ALGAE OF DRYLAND WHEAT FIELDS

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ABSTRACT

The soils of the dry wheat fields with typical gray soil distributed in the south of the Fergana Valley and the algae in it mainly consist of a total of 39 species and species belonging to sections such as Cyanobacteria (14), Chlorophyta (13), Xanthophyta (6). The collected samples were taken on January 19, 2019. If the temperature of 20°C on the surface of 0.5 cm of the soil is 19°C in the 45-50 cm layer at a depth of 10-72 cm and the humidity is around 35%, the

temperature of the soil surface in the summer on July 20, 2019 is 34°C, at a depth of 10-12 cm it is 30°C, and in the 45-52 cm layer it is 25°C , moisture content on the soil surface was 4%, 14% in the 45-50 cm layer, was taken and analyzed after harvesting wheat

АННОТАЦИЯ

Почвы сухих пшеничных полей с типичным сероземом, распространенным на юге Ферганской долины, и водоросли в ней в основном состоят из 39 видов и видов, принадлежащих к таким секциям, как Cyanobacteria (14), Chlorophyta (13), Xanthophyta (6). Отобранные пробы были отобраны 19 января 2019 г. При температуре 20°C на поверхности 0,5 см почвы 19°C в слое 45-50 см на глубине 10-72 см и влажности около 35%, температура поверхности почвы летом 20.07.2019 г. 34°C, на глубине 10-12 см 30°C, а в слое 45-52 см 25°C , влажность на поверхности почвы 4%, 14% в слое 45-50 см, взята и проанализирована после уборки пшеницы.

Key words: Ferghana, gray soil, dryland areas, soil algae, Cyanobacteria, Chlorophyta, Xanthophyta, species, varieties.

Ключевые слова: Фергана, сероземы, засушливые районы, почвенные водоросли, цианобактерии, хлорофиты, ксантофиты, виды, сорта.

Wheat occupies the largest area among the crops that are grown mainly in dryland in many foothills of the Fergana Valley. The productivity of the dryland wheat fields of the southern borders of the valley is related to the soil fertility. Soil fertility depends mainly on soil algae, which have the ability to convert free nitrogen in the air into ammonium salts necessary for plants[1].

Algae belonging to 39 types and species were identified by means of water culture in the samples taken from the dryland wheat fields with typical gray soil in the south of the valley. It was found that 14 types of cyanobacteria, 13 types of

green, 3 types of yellow-green and 6 types of diatoms belong to them. Below is their systematic composition [1, 2].

Cyanobacteria section

Gloleocapsa punctate	*Ph. incinatum*
G. yurgida f. subnuda	*Lyngbya amplivaginata*
Nostoc punctiforme	*L. lagerhemii f. edaphicum*
Anabaena variabilis f. rotundospora	*L. nigra*
Phorminosum autumnale	*Plectonema boryanum f. hollerbachiana*
Ph. laminosum	*Pl. puteale f. edaphicum*
Ph. tenue	

Chlorophyta section

Chlamydomonas atoctogama	Chlorella vulgaris
Ch. globasa	Ch. tericola
Dictyococcus mucosus	Ankistrodesmus braunii
Palmella miniata	A. convolute var. minitum
Muriella magna	A. faleata f. terrestris
Chlorhomidium fleaccidum	Senedesmus quadricande
	Ulotrix variabilis

Xanthophyta section

Botrydiopsis eriensis	Heterothrix bristoliana
Bumilleriosis brevis	
Bacillariophyta бўлими	
Navicula atomus	Hantzschia amphioxys
N. minima	Nitzschia amphibia
N. muralis	N. palee

Winter soil samples from dryland wheat fields were collected on January 19, 2019. The temperature of 20°C on the surface of 0.5 cm of the soil is 19°C at a depth of 10-72 cm in a layer of 45-50 cm and humidity is around 35%. *Gloleocapsa punctate, Phorminosum incinatum, Lyngbya nigra, Chlorococcum humicola, Chlorella vulgaris* and others are developed in the samples obtained in the bubbles slightly above the solution in the flask. *Anabaena variabilis, Nostoc punctiforme, Muriella magna, Dictyococcus mucosus, Chlorhomidium fleacidum, Bumilleriosis brevis* and *Heterothrix bristoliana* were found in the film formed on the solution surface. Together with them, *Navicula atomus, N. minima, Hantzschia amphioxys, Nitzschia amphibia, N. palee,* among them *Hantzschia amphioxys,* were developed massively. Lyngbya amplivaginata, *Plectonema boryanum f. Hollerbachiana* and *Palmella miniata* were identified on the surface of the soil in the flask, on the film on it. Chlamýdos such as Chlamydomonas atoctogama, Sh. Oblongella and Ch. globosa was found to have developed in the solution in the flask. *Nostoc punctiforme, Anabaena variabilis* were recorded in all samples for wheat field soils in winter. It turned out that species belonging to the order of chlorococci are also well developed from the greens. Algae groups of 9 species and varieties were also identified under the plowed layer of wheat fields in winter. They are *cyanobacteria Gloleocapsa punctate, Phorminosum tenue, Ph. valderiae f. magus, Lyngbya lagerhemii f. edaphica, Plectonema puteale f. Chlorococcum humicola, Chlorella vulgaris, Chlorhomidium fleacidum* from edaphicum green algae, *Navicula atomus, Hantzschia amphioxys, Nitzschia palee* from diatom algae [3, 4].

