including the milling and bakery (BÂLTEANU GH.,1991)., is making any scientific information about the wheat cultivation to be welcoming.

MATERIALS AND METHODS

The actually studies is proposing to disseminate the experiment results from the doctorate cycle in curse and is extended by a three years period. The experimental dates are as a rough guide, and are obtained in the first experimental year, in 2010.

For the testing in the field of the 4 wheat varieties, it had need necessary to accomplished in the Curtici-Arad county, a bifactorial agricultural experiment, where the A factor is represented by the four local wheat. A1:Ciprian, A2:Alex, A3:Boema and A4:Glosa; the B factor is represented by the sowing

density which is having three graduations: B1- 200 germinable grains/m²; B2- 400 germinable grains/m²; B3- 600 germinable grains/m²; B4- 800 germinable grains/m².

The experiments cropping with the wheat varieties it had made at the technical maturity.

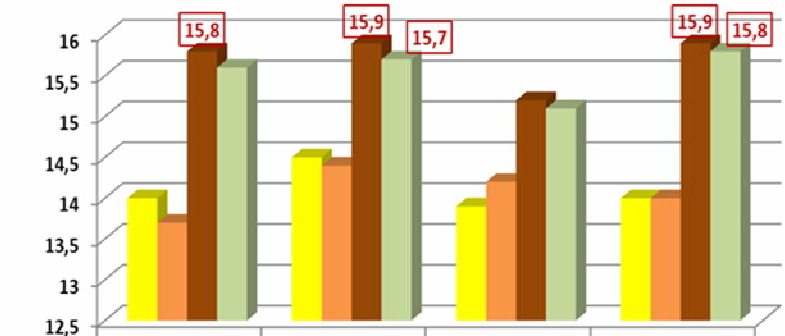
The research are proposing to establish an optimal sowing density so that obtain a maximum production correlative with the quality indicators as well as higher. The physico-chemical tests of this study it was released in the "Testarea Calitatii Semintelor si a Materialului Vegetal" lab, using the newest equipment, the NIR analyzer OmegaAnalyzer G for the fast and accurate analyze of the full cereals grains about the protein and starch content, the caryopsis fat content. The lab is inside of Departamentul Tehnology Agricole al Facultatii de Agricultura U.S.A.M.V.B. Timisoara.

RESULTS AND DISCUTIONS

The protein content of the wheat grains. The results about protein content of the wheat grains in the experimental year 2010

The protein substances are the most important part of the wheat grain, in the way with the nutritional value and the quality of the bakery industry.. The protein content of wheat grain, depends high by the wheat varieties, by the technology of cultivation and the pedoclimatic conditions (HERA and co., 1986).

The studied wheat varieties under the influence of density in the pedoclimatic conditions in Curtici released a very good protein content (%) but the highest value for 2010 it was for the Glos and Boema varieties. Like in Figure 1 it could be observed that the average variation of the protein content of the wheat grain under the interaction cultivated variety x sowing density, is this: the highest average value of the protein content is recorded by Glosa variety for 15.9% value obtained for the soil density 400bg/m^2 and 800bg/m^2. The high values of the protein content are on Boema variety: 15.8% with 200bg/m^2 and Glosa variety: 15.8% with 800bg/m^2.



	200g/m2	400bg/m2	600bg/m2	800bg/m2
CIPRIAN	14	14,5	13,9	14
ALEX	13,7	14,4	14,2	14
BOEMA	15,8	15,9	15,2	15,9
GLOSA	15,6	15,7	15,1	15,8

Figure 1 - The protein average content of wheat grain (%) for the 4 wheat varieties under the influence of sowing density, Curtici 2010

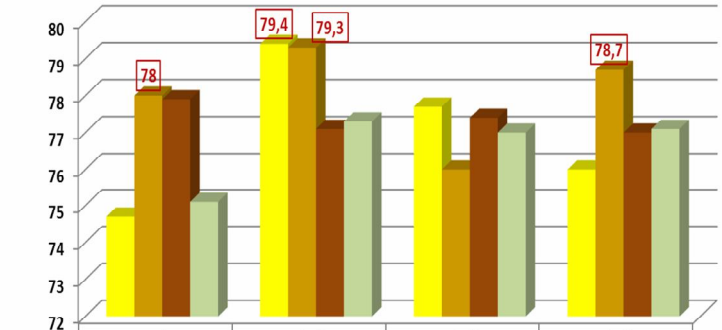
The starch content of the wheat grains. The results about the starch content of the wheat grains in the experimental year 2010

Among glucides, the starch have the most weight in the wheat flours. It is practical present only in endosperm that's why his content decrease with the increase with flour extraction, pronounced for extraction over 70%. For extractions until 70%, the starch content fluctuate between 75 and 80-82%, and over this extractions decrease to 67% for 90% extractions (BURLUC R., 2007)

The fluctuation of starch content average of wheat grains (%) under the influence interacting

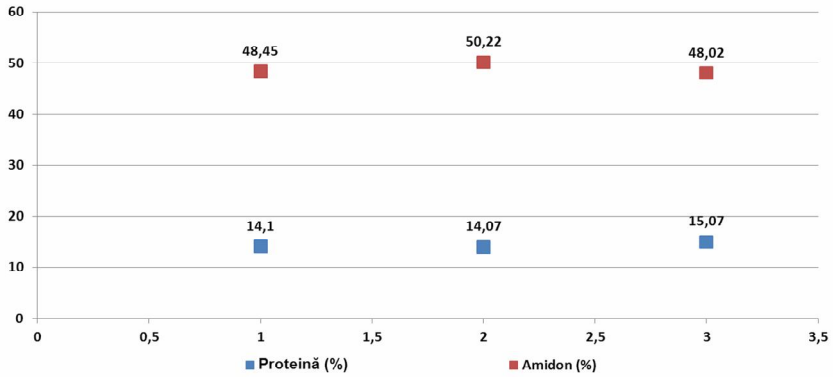
cultivated variety x soil density, is in progress between 75,1% for Glosa at 200bg/m² and 79,4% for Ciprian variety at 400 bg/m². The amiolitic activity is high at the Alex variety too at density 200bg/m² (78%), 400bg/m² (79,3%) and 800 bg/m² (78,7%) (Fig.2).

