YIELD AND QUALITY CHARACTERISTICS OF WINTER WHEAT VARIETIES DEPENDING ON DIFFERENT NITROGEN NUTRITION LEVELS IN SEMIARID CLIMATE

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Actuality of theme. Global needs of winter wheat varieties adapted to different areas, including high baking quality annually improved, even with an increasing grain production. Growing of physiological values and baking quality of wheat production in many regions is now and in the future an extremely important agriculture task. However, in many industrial regions technological process of wheat growing needs improvements, especially by a reasonable selection of varieties and nitrogen supply. Austria's experience as an important producer of high quality wheat in Europe could be taken into account to achieve this.

Purpose of research. To establish features in yield and grain quality using different genetic potential of Ukrainian and Austrian winter wheat selection with optimizing nitrogen feeding to obtain high baking quality under different soil and climatic conditions of both countries, defining standards of nitrogen nutrition and wheat varieties for grain production with high quality.

Materials and methods of research. A field research was conducted during 2012 – 2014 in three soil-climatic zones – in Ukraine and Austria. The design of experiment included study of three factors effect: variety, nitrogen amount and distribution, seeding rate. Were chosen six varieties, different by genetically determined baking quality (high and low baking quality) and origin (Ukrainian and Austrian) with winter rape as previous crop. Accommodation of variants in experiment followed split plots method with 25 m^2 plot area, in four replications.

Several grain quality indicators were defined by international standards ICC: falling number (ICC 107/01), flour strength (W) and P/L ratio in Chopin alveograph (ICC

121). Protein content was determined by infrared spectroscopy and grain unit by ISO 4233. For statistical analysis was used software SAS 9.4.

Results of research and discussion. According to the experimental data was high accuracy established the dependence of winter wheat production from genotypes (varieties) and nitrogen nutrition in each year and on average for the entire study period. Soil and climate conditions of research had significantly affected the productivity level, especially evident in 2012 and 2013. Statistically significant differences in yield between the different options with the introduction of nitrogen D2 (120 kg/ha), D3 (180 kg/ha) and D4 (150 kg/ha) were not established. Was observed specific reaction of winter wheat varieties on nitrogen nutrition. The highest yield was obtained by Midas and Balaton varieties at all studied soil and climatic conditions that indicates their high adaptive capacity. Were established differences in requirements regarding of highest quality wheat varieties classification in Ukraine and Austria. So that, to be included in the highest quality group or «premium» class (Premiumweizen), in Austria, the varieties have to be at the highest level in baking volume, protein content and more other quality characteristics.

The experimental data confirm dependence of protein content from genotype, nitrogen nutrition and soil-climatic conditions of growing with high probability. Distribution of total nitrogen quantity for several applications, also called application "for quality" (variant D3, 180 kg/ha of nitrogen with application 60 kg/ha at heading - BBCH 51-59 stage) was in each year a criterion for achieving a high protein content of over 15% and the high baking quality.

According to the research was revealed significant dependence of yield from genotype, soil type and annually climatic conditions of growing, but the effect of nitrogen nutrition on grain production is not fixed. There was a pronounced dependence of the falling number and its stability from genotypes (varieties) and weather conditions, especially during the ripening period. Over the years the research shown dependence of baking quality indicators, on different nitrogen nutrition and clear varietal differences in these indicators. Variant with 60 kg/ha

nitrogen applied during heading allowed to achieve a high level of flour strength and flour ratio of elasticity to dough extensibility by all high quality wheat varieties, except Lybid.

Conclusions

The difference, especially by temperature and rainfall, soil and climatic conditions, confirming the validity and necessity to follow adaptive technology at winter wheat, which takes into account variety, soil and climatic conditions in the growing region and are optimized for production of a certain quality production.

Was established the specific response of winter wheat on nitrogen application for protein content, flour strength and elasticity to dough extensibility (P/L) ratio. Expressed dependence from variety and weather conditions was shown by falling number and grain production. In all experiments high baking quality with medium to high grain yield was received only by varieties as Midas, Capo, Josef using 180 kg/ha nitrogen at three applications during spring growing season, the last of those by 60 kg/ha at BBCH 51-59 stage. Along with this, Midas variety obtained the highest yields at all soil and climatic conditions. Significant influence of weather conditions on grain yield in some years confirms the feasibility of using retardants for increasing plant resistance to lodging and chemical protection against diseases to avoid the yield losses.