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ALGOFLORA OF TYPICAL GRAY SOILS FOR CONTINUOUS TILLAGE

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ABSTRACT
The abstract depicts and gives data on reserves, wheat fields, meadows, cotton fields, vineyards and apple-tree orchards, distribution of systematic and ecological groups of algae in different soils on anciently cultivated soils on the basis of typical gray soils, the distribution of life forms in protected and ancient arable lands.
KEY WORDS: *Fergana valley, reserve, wheat field, meadow, cotton field, soil, algae, soil algae, systematic groups, ecological groups, life forms.*

INTRODUCTION

The scale of the harvest in the wheat fields, meadows, cotton fields, vineyards and apple-tree orchards of the Fergana Valley is higher than in other regions. This is due to the fact that the land is fertile, rich in freshwater basins and, of course, in optimal temperature. By studying the algae flora of soil algae in the gray soils of such an environment, it is possible to determine whether there are other reasons for high yields, and whether it is possible to create similar conditions in other environments.

MATERIAL AND METHODS

We have tried to create as similar conditions as possible for the development of species with different systematic compositions, taking into account the phototrophic nature of algae. For this, the "soil culture" method was used (Fritsch a John, 1942) [1]. The room temperature is 25-30 ° C, and depending on the period of light fall (sunlight or 25wt of fluorescent lamps) in the spring, autumn, early summer, algae dust appears in 10–12 days (sometimes earlier). These dusts were seen under a microscope. Placing a sterilized cover glass on the soil culture in a petri dish makes it more convenient for diatom algae species to show more of the algae species in it. After a certain period of 5 - 6 days, dust formed by the development of algae under the cover glass began to appear. Each cover glass was viewed under a microscope for a period of time, then new cover glass was placed 5-6 times in each container. The appearance of algae in one petri dishwas observed for 4–6 weeks. The "water culture" method was also used to more fully study the taxonomic composition of soils in which algoflora content was studied. It was ensured that the nutrient medium prepared for the full expression of all the algae in the soil contained almost all the minerals. In order to do this, the solution was assumed to contain nitrogen, phosphorus, sulfur, magnesium, iron, calcium, potassium and a number of microelements. The nutrient that allows the algae in the soil to appear in the "water culture" is Bristol solution: $NaNO_3$ -0,25г, KH_2PO_4 -0,25г, $MgSO_4$ -0,15г, $CaCl_2$ -0,05g, NaCl -0,05г, Fe_2Cl_2 –(3 drops of 1% solution), water -1000 mg.

RESULTS

Reserves, wheat fields, meadows, cotton fields, vineyards and apple-tree orchards, which differ in the water regime and agro-technical characteristics of the Fergana Valley, have long been cultivated on the basis of typical gray soils since ancient times. It was once suggested by Bristol-Roach [3] that arable soils have specific algae groups. Scientific data on this subject, collected since that time, have shown that some regularities occur in the algae groups in the cultivated soils.

Its productivity increases in tillage soils. Biogenic and biological productivity are activated. When tilled soil is cultivated, algae communities of

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plowed soils are gradually formed. Ancient arable soils [4] have the following characteristics:

1) The main divisions of algae are Cyanobacteria, Chlorophyta, Xanthophyta, and Bacillariophyta, which increase the diversity of species;
2) Of the cyanobacteria, species of the Nostocales order, especially the Nostoc, Anabaena, Cylindrospermum families, proliferate;
3) The development of small-cell diatom algae occurs;
4) The diversity of single-celled forms of yellow-green algae, especially the families Pleurohloris, Characiopsis, Munudus Ellipsoidion, enhances their development.

Many algal researchers have reported an increase in the number of algae cells in arable soils [2].

According to the data, the organic mass of the soil weighs from 60 kg to 100 kg per hectare. The biomass of the water is often updated during the growing season. Soil algalae enhances biological activity in the soil, in addition to which soil water provides nitrogen accumulation as nitrogen compounds (Pankratova, 1979, 1986). Accordingly, the nitrogen accumulated in the soil is 3.0-5.5 kg / ha in different years [5].

In our research, soil algal flora, which has been cultivated since ancient times, has been compared to other soils and phytocenoses. The following sources were used for comparison:

Table 1
Distribution of systematic groups of water algalae in different soils
(1-number of species, 2-percentage)

Soils and phytocenoses	Number of all types	Cyanophyta		Chlorophyta		Xanthophyta		Bacillariophyta	
		1	2	1	2	1	2	1	2
Tundra	136	43	31,6	60	44,1	25	18,4	8	5,9
Forest	383	96	25,1	157	41,0	94	24,5	36	9,4
Desert	410	208	50,7	111	27,1	23	5,6	67	16,4
Typical gray land	190	71	37,37	47	24,73	8	4,2	64	33,68
Types in total	845	297	35,1	274	32,4	125	14,8	140	16,6

In the studied soils, which have been cultivated for a long time, algae belonging to all systematic groups, as in other soils, were identified. Green algae in soils that have been cultivated since ancient times accounted for 44-41% in tundra and forest soils. They make up 27-24% in desert and typical gray soils. Cyanobacteria make up 50.7% of the forms distributed in the arid region. It is 37.3% in the typical gray soils of the study area. Species belonging to the genus Xanthophyta are rare in all soils: they accounted for 4.2% in typical gray soils. Species of the Bacillariophyta division have a large rate of 33.68% in typical gray soils [6].

