AGROCHEMISTRY DEPARTMENT

National Scientific Center «Institute for Soil Science and Agrochemistry Research named after O.N. Sokolovsky» (NSC ISSAR), Kharkiv, Ukraine

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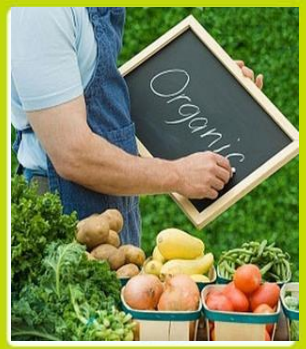
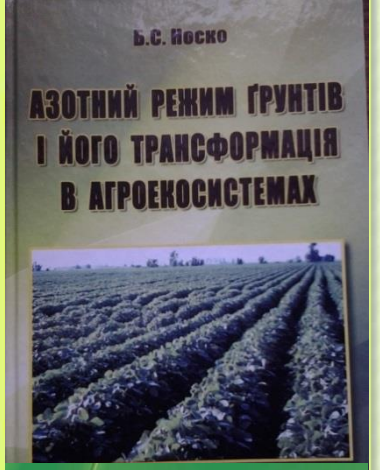
Skills and competences

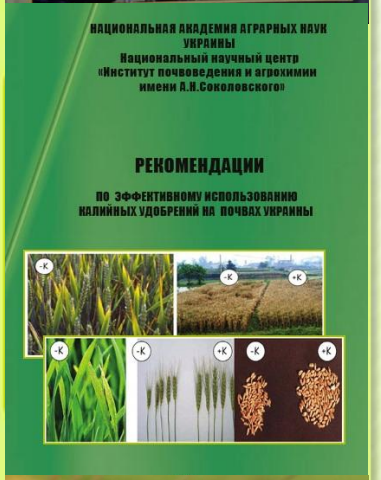
- Soil diagnostics of mineral plants nutrition;
- Soil fertility diagnostics and monitoring at the different levels of agricultural biologization;
- Diagnostics and monitoring of soil quality in traditional and alternative agriculture;
- Diagnostics of macro-and microelement plants' nutrition;



Skills and competences

- The anthropogenic evolution of the nitric, phosphatic and potassium state of soils of Ukraine;
- Optimization of fertilizer systems of the agricultural plants using the processed and native mineral fertilizers;
- Ekological and agricultural chemistry estimation of agricultural lands and soils for organic production;
- Development of operational and long-term prognosis of nutrients in the soil;
- Soil quality management;
- Testing new forms of mineral fertilizers, microbiological drugs and growth promoters in different soil types.

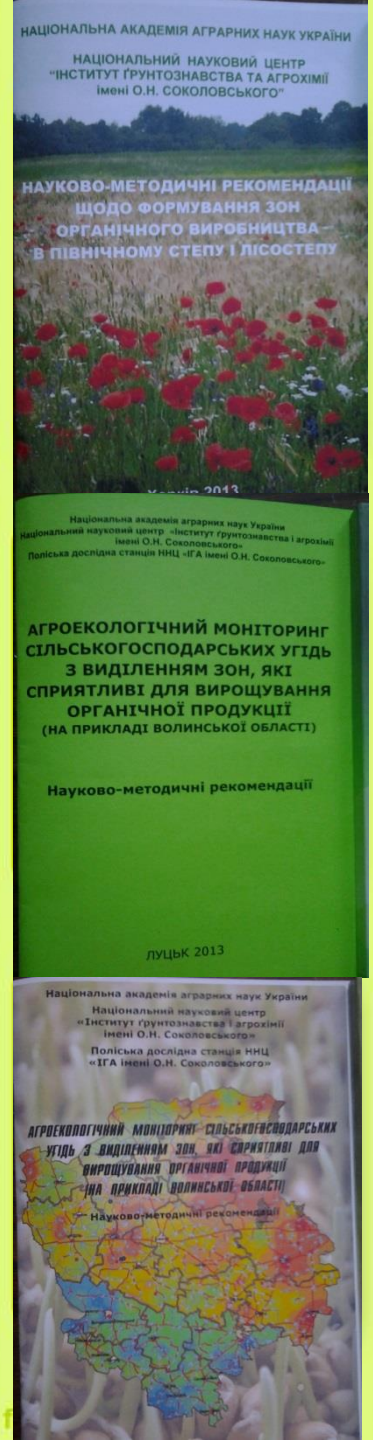




Main scientific results

NSC ISSAR Ukraine

- Monographs «The anthropogenic evolution of chernozems», «Agricultural chemistry aspects of arable farming ecologization»;
- Monographs «Nitrogen regime of soils and its transformation in agroecosystems»;
- Normatively methodical providing of precise determination of phosphorus, potassium and total nitrogen available compounds in soils of Ukraine;
- Conceptual model of biological agriculture on the basis of creation areas of trophic comfort for plants ;

