

# Agronomy improving the Fertility of Alluvial Soils in the Hazelnut Plantation Using Green Manures

Mzevinar Shalamberidze-PhD student, akaki tsereteli state university

T: + 995 (55) 185385;

E-mail: [mzevinar.shalamberidze@atsu.edu.ge](mailto:mzevinar.shalamberidze@atsu.edu.ge).

## Annotation

The study refers to the selection of measures to increase the fertility of the alluvial soils of the georgian region - samegrelo in the hazelnut plantation, which is built in the training-trial farm of akaki tsereteli state university.

the mentioned plantation was built as part of a scientific grant funded by the rustaveli national science foundation, at the base of the agricultural faculty of akaki tsereteli state university.

the purpose of the research hazelnuts for the already existing industrial plantation, adapted to specific soil-climatic conditions, the selection of the best options for culture maintenance, which will be scientifically substantiated and supported by research.

within the framework of the study, the determination of the level of soil fertility was carried out; the content of the main food elements - nitrogen, phosphorus and potassium in the forms available to the plant, the total amount of calcium and magnesium, humus content, actual acidity - PH.

as part of our research, the focus is on the quality indicators of the nuts, which will ultimately lead to an increase in their price. so we decided to use in bio farms allowed fertilizers.

try to include 4 options: I option-unfertilized (control) II option- fertilizer obtained from chicken manure "biutera". III option- humic fertilizer "geo humat"; IV- option sideration, use of green fertilizers (sowing of tsertsvela).

the paper presents soil research materials and the results obtained using one of the organic fertilizers used on the research site - siderate tsertsvela.

**Keywords:** soil research; fruit culture; alluvial soils; increasing fertility; organic fertilizers; sideration; biofarming.

## Introduction.

most scientists agree that the eastern coast of the Black Sea is the most suitable for the cultivation of hazelnuts and that there we find the roots of its worldwide spread. the turkish word "findik" is derived from the greek word "corylus" which means "black sea". [6]

according to FAO's latest data, georgia is the sixth largest producer of potatoes, and 3% of the harvest of this product comes from it. [5]

it is included in the top 10 export products of georgia. between 2010 and 2020, fruit exports accounted for 4.4% of georgia's total exports.

apples are not only one of the most important products for georgia from an export point of view, but also from an employment point of view. according to the 2014 agricultural census, 107,247 households are involved in the production of nuts, and the welfare of most of them depends on this activity. [2]

## Research object and methods

the research hazelnut plantation was planted in 2009. in the region of samegrelo, in the "nosiri" (village) low-lying alluvial soils. there are 39 plots in the plantation, 12 plots in the plot, and 5X4 m<sup>2</sup> of fruit trees. [3]

plantation is developed one of the varieties of hazelnut. its height is 4-4.5 meters, the average weight of the fruit is 2.3-2.4 grams. The harvest period is july-august. average yield per plant is 5.5 to 5.5 kg. [1]

we have decided to implement various agrotechnical measures to increase soil fertility and have a positive impact on the yield of hazelnut culture.

a soil survey was carried out before testing. the analyzes were carried out in the laboratories of the agricultural faculty of soil science, ecological monitoring and improvement, land management and agrochemistry of the tsereteli state university.

the study of the chemical composition of the soil was carried out with the following methodology: soil reaction - PH in water and salt solutions, using a PH meter; exchange acidity- by daikuhara's method; absorbed the sum of the bases (S) by capen-gilkowitz method; hummus - i.v. by the turin method; easily hydrolyzable by nitrogen-tyurin and kononova method; movable phosphorus - according to the denije method, truog-meyer variant; exchangeable potassium - a.a. by the maslova method [4].

