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THE ANALYSIS OF NEGATIVE IMPACT OF FERTILIZERS ON THE ENVIRONMENT ON THE EXAMPLE OF BASHTANKA DISTRICT IN THE MYKOLAIV REGION

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The agroecological assessment of the main types of fertilizers in order to predict possible negative consequences of their impact on soil system and water objects as related components of agro-ecosystems had been done.

Key words: fertilizer, environment, soil, chemical elements, surface drainage.

Introduction. The negative effects of the uncontrolled use of fertilizers are associated with the fact that they, with key nutrients often contain various impurities in the form of heavy metals, organic compounds, radioactive isotopes, which can lead to their negative environmental impact on crop production, wildlife, people health, who work with fertilizers and on the population in general [1]. Raw material for fertilizers - fosforydy, apatite, raw potassium salts usually contain significant amounts of impurities - from 5.10 to 5% or more. The presence of toxic elements such as arsenic, cadmium, lead, fluoride, strontium, should be considered as potential sources of pollution and to be strictly taken into account applying fertilizers in to the soil [2]. According to some authors [3,4,5] in the last 5-7 years significant changes have occured in the structure of contamination of agricultural products: nitrates took the first place - 75% out of all the pollutants while the proportion of heavy metals is - 15% and pesticides - 8%. The problems of ecologically efficient use of fertilizers has gained considerable attention from the famous scientists such as O.O. Hatsa [6], V.V. Horlachuk, L.V. Deineko, E.V. Hlobystov [7] and others.

Analysis of recent research and publications showed that the lack of fertilizers on the one hand, and the use of substandard high ballast types, on the other, requires to solve the complex problem: to provide agriculture Ukraine with the sufficient amount of fertilizers and to prevent possible negative consequences by the prohibition of using low-quality species.

Problem. Despite a number of negative consequences of the use of fertilizers, the results of domestic scientists' researches show that through the use of fertilizers the growth on average in 40-50%in major crops, can be obtained which is significantly higher than the proportion of the increase in yield varieties of seeds, plant protection products or cultivation. Depending on the soil-climatic and other conditions the increase of the harvest due to fertilization varies widely. Thus, in Polissya it is 60%, forest-steppe - 40% in moist soil steppe - 15%, dry - 10% and irrigated desert - 40% [2,3]. The regulation of the safe use of fertilizers and disposal of their waste requires precise quality control system and matching fertilizers safety for human health and environment and the development of

scientifically based requirements for hazard assessment in the fertilizer production and its use in agriculture.

The purpose of research is to assess agroecological estimation of the main types of fertilizers in order to predict possible negative consequences of their impact on soil system and water objects as related components of agro-ecosystems.

The results of the research. The basis of writing study consist of the collecting, processing and filing of annual reports materials provide by District Department of Environmental Inspection of Mykolaiv and results of their research.The predicting of a risk of fertilizer application based on the timing of achieving critical concentration in soil elements, which have to be monitored. Carrying out the calculations of toxicants give us an opportunity to assess the potential danger of the type of fertilizer and, if it is necessary, take appropriate measures to improve the quality of his or limit of its use in fragile ecosystems. The ratio of the content of toxic elements in the soil during the process of applying the fertilizers to their background content can be used as an indicator of ecological condition of the soil system. Due to the results of our research, soil will be received 84 mg / ha nickel, 20-25 mg / ha of cadmium, zinc and copper when physical mass of 100 kg of ammonium nitrate would applied. This amount of impurities is safe for environmental conditions of the soil, but adding fertilizer doses under planned yield (more than 35 kg / ha) the concentration of heavy metals will increase that are potentially dangerous [9].Talking about the pollution of surface waters, cadmium impurities are the most dangerous (3^{rd} grade of water quality). Ammonium sulphate contains more impurities than ammonium nitrate in 2,5-10,0 times. Adding the same amount of ammonium sulfate (100 kg of physical weight) causes water pollution by cadmium (3^{rd} grade of water quality). The results of our studies show that use of physical mass of 100 kg superphosphates - simple and dual flow causes the more amount of toxic contaminants into the soil per unit area compared with other types of fertilizers. For example, copper will receive 1830-3120 mg / ha, lead - 2170-2900 mg / ha, nickel - 1290-2650 mg / ha. Despite the significant funds of toxicants, the time during which it achieved a critical concentration is more than 100 years. Talking about the water pollution, simple superphosphate causes the IV th grade of pollution by lead, IIIrd grade of pollution by other impurities. Doubled superphosphate in less harmful than simple superphosphate to the soil (due to the fewer dietary fibers), water pollution achieves the IIIrd grade which is determined by the amount of toxic substances. Danger can also be made by toxic impurities contained in the potash fertilizers, as evidenced by the results of the evaluation potassium chloride: Zn -3.1 mg / kg, Cu - 8,7, Ni - 4,3, Pb - 8,7, Cd - 0,25 mg / kg. These will determine the number of toxic contaminants entering the soil copper and lead by 870 mg / ha, zinc and nickel - 300-400 mg / ha. Concentrations of pollutants in water will cause pollution of IInd - IIIrd grades. There are indicators of agroecological evaluation of potash fertilizer application for their impact on soil and water bodies. Potassium sulphate contains higher concentrations of impurities per unit mass of fertilizer, so the flow of toxins in the soil are higher compared to potassium chloride. The greatest threat

