ABSTRACT

of the PhD thesis with the title:

Research on the productive, economic and social effectiveness of premium wheat varieties in the Seini Maramureş area

Prepared by PhD Student Eng. Cărăbăț Vasile Marius,
under the scientific guidance of Prof.univ.dr. Berca Mihai

Keywords: wheat, premium variety, A class variety, triticale, nitrogen, nutrition models, algae extract, yields, productivity, wheat quality, economic effectiveness, social effectiveness, food safety

The thesis entitled **"Research on the productive, economic and social effectiveness of premium wheat varieties in the Seini Maramureş area"** includes a series of field experiments, conducted over a longer period of time, in two stages: 2009-2012 and 2014-2015. The area chosen for the realization of these studies is located in Maramures County, across town Seini, in the area of Viile Apei.

The choice of theme was due to unsatisfactory achievements of the Romanian agriculture in the wheat crop, which so far fails, at average to align the other European countries, even those with climatic conditions and with similar weather conditions. However, at least for wheat crop, the results in the same area varies very large, namely from 1000 to 8000 kg / ha. The explanation can be only one, namely the poor management of the majority of farms, and this situation should be understood to want to change it, or we will help ensure the food needs of the population in Romania, Europe and world.

As regards wheat crop easily adaptable to different environmental conditions with extremely high ecological plasticity, it is imperative to make every effort to ensure widespread and increasing performance, covering both quantitative and qualitative those.

The area chosen to carry out this study, we can say that without offering very favorable conditions for agriculture and, in particular, for the wheat crop, here there are still large areas that can get competitive European production. One of the innovations is the introduction into the local culture of varieties of wheat and triticale originating in Austria in order to be verified capacity of acclimatization to the environment and the effectiveness of economic and social development, both based on the reference area. Another innovative element is the testing of

many types of nitrogen fertilization, to establish a scheme optimum management at the level of a well-tuned rotation and performance of technology for farmers. We include in this point and testing a new product based on seaweed (Super Fifty® 0-0-8), whose stated role is to support the development of plants, soil and recovery time.

In short, the proposed research aims mainly finding a model and technology-based economic links seed and nutrition model to revive wheat production in the Seini (Maramureş), reduce costs and ensure higher quality wheat grains and bread. It ensures thus the food security of local residents, a prerequisite for good health and a balanced social life.

Since the topic is complex, the list of objectives is also quite long. However, at least must overall objectives of the work aimed at developing agriculture, especially wheat crop in the village Seini by implementing new strategies at explotație zone and extend the range of wheat varieties grown in the region, so to obtain higher yields and better quality, which will ensure local wheat consumption. Note that currently most bread wheat is imported from neighboring countries, especially in Hungary.

The work is divided into two major parts, separated according to their own contribution. The first part, which comprises the first two chapters, is allocated to research theoretical, ie stay current state of knowledge on the research theme and highlighting the latest news on the wheat crop - economic, ecological and social global, national but mostly regional.

What was the second part consists of three chapters, which are added a section of conclusions and recommendations, is the contribution materialized by setting its own methodology of work by placing in the field of proposed experiments and finally, by laboratory testing of samples collected statistical processing and interpretation of results.

Punctual, **Chapter I** is focused on gathering information on each of the issues included in the thematic study. It provides information on developments here wheat crop worldwide, together with general statistics on production, consumption, trade, etc. The importance of wheat crop is highlighted by the chemical composition and nutritional value of the grain of wheat, but also quality indexes yields obtained. Fertilization, especially with nitrogen plays an essential role in the formation of high yields, especially to quality bakery decisive in determining the selling price and, therefore, profitability crop for farmers.

Chapter II outlines the large main features of the research area, providing data on location, terrain, weather conditions, river, soil types and their characteristics, the current state of agriculture at the time of research, with a focus on management practices innovative, bio, which I would like to improve their contributions.

The methodology part covers all **Chapter III** of the thesis. Here are detailed schemes played two experimental groups and presentation of the factors that make up each stage of research - nutrition varieties and models used.

The first stage of the research was conducted in 2009-2012, over three agricultural years, and comprises two factors:

1. Factor - modern varieties of wheat and triticale, originating in Austria:
   - A_1 = + class wheat variety (bakery) - Balaton;
   - A_2 = wheat variety of premium class (E supercalitate) - Atrium;
   - A_3 = triticale variety of high productivity for feeding - Polego.

