

## ABSTRACTS

### LAND RECLAMATION IN LENINGRAD REGION: PROBLEMS AND INNOVATIVE SOLUTIONS

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The paper presents some data on the work of agricultural enterprises on reclaimed lands in the Leningrad region. The results of observations and surveys of drainage systems are included. The analysis of the factors affecting the water-air regime of reclaimed land with expired guarantees is presented. Program activities for the prolongation of the drainage exploitation periods and for the repair of drainage systems on agricultural land are recommended.

**Key words:** program, repair, drainage tube, reclaimed land, siltation, fault, collector, method.

### SCIENTIFIC BASIS FOR LANDSCAPE-ADOPTED TECHNOLOGIES OF SOIL AND CROP MANAGEMENT ON RECLAIMED LANDS OF NON-CHERNOZEM REGION

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The problems of soil and plant management in the landscape-adopted technologies on reclaimed lands are discussed. The state of reclaimed lands and the role of these lands in plant production are described. The main principles of crop rotations in the landscape-adopted technologies are given.

**Key words:** reclaimed lands, landscape-adopted technologies of soil and plant management.

### ABOUT LIMING OF ACID SOILS IN RUSSIA

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Soil liming is one of the first steps to be taken for soil quality improvement. The paper presents the results on the positive effect of soil liming with lime stone materials which are extracted directly from lime stone deposits in Tatarstan. The way for transferring the technique to the Leningrad region are being discussed.

**Key words:** soil amelioration, soil fertility, fertilizer applicators, technical conditions, lime stone.

### ECOLOGO-AMELIORATING AND AGROBIOLOGICAL METHODS TO INCREASE PRODUCTIVITY OF ORGANIC SOILS IN THE EUROPEAN NORTH OF RUSSIA

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Based on the results of the soil fertility survey the ways to increase peat soil productivity are given. Soil management, soil reclamation and plant management should be based on the condition of individual studied areas. Individual fields have to become part in crop rotation systems where yields are being planned according to the soil condition.

**Key words:** peat soils, agroecosystems, effective management, mineral fertiliser rates.

### THE STATE OF LAND RECLAMATION IN THE NOVGOROD REGION

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The article provides information about the development of land reclamation in the Novgorod region from the mid-nineteenth century to nowadays. It tells about the very first system of drainage in Russia, built by the academician N.I. Zheleznov in 1854. Special attention is paid to scientific developments over the last 25 years. As a result of research of various methods and ways of draining have shown that the two most effective methods used in the area were tiered drainage and flow hollows. Analysis of productivity of reclaimed lands has shown that it depended very much on time and meteorological conditions of growing seasons. The analysis of the land reclamation state in the Velikiy Novgorod region, as well as the goals and objectives of the regional program «Development of the agricultural lands melioration in Novgorod region 2014-2020» are given.

**Key words:** drainage pilot plots, flow hollows, agro-ameliorative actions, reclaimed land.

### CONDITION AND EXPLOITATION OF AGRICULTURAL RECLAIMED LAND IN THE REPUBLIC OF KARELIA

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The paper shows that the main part of Karelia is covered with wetlands. These soils need drainage reclamation in order to improve water-air regime of the soils and make them available for the farmland industry. The analysis of the current state of agricultural lands in Karelia and the results of the reclaimed lands inventory are presented. It is revealed that at the present time only 44.6% of available reclaimed lands are used in the farmland industry. There is an indication that further degradation and cultivated land elimination can lead to complete stagnation of the agricultural industry of the region. Prospects of further development of farmland in the region are listed.

**Key words:** reclaimed lands, reclamation systems, land owners, soil characteristics, development prospects

## INFLUENCE OF POLYMER GEL «RITIN-10» ON THE WATER-PHYSICAL PROPERTIES OF SOILS

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Hydrogels are considered to be useful for regulation of water-physical properties of agricultural soils. Hydrogels increase soil water-holding capacity, water use efficiency and infiltration rates. The hydrophilic polymer chains of hydrogel can swell in water.

In our research the swelling of hydrogel in water and in Knop solution were studied as well as water-holding capacity of sandy soil, grey forest soil and loamy sand Spodosol with and without hydrogel. The results have shown that water-holding capacity of the soil with the hydrogel was higher.

**Key words:** Hydrogels, swelling, water retention, soil.

## SOME RESULTS OF LAND RECLAMATION WITH FINE FRACTIONS OF DOLOMITE AND BLAST FURNACE SLAG OF THE CHEREPOVETS STEEL MILL

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A comparative study of the fertilizing value and reclamation properties of dolomite and blast furnace slag was carried out in a 4-year pot experiment. It was shown that the usage of dolomite in the rates equivalent by the neutralizing capacity with the blast furnace slag resulted in a greater shift of the pH<sub>KCl</sub> value and higher precipitation of phytotoxic cations of aluminum, manganese and iron. It also resulted in the absorption of higher amounts of exchangeable cations (Ca<sup>2+</sup> + Mg<sup>2+</sup>) by the soil. Significant differences between yields of rapeseed, vetch and wheat straw were found for average rates of the ameliorants. The effect on the productivity of wheat grain was higher for dolomite than for blast furnace slag.

**Key words:** soil, plants, dolomite, blast furnace slag.

## POSSIBILITIES FOR ESTIMATION OF RECLAIMED AGRICULTURAL LAND QUALITY GIVEN BY ACCUMULATION AND PROCESSING INFORMATION FROM REMOTE SENSING

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Possibilities of remote sensing as a source of information for determining agricultural land quality and for mapping drainage network are considered in the paper. Remote sensing information and field investigation data were used to make recommendations on the renovation of soil reclamation systems.

**Key words:** remote sensing data, hyperspectrometer, image decoding, image and data analysis, drainage network.

## SOIL ACIDITY MANAGEMENT IN PRECISION AGRICULTURE SYSTEMS

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In the classical theory of stochastic dynamic control systems pose and solve the problem of control of soil acidity in real time scale. The peculiarity of the problem is the application of the methodology and technology for precision agriculture, which allows to apply the results in practical agriculture.

**Key words:** soil liming, mathematical models of crop losses, dynamics of soil acidity indicators, medium risk, optimality criterion.

## EVALUATION OF LAND RECLAMATION AREA IN THE SYSTEM OF PRECISION AGRICULTURE

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The article covers the basics of economical evaluation of the reclaimed land area in precision agriculture system based on a qualitative evaluation of the land. The proposed economic evaluation is done in several steps and is based on the following indicators: regulated crop yields, current expenses and main funds for increase of fertility and agricultural productivity of soils, net income and evaluation of the land. The main criteria adopted for this assessment is differential rent. The economic evaluation of drained lands also includes the data on the drainage system constructions and possible yield losses related to the degree of the drainage system uptime.

**Key words:** ameliorated soils, drainage systems, differential rent, economical evaluation of agricultural lands.