SUMMARY of the doctoral entitled **„RESEARCH CONCERNING WHEAT CROP IN GĂVANU-BURDEA PLAIN WITHIN CLIMATE CHANGES CONTEXT'' -** Author: **Eng. POPA GR. MARIAN**

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Nowadays area climate changes are shown by means of milder and moister winters, warmer and drier summers and ever frequent intense meteo events. It is possible that the most serious consequences of the meteo events should not be felt until 2050, but there are anticipated adverse effects earlier, results of extreme meteo events such as frequent and long heat waves, droughts and floods. Due to the dependency on the meteo conditions, agriculture represents the most damaged economic branch because of the climate changes.Year to year climate variance represents one of the main causes of crops variable gain and one of the agriculture inherent risk. Consequently, agriculture is in the first line of thebattle against climate changes effects.

The most defenseless cultivated varieties will be especially the yearly grains and weeder crops, the summer shortage of water which coincides with maximum water demands resulting in important production decreases. Among these, the wheat, the most important grain worldwide but also in Romania will suffere serious consequences concerning the gains unless there are taken serious scientifical measures in order to adjust technology to new cultivation conditions and global warming reduction.

The most important technological links in fighting against climate changes are: crops rotation change in order to acquire a better use of the available water; a new guidance in the structure of agricultural crops, namely cultivation highly tolerance genotypes for high temperatures and for the hydric stress caused by the shortage of water; agricultural technologies correlation with the water resource; the soil water preservement by choosing a minimal works system; cultivation a higher number of genotypes, namely varieties/hybrids, every agricultural year, with different vegetation period, in order to acquire a beter valorization of climate changes; growing varieties mixtures with similar precocities; sowing data adjustment depending on the precipitations and temperatures conditions.

The main objective of this doctoral thesis has been the founding of a wheat growing sustainable system in Găvanu - Burdea Plain, based on solutions to adjust technology to global climate changes, without diminishing gain performances, food quality and ecological and economic effectiveness. Research objectives in the experimental period 2012 – 2014 made refference synthetically to:

- inputs reduction in crop system;

- production performances harmonization with ecological demands and with the rational use of soil renewable resources;

- reduction and restriction of negative values for the meteo factors as a consequence of global and area climate changes;

- scientific groundwork of a wheat cultivation sustainable system for a multifunctional use (food, feed and as a sowing material),included in the sustainable development of the rural area.

In order to know the productive and quality wheat potential and the factors which determine the gain making in the crop system adjusted to climate changes, there were organized trials within SC Polirom Prod SRL, on the reddish preluvosoil soil with Romanian and foreign wheat varieties ,under the shape of pure or mixed crop, under soil work and sowing periods variants.

The research had as objective the Romanian autumn wheat varieties created in INCDA Fundulea over ten years, from the category of precocious-half-precocious varieties with high tolerance to drought, heat and winter, in comparison with foreign varieties from the same precocity group. The research was made within 3 field trials, made according to present experimental technique, completed with modern laboratory techniques for quality analysis. By means of the separate study of each experimental factor and of the combination between factors, there were obtained original data with a specific scientific and practical importance, concerning: varieties structure and cultivation way (pure crop, mixture of two varieties), the production potential and the production quality achieved by the experimented varieties in different variants of pure and mixed crop; the optimum system of soil tillage which ensures the best preservement and valorization of soil water; establishment of the sowing period, correlated with the thermical and rain conditions specific to each experimental year; fundamental biological and ecological aspects concerning the studied soils.

The work is structured in 9 chapters, the research results being centered in synthetical tables and interpreted in terms of variance analysis as well as of graphical representation.

Chapter I, entitled ''**The present stage of knowledge concerning wheat crop under droughty climate conditions**'', presents the wheat crop situation at national and global level, this variety requests for the climate factors, the climate particularities in favourable and very favourable crop areas from the south of the country, the research and the experimental results achieved at national and global level, as well as the conclusions concerning the present situation of this crop.

Chapter II, entitled ''**Natural conditions where research was made**'' makes a description of the physical-geographycal unit where the research was unfolded, presenting the

elements connected to hidrography, hydrology and geology of the soil and of the climate conditions as well as of the vegetation present in the research area.

Chaper III, entitled ,,**Material and research method**'' presents the research methods, the used experimental methods, description of the studied biological material, determinations and analysis made in the field and in the laboratory in order to establish the productive potential of the crop quality for the studied autumn wheat genotypes.

