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## **Influence of indexes of fertility of soils on quality of grain of winter wheat on sodpodzolic soils of Polissya**

**Goal.** Determine the influence of soil parameters (humus, pH, mobile phosphorus and potassium compounds) on the protein content, gluten and vitreous appearance of winter wheat grains on soddy podzolic soils of Polissya. **Methods.** Mathematical-statistical processing of the relational database of field experiments with fertilizers. **Results** On the sod-podzolic soils of Polissya the quality of winter wheat grain depends on the content of humus and the degree of acidity of the soil solution. **Conclusions** The norms of influence of soil fertility indices on grain quality are established.

*Key words: winter wheat, protein, gluten, vitreous, normative indices, humus, phosphorus, potassium.*

In recent years, agrarian production in Ukraine is not able to provide significant volumes of winter wheat of high quality. Therefore, it is important to establish the conditions under which high quality grain can be achieved. According to previous studies [1 - 10], it is known that the quality of the grain depends on many factors, in particular on the soil fertility (humus, pH, mobile phosphorus and potassium compounds).

The purpose of the research is to determine the influence of soil parameters (humus, pH, mobile phosphorus and potassium) on the protein content, glue, and vitreous appearance of wheat grain on soddy podzolic soils of Polissya.

**Research methodology.** For the development of normative indicators for improving the quality of winter wheat grain, a relational base of field experiments with fertilizers used on soddy podzolic soils of Polissya was used. The correlation between soil fertility (humus, pH, mobile phosphorus and potassium compounds) and grain quality (protein, gluten, glass) characteristics was established. Quantitative indices of soil fertility are divided into 3 groups of provision (low, medium, high). To do this, agrochemical scales (groups) of soil protection by humus, mobile phosphorus and potassium and the degree of acidity of the soil solution were used. According to each of the soil fertility indices, a sample of grain quality indicators from the database was formed. Each mathematical-statistical analysis method was applied to each sample. The worked out quality indicators of products are differentiated according to the corresponding groups of soil provision with humus, phosphorus and potassium. For the development of norms of influence of soil fertility indicators on grain quality, the data of field experiment on the control version (without fertilizers) were used. In fertilized versions, the standards of mineral fertilizers with the highest grain quality indices are determined.

**Research results.** Among the main soil fertility indices, the humus content is most affected by the quality of the grain. On soils up to 1% humus protein content is 10.5%, 1 - 2 - 10.7%, over 2-11% (Table 1). The acidic reaction of the soil solution negatively affects the protein content of winter wheat. Low-acid soils (pH 5.1-5.5) provide a protein content of 11.5%, with an average acid (pH 4.6-5) -10.8%, and a strong acid (pH <4.6) - 10.4%. The level of provision of sod-podzolic soils with mobile phosphorus has little effect on the quality of the grain. The content of P<sub>2</sub>O<sub>5</sub> to 51 mg / kg of soil provides 10.7% protein, 51 - 100 - 10.8%, over 100 mg / kg of soil - 10.9%. The level of soil supply by moving potassium to a greater extent than phosphorus, affects the quality of winter wheat grain. If the K<sub>2</sub>O content is less than 80 mg / kg of soil, then the protein content is 10.4%, at the level of 80-120-11.1, over 120 mg / kg of soil - 11.7%.

An increase in the content of humus in sod-podsolous soils increases the content of gluten in wheat grains from 25.9 to 26.8%. Reducing the acidic reaction of the soil solution also positively affects the content of gluten. An increase in the content of mobile phosphorus in the soil does not significantly affect the content of gluten, and moving potassium - somewhat increases its content. The grain of glass is in optimum limits.

On the sod-podzolic soils of Polissya, grain of high quality can be obtained only through the use of mineral fertilizers. It is established that nitrogen fertilizers are the most effective in mineral fertilizers (Table 2). On average, without the introduction of nitrogen fertilizers, the content of protein in winter wheat is 10.7%, gluten - 25.3, glass-like - 62.6%. The transfer of nitrogen in the normal range of 60, 90, 120 kg / ha to the phosphorus-potassium background gradually increases the protein content from 10.7 to 11.6%, the glue from 25.3 to 26.7, the glass-like - from 62.6 to 67.3%.

1. Effect of fertility indices of sod-podzolized soil on the quality of winter wheat grain, %

2. Influence of nitrogen fertilizers on phosphoric-potassium background on winter wheat grain quality indices

### Conclusions

In the conditions of the Polissya on sod-podzolic soils, the average protein content of winter wheat is 10.7%, glue is 25.3%, and the glass-like - 62.6%. The addition of mineral fertilizers increases the protein content by an average of 11.6%, glue compounds - 26.7, vitreous - up to 67.3%. Normative indexes of protein content, gluten and vitreousness in winter wheat grain have been established, depending on the content in the sod-podzolic humus soil, mobile phosphorus and potassium compounds, and the degree of acidity of the soil solution. Normative indicators are used for prediction and receipt of grain of winter wheat of high quality in the conditions of Polissya.

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