# METHOD FOR CALCULATING OPTIMAL SOIL DENSITY VALUE IN ANY PERIOD OF VEGETATION

A. A. Konishchev, I. I. Garifullin

*Ivanovo Research Institute of Agriculture – branch of the Verkhnevolzhskiy Federal Agricultural Research Center, 2, Tsentralnaya St., Bogorodskoye village, Ivanovskiy district, Ivanovo region, 153506*
*E-mail aleksei.konishev2010@yandex.ru*

The values of the soil «optimal density», used in Russia and the countries of the former USSR, are determined for the density averaged over the entire depth of the arable layer at the moment when the soil is ready for sowing. The assumptions and limitations adopted in their definition have now turned into a limiting factor on the way to improve soil cultivation technologies, in particular, in the transition to minimum tillage. The paper proposes a method for calculating the value of «optimal density» for any plant development phase of interest, as well as for any depth of the soil layer and treatment. The method requires the following procedure: obtaining experimental data on the relationship between the studied crop yield and the bulk density in the soil layer of interest in the studied phase of development; approximation of the obtained data by a polynomial of the second degree; study of the obtained function for an extremum. The highest point of the function will be the desired value. The obtained data are checked using the methods of mathematical statistics. The proposed method was tested on spring grain crops, and it was established that from a mathematical point of view, the yield significantly depended on the soil bulk density in the layer located deeper than the placement of seeds, at the «tillering – booting» phase of plant development. The method allows to set the density value that ensures the maximum yield of the cultivated crop in the conditions of experiments. The obtained results can be used to develop new technologies or to assess the impact of the soil bulk density on the crop yields when using certain technologies.

*Keywords:* **s**oil density, soil moisture, depth of the soil layer, growing season, yield of spring wheat.