IDENTIFICATION OF COMPONENT COMPONENTS OF SOIL MIXTURES TO INCREASE THE SURVIVAL RATE OF WHEAT

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Abstract. The article considers the parameters indicating the influence of the prepared soil mixtures on the root system of spring wheat of the AGATA variety (Russia) in laboratory conditions. The options being considered are preparatory aspects in the development of methodological aspects for improving the soil with sapropel deposits of the Lower Volga region.

Keywords: soil, sapropel deposits, root system.

The modern norms applied to the fertility of soil resources are determined by the environment-forming functions of the planet's ecosystem. In order to avoid aggravating factors of contact between man-made and biological components, predictability or programming of the necessary conditions for coexistence is necessary. One of the predictable options can be artificially composed soil mixtures that reflect the conditions necessary for a certain landscape and the cultivated crop.

Fertile soil is an indicator of the qualitative development of any plant. In the natural conditions of our planet, this component of nature is in limited values, since certain climatic and relief-forming conditions are necessary for its manifestation. A person covers the insufficiency of natural fertility by creating an artificially created soil mixture. Each such soil is formed from the base and related components that represent a certain value. The main criterion for using a certain component is availability, low price, availability of raw materials.

Modern society uses all available natural resources in the production sector, while the availability of natural raw materials is catastrophically decreasing. Newly created components and materials do not always go through the recycling process, which aggravates the environmental burden of the natural environment. Under these conditions, scientists are searching for the use of unconventional materials and components in the creation of new directions. Such technological processes are also being introduced into the creation of fertile impurities or soils.

In literary sources, soil is treated as an organic substance, which is based on a humus-containing component with added mineral impurities. Soil - any fertile soil that does not have a permanent composition. The filling depends on the material and on the method of its production (place, time, method of extraction and the process of artificial processing). There is no classification by type of soil, as well as proportions of component contents. The variation of different components and the
difference in dosage makes it possible to obtain an infinite number of types of fertile soil with special characteristics, where micro- and macronutrients are in a form accessible to plants.

This article reflects the results of studies of compiled samples of soil mixtures with predicted conditions.

To conduct an experimental study, 6 samples of soil mixtures were compiled. The prepared variants are involved in conducting laboratory studies to identify the growth processes and survival of wheat at the early stages of ontogenesis. As a test crop, the seed material of spring wheat, the Agata variety (Russia) was used.

Variants of experimental studies with a background load of artificial fungal infection were performed using the equipment of the CCP GCFM of the Federal State Budgetary Scientific Institution "All-Russian Research Institute of Phytopathology" (http: www.vniif.ru/vniif/page/ckp-gkmf/1373 ). State Collection of Plant Pathogenic Microorganisms, Indicator Plants and Differential Cultivars at All-Russian Research Institute of Phytopathology (SCPPM ARRP)/

Collection strain Fusarium avenaceum Fa-1, sporulation - 260.0 million/Petri dish, origin - 2016, Central Chernozem region, Voronezh region, the number of spores in suspension/ml - 1.4 x 106.

A standardized sample typical for the zones of possible application of artificial soil mixtures was selected.

Experimental studies were conducted in prepared versions with a test culture - spring wheat "Agata" to identify the dependence of growth processes and wheat survival at the early stages of ontogenesis in 4-fold repetition.

To compile the volume characteristics of the study, it is necessary to consider the % survival rate of spring wheat. The comparative characteristics of the conducted research are well traced on the graph. The conducted studies are reflected in the survival chart of spring wheat of the AGATA variety (Russia) (Figure 1).

Under the created conditions of growing spring wheat of the Agata variety, factor 3, there is a positive dynamics of the development of seed material in variants 1, 3, 4, 5 and 6, where the survival rate was from 91% to 96 %. Option 2 showed a 57% survival rate.
In conditions with a background load (factor 4), the indicators for all variants show a decrease in:

- 1-2.8 times;
- 2-3.0 times;
- 3 (Control) - 2.4 times;
- 4-1.2 times;
- 5-2.9 times;
- 6-3.0 times.

Natural components with a base of organic and mineralized substances were used as fillers of soil mixtures, using sapropel deposits. The initial data clearly show the beneficial effect of sapropel deposits on the survival of wheat under stressful conditions. The mineralized composition of these soil samples stimulates the immune potential of the plant, thereby increasing resistance to the environment, in our case, to the presence of fungal lesion Fusarium avenaceum Fa-1.

The best indicators are in the variant with the use of a mixture of light chestnut soil with sapropel deposits. At the early stages of ontogenesis in this variant, plants focus their attention on the formation of the root system as a guarantee of sustainable development. The indicators of the main growth parameters recorded the steady development of the wheat root system. Of all the variants, the greatest indicators of roots are in this variant, there is also a pubescence of the roots in the range of 50-75%, which is not recorded in any of the variants. As a result, a well-formed area of plant nutrition contributes to the development of a powerful root system over a period of 7 days.

With artificial contamination of soil components, suppression in the development of the root system is observed. However, the development of coleoptile and leaf compared to the non-infected background has an increase of 1.2 and 1.4 times, respectively, which indicates the release of the energy potential of the maternal seed in the development of these growth parameters due to the attack of pathogenic organisms.

These studies have revealed a beneficial effect of sapropel deposits on the immune system of spring wheat of the AGATA variety. The created stressful conditions with the appropriate nutritional regime do not fully suppress the growth characteristics of the culture, which in turn has the potential for survival [3,6,7].

The revealed fruitful influence of the composed soil mixtures proves the need to study the conditions of soil fertility formation in forecasting.

The research carried out to study the influence of the component composition of soils revealed the phytostimulating effect of introduced strains of Bacillus subtilis in interaction with the composition of soils. The results showed a high survival rate of bacteria in soils and rhizosphere, as well as their interaction with active components. Studies have revealed certain types of strains with an overwhelming effect on the development of pathogens when bentonite and clay are added to the substrate [2, 8, 10, 15].

Comprehensive study by scientists of projections for the construction of methodological recommendations and developments in the conduct of certain laboratory studies.

Scientists from the Republic of Belarus have developed a method for preparing soil samples to determine total nitrogen, phosphorus and potassium. The method is based on the mineralization of the sample using a digester, which allows you to determine the necessary parameters from a single sample of soil, which increases economic efficiency [1].

Interesting studies have been carried out with a model MPG soil (200-1500 mg/kg P2O5) using biotesting of a wide range of mobile phosphorus concentrations at different phases of the development of herbaceous plants in field and laboratory conditions. The experimental results revealed acute toxicity of MPG with a P2O5 content of over 800 mg/kg at the early stages of plant development, namely in the germination phase in laboratory and vegetation experiments, while in the field, the results of the analysis of the green mass did not reveal an excess of phosphorus [4, 12].

Fried A.S. and Ermakov A.V. (2015) studied the dynamics of soil properties for lawn landscaping. The composition included peat-sand and peat-land mixtures. After removing the top layer of the
original urban soil, rapid mineralization of the organic matter of the peat-land mixture was revealed, where initially the losses during calcination were large (~50%). Agrochemical properties of soils changed in different directions. The aboveground biomass of grasses in all mowing was greater when using peat-land mixture and when applying mineral fertilizers [5, 9, 10, 11, 13, 14].

Any survey work in this direction will favorably affect the natural processes of soil formation, as society is trying to create acceptable conditions for the development of crop culture, the culture of being.

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