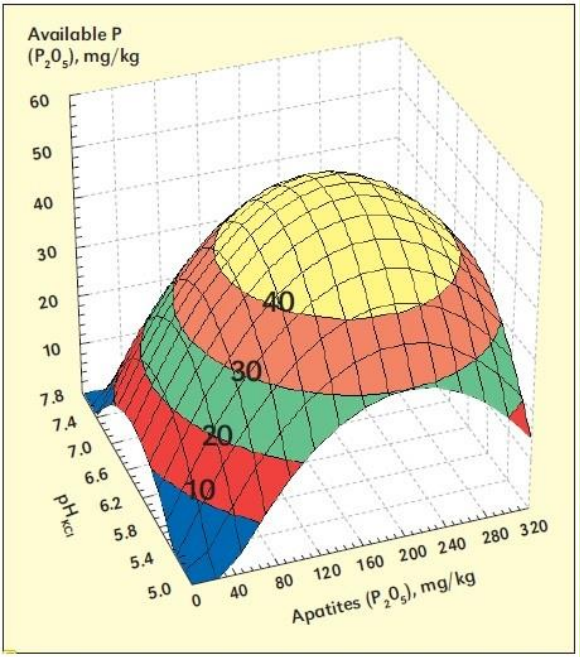


Main scientific results

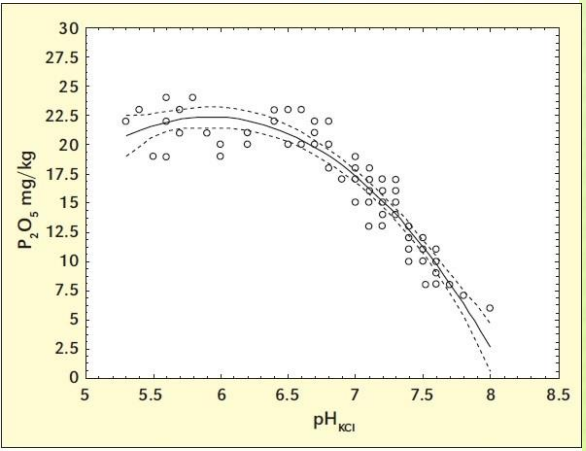
NSC ISSAR Ukraine

- The system of agricultural plants fertilizing on the basis of precise diagnostics of soils;
- Technologies of the effective using of phosphorites of local deposits in Ukraine;
- Department is the first among the CIS countries, that has developed a system of national standards for methods of determining nitrogen, phosphorus and potassium in the soil of the country. The use of these normative documents can improve fertilizer efficiency by 30-50%.

Improvement of Diagnosis Accuracy of Phosphate Status for Ukrainian Soils



Determination of P in soils by the Egner–Riehm method depending on soil pH and apatite content (Ca–P fraction).



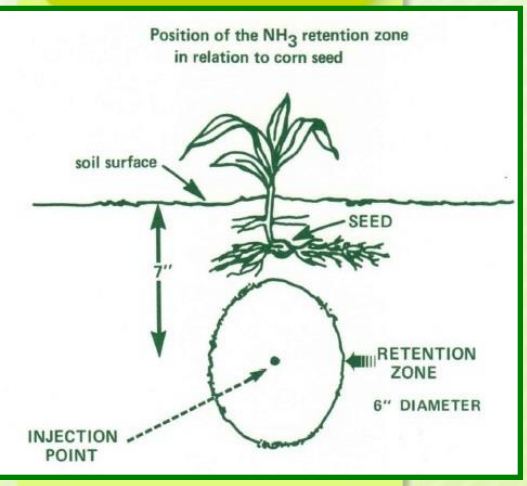
Results of the determination of available P by the Olsen method depending on soil pH.

- **Most methods include the use of strong acid solutions that can underestimate results for all coarse (sandy and loamy sandy) soils, as well as for strongly acid (pHKCl < 4.5) soils of different textures, and can overestimate results for soils with high contents of primary P-containing apatite minerals.**

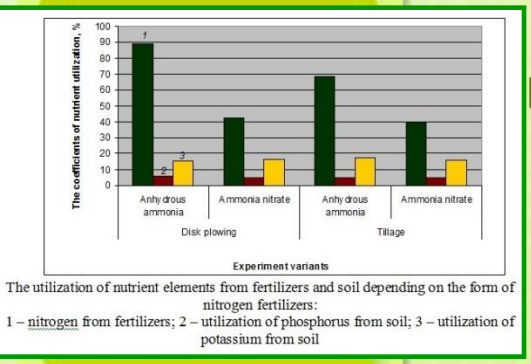
- **Presently by the Agrochemistry department it has been developed eight national soil test standards and five standard drafts for Ukraine's 32 million ha of arable land. The process began with the identification of Ukrainian regions and soil types for which specific chemical methods of determining plant available N, P, and K are most advisable.**

Influence of anhydrous ammonia on the soil properties and environment

Achieve the environmentally sound application of anhydrous ammonia in agriculture is possible guided by the following sentences:



- It is not recommended on acid sandy soils autumn application of anhydrous ammonia, which can cause saturation of the soil by ammonia at a time when nitrification processes are weakened, and starting the intensive irrigation of soil by precipitation;
- safe application of liquid anhydrous ammonia in agriculture, does not change the soil and environmental indicators are achieved through its application in the rate, which does not exceed 100 kg/ha to a depth of 18-20 cm;
- the application of anhydrous ammonia in agriculture should be subjected to systematic monitoring of soil fertility following indicators: exchange acidity of the soil solution, the content of labile carbon number of different groups of microorganisms, saturation soil absorption complex ammonium.



The utilization of nutrient elements from fertilizers and soil depending on the form of nitrogen fertilizers:
1 – nitrogen from fertilizers; 2 – utilization of phosphorus from soil; 3 – utilization of potassium from soil

Investigation of emissions and carbon sequestration

- One of the methods reducing the emission of CO_2 flux is to increase carbon accumulation in the soil. Additional advantage is the simultaneous increase of efficiency of agricultural production and environmental protection. Methods farming occupied an important role in the accumulation of soil carbon and raising the ecological in production systems.

- Investigations on improving the methods for calculating volumes and dynamics of CO_2 emissions from soil in the future may be used for the implementation agricultural technologies aimed at reducing greenhouse gas emissions and assessment of the impact of land use on humus state and carbon sequestration in the soil.

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Thank you for your attention!!!

With Best Regards,

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