Nostoc punctiforme, Phormidium foveolarum, Navicula mutica, Phormidium borealis, Pleurochloris magna, Pleurochloris pyrenoidosa, Botrydiopsis arhiza, Caraciopsis minuta, Chlamydomonas gloeogama, Chlorococcum Chicro, Chlorococcum humicola, Chlorococcum humicola. nitens, Stichococcus minor dominated in forest soils (Alexaxina, Shtina, 1984).

Dominant species in the typical gray-brown soils which have been studied are as follows: *Nostoc punctiforme, Anabaena sphaerica, Cylindrospermum licheniforme, Cylindrospermum muscicola, Phormidium autumnale, navicular mutica, Nantzschia amphioxys, Pleurochloris magna Pleurochloris pyrenoidosa, Botrydiopsis archive, Polyedriexilis, Chlomydomonada gloegama, Chlorococcumhumicola, Chlorella vulgaris, Chlorhormidium feaccidum var. Nitens*, they formed the dominant species composition. The *Jacquard floristic* commonality coefficient is 0.37 in dominant species.

Ecological analysis of algoflora in the comparable soils shows that edaphiphil species make up 75.9% in the arable soils that have been cultivated since ancient times, and it is second only to tundra soils (89%).

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Table 2
Distribution of algae in different soils by ecological groups
(1- number of species; 2-percentage)

Soils and phytocenoses	Edophophylls		Amphibians		Hydrophiles		Total
	1	2	1	2	1	2	
Tundra	121	89	10	7,3	5	3,7	136
Forest	275	71,8	56	14,6	52	13,6	383
Typical gray	86	45,26	70	36,84	33	17,37	190
Types in total	384	45,2	311	36,8	150	18	845

The number and percentage of algae belonging to ecological groups identified from typical gray soils were determined in accordance with those of other soils.

Table 3
Distribution of systematic groups in protected and ancient arable lands

Soils	Types in total	Cyanophyta		Chlorophyta		Xanthophyta		Bacillariophyta	
		1	2	1	2	1	2	1	2
Protected lands	25	11	44,0	8	32,0	1	4,0	5	20
Lands that have been cultivated since ancient times	165	65	37,14	43	24,57	7	4,0	43	24,57

The biodiversity of all systematic groups of algae is high in the ancient arable soils. The number of species belonging to cyanobacteria is 5.9 times higher than in protected areas, green algae - 5.3 times, yellow-green - 7 times. The differences in the number of diatom algae species are not large: only 1.22 times. Yellow-green algae have a strong "sensitivity" to changes in the soil. Soil drainage and soil softening increase the diversity of algae species.

There are ecological differences in the algoflora in the protected and ancient cultivated soils.

Table 4
Distribution of algae by ecological groups
(1-number of species; 2 - percentage)

Soils	Types in total	Edophophylls		Amphibians		Hydrophiles	
		1	2	1	2	1	2
Protected lands	25	15	60,0	8	32,0	2	8,0
Lands that have been cultivated since ancient times	165	86	45,26	51	30,90	28	16,97

According to our data, 86 species of edophophytes accounted for 45.26% of the total algoflora in ancient arable soils, while amphibians accounted for 30.9%. The share of hydrophils is around 17%. Amphibious and hydrophilic species produce mass development.

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Table 5
Distribution of life forms of algae in protected and ancient arable lands
(1-number of species; 2 - percentage)

Life forms	Protected lands		Lands that have been cultivated since ancient times	
	1	**2**	**1**	**2**
Ch	2	8,0	16	9,7
C	6	24,0	40	24,24
CF	2	8,0	23	13,9
X	3	12,0	20	12,12
B	3	12,0	16	9,7
H	3	12,0	20	12,12
P	6	24,0	30	18,18
жами	25	100	165	100

According to our data, C-form and P-form are more abundant in algae.

CONCLUSION

The data show that there were no changes in the composition of algoflora during the drainage of plowed soils, in which a set of species specific to plowed soils was formed. However, the deep mitigation of subsurface drainage has led to an increase in algae species and cell numbers. Separate algoflora is formed in the soils, which have been cultivated since ancient times.

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