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«Bioindication of fertility chernozem soils of apple agrocnoses of the Lipetsk region»

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Problem statement

- 1. Analyze the properties of two soils of LLC "Timiryazevo" - leached chernozem and chernozem-meadow in two zones of the garden (row spacing and trunk strip) and from virgin land and conduct their bonitirovku
- 2. Lay down a growing experience with selected soils and three grain crops: winter wheat, barley and oats
- 3. To take into account the biomass and its quality in the selected bioindicator plants
- 4. Perform a variance analysis of the data obtained
- 5. Evaluate the fertility or degree of degradation of the soil from the garden in relation to the control variant-virgin soil
- 6. Identify the most responsive to soil fertility plants
- 7. Identify the most indicative test-the plant organ
Solution methods

• 1. chemical (titrimetric)
• 2. physical (photometric, thermostatic-weight)
• 3. analysis of variance
Conclusions

1. The water content in the aboveground mass of crops and the provision of the ear with mineral elements do not depend on the properties of the soil. Plants in the process of their development maintain the necessary water content of tissues for life and form a green ear with a stable and characteristic supply of mineral elements for the species. Therefore, the water content in plant tissues and nutrition elements in the green ear cannot be used in bioindication as test indicators for the fertility of chernozem soils.

2. The provision of green mass of the winter wheat and the barley in the tillering phase with total nitrogen is a test indicator for changes in the fertility of chernozem soils within their types and subtypes. The provision of plants with potassium is, on the contrary, a very inert indicator. The availability of phosphorus in plants can be a test indicator of soil fertility only when it is waterlogged, since the mobility and availability of phosphorus decreases sharply. This can be seen in the example of hydromorphic chernozem-meadow soil.

3. The productivity of the aboveground mass of the wheat and the barley and the content of common forms of nitrogen and phosphorus in them are generally consistent with the data of soil bonitation, so these agricultural plants are recommended to be used as test crops for bioindication of chernozem soils regarding fertility and ecology, which is one of the components of agroecological soil assessment.

4. The oats are a very unpretentious crop to soil conditions, so it is not recommended to use it as a bioindicator of chernozem soil fertility.

5. If the winter wheat and the barley are sown on leached chernozem and meadow chernozem soil immediately after the apple orchard is uprooted, the crop yield will vary depending on the soil bonitet.
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