## Results

before setting up the test, the soil analysis showed that the soil is provided with the content of mobile forms of phosphorus in the upper layers - 120 g/0.5 ha, and at a depth of 20-40 cm - the average - 90 g/0.5 ha. on average, both layers (0-20 and 20-40 cm) are provided with exchangeable potassium - 150 g/0.5 ha. as for absorbed bases, on average calcium is provided - 1032 ppm/0.5 ha, and magnesium is provided - 123.84 ppm/0.5 ha. that is, the sum of absorbed bases on the research soils is average - 3096 ppm/0.5 ha.

soil fertility rate - humus is average in the upper layer - 2.108%.

the moving forms of nitrogen in the soil are in small amounts. the rate of ammonia nitrogen is low in both depth layers. 30,564 at 0-20 cm, and 20,611 gr/0.5 ha at 20-40 cm depth. also, the nitrogen content of the nitrate form is also distinguished by its low rate in the second layer. 0-20 cm depth - 37,866 and 20-40 cm depth - 44,188 gr/0.5 ha.

to improve soil fertility, try **4 options**. we use only organic fertilizers in all options.

try scheme is as follows:

I option- unfertilized (control)

II option- fertilizer (biutera)

III option- fertilizer (geo humat)

IV option-sideration (sowing cercvela)

on option IV, we are sowing siderats. we chose "tsertsvela," which we use in an intermediate form, by sowing, i.e. by sowing between the rows and then plowing into the soil.

like other organic fertilizers, cider is characterized by many positive properties:

1. the green mass pressed into the soil enriches the soil with organic substances, which improves its physical-chemical properties;

2. the soil is enriched with essential food elements for the plant, such as nitrogen;

3. soil erosion decreases and its fertility increases;

4. nitrogen leaching of the soil is reduced, after which the nitrogen balance is improved;

5. the activity of free-living nitrogen-fixing microorganisms in the soil increases, which is followed by an increase in atmospheric nitrogen fixation and soil nitrogen supply;

6. as a result of the decay of charred green mass, carbon dioxide is released, which enhances the plant's photosynthesis.

siderates accumulate in the soil both free nitrogen released from the atmosphere and enrich the soil with organic mass. therefore, on this variant, the sharp reduction of the moving forms of hummus and the main food elements was noted.

the results obtained after 3 years of trial use are given in table 1.

Table 1.

Soil chemical analysis

place of sampling	depth	moving forms hummus marginal norm 1-5%		hummus marginal norm 1-5%	moving forms	
		p moving phosphorus P2O5	K change K2O marginal		N nitrogen NH4 marginal norm 10-80	N nitrogen NO3 marginal norm 2.5-100 g/0.5 ha
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		15-150 g/0.5 ha	norm 120-200 gr/0.5 ha		gr/0.5 ha	
	0-20	125	158	2,267	48,564	50,700
	20-40	provided	average	average	above average	average
		96	156	-	29,512	48,890
		average	average	-	below average	average

From the data in the table, it can be seen that the humus content of the fourth variant after 3 years was 2.267%, or the increase compared to the control was 0.159%.

The moving phosphorus content was 125 at 0-20 cm depth and 96 gr/0.5 ha at 20-40 cm depth, or the soil is respectively - 5 and 6 gr/0.5 ha.

The exchangeable potassium content was 158 g/0.5 h in the soil samples taken at a depth of 0-20 cm and 156 g/0.5 h in the soil samples taken at a depth of 20-40 cm. therefore, moisture was 8 and 6 g/0.5 ha.

The ammoniacal nitrogen content was 48,564 g/0.5 at 0-20 cm depth and 29,512 g/0.5 at 20-40 cm depth. In this case, the readings amounted to 18 g/0.5 h at a depth of 0-20 cm and 8.901 g/0.5 h at a depth of 20-40 cm.

As for the nitrogen content in the nitrate form, it increased at both depths and was 50,700 g/0.5 ha and 48,890 g/0.5 ha respectively. or increase was as follows - 12.834 and 4.702 gr/0.5 ha.

## Conclusions

From the results of the test, we can draw the following conclusion:

in samegrelo (nosiri) alluvial, overgrown and In the bean plantation built on low-fertility soils, where we have not had any type of fertilizer for more than 10 years, we have had positive results with green fertilizer – sowing of tsertsvela on this variant, the content of humus increased, as well as the content of mobile forms of the main food elements (nitrogen, phosphorus, potassium).

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