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Comparative Analysis of Soil Algoflora in Some Regions of Uzbekistan and Central Asia

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Abstract In this article, the comparative analysis of soil algae found in the soils of some regions of Uzbekistan and Central Asia (plains, hills, foothills and mountains), comparative comparison, the similarity coefficient of soil algoflora at observation points, the leading groups of soil algae in the regions and their distribution in the appropriated soils of Namangan region and Tashkent region the identification of similar species is discussed and information is provided.

Keywords Algoflora, Taxa, Cyanophyta, Xanthophyta, Bacillariophyta, Chlorophyta, Coefficient

1. Introduction

In the world, special attention is being paid to determining the diversity of soil algae, evaluating their biological activities, and attracting productive species to production. Representatives of soil algoflora in different geographical regions are sharply different from each other due to rapid growth of soil algae, features of easy occupation of open spaces and easy adaptation to adverse environmental factors.

As you go up the mountain slopes from the plains of Uzbekistan, the general climatic conditions change. That is, as you go up, the hot climate alternates with a warm climate, and then at the top of the mountain with a cold climate. Also, the amount of precipitation, air pressure and relative humidity of the air also changes. As a result, altitudinal climate regions are formed. These changes affect the formation and location of altitudinal natural zones [3].

2. Research Methods

Collecting soil samples in laboratory conditions, planting and growing in the laboratory and examining it under a microscope were performed based on the methods created by Gollerbach and Shtina. Normal Petri dishes and flasks were used for cultivation and species identification of soil algae from the collected samples. First, Petri dishes and flasks are covered with special caps and placed in an autoclave. 1.5 atmospheric pressure, sterilized at 1200 C, this process takes 20-30 minutes. Put 10 grams of soil into sterilized flasks and pour 100 ml of distilled water.

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The flasks and Petri dishes were then kept in a temperate environment with sufficient light. After 1-2 weeks, the growth and development of algae is checked under a microscope [2,8].

Carl Zeiss and Moticam 5 N-300 M binocular microscopes were used to determine the species composition and morpho-biological characteristics of soil algae.

3. Results

In the process of comparative analysis of soil algoflora of steep regions of Namangan region of Uzbekistan, it was found that distribution of soil algae in some regions of Central Asia differs with ecological environment and factors.

Compared to the studied area, the Pamir Mountains are located much higher (3200-4200 m) than the sea level, and it is noted that the soil is a barren, desert zone.

The soil algoflora of the steep regions of Namangan region was more numerous than the soil algoflora of the Pamir mountains. In these high mountain areas, soil algae species may decrease as a result of the high intensity of sunlight during the day, high radiation levels, and the soil quickly heats up and cools down sharply at night. There are 4 sections, 7 classes, 16 orders, 46 families, 60 families and 183 species in the soil algoflora of the Pamir Mountains. Most identified species belong to Cyanophyta section (16 families, 22 genera and 121 species are listed), Schizothrix (7 species), Gloecapsa (7), Oscillatoria (18), Phormidium (33), Lyngbya (7), Plectonema (7), information on the most frequent occurrence of species of the Microcoleus (7) family [1].

Algofloristic comparison of soil algae (88 species) identified in the mountainous part of Namangan region with soil algae (183 species) identified in Pamir Mountains revealed similarity of 30 taxa. As a result, it was observed that the soil algoflora of our compared areas differs from the

soil algoflora of our researched areas, which can be justified by the fact that they are in distant natural-geographic and ecological areas.

4. Discussion

For the purpose of comparative floristic analysis of soil algae of the studied area, some regions of Uzbekistan were compared with Qibray and Zangiota districts of Tashkent region.

When carrying out algofloristic comparisons, taxonomic groups are made based on the leading families and genera of this place [4,5,6,7,12,13]. This makes it possible to study the patterns of distribution of soil algae in the areas where algoflora is being compared and to compare floristics.