in pollution is made by cadmium - 100 mg / ha of soil and 3.3 mg / L of water (class IV - dirty water). Adding 100 g of ammophos in revenues gaining 1400 mg / ha zinc, 500 mg / ha copper, 36 mg / ha cadmium. Water objects will be on a level determined by class II-III pollution. Nowadays, fertilizer application - one of the key elements in the system of measures to increase the volume and to improve the productivity and efficiency of crop production industry. It should be noted that in recent years due to the elimination of large livestock farms the use of organic fertilizers reduced significantly.

Conclusions: According to research conducted and data based in Table 5 and Fig.1 can conclude that last few years, more precisely from 2005 to 2013, the amount of space that have been fertilized with organic fertilizers decreased steadily from 6 thousand hectare in 2005 to 1.5 thousand hectare in 2013. The exception is only 2008, when the background of the global financial crisis and the absence of appropriate funds in the agricultural enterprises to purchase fertilizers dramatically increased the amount of use of cheaper and available organic fertilizers, and this volume amounted to 8.7 thousand hectares. The number of listed organic fertilizer per hectare is constant and is 0.1 tonn of organic fertilizer per 1 hectare. The volume of organic fertilizers in the subzone fluctuate significantly from 7.5 - 9 vol. / hectare in the forest steppe zone up to 12.5 - 14 t / hectare in the area of the Northern steppe. Analyzing number of fertilizers ammonium nitrate is characterized by the lowest content of toxic contaminants. Phosphate fertilizers ranks as the first one among mineral for the content amount of toxic contaminants. The most dangerous component is cadmium phosphate fertilizers. Among potash potassium sulphate highest content of impurities. Particular attention should be given to cadmium pollution control. The application does not lead to pollution of the upper layers of soil by heavy metals. Time to reach a critical concentration of the element fluorine in soil is 45 years. Weather migration of chemical elements in the application of ahrofosk indicates to the need to control the flow into the water of fluoride and iron. The application of humate ammonium sulfate need to control the copper content to prevent water pollution. In order to prevent the threat of environmental pollution by fertilizers, we have to organize a clear system of quality control and compliance of fertilizers safety for human health and the environment and its use in agriculture.

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ANALYSIS ON THE NEGATIVE INFLUENCE FERTILIZED OKRUZHAYUSCHUYU ENVIRONMENT FOR EXAMPLE BASHTANKA RAION NYKOLAEVSKOY AREA

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Key words: fertilizer, environment, soil, chemical elements, surface drainage.

Summary

It was done the agroecological assessment of the main types of fertilizers in order to predict possible negative consequences of their impact on soil system and water objects as related components of agro-ecosystems.

АНАЛИЗ НЕГАТИВНОГО ВЛИЯНИЯ УДОБРЕНИЙ НА ОКРУЖАЮЩУЮ СРЕДУ НА ПРИМЕРЕ БАШТАНСКОГО РАЙОНА НИКОЛАЕВСКОЙ ОБЛАСТИ

Вовкодав Г.М.

Ключевые слова: минеральные удобрения, окружающая среда, грунт, химические элементы, поверхностный сток.

Резюме

Проведена агроэкологическая оценка основных видов минеральных удобрений для прогнозирования возможных негативных последствий их влияния на почвенную систему и водные объекты, как смежные составляющие агроэкосистемы.