Spring samples were taken on April 19, 2019. The temperature on the surface of 0.5 cm of the soil was 20^0 C, 19^0 C in the depth of 10-12 cm, 18.5^0 in the 45-50 cm layer, moisture content was 30-35%, it was the flowering period of wheat. 22 species and varieties of algae were identified from the obtained soil using water cultures, and 9 species from the samples taken from the bottom of the plowed layer. *Chlorococcum humicola, Chloroplana terricola, Chlorella vulgaris*

from the green fumes formed on the walls of the flask, *Gloeocapsa turgida f. subnuda* was noted on the solution surface. Only one species of chlamydomonas, Chlamydomonas oblonga, was identified. *Phorminosum autumnale, Phorminosum laminosum, Plectonema puteale f. edaphicum, Anabaena variabilis, Lyngbya lagerhemii f. edaphicum, Chlorhomidium fleacidum, Ulotrix variabilis, Botrydiopsis eriensis* were noted to be well developed, and from diatoms *Navicula atomus, N. minima, Hantzschia amphioxys, Nitzschia amphibia, N. Palee* were noted to be well developed. A bluish film appeared below the surface of the solution in one of the sample tubes. *Phormidium laminosum* was developed in it. Among its threads *Gloeocapsa turgida f. subnuda* was recorded. For the soils of wheat fields *Gloeocapsa turgida f. subnuda, Phorminosum autumnale, Lyngbya lagerhemii f. edaphica, Ulotrix variabilis, Nitzschia palee* and *Nitzschia amphibia* were charasteristic. Along with these, single-celled chlorococci from green algae, the species that often cause the soil surface to turn blue in spring, were recorded [5, 6].

The following species were identified from the bottom layer of soil plowed in the spring: *Gloleocapsa punctate, Phorminosum autumnale, Lyngbya lagerhemii f. edaphica, Chlorococcum humicola, Chlorella vulgaris, Chlorhomidium fleaccidum, Navicula atomus, Hantzschia amphioxys, Nitzschia palee.*

In the summer, soil samples were taken on July 20, 2019, after harvesting wheat at the temperature of 34°C on the surface of the soil, 30°C at a depth of 10-12 cm, 25°C at the 45-52 cm layer, moisture content at the soil surface 4%, and 14% at the 45-50 cm layer. The appearance of algae in cultures with soil samples occurred after one or one and a half months. *Chlorococcum humicola* from the chlorococci order of green algae, *Gloleocapsa punctate* from the cyanobacteria Chlorella vulgaris appeared in them. After a period of two months, thin blue-green spots of *Phormidium uncinatum* appeared on the surface of the solution around the edge of the flask. Of the diatoms, *Navicula atomus, Hantzschia amphioxys*

and *Nitzschia palee* developed well. Species from the Chlamydomona family were recorded in our samples. In summer samples, 7 species were found: Gloeocapsa punctate, Chlorella vulgaris, Phormidium uncinatum, Chlorococcum humicola, Navicula atomus, Hantzschia amphioxys and Nitzschia palea. 5 species were identified under the plowed layer. The warming of the soil due to the post-harvest air in the wheat fields did not allow the development of algae in it. Only xerophytic forms survived[7].

Autumn samples were taken on October 21, 2020, soil temperature 0-5cm 20°C, 10-12cm depth 19°C and 45-50cm layer 18.5°C humidity 32-33%. 18 species and types of algae were identified from the samples taken in water cultures. 7 species were identified from the samples taken from the soil below the plowed layer of the soil. The number of species identified from autumn samples is 2 more. *Gloeocapsa punctate, Chlorococcum humicola, Chlorella vulgaris, Ch. Ellipsoidea, Phormidium incinatum* from the surface of the solution, *Plectonema puteale f. edaphycum* was identified. Along with *Nostoc punctiforme, Lyngbya nigra, Chlorchormidium flaccidum, Ulothrix variabilis, Heterothrix bristoliana, diatoms Navicula atomus, N. muralis, Hantzschia amphyoxys, Nitzschia palea, N. amphibia* were found in the surface film of the solution. *Coccomyxa dispar* was recorded from one tube below the solution of the tube wall, together with the cyanobacteria *Lyngbya nigra, Plectonema puteale f. Edaphycum* was also encountered. *Anabaena variabilis* grew on the surface of one tube of solution.

In autumn for the soils of wheat fields Chlorococcum humicola, Chlorella vulgaris and Ch. ellipsoidea developed more than others. They are always found in preparations. Besides them, *Nostoc punctiformeb Chlorchormidium flaccidum, Heterothrix bristoliana* were also recorded. As a result, a total of 25 types of algae were detected in 8 soil samples, of which cyanobacteria - 13, green algae - 13, yellow-green - 3, and diatoms - 6. Cyanobacteria and green algae, which showed the same indicator in terms of the number of species in the soil of the wheat fields, led from others. We explain the abundance of algal species in wheat fields in

protected, uncultivated, natural soils with the agrotechnical measures and mineral nutrition carried out in the soil. With this, moisture, light, and air enter the lower part of the soil. Plowed soils have a lot of moisture. Therefore, the composition of flora is richer in winter and spring algae species. Unidentified Palmella miniata, Dictyococcus mucosus, Miriella magna, Chlorella ellipsoidea, Botrydiopsis eriensis, Bumelleriopsis eriensis, Phormidium incinatum, Ph. Laminosum, Lyngbya amphivaginata, Gleocapsa turgida f. sulnuda appeared in the protected, uncultivated soils.

Algae found only in spring are Chlamydomonas atoctogama, Lyngbya amphivaginata, Plectonema boryanum f. hollerbachiana, Chlamydomonas gloeogama, Palmella miniata, Muriella magna, Monodus chodatii.

Only in summer samples Phormidium tenue, Lyngbya lagorhemii f. edaphicum, Chlorella ellipsoidea, Bumillariopsis brevis were found.

Shloroplana terricola, Nitzschia muralis were recorded only in winter samples. Species occurring only in the autumn sample were not recorded.

Thus, more 39 species were detected in autumn soil samples in dryland wheat fields compared to other seasons.

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