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**THE ROLE OF PERENNIAL HERBS IN CONSERVATION
AND REPRODUCTION OF SOIL FERTILITY**

Antipova L. K., Doctor of Agricultural Sciences, Professor
Mykolayiv National Agrarian University

Petrychenko V. F., Doctor of Agricultural Sciences, Professor
*Institute of Feed and Agriculture of Podillya
of the National Academy of Agrarian Sciences of Ukraine*

Adamovics A. M., Doctor of Agricultural Sciences, Professor
Poisha L. A., Doctor of Agricultural Sciences
*Institute of Soil and Plant Sciences of the
Latvia University of Life Sciences and Technologies*

It is generally known that constant anthropogenic and technogenic growing pressures on natural ecosystems lead to depletion, dehumification of soils, and, consequently, loss of their fertility. There is no doubt that the chernozems, which occupy more than the half of the entire territory of Ukraine, create optimal conditions for growing crops, specifically cereals and legumes, fodder, etc.

On the flip side, according to the Institute of Soil Science and Agricultural Chemistry named after A.N. Sokolovsky and others, in Ukraine the area of degraded and infertile soils, including eroded, is increasing every year.

A similar situation is observed in Latvia, where clay soils are ubiquitous. An agrochemical study conducted by the State Plant Protection Service (GSOR) indicates that the quality of soil in Latvia has also deteriorated in recent years. The natural fertility of all subtypes of podzolic and peat-bog soils is low. They are poor in humus and minerals necessary for plant nutrition, and also contain organic acids.

The weighted average humus content in Latvia is about 2.0%; in Ukraine it is almost twice as high. For intensively cultivated regions of Ukraine and Latvia there is a problem of protecting the soil from water and wind erosion. It has been taught that in order to increase fertility, acidic soils must be calcified (to neutralize acids and improve structure), and organic and mineral fertilizers should be applied. On slopes, measures are required to combat soil erosion (water erosion).

Well-known home and foreign scientists have proved that to protect the soil from erosion, it must be provided with all the necessary substances and energy and is possible mainly due to the magnification in the area under perennial grasses, especially legumes. At the same time, planted with perennial grasses decreases annually. In all categories of farm-holdings in Ukraine in 1990, 12.3% of the total sown area was allocated for perennial grasses, in 2017 only 3.5%.

It has been established that perennial leguminous herbs (in particular alfalfa, sainfoin, and melilot) contribute to improving the temperature, air, and water regimes of soils due to their deeply penetrating root systems.

Our studies conducted in the Steppes of southern Ukraine found that both with deep plowing and small non-leaf tillage for alfalfa crops, the humus balance in the arable layer of the soil after three years of cultivation is positive: +1.56 and +1, 71 t/ha, respectively, for the above methods. This pattern allows us to confirm the feasibility of growing alfalfa and other perennial herbs in organic farming.

It has been established that from 1990 to 2017 in Ukraine, due to the reduction in areas under perennial grasses, the intake due to nitrogen fixation of biological nitrogen to the soil decreased by more than 4 times (from 478.4 to 114.6 thousand tons of active substance). If we transfer these figures to mineral nitrogen fertilizers, in particular ammonium nitrate, we will get a free pile of nitrogen in the soil in 1990 of 1390.7 thousand tons of fertilizers, and in 2017 - only 333.1 thousand tons. In value terms (at prices of 2019), these indicators are approximately 9595.8 mln UAH in 1990 and 2298.4 mln UAH in 2017.

It was calculated that from 1990 to 2017, the energy input to the soil decreased from 41525.1 TJ to 9947.28 TJ, which indicates a large energy loss.

It is known that one of the main factors of soil erosion is overly intensive plowing of soils.

We found that in southern Ukraine, the root system of alfalfa structures the arable layer of soil, especially against the background of plane-cutting loss. The structural coefficient with this method of treatment increased by 0.2-0.7 in the arable soil layer on alfalfa crops of the second year of life. The content of macroaggregates (10-0.25 mm) increased from 77.6-77.9% in the first year of alfalfa life when plowing to 79.0-80.1% in the second year of life. With planar loss, this indicator ranged from 74.6-76.8 to 78.0-87.5%, respectively.

Therefore, herbs are an integral component of the biologization of agriculture. Legumes are especially capable of enriching the soil with environmentally friendly nitrogen due to nitrogen fixation, improving its agrophysical properties, and replenishing the soil with energy. Non-observance of crop rotation and a sharp decrease in the area planted with these herbs negatively affects the indicators of soil fertility.