

## SUMMARY

Keywords: wheat, cultivars, fertilization, seed.

PhD thesis entitled " Research on cultivarss assortment and on wheat sowing material's quality in the ecological conditions of Iasi county " aimed to quantify the effect of fertilization and wheat cultivars on caryopses production and their quality in order to achieve security and food security for the population. In order to realize performant technologies for winter wheat, knowing the seed's role in obtaining high yields, we conducted research on planting material, quantitative and qualitative, through physical, physiological and chemical tests of products for use according to their characteristics at ITCS MS Iasi, proposing ways and methods to ensure wheat seeds for Iasi county.

Addressing these issues was made taking into account the recommendations of the FAO that "seed must be the foundation on which to build any vegetable production development strategy" and that farmers must use only certified seed.

The work consists of two parts: the first stage includes national and international knowledge in the field research conducted with two chapters. In chapter I we analyze the scientific literature relating to wheat cultivars and to providing nitrogen, phosphorus and potassium nutrients, and in Chapter II we examine the literature on the production and control of the sowing material in general and for wheat in particular.

Part II contains the results obtained in original research, the author's conclusions and recommendations. This part of the paper presents the goals, objectives and methodology of research, the natural frame and ecological conditions of Iasi county, research results on the effect of fertilization on production and its quality, economic efficiency obtained results, the results on the production and control of planting material; conclusions and recommendations.

In the thesis foreword there were reviewed, in short, data on wheat as food, fodder and raw materials for food industry, its spread throughout the world and our country.

Worldwide, in 2009, 225.6 million hectares were cultivated with wheat, with an average of 3038.8 kg / ha, the largest areas being cultivated in India (28.4 million ha), Russia (26.63 million ha), USA (26.51 million ha), China (24.21 million ha). Higher yields per hectare were obtained in UK (7926.6 kg / ha), Germany (7808.4 kg / ha), France (7446.6 kg / ha). In Romania, in 2010, there were 2.06 million hectares cultivated with wheat with an obtained average of 2780 kg / ha.

In Chapter I - Stage of knowledge worldwide and in Romania of the research problem, based on consulted scientific literature, we presented the obtained research results on the productivity of wheat cultivars, their response to fertilization with nitrogen, phosphorus and potassium and the influence on key quality indicators (MMB, MH, protein content, starch, etc.).

In Chapter II - problems of the production and sowing material (seeds) control, with special reference to wheat, we talked about establishing the first laboratory for the seeds control in the world, in Germany, in 1869 at the initiative of Professor Nobbe, to avoid counterfeiting seeds, then about "Elementary agriculture lessons" by Ion Ionescu de la Brad in 1870, in which he advises farmers that "seed of the land must be suitable with climate site, must be clean (pure), and their germination must be well known". It shows that the first seeds control resort that was organized on scientific principles was established in Cluj-Napoca, in 1984.

Chapter III- The purpose, objectives, material and research methodology, based on experimental techniques of agriculture - says that the aim was to improve the technology for the culture of the main cultivars of wheat grown in the county, through fertilization process and organization of planting material's production and control. The process of obtaining and controlling seeds is well known at ITCSMS Iasi, where the author works, and cultivars were investigated in terms of fertilization and the SCDA Podu Iloaiei. Following varieties were investigated: Beti, Boema, Crina, Dropia, Eliana, Faur, Flamura 85, Gabriela, Gruia, Iasi 2, Izvor, Moldova 83. Phenological observations and biometric measurements were made. Caryopses' production was determined, to which there were determined key indicators of quality, physical, physiological and biochemical, and calculations were made by the statistical method of variance analysis, after Săulescu N. and G. Jitoreanu. We also conducted an analysis of economic efficiency for the obtained results by calculating the profit and the profit rate.

Chapter IV- The natural and environmental conditions of the Iasi county and SCDA Podu Iloaiei against wheat requirements; Iasi county settlement was presented geographically, on the map of Romania, than the temperature and rainfall regimes and all 15 micro zones, defined on the basis of soil scoring.

We highlighted the multi-annual temperature of 9.30 C and the amount of 518.3 mm rainfall multiannual and that of the 3 years of experimentation, the agricultural year 2007-2008 was the most favorable for wheat and 2005-2006 was a favorable year.

The experimental soil was a cambic chernozem aric-regraded (after SRTS) with 3.42% humus, 0.188% total nitrogen, 101 mg / kg PAL and 594 mg / kg KAL in the 0-15 cm layer.

We pointed out that in Iasi, the evaluation notes for wheat determined that 60 municipalities have medium potential, 29 have low potential and no one has high potential for common wheat culture.

In chapter V- Research on productivity and quality of wheat caryopses of the cultivars grown at SCDA Podu Iloaiei Iasi, presents phenological observations, biometric measurements and caryopses' production on years of experimentation and averaged over 3 years.

In the agricultural year 2005-2006, the highest caryopses production was obtained from cultivar Beti, with 8842 kg / ha, the cultivar Faur in 2007-2008, with 9990 kg / ha, and in 2008-2009, the cultivar Flamura 85, with 8881 kg / ha.

Averaged over three years, cultivar Beti was highlighted with the biggest production of 8767 kg / ha, with 547 kg / ha higher than the control cultivar Flamura 85. The lowest production was obtained from cultivar Gabriela. The data obtained show that Romanian wheat cultivars have great production potential and are better adapted to the climate of Moldavia.