Chapter IV, entitled ,, **Experimental results concerning the genotype influence on the wheat production during 2012 – 2014**'', makes a detailed presentation of the research results as well as their statistical interpretation on the basis of the variance analysis according to the experimental method used within the research, thus, at the end of this chapter the main conclusions concerning the wheat genotypes gain being presented; depending on the crop tehnology, in the climate conditions during 2012 – 2014, in Gǎvanu – Burdea Plain.

În **Chapter V**, entitled ,, **Experimental results concerning sowing period effect on wheat production (trial no.3)**'', there are presented experimental results concerning the experimental results related to the productive capacity of *Boema 1* and *Glosa* varieties sown in 5 different periods (1st of October – the 10th of November) as well as the conclusions resulted from the analysis of the sowing period influence on the grains production obtained in the surface unit from the studied Romanian autumn wheat varieties.

In **Chapter VI**, entitled ''**Production components determination at the harvest maturity''**, there are presented the experimental results concerning the genotypes influence and the soil working system on the number of harvestable ears formed in the surface unit, the number of the grains in the ear and their weight, as well as the determinations results concerning 1000 grains mass, on the basis of these productivity elements, the biological production value obtained frm each studied genotype being established afterwards.

Chapter VII, entitled ''**Experimental results concerning the wheat quality depending on genotype and crop technology, during 2012 – 2014**'', presents the influence of the studied experimental factors on the quality indexes which render the bakery value of autumn wheat, namely: grains moisture, hectolitrical mass, their content in moist gluten as well as, gluten change index on account of these indexes the bakery value which characterize each studied autumn wheat genotype is established.

In **Chapter VIII**, entitled ,,**Experimental results concerning the climate resources use by experimented wheat genotypes within 2011 – 2013**'', there are presented the results obtained as a consequence of the genotype influence on the production, of the specific rainfall and temperature contribution to the production achievement, as well as to the effectiveness of rainfall and temperature valorization in the achievement of autumn wheat production.

Chapter IX, entitled „ **General conclusions and recommendations**'', includes the main conclusions detached from the work, the author's scientific contributions and his recommendations for the future research directions on this topic.

The bibliography comprises the list of the studied works for the necessary documentation to the elaboration of the present work.

The experimental results, averagely obtained during the three years trial period,emphasize the fact that the grains productions obtained with the tested autumn genotypes have been superior under the circumstances of minimum soil working conditions, in comparison with the ones achieved in a conventional system. On the first place, in terms of productive potential, there were placed early autumn wheat varieties, followed by very early and half-early varieties, the latter ones being weaker in terms of productivity, in the soil-climate conditions specific to Romanian Plain.

Hystar hybrid has been the most valuable genotype in terms of productivity aspect, this one emphasizing its genetical possession related to the production capacity, significantly surpassing all the other autumn wheat genotypes tested within the trial, obtaining average productions of over 6000 kg/ha, no matter the practiced soil working system.

There were also remarked Romanian varieties *Litera*, *Izvor* şi *Felix*, varieties which recorded production gains in terms of statistical difference within both systems of soil works.

The most valuable varieties mixtures were the mixtures obtained from *Litera* and *Izvor* and *Glosa* and *Izvor* varieties, both mixtures recording very significant statistical production gains.

Autumn wheat crop setting up during the period 1st October – 10th October led to obtaining very significant production gains, while, the sowing delay beyond the recommended period for the soil-climate conditions where there was unfolded the research had as effect a constant decrease at the production level.

Most studied autumn wheat genotypes surpassed the minimum accessible limits in terms of bakery value thus, being considered fit for this objective, excepting *Hystar* hybrid which having a gluten change index of 20 mm proved to be unsatisfactory in terms of bakery value.

In the specific conditions to Găvanu - Burdea Plain, the early and half-early wheat varieties valorized effectively the area climate resources.

Among the experimented autumn wheat genotypes, the highest valorization efficiency of basic climate values was possessed by: *Izvor* (RO), *Felix* (HR), *Renata* (HR), *Kalasz* (HU), *Csillag* (HU), *Petur* (HU), *Glosa* (RO) and *Akratos* (DE), these varieties having the capacity to adjust the specific consumptions of climate resources and the growing and development

process, so that the production stability should be assured in terms of variable climate conditions.

The work topic is comprised within the European scientific research concerns related to the establishment of technologies adjusted to wheat crop sustainable systems, technologies capable of ensuring the farmers competitivity and the consumers'demands concerning their quality as well as the landscape maintenance and the environmental protection.