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SOME AGROCHEMICAL PROPERTIES OF CARBONATE CHERNOZEM AND DIFFERENT SOIL USE

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Soil plays a key role in the functioning of any terrestrial ecosystem. The human impact on soils has sharply increased in the face of increasing intensification of agricultural productions and leads to changes in physical, chemical and biological properties of soils. Therefore, timely control over changes in their properties is very important. The purpose of these studies is to assess changes in the chemical properties of carbonate chernozem under the influence of various types of land use: long-term fertilization, long-term crop rotation, single-crop system, forest belt, fallow.

This research was conducted on the Ketrosy (Chetrosu) Experimental Station in the Central Zone of Moldova. The soil is a Calcareous chernozem or Calcic chernozem in the World reference base for soil resources with the following characteristics: light loam with 2.5-3.0% humus, the content of mobile phosphate (Machigin) was 0.8-1.5 mg 100 g^{-1}, exchangeable potassium - 18-22 mg 100 g^{-1} and carbonates - 1.8-2.2% in the 0-20 cm layer. In the experiment, the following variants were studied:

1. long-term fallow (over 30 years);
2. monoculture (winter wheat);
3. crop rotation without fertilization from 1953;
4. crop rotation with mineral fertilizers ($N_{47}P_{46}$ per year on variants with previous long- term application of $N_{90}P_{60}K_{60}$);
5. crop rotation with organic fertilizers (manure 18 t ha^{-1});
6. forest belt.

Soil samples were taken from layers 0–20, 20–40, 40–60, 60–80, 80–100 cm in May, the same term for all variants. For each sample, the following agrochemical properties were determined: the content of nitrate nitrogen (NO_3-N), mobile phosphate (P_2O_5) and exchangeable potassium (K_2O).

The highest content of nitrate nitrogen was observed in the variant with minimal anthropogenic impact – with the field protective forest belt. The nitrate nitrogen content in the topsoil (0-20 cm) was minimum in the variant with monoculture – by almost 3.4 times less than in the variant with the forest belt. Long-term use of crop rotation and organic fertilizers had a favorable effect on the content of mobile phosphorus and exchangeable potassium in the topsoil, but this content sharply decreased in deeper layers. The lowest content of mobile phosphorus and exchangeable potassium in topsoil was in the variant with monoculture and in the variant with crop rotation and natural soil fertility.

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Keywords: carbonate chernozem, chemical properties, crop rotation, mobile phosphorus, nitrate nitrogen content, organic fertilizers.