BIOLOGICAL ACTIVITY OF LIGHT-GRAY FOREST SURFACE GLEYING SOIL DEPENDING ON THE ANTHROPOGENIC IMPACT

V. V. Snitynskyi¹, A. Y. Gabriel², O. M. Hermanovych¹, Yu. M. Olifir²

¹Lviv National Agrarian University,

1, Volodymyra Velykoho Str., Dublyany Town, Zhovkivskyi district, Lviv region, 80381, Ukraine

²Institute for Agriculture of Carpathian Region of NAAS

5, Hrushevskoho Str., Obroshyno Village, Pustomyivskyi district, Lviv region, 81115, Ukraine

e-mail: olifir.yura@gmail.com

The most important task of agricultural chemistry is the optimization of the circulation of substances in agricultural ecosystems and regulating chemical processes occurring in the soil to improve crop yields and improve product quality through preservation of soil fertility.

In the fertility formation and regulation of all valuable properties of soil microorganisms play a major role. They participate in the mineralization of organic fertilizers applied to the soil, crop residues of agrophytocenoses, transformation of inaccessible to plants nutrition elements into an accessible form, transformation of applied fertilizers providing the circulation of substances in biogeocenoses and closing biological cycles of ecosystems. Due to high lability microorganisms are sensitive to changes occurring in the soil in the process of agricultural use and can serve as indicators of environmental change [1; 2].

Indicators of biological activity allow to judge on the conditions of nutrition, plant growth and development and, ultimately, the level of soil fertility and productivity [3].

Despite the considerable attention of researchers to the diversity and functioning of soil biocenoses, the literature insufficiently highlights the issue of regularity of their composition change depending on environmental conditions. However, we know that due to the effect of a stress factor on microbial coenosis that affects individual ecological and tropical groups of microorganisms, the most noticeable development of certain groups of bacteria and depletion of species diversity groups is observed [4].

The objective of the study is to investigate special features of functioning of the of light-gray forest surface gleying soil

microflora under prolonged use of different systems of fertilization and liming.

Materials and methods. The study was conducted in the prolonged stationary experiment of the laboratory of agriculture and soil fertility restoration of the Institute for Agriculture of Carpathian Region of NAAS, started in 1965 on light-gray forest surface gleying soil with different doses of mineral fertilizers, manure and lime in the field of green corn, which begins the ninth sequence of four-field crop rotation: corn for silage – spring barley with clover undersow – meadow clover - winter wheat.

The agrochemical characteristics of ploughing layer of soil before the experiment start: humus content (by Turin) – 1.42%; pH_{KCl} 4.2; hydrolytic acidity (by Kappen) - 4.5; exchangeable acidity (by Sokolov) - 0.6 mg eq./100 g of soil; content of mobile aluminum – 6.0 mg/100 g of soil; mobile phosphorus (by Kirsanov) and exchangeable potassium (by Maslova), respectively, 3.6 and 5.0 mg/100 g of soil.

Cultivated area of plots - 162 m², reported – 100 m², repetition of the experiment – three-time.

The study was conducted in the following variants: without fertilization (control, variant 1); organic fertilization system (variant 4), organic and mineral (variant 7) and mineral (variant 17) on the lime background and in the variant of prolonged systematic application of mineral fertilizers (variant 15).

Soil biological activity was studied by decomposition of gelatine layer of X-ray film and application method [5]. The number of microorganisms was studied on nutrient agar, Endo medium and Sabouraud medium [6].

The results of the studies in prolonged stationary experiment indicate that the reduction of the reaction of soil solution by chemical reclamation and fertilization make a decisive impact on the intensity of biological processes in light-gray forest surface gleying soil.

At systematic joint use of manure and fertilizers on the lime background the overall biological and protease activity, number of

saprophytic and aerobic bacteria has increased at most. The number micromycetes increases mostly in control variants and mineral fertilization.

Prolonged use of mineral fertilizers on low-buffer light-gray forest surface gleying soil reduces biological activity and the number of microorganisms in the soil to the level of control without fertilizers.