Chemical quality indicators were different depending on cultivar and climatic conditions of the years. On average over those three years, the caryopses' raw protein content differentiated between 13.80% for Iasi 2 cultivar and 14.94% for Dropia cultivar. Wet gluten ranged in very good criterion for all studied cultivars, the highest percentage being registered for Boema cultivar, with 31.33%. Dry gluten ranged from 7.64% at Iasi 2 cultivar to 8.13% for Boema cultivar. Deformation index was very good in all varieties and gluten index of 40-59 shows that the flour can be used for current bakery. From the technological indicators, the bread's volume and weight were investigated, noticing the highest value for the volume of bread for Crina cultivar (484 cm<sup>3</sup>) and for bread weight for Beti cultivar (145 g).

In chapter VI- Results on the influence of fertilization on production and quality in the main wheat cultivars grown in the county of Iasi - obtained yields were presented on years of research, averaged over 3 years and experience factors. On average those three years, fertilization resulted in very significant production increases. Thus, fertilization N<sub>120</sub>P<sub>80</sub>K<sub>80</sub>, caused an average of 8123.7 kg / ha, with 26.18% higher than in the control variant, N<sub>0</sub>P<sub>0</sub>K<sub>0</sub>. Influence of cultivar on the production determined maximum yields for Faur cultivar, with 7853.7 kg / ha, with a very significant increase of 24.06% determined for Gabriela control cultivar.

Interaction between fertilization and investigated cultivars materialized in the highest production of 8790 kg / ha for the interaction N<sub>120</sub>P<sub>80</sub>K<sub>80</sub> x Faur cultivar.

Climatic conditions determined each year, on average on all variants, the largest production of 7753.88 kg / ha in 2007-2008, of 7140.05 kg / ha in 2008-2009 and of 6851.55 kg / hectare in 2005-2006. In all years  $N_{120}P_{80}K_{80}$  fertilization was the best, in interaction with Beti cultivar in 2005-2006, with a production of 8292 kg / ha, with Izvor cultivar, in 2007-2008, with a production of 8930 kg / ha and Flamura 85 cultivar, with a production of 8920 kg / ha.

For one kg of active substance fertilizer there were obtained 11.442 kg caryopses for the interaction  $N_{120}P_{80}K_{80}$  x Faur cultivar and 10.486 kg caryopses for the interaction  $N_{60}P_{80}K_{80}$  x Faur cultivar.

Wheat caryopses' quality was influenced by fertilization. The interaction  $N_{120}P_{80}K_{80}$  x Crina cultivar achieved a 15.73% content of raw protein and the interaction  $N_{120}P_{80}K_{80}$  x Boema cultivar obtained 33.80% wet gluten; the obtained bread volume for the interaction  $N_{120}P_{80}K_{80}$  with Gruia and Beti cultivars was of 501 cm<sup>3</sup>.

Chapter VII- Economic efficiency of the results of fertilization and the use of new wheat cultivars emphasize the fact that economic efficiency can be achieved by using wheat crop cultivars with high production potential and fertilization.

Among the cultivars, the highest profit rate was obtained from Faur cultivar, with a net profit rate of 66.90%, from Beti cultivar, with 61.99% and from Iasi 2 cultivar, with 61.77%.

The interaction of factors caused the greatest profit of 2195.05 RON / ha for the interaction  $N_{120}P_{80}K_{80}$  x Faur cultivar, where we registered the highest profit rate of 62%. The single factor experiment with the wheat cultivars obtained the highest net profit from Beti cultivar, of 61.74%.

In chapter VIII- Research on seed production and control in winter wheat in Iasi during 2005-2010, there were presented ways of production and control for the planting material, conducted quality analyses, the Romanian and EU regulations. Averaged over the 5 years, in Iasi, arable land was 250,849.6 ha, of which 56.66% cultivated with cereals. Wheat area was 35,090 hectares, representing 23.74% of the grain and wheat seed lots occupied 2017.6 ha, representing 5.75% of the wheat, making an average of 3579.2 kg / ha higher than in wheat consumption cultures.

The synthetic tables presented the quality indicators for caryopses, as purity, humidity, MH, protein content, wet gluten, index of deformation and gluten index during 2006-2009, then the biological value of the studied wheat cultivars in Iasi, the ratio of the seed producing surfaces and the quantity of seeds for each year.

In 2007-2008, 3060 tons of seed were obtained, in 2008-2009, 2460 tones and in 2009-2010, 1860 tones seeds were produced. Wheat cultivars found each year in top for seed production were Alex, Arieșan, Boema, Dropia, Flamura 85, Eliana and Glosa.

Chapter IX- Conclusions and recommendations – presents the results obtained, summarized and combined with data from scientific literature. We offer a range of alternatives for wheat producers, which certifies the need for certain wheat cultivars, more productive and adaptable, whether the allocation of inputs is needed to increase production and quality as planting material or as raw material for industrialization.

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Thesis makes a modest contribution to the establishment of wheat cultivars, obtained recently, more productive, of good quality and that meet the allocation of production factors and the reorganization process of obtaining and controlling the planting material in Iasi.