The most active part of the soil, which depends on its agrophysical and physicochemical properties and, ultimately, its fertility, is the earthworm fraction. It should be noted that mineralogical analyzes of the soil, to a certain extent, can be replaced by chemical and mechanical ones. Clay minerals make up the fraction less than 0.001 mm, so it is important to determine the amount of this fraction.

The content of gross potassium in the sludge fraction is also quite important, bearing in mind that hydromics contain 6% $K_2O$. In typical chernozem, the silt content increases to the lower transitional horizon (Phk) and amounts to 24.3% and 28.0%, respectively. Its quantity decreases from the lower transitional horizon to the rock. The content of gross potassium in the mud also increases towards the lower horizon and decreases towards the rock. Such changes can be explained by a change in the mineralogical composition of the silt fraction in the genetic horizons.

In chernozem, the typical composition of the silty fraction varies little along the profile: hydromica minerals predominate, mixed layer mica-smectite formations, kaolinite, chlorite, and one-and-a-half oxides in the upper part of the profile. Also, the worm fraction of chernozems contains highly dispersed quartz. There is some increase down the profile of montmorillonite group minerals and a decrease in hydromica. This is explained by illitization of swelling minerals as a result of potassium fixation, as well as mica hydration.

The content of hydromica in typical chernozem ranges from 42.8 to 36.3%. The entire supply of ash elements according to M.M. According to Gorbunov (1974), we call it the general reserve. It includes direct, near and potential, which is determined by gross soil analysis.

With the help of agrochemical extractions (ammonium acetic acid), we determine the immediate reserve, and it is this that is the source of nutrients for plants. We call the number of elements that are in the silty fraction of the soil near. The allocation of this reserve is explained by the fact that plants will consume ash elements from the muddy part of the soil when they are not in the immediate reserve. Ash elements contained in the fraction less than 0.001 mm are called a potential reserve.

The potential reserve is calculated from the general, immediate and near-term reserve. It should be noted that the content of the fraction less than 0.001 mm is approximately equal to the content of clay minerals.

Potential reserve potassium is slow-moving and is removed over a long period of time, gradually moving into near and immediate reserves. The potential reserve down the profile increases in the upper transitional horizon and decreases in the lower one.

The close reserve with an increase in the number of fractions less than 0.001 mm increases down the profile.

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## THE ROLE OF CROP ROTATION IN ORGANIC AGRICULTURE

Crop rotation is a key feature of the entire system of organic farming, because thanks to it there are mechanisms for the formation of healthy soils, it is the main way to fight pests and weeds, as well as a way to preserve the organic matter of the soil.

In organic farming, the role of crop rotation is extremely important. Crop rotation is a systematic change of crops on one plot of land for several years. This practice helps to improve soil fertility, preserve biodiversity and increase crop yields.

Organic agriculture develops on the principles of sustainable use of land resources and preservation of ecological balance. In this context, crop rotation plays a key role in maintaining soil and plant health.

First of all, crop rotation helps improve soil fertility. Each crop has its own nutrient requirements. By planning a proper crop rotation, a farmer can use crops that add nutrients to the soil or reduce its loss. For example, some crops may have deep roots that facilitate soil water supply and improve soil structure.

In addition, crop rotation helps reduce the risk of diseases and pests. Multiple crop rotations on the same plot of land prevent the accumulation of pathogens and harmful organisms that can damage crops. Each crop contributes to the ecosystem and changes the conditions for other pests and diseases, reducing the risk of their spread.

Conservation of biodiversity is also an important component of crop rotation. The variety of crops on one piece of land contributes to the diversity of organisms that live in the soil and on the plants. This includes beneficial insects, microorganisms that facilitate the decomposition of organic residues and improve soil structure.

Crop rotation plays an important role in increasing productivity. Correct planning of crop rotation allows to maximize the potential of the soil and increase the yield of crops. In addition, crop rotation facilitates weed management and helps avoid the emergence of pest resistance to pesticides.

Farming systems must be designed in such a way that the soil is almost always covered by vegetation. In the case of arable crops, careful planning of sowing and planting dates can help prevent the washing away of bare soil during the rainy season.

