

ABSTRACTS

PHYSICO-STATICAL INTERPRETATION OF THE PARAMETERS OF THE SOIL WATER RETENTION FUNCTION

Terleev V. V.¹, Mirschel W.², Badenko V. L.¹, Guseva I. Y.¹, Gurin P. D.³

¹ St. Petersburg State Politechnical University,
29 Politechnicheskaya ulitsa, St. Petersburg, 195251, Russia.

² Leibniz Centre of Agricultural Landscape Research (ZALF),
84 Eberswalder Strasse, Muencheberg, 15374, Germany.

³ Agrophysical Research Institute of Russian Academy of Agricultural Sciences,
14 Grazhdansky prospect, St. Petersburg, 195220 Russia.

E-mail: Vitaly_Terleev@mail.ru

The theoretical basis for the soil water-retention function based on the conception that the properties of a soil pore system represented by cylinder-pores are equivalent to a real pore system of the soil is given.

Keywords: soil water-holding capacity, Van Genuchten model.

THE INFLUENCE OF SOIL FERTILITY OF LOAMY SAND SPODOSOL ON CROP PRODUCTION AND SOIL PHYSICAL PROPERTIES IN THE NEWLY ESTABLISHED FIELD EXPERIMENT

Olenchenko E. A., Rizhiya E. Y., Buchkina N. P., Balashov E. V.

Agrophysical Research Institute of Russian Academy of Agricultural Sciences,
14 Grazhdansky prospect, St. Petersburg, 195220, Russia.

E-mail: buchkina_natalya@mail.ru

The long-term field experiment studying the effect of soil fertility and fertiliser application on crop yields and soil properties was established at the Agrophysical Research Institute in 2003. The first rotation of crops started in 2006 and finished in 2011. The paper presents the results on crop yields during the first rotation of the crops as well as the soil physical properties of the soils with different management. It was shown that the vegetable crops such as potato, cabbage, carrot and beat root as well as oats with legumes grown for silage were most sensitive to the level of soil fertility as well as to the level of mineral fertilizers being applied to the soils. Grain crops, such as winter wheat and spring barley were also sensitive to soil fertility but less sensitive to fertilizer application. Grasses with legumes grown for hay reacted negatively to mineral N application and produced better yields on unfertilized soils.

Keywords: long-term field experiment, soil fertility, mineral fertilizers, crop productivity, soil physical properties.

METHODIC TO CALCULATE RADIATION CHARACTERISTICS WHILE TAKING INTO ACCOUNT THE PLANT COVER OF AGRICULTURAL FIELD

Sitdikova J. R.¹, Rusin I. N.², Kozireva L. V.¹

¹ Agrophysical Research Institute of Russian Academy of Agricultural Science,
14 Grazhdansky prospect, St. Petersburg, 195220 Russia.

² St. Petersburg State University,
7-9 Universitetskaya naberezhnaya, 199034, St. Petersburg, Russia.

E-mail: yulia.sitdikova@yandex.ru

The methodic for radiation balance calculation in the conditions of clear sky is offered with taking into account the uneven characteristics of an agricultural field. Differences in the plant cover of an agricultural field are being calculated by a specially-developed computer program. The methodic allows to calculate radioactive characteristics of an agricultural field without measuring them.

Keywords: radiation balance, sum radiation, plant cover.

CHANGES IN THE PARAMETERS OF SPRING WHEAT GRAIN QUALITY AFTER GRAIN FRACTIONATION

Pasinkova E. N.¹, Pasinkov A. V.¹, Andreev V. L.², Zavalin A. A.³

¹*Agrophysical Research Institute of Russian Academy of Agricultural Sciences
14 Grazhdansky prospect, St. Petersburg, 195220, Russia.*

E-mail: office@agrophys.ru

²*North-East Agricultural Research Institute of Russian Academy of Agricultural Sciences,
166-a Lenin Street, Kirov, 610007, Russia.*

E-mail: niish-sv@mail.ru

³*Pryanishnikov All-Russian Scientific Research Institute of Agrochemistry
31-a Pryanishnikov Street, Moscow, 127550, Russia.*

The possibility of grain size-fractionation with sieves to increase the grain quality parameters is studied. Different grain size fractions have different quality properties and the quality of the whole yield depends on the amount and quality of different grain size-fractions representing the yield. Such parameters as protein and gluten content, the nature of grain and weight of 1000 grains are always higher in thicker grains while the “falling number” is smaller. Knowing all these parameters for different grain size-fractions for any particular grain yield and using sieves for grain fractionation it is possible to significantly change grain quality parameters.

Keywords: spring wheat, grain fractionation, sieve, weight of 1000 grain, protein, gluten, the nature of grain, «falling number».

POSSIBILITIES TO USE THE HYPER SPECTROMETER “LEPTON” TO MONITORE THE PROPERTIES OF PALNT-SOIL COMPLEX

Surin V. G., Moiseev K. G., Kurashvili A. E.

*Agrophysical Research Institute of Russian Academy of Agricultural Sciences,
14 Grazhdansky prospect, St. Petersburg, 195220, Russia*

E-mail: VSurin.40@mail.ru

The results of the studies of the hyperspectrometer “Lepton” together with optical, agrochemical and soil physical studies of the plants and soils at the Menkovo Experimental Station are being presented. The hyper spectrometer “Lepton” has 290 channels with the wave length from 400 to 1000 nm and specter resolution from 1 to 20 nm. On a wheat crop it was shown that the hyper spectrometer can be used to study the physiological status of the crop, plant N level as well as for indication of differences in the structure of soil cover.

Keywords: hyper spectrometer, N-stress, vegetation indices, reflection specters.

NON-TRADITIONAL WAY TO USE ERODED GRAY SOILS ON SLOPE AS A CROPLAND IN NON-CHERNOSEM AREA OF RUSSIA

Izvekov A.S., Schepotyev V.N.

*Dokuchaev Soil Institute of Russian Academy of Agricultural Sciences
7 Pyzhevsky pereulok, Moscow, 109017, Russia*

E-mail: laberosi@yandex.ru

The anthropogenic changes in the fertility of the gray soils on the slopes are being discussed in this paper. The aim of this study is to support the idea that the fertility and productivity of these soils can be improved if a special complex of soil protecting techniques is used and amelioration with green manures is applied. Soil management techniques preventing soil erosion and increasing soil productivity even in very extreme weather conditions were developed. The results received during several years of studies have shown that the developed soil management techniques were improving the eroded slope soils.

Keywords: Soil erosion, slopes, gray soils, soil fertility, soil productivity.