

AGROCHEMICAL ASSESSMENT OF VARIOUS FERTILIZERS SYSTEMS OF CORN IN TRANSCARPATHIA ON THE BASIS OF MICROELEMENTS' BALANCE INDICATORS

*Спаський Г.В., доктор економічних наук, директор,
Закарпатська державна сільськогосподарська дослідна станція
НААН, с. Велика Бакта, Берегівський р-н, Закарпатська обл.,
insbakta@ukr.net*

One of the decisive conditions of a sustainable development of agroindustrial complex and increase of its efficiency is the rational usage of the land resources. To the prior substances, the balance of which should be defined practically in all the nature-climate zones of Ukraine, belong humus, nitrogen, phosphorus, potassium, and then on renewable energy, which is in the agrochemical products – potential pollutants of the environment. The balance calculation of the nutritional chemicals in soil should be viewed as the most available and realized control on the state of soil's productivity in each household. It is being realized under the following scheme: suspension items – introduction of the mineral and organic fertilizers, - yield removal of agricultural crops, - incoming of the seed and planting material – sediment detachment, receiving from the precipitation, filling at the expense of the inter green manuring, —refill due to the own nitrogen fixation, - refill thanks to then on symbiotic nitrogen fixation. For balance calculation it is necessary to have the requirements of macro elements' removal by the different cultures, standards of nitrogen fixation, sediment detachment and others. The main and most important part of nutrition chemicals incoming into the soil are organic and mineral fertilizers. Metering the nutrient substances, which enter with the mineral fertilizers, is being defined according to the content in the solid fertilizers of the main active substance. Metering the nutrient substances, which enter with the organic fertilizers, is being defined according to their chemical composition. Entry of the biogenic elements with the different kinds of organic fertilizers are the following: on the basis of green manures (blue lupine) general nitrogen– 138,2 kg/ha, phosphorus – 66,9 kg/ha, potassium – 147,6 kg/ha; mold (40 t/ha) – nitrogen – 196,0 kg/ha, phosphorus – 128,0 kg/ha, potassium– 224,0 kg/ha. Of course, the circulation and balance of the nutrition chemicals have to be directed on the effective functioning of agro ecosystems, when the partially lost by them characteristics – circularity, self-regulation and sustainability – are being constantly kept in them from the side of the anthropogenic factors, especially in the gradually increasing sizes, to the degree of arable farming intensifying. Lysimetric investigations give the possibility to control the migration of moistness and nonproductive losses of biogenic elements, which are in the conditions of Polesye (forest area) and make up the new modern technologies of growing the agricultural crops - V International scientific-practical conference of young scientists (Kyiv, 29–30

September 2016) 22 I. Agro chemistry and arable farming in general: moisture – 16–18 % from the yearly amount of rains, biogenic elements from soil and fertilizers – 120–200 kg/ha, and also to work out the technology of reducing these losses in 1,4– 2,5 times. The aim of the given investigation is realization of the ecological-agrochemical grounding of various systems of corn fertilizers while growing it in the terms of the moderately previously cultivated soils of soddypodsolic type of Transcarpathia. The investigations were conducted in the stationary field research and stationary lysimetric device of Zakarpatian State Agricultural Experimental station of NAAS during 2011–2015 . A chain of crop rotation: winter wheat-corn-spring wheat-blue lupine. The frequency in research is quadruple, general area of land - – 102 m². The scheme of research included the following variants: 1. Control – without the fertilizers; 2. Mineral system of fertilizers NPK (N90P90K120); 3. Green manure crop – blue lupine; 4. Green manure crop + NPK; 5. Mold, 10 t/ha; 6. Mold + NPK; 7. Green manure crop + mold+ NPK; 8. Mold, 20 т/га. Variants of field experiments 1, 2, 4, 6, 7 have been duplicated in the lysimetric research. Many years researches had shown, that the ultimate analytical variants of lysimetric experiment - fallow land and pouring over differed from each other in the moisture loss approximately in four times , humus substances- in 6 , biogenic elements : calcium, nitrogen and magnesium – in 8– 14times; phosphorus and potassium, correspondingly to the elements - in 4–16times, which is efficient ; the vertical moisture migration, water soluble humus and biogenic elements is rational to regulate with the crop rotation cultures (type of plant growing). The advantages should be given to the many years' grasses, a part of which in the crops rotation has to be equal to tilled crops. Our researches in the lysimetric stationary device had shown that any fertilizing system (organic, mineral, and mixed) is rational to be strengthened with the growing of the green manure crops in the intermediate sowings, which gives the possibility to lower the losses of humus substances and biogenic elements in 1,5– 2,0 times, over the measures of the roots containing soil layer, especially of calcium, nitrogen and magnesium. The productivity of corn depending from the system of fertilization had changed due to the following factors: yield capacity of grain maize on the control (without fertilizers) 4,6t/ha under the influence of fertilizers have provided approximately the same level of grain yield capacity– 8,0 t/ha. In case of combination of the tilled crops with mold and green manure crops the grain yield capacity made up 9,0– 9,5 t/ha. Due to the complex assessment of various fertilizing systems there had been established, that the traditional system of fertilizing (mold + NPK) can be replaced by the alternative (green manure crops + mold), which gives the possibility to lower the productive expenses and increase the level of profitability of arable farming almost in 3 times. Alongside with this, the productivity of the crops rotation decreases inconsiderably on 3–5 %, energy efficiency increases in 1,5times, intensity of macroelements balance doesn't change essentially. In the aspect of optimization of nitrogen balance, the green manure crop should be examined as the agro technical method of the multy planned action: the source of nitrogen admission, optimizing the taking out, reception, directed on the increase of the nitrogen losses according to the

infiltration of the downfalls, increase of the coefficient of nitrogen usage from the mineral fertilizers and soil. The calculations had shown, that under the variant without the fertilizers in the mentioned above crop rotation the nitrogen balance made up minus 42 кг/ha, phosphorus –minus 20 кг/ha, potassium – minus 46 кг/ha; mineral system of fertilizers had provided the positive balance of nitrogen and phosphorus on the level of 11– 22 кг/ha and debt neutral – potassium, in case of combining the green manure crop with the tilled crop there had been obtained the positive balance according to all the macro elements, due to the saturation of agro technology with the fertilizers (green manure crop + mold + NPK) productivity of crop rotation made up more than 8 tons from one unit per hectare with the balance intensity on the nitrogen 140 %, phosphorus– 190 %, potassium– 89 %.