After harvesting the main crops, side crops can be sown. On slopes, crops should be grown in strips along the slopes (along contour lines), not vertically. This can lead to a significant reduction in the flow rate of surface water, thereby helping to reduce erosion. When growing crops that take some time to develop a protective cover, intercropping with fast-growing species such as beans or clover can help protect the soil in the early stages of the main crop's development.

Application of natural (animal) fertilizers, we can only reduce the loss of humus to a minimum. Every field of leguminous plants works as a nitrogen factory. Both perennial forage legumes and annuals bind this element, but their productivity is significantly different. The main rules for forming the structure of crop rotation in organic farming: 1. The share of legumes in crop rotation should be 25%, preferably 33%. 2. Use intermediate and cover crops (legumes) as often as possible. 3. The inclusion of root crops in crop rotation has a positive effect (weed suppression) 4. Plants with a long early stage of development are included in the crop rotation after grass stands that suppress weeds. 5. Alternation in crop rotation of winter and spring crops. 6. For at least one year, fields must be under fodder crops and steam occupied by annual forage grasses (weed control).

Red clover and hybrid alfalfa belong to the group of perennial legumes. On less fertile soils, a very important crop is white clover grown in pastures. When comparing the impact on the soil of perennial forage legumes, their mixtures with grasses and annual legumes, it should be remembered that the soil degrades without plant cover. The amount of nitrogen remaining on 1 ha after harvesting lupine and peas is 50-60 kg, fodder (horse) beans – 100 kg, red clover – 120–150 kg, alfalfa – 150–200 kg, but they affect the structure in different ways soil Lupine and peas have a weakly developed root system, and the soil remains compacted after them. Red clover and alfalfa contribute to the formation of a clumping structure and after the first mowing, all annual weeds are destroyed. The more leguminous plants are grown, the better the soil structure and the more nitrogen remains in the crop residue for plants that will be sown later.

Therefore, crop rotation in organic farming plays an important role in maintaining soil fertility, preventing diseases and pests, preserving biodiversity and increasing productivity. This practice is effective and has become a component of sustainable agriculture, contributing to the balanced use of land resources and the preservation of the environment.

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# НОВІ ВИСОКОПРОДУКТИВНІ СОРТИ СОЇ ОДЕСЬКОЇ СЕЛЕКЦІЇ

Соя є одною з найбільш поширених сільськогосподарських культур, яка у світовому землеробстві займає четверте місце після пшениці, кукурудзи і рису та перше серед зернобобових культур. Україна, за даними ФАО, входить до першої десятки країн-виробників сої у світі. Середня урожайність сої в нашій країні вища, ніж у середньому в Європі (2,6 т/га у 2021 році), а площі посіву в останні 6 років (2016–2021) стабільно знаходяться у межах 1,6–2,1 млн. га. Використання сої у продовольчих, кормових, технічних, медичних і фармацевтичних цілях вимагає створення спеціалізованих сортів з характерними ознаками, які залежать від сфери застосування сорту.

У результаті 40-річної роботи з соєю в Селекційно-генетичному інституті нами було створено і зареєстровано більше 30 сортів цієї культури. До Державного реєстру занесено 12 сортів сої, які відзначаються підвищеною продуктивністю, білковістю насіння на рівні 39–42%, стійкістю до основних хвороб. Важливо зауважити, що і за оптимальних умов вирощування вони виділяються високим рівнем урожайності, яка сягає 3,4–3,8 т/га. Проте багато аспектів покращення господарсько цінних ознак ще вимагають вирішення. Перш за все це стосується підвищення адаптивного потенціалу культури, здатності протистояти різким змінам метеорологічних чинників та ефективно використовувати сприятливі фактори середовища.

Нижче наводимо коротку характеристику нових високопродуктивних сортів сої одеської селекції.

'Зміна' – сорт інтенсивного типу, високопродуктивний, під час державного сортовипробування у зоні Степу із середньою урожайністю 2,61 т/га на 40,3% перевищив усереднену урожайність сортів, що пройшли державну реєстрацію за п'ять попере-