

9. СЕКЦІЯ ПРИРОДОКОРИСТУВАННЯ ТА ТЕХНОГЕННОЇ БЕЗПЕКИ

9.1. ПІДСЕКЦІЯ - АГРОНОМІЯ ТА ЛІСОВЕ ГОСПОДАРСТВО

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SOIL FERTILITY PROTECTION: EU EXPERIENCE FOR UKRAINE

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The importance of protecting soil fertility and preserving it is now recognized by many of the world's leading countries. In particular, the most appropriate and valuable in this area for Ukraine is the experience of the European Union countries, which every year improve the methods of soil protection and preservation of their fertility.

There are more than 800 soil types, more than 60% of them are black soils in Ukraine. The areas of degraded soils are impressive. According to various data, they make from 10 to 15 million hectares, and in 130 years the humus composition in black soil has decreased by 30% [1]. Biodegradation of humus of arable land is associated with the processes of reducing the amount of plant remains in the soil and the activity of mineralization of organic matter in it. Its annual losses make over 20 million tons, and accordingly the area of degraded land increases by 80 thousand hectares [1]. Therefore, the restoration of natural fertility involves the search of new forms and types of organic fertilizers, ways of their application, the development of agrotechnical methods of deposition and storage of biogenic humus elements, which will increase the quality parameters of soils.

Ukrainian black soils are gradually being transformed into medium fertile soils. The main causes of fertility loss are: moisture deficiency, unbalanced nutrition, degradation. More than 75% of the territory of Ukraine suffers moisture deficiency [2]. The moisture content of Ukrainian soils is indeed much lower than in Western Europe. Only moisture conservation technologies for soil cultivation, growing varieties and hybrids adapted to the arid conditions, as well as restoration of irrigation can help resist it. The second factor is unbalanced nutrition, nutritional deficiency. The third reason for the decline in fertility is degradation. Degradation processes have been developing very intensively since the early 1990s. The eight-crop rotation was quickly changed into two- and three-crop rotations. Besides, the country has gradually developed an unjustifiably high level of agricultural development and plowing. Today, the ratio of arable land and natural forage is 3: 1, when the norm is 1: 1. The scientifically reasoned crop rotation can successfully manage soil fertility. Today, approximately 14-15 million hectares of Ukrainian lands are affected by degradation. A direct consequence of degradation is a decrease in yields, which means that Ukraine receives 35 billion UAH less in production each year [2].

The European soil preservation and fertility policy has already been proven by years of experience and time, can be successfully implemented in Ukraine. It provides legislative technological support for the rational use and soil preservation. In developed countries, regardless of ownership, soil resources are managed by the state. In addition, nowhere in the world a farmer is left alone with problems, especially when he implements soil protection technologies. For its part, the farmer is also responsible for complying the rules, which aim to maintain an appropriate level of soil fertility. Violations lead to considerable penalties.

For instance, the Austrians estimated that erosion of a 1 cm soil layer (of average density) leads to irreversible loss of about 150 tons of fertile land per hectare. The crop losses at compaction of the soil by heavy transport can reach up to 35% [3]. For Austrians crop rotation is not only intended to promote soil fertility. Its related objectives are to control weeds, plant diseases and pests. Another purpose of crop rotation - resource conservation through a closed fields contour, optimization of the labor economy. It is cultivated to grow mixtures of plants as intermediate crops in Austria. For this agrarian activity farmers receive subsidies from

the government: from 120 to 200 EUR per hectare. It is about growing from one to five crops at a time in one field, meeting the requirements for crop dates and cultivation [3].

Therefore, the basic measures for preserving soil fertility combine soil and water conservation methods, avoiding soil compaction and energy-efficient ways of cultivating it.

Another prime example is the organo-biological systems of soil cultivation in Sweden and Switzerland. The system essentiality is to create a "live and healthy" soil by activating microflora life. The activities of farms are based on the principles of inheritance of the natural ecosystem: fields for a long time under plants, plant residues are laid in the top layer of soil, in crop rotation are grown legumes and grass mixtures. Only organic (manure, straw, siderata) fertilizers and mineral slow-soluble tuka (tomashlak, potassium magnesium, basalt dust) are allowed. Fire and agrotechnical measures are used to control weeds. With pests and diseases - preventative measures. It is allowed to use non-toxic preparations - essential oils of plants, powders of algae and rocks, biodynamic preparations (infusion of nettle, decoction of horsetail or bitter wormwood) [3].

The experience of France's biological (ecological) farming system is valuable. The use of mineral fertilizers, especially easily soluble, is dramatically reduced. The main source of plant nutrition is organic fertilizers. Fresh organic fertilizer is recommended not to be deeply embedded in the soil by this technology. The predominance of anaerobic processes may produce toxic products for the seeds and roots. Prior to grounding, organic substances should be composted to undergo aerobic fermentation. Basalt dust, ground algae are recommended for soil acidity removal [4]. Soil cultivation is of great importance, which increases its biological activity. One of the elements of organic farming is crop rotation with a regime of saturation with one crop and the use of siderates. For plant protection, pest and weed control, the same measures are being taken as in the organo-biological system.

Considering the current state and degradation processes of Ukrainian soils, a number of measures need to be developed and implemented. The most important of them are: implementation of scientifically valid crop rotations; increase in volumes of organic fertilizers application, in particular through the use of non-market crop leavings (straw, stubble, crushed sunflower stems, corn, sorghum, vetch), leguminous crops, perennial grasses and siderata. To address the problem of soil reproduction and fertility, Ukraine must have a clear strategy for soil protection, which includes the effective functioning of soil protection programs, monitoring of their implementation, mandatory regulation of anthropogenic influence.

References

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