The starch content (%) of the winter local wheat grains studied in the pedoclimatic conditions of Curtici, Arad county area in the year 2009/2010 is in inverse ratio to protein content (%), the highest, in this case 15,07% have the corespondent the lowest starch content: 48,02% (Fig.3).



	200g/m2	400bg/m2	600bg/m2	800bg/m2
CIPRIAN	74,7	79,4	77,7	76
ALEX	78	79,3	76	78,7
BOEMA	77,9	77,1	77,4	77
GLOSA	75,1	77,3	77	77,1

Figure 2 - The amiolitic average (%) for the 4 wheat varieties under the influence of sowing density, Curtici 2010



Indicii de calitate monitorizați	Soiurile de grâu de toamnă			
	CIPRIAN	ALEX	BOEMA	GLOSA
Proteină (%)	14,1	14,07	15,07	15,55
Amidon (%)	48,45	50,22	48,02	49,03

Figure 3 - The dynamic of the report between protein content and the starch content for the 4 wheat local varieties, Curtici-Arad, 2010

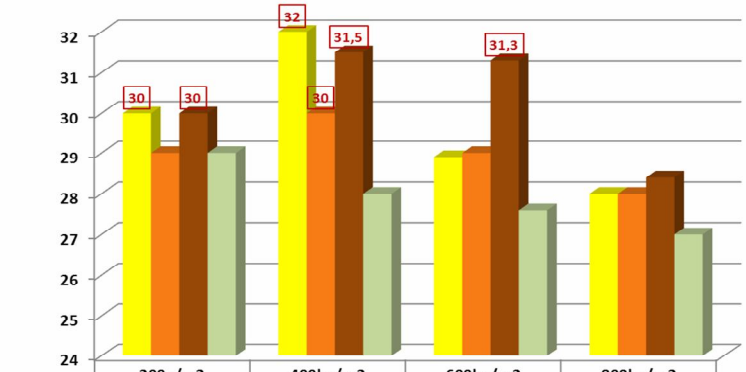
The content in the wheat grains. The results about gluten content in the wheat grains in the experimental year 2010

Gluten includes especially from protein, his quality and efficiency depends by the wheat quantity and quality of the wheat proteins. In according to quantity of the gluten in the wheat flour the classification is in four groups: with an high gluten content (over 30%), with a medium gluten content

(26-30%), with a low gluten content (between 20 to 25%), with a small gluten content (below 20%).

Some wheat varieties cultivated in soil and in the favorable climatic conditions in our country, has a content up to 45% gluten. (NAIDIN C., 2004)

In figure 5.17 is graphical represented the dynamics of the gluten content of the wheat grains (%) as an interaction cultivated variety x sowing density. So, the highest values of the gluten content average are for: Ciprian 32% at 400bg/m² and Boema 31,5% at 400bg/m² and 31,3% at 400bg/m², the very good values 30% of gluten content are for the next varieties: Alex (400bg/m²), Ciprian (200bg/m²), Boema (200bg/m²).



	200g/m2	400bg/m2	600bg/m2	800bg/m2
CIPRIAN	30	32	28,9	28
ALEX	29	30	29	28
BOEMA	30	31,5	31,3	28,4
GLOSA	29	28	27,6	27

Figure 2 :The gluten content variation for the wheat grains(%) for the 4 wheat varieties under the influence of sowing density, Curtici 2010

CONCLUSIONS

The results of determinations made it in the laboratory with the wheat varieties tested in Curtici (2010) concludes that a sowing density by 400 bg/m² are obtained has the best values of the indicators which reveals the bakery quality of the wheat.

The bakery quality is influenced by the wheat variety in the Curtici-Arad conditions (2010). Hence the Boema variety recorded the highest gluten content in the grains 30% and a protein content of the grains 15,07% , this value is considered to be “very good”.

The 4 winter wheat varieties tested under the influence of sowing density (b.g./m²) but as well the climate conditions demonstrating the well potential of this area for the wheat cultivation and the especially value of the wheat varieties.

BIBLIOGRAPHY

1. ADAM AL., GALAL A.A., MANNINGER K., BARNA B., 2000, Inhibition of the development of leaf rust (*Puccinia recondita*) by treatment of wheat with allopurinol and production of a hypersensitive-like reaction in a compatible host, Plant Pathology, Vol. 49(3): 317 - 323.
2. AHRENDTS J., BEITZ W., şi colab., 1995, Manualul inginerului - Fundamente (traducere din lb. germană); Editura Tehnică, Bucureşti;
3. ALEXA ERSILIA, 2004, Tehnologia produselor făinoase, Editura Eurobit, Timisoara;
4. BÂLTEANU GH., 2003, Fitotehnie, Vol I, Ed. Ceres;
5. BÂLTEANU GH., FAZEKAŞ I., SALONTAI AL., VASILICĂ C., BÂRNAURE V., CIOBANU FL., 1990, Fitotehnie, EDP Bucureşti;