2. Factor B - nutrition patterns of nitrogen, 14 variants, depending on amount and time of application (fractionation):
   - $V_1 = N_{40}$ - at the entry into vegetation;
   - $V_2 = N_{60}$ - at the entry into vegetation;
   - $V_3 = N_{80}$ - at the entry into vegetation;
   - $V_4 = N_{100}$ - at the entry into vegetation;
   - $V_5 = N_{120}$ - at the entry into vegetation;
   - $V_6 = N_{20} + N_{20}$ - entry into vegetation + start of the sprouts;
   - $V_7 = N_{30} + N_{30}$ - entry into vegetation + start of the sprouts;
   - $V_8 = N_{40} + N_{40}$ - entry into vegetation + start of the sprouts;
   - $V_9 = N_{50} + N_{50}$ - entry into vegetation + start of the sprouts;
   - $V_{10} = N_{60} + N_{60}$ - entry into vegetation + start of the sprouts;
   - $V_{11} = N_{20} + N_{20} + N_{20}$ - entry into vegetation + start of the sprouts + boot phase;
   - $V_{12} = N_{20} + N_{30} + N_{30}$ - entry into vegetation + start of the sprouts + boot phase;
   - $V_{13} = N_{30} + N_{30} + N_{40}$ - entry into vegetation + start of the sprouts + boot phase;
   - $V_{14} = N_{30} + N_{40} + N_{50}$ - entry into vegetation + start of the sprouts + boot phase.

The second stage of the research, more streamlined and innovative in terms of fertilization was conducted in the agricultural year 2014-2015, also with two factors:

1. Factor - modern and new wheat varieties, originating in Austria:
   - A_1 = Balaton variety (A +), best variety for baking;
   - A_2 = Josef variety, variety premium (E) improvement and higher flour confectionery;
   - A_3 = Fulvio variety, variety premium (E) with very good qualities, a little late;
   - A_4 = Adesso variety, variety premium (E) extremely rich in protein and gluten, highly nutritious and breeder.

2. Factor B - nutrition patterns of nitrogen, 4 variants depending on amount and time of application (fractionation):

- $V_1 = N_{120}$ - fully applied in the spring to early tillering;
- $V_2 = N_{60} + N_{60}$ - applied in spring, early tillering + formation of the second node;
- $V_3 = N_{30} + N_{40} + N_{50}$ - applied in spring, early tillering + formation of the second node + summer before leaving the ear (bellows);
- $V_4 = N_{30} + N_{40} + N_{50}$ + Super Fifty® 0-0-8 – applied in spring, early tillering + formation of the second node + summer before leaving the ear (bellows) + 0,5 kg / ha Super Fifty® 0-0-8 algae extract every application of nitrogen.

This latest stage of research was planned as a further simplified and improved the previous one. The role of these practical researches was the confirmation that the capacity of acclimatization wheat varieties of premium and conditions offered by Class A particular area - Seini, Maramures County. The need to continue with lots of research emerged from the reaction of farmers who took mode, some varieties and models of fertilizer used in the desire to obtain and her positive results that we have seen lots of Viile Apei (Seini). The feedback so far has been very positive.

Chapters IV and V deals with the statistical interpretation of data obtained in the two phases of research in the application and the algorithm proposed management work presented. Using analysis of variance, using programs such as Anova, and dimensional graphics (Table Curve 2D) and three dimensional (3D Curve Table) were presented and interpreted as tabular, graphic and narrative results on:

- productions (q/ha);
- protein content (%);
- wet gluten content (%);
- Zeleny sedimentation index (ml).

In addition to simple analysis of each remember indicators were achieved and correlations between indexes and checks assumptions about correlations positive or negative that may arise between them (e.g., the negative correlation between production and gluten content).

At the end of each chapter (except the methodology) there is a section partial conclusion, which greatly facilitates tracking and understanding of outcomes. In the last part of the paper, in the section allocated to **conclusions and recommendations** are outlined general ideas drawn from implementing the proposed management, from which you can make suggestions for the development of agriculture in the region.

We set out a few conclusions:

1. Type A culture of wheat, and triticale premium coming from eastern Austria were acclimatized and can be grown successfully in the Seini.
2. Culture of premium wheat varieties react very effective at doses of nitrogen and fractionation respond significantly to high doses of 100 and 120 kg / ha.
3. Genetics superior varieties of one crop coming bioeconomy. The economic effects are significant, up to 700 euros / ha, as well as the environmental impact of its resources and human and animal food safety.
4. Statistically, between the two varieties of wheat there is a very significant difference. Qualitatively, Adesso variety is chosen, followed by Josef and Fulvio varieties.
5. Application of the test product - extracted from seaweed Super Fifty® 0-0-8 - is not justified, so far, in terms of results.

The doctoral thesis has a total of 187 pages, including 81 figures and 32 tables. Of these, 41 figures and 20 tables are original and others are originally processed for their adaptation to the topic. The bibliography includes 166 titles, mostly articles and books.

Due to lack of time only a small part of the results obtained during the research were presented at scientific conferences and published in journals. Two papers published in journals indexed were in international databases, rated B +, and have been cited in the thesis being referenced in the bibliography.

The personal recommendation that I address to all farmers in Romania is to try to make the transition to a management model adapted mining area and the conditions they have. Progress is not always wrong, and if genetics and technology have evolved, it is a pity that we do not keep up with them just unable to see beyond traditionalism characteristic. It is time to collaborate more closely, to look for examples of best practices and adapt them and use them in the interest of us all.

Some discussions about sustainability are not purely theoretical, and we must manage our resources we can to provide much needed food security of the entire population of the planet. In conclusion, I believe that the model implemented in farm management in Viile Apei (Seini, Maramures) is one of the futures and will continue to develop and improve in the coming years.