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EFFECTS OF SIDERATE CROPS ON SOIL BIOMASS AND FERTILITY

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ABSTRACT

One of the most convenient ways to increase soil fertility is siderate crops. They enrich the soil with organic matter, increase the activity of microorganisms in the soil and enrich the soil with necessary nutrients due to biomass.

KEYWORDS

Siderate crops, organic fertilizers, trace elements, rapeseed, vetch, radish, leguminous crops.

INTRODUCTION

There are many ways to increase soil fertility, and siderate crops are considered the best. Green manures are planted in order to enrich the soil with organic matter and nitrogen. This type of crops is an economically useful and ecologically safe source of soil enrichment with organic fertilizers. They fundamentally improve the properties of the soil, the activity of microorganisms in the soil, prevent erosion and salinity, and increase the quality of the product.

The effectiveness of planting siderate crops is close to the effectiveness of manure. The green mass of this type of crops is rich in nitrogen, protein, starch, sugar and various microelements. Unique nodular bacteria are formed in the roots of any plant, they absorb free nitrogen from the air and play an important role in increasing soil fertility. But if the siderates remain on the ground for a long time without being harvested in time, its coarse stem becomes a source of viral and fungal diseases without rotting well under the soil.

When the ground covered by the siderate plant is turned over, the green mass can oversaturate the soil with nitrogen. As a result, the next crop cannot digest it and begins to burn. For this reason, you should not wait until siderat crops begin to ripen. In order to avoid

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such a situation, it is necessary to determine the expected yield before planting siderate crops. Also, before planting, it is necessary to study the agrotechnical characteristics of siderat crops well. These types of plants include rapeseed, oats, triticale, rye and others.

According to E.V.Shatskikh, D.M.Galiev, I.V.Rogozinnikova, A.N.Masliuk [7], the inclusion of perennial legumes in the crop rotation system has a positive effect on the biological activity in the soil. The number of microorganisms in the soil increases, the decomposition of plant residues improves, soil fertility increases.

V.S.Polous, S.P.Stepanov, L.O.Prokopova, S.N.Osaulenko [13] analyzed the work carried out on the use of organic mineral fertilizers, microorganisms and resource-saving technologies to stabilize the biological activity of the soil.

As a result of cultivation and irrigation, the irrigated gray-meadow soils of the Mirzachol oasis have gone through various evolutionary stages and have their own properties and characteristics [5,6,8-11].

Increasing the soil fertility in saline areas, using it as a drain will lead to a decrease in the level of seepage water in cultivated areas, and an improvement in soil reclamation [1,2,3,4,12].

One of the main activities in increasing soil fertility by improving soil properties is the use of intercrops as siderates. The application of green manures enriches the soil with organic matter, improves its general physical properties and enhances microbiological processes, and leads to an increase in the amount of nitrogen and mobile phosphorus in the plowed layer of the soil. Green manures have a positive effect on the state of the soil aggregate, volume mass, water permeability, soil moisture and temperature, the amount of nutrients and many other properties.

Table 1

Amount of biomass remaining under the influence of siderates, t/ha (2023-2024 years)

№	Options		2023 year	2024 year	Average
1	Without control-siderate		**0**	**0**	**0**
2	Rapeseed		17,2	16,6	16,9
3	Vika		13,4	16,8	15,1
4	Radish		15,8	15,5	15,6
5	Oats		14,4	15,9	15,1

Siderate crops increase soil biomass, as a result, soil fertility increases, microbiological processes accelerate, and the amount of humus increases. The average biomass in the areas planted with siderate crops (2023-2024) was 15.1-16.9 t/ha. In the

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experimental field, the highest biomass was observed in the rapeseed plant, 16.9 t/ha (table 1).

Planting siderate crops is one of the best ways to improve soil fertility, but it is not widely used. Green manures are important in enriching the soil with organic matter and thereby improving the physical properties of the soil. In the experimental options, when studying the condition of soil volume weight before planting and after siderates, we observed that the volume weight of the soil of the experimental area is equal to 1.36-1.41 g/cm3 on average, and after planting siderates, the soil volume weight changed to 1.26-1.33 g/cm3 possible Among the experimental variants, the best volume weight difference change can be seen in the radish plant variant of 0.11% (table 2).

Table 2

Changes in soil volume weight under the influence of siderates (2023-2024 years)

T/p	Experience options	Layer depth, cm	Volume weight, g/cm³		
			Before planting	After siderates	Difference (±)
1	Without control-siderate	0-30	1,32		
		30-50	1,41		
2	Rapeseed	0-30	1,36	1,28	0,08
		30-50	1,39	1,31	0,08
3	Vika	0-30	1,38	1,29	0,09
		30-50	1,41	1,31	0,10
4	Radish	0-30	1,37	1,26	0,11
		30-50	1,39	1,28	0,11
5	Oats	0-30	1,38	1,31	0,07
		30-50	1,39	1,33	0,06

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Siderate crops also affect the physical and physical-mechanical properties of the soil. The physical properties of the soil are improved, the porosity of the soil increases, as a result, the volume mass of the soil decreases.In the experiment, we can see that the soil porosity in the 0-30 cm layer of siderate planted areas before planting was 49.26-51.41%, and after planting siderate crops, we can see that the porosity in the fields of experimental options increased to 52.36-54.67%. (table 3).

Table 3

Changes in soil porosity under the influence of siderates (2023-2024 years)

T/p	Experience options	Layer depth, cm	General porosity, %		
			Before planting	After siderates	Difference (±)
1	Without control-siderate	0-30	47,4		
		30-50	45,6		
2	Rapeseed	0-30	49,82	52,77	2,95
		30-50	50,71	53,55	2,84
3	Vika	0-30	51,41	54,58	3,17
		30-50	51,21	54,67	3,46
4	Radish	0-30	49,26	53,33	4,07
		30-50	49,64	53,62	3,99
5	Oats	0-30	49,82	52,36	2,55
		30-50	50,18	52,33	2,15

CONCLUSION

In conclusion, it can be said that siderate crops such as rapeseed, vetch, radish, oats planted in the

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experimental options have a positive effect on several properties of the soil. In this case, we can see that the highest biomass of the soil is accumulated in the rapeseed plant, on average 16.9 t/ha, and the physical properties of the soil are improved, having a positive effect on the soil volume weight and soil porosity. The best index of soil density was observed in radish plant, which was 1.37 g/cm3 in khaydov layer before planting, and 1.26 g/cm3 after siderates. The difference in the change of soil porosity under the effect of siderates is around 2.15-4.07%, and the best porosity is 3.99-4.07% observed in siderate of radish plant. In general, the use of siderate crops as green manure improves the general physical properties of the soil, reduces soil salinity, their roots serve as drainage, reduces the amount of tillage, weeds, diseases and insects, softens the soil, prevents erosion and improves soil fertility with other positive properties increases.

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