In Uzbekistan, K.Yu. Musaev, Sh.J. Tojibaev, Sh.U. During 1960-1975, Umarov and Z. Ormonov carried out algofloristic studies in different agricultural soils of Tashkent region [9,10,11]. Among the 12 genera leading in the soil algoflora of the steep regions of the Northern Fergana Valley, it was found that representatives of the genera were similar to 5 genera with soil algae in wheat and cotton fields of Kibrai district of Tashkent region, specialized in horticulture, and 7 genera with soil algae in cotton fields of Zangiota district (Table 1).

Table 1. Leading genera of soil algae in the regions under comparative analysis

Namangan region horticulture, wheat and cotton fields		Kibrai district horticulture, wheat and cotton fields		Zangiota District Cotton Cultivation Areas	
Oscillatoria	30	Anabaena	6	Gloeocapsa	5
Phormidium	27	Phormidium	18	Nostoc	6
Gloeocapsa	17	Gloeocapsa	5	Oscillatoria	12
Lyngbya	17	Lyngbya	7	Phormidium	12
Nostoc	16	Plectonema	7	Lyngbya	5
Schizothrix	12	Chlamydomonas	6	Chlamydomonas	6
Microcystis	9	Chlorella	5	Chlorococcum	5
Microcoleus	8	Synedra	7	Navicula	5
Nitzschia	7	Navicula	17	Nitzschia	5
Achnanthes	6	Nitzschia	9		
Navicula	6	Pinnularia	5		
Total:	**160**		**92**		**61**

As can be seen from the data presented in table 1, Oscillatoria, Nostoc, Phormidium, Lyngbya, Nitzschia, Navicula species of this category are explained by their high viability in all climatic conditions.

Cotton planting area of Namangan region and wheat and cotton planting areas specialized in horticulture of Kibrai district of Tashkent region Schizothrix coriacea, Sch.lardacea, Microcystis pulverea f.racemiformis, M.pulverea f.parasitica, M.pulverea f.holsatica, M.grevillei f.grevillei, M.grevillei f.pulchra, Gloecapsa punctata, Gl.turgida f.subnuda, Gl.minuta f.minuta, Nostoc microscopicum, N.linckia, N.linckia f.piscinale, N.commune f.sphaericum, Cylindrospermum licheniforme, Calothrix elenkinii, C.braunii, Scytonema ocellatum, Oscillatoria amoena, O.brevis, Phormidium foveolarum, Ph.curtum, Ph.subcapitatum, Ph.tenue, Ph.valderiae f.majus, Ph.laminosum, Ph.ambiguum, Ph.corium, Ph.uncinatum, Lyngbya limnetica, L.amplivaginata f.hyalina, L.martensiana f.tenuivaginata, Plectonema boryanum f.hollerbachianum, Botrydiopsis eriensis, Bumilleriopsis brevis, Navicula bacilliformis, N.cryptocephala var.exilis, Chlorococcum infusionum, Palmella miniata, Dictyococcus mucosus, Scenedesmus bijugtus, Chloroplana terricola such as species, which have also been identified in these regions.

Cotton planting area of Namangan region and cotton planting area of Zangiota district Synechocystis sallensis, Microcystis aeruginosa f.sphaerodictyoides, Gloeocapsa magma f. magma, Gl.rupestris, Gl.minuta f.minuta, Gl.minor f.minor, Nostoc punctiforme, N.punctforme f.populorum, N.paludosum f.paludosum, N.linckia, Scytonema ocellatum, Oscillatoria chlorina, O.irrigua, O.rupicola, O.amoena, O.brevis, Phormidium foveolarum, Ph.curtum, Ph.tenue, Ph.valderiae f.majus, Ph.bohneri, Ph.ambiguum, Ph.corium, Ph.papyraceum, Lyngbya amplivaginata f.hyalina, L.martensiana f.tenuivaginata, L.aerugineo-coerulea, Botrydiopsis arhiza, B.eriensis, Chlorococcum dissectum, Ch.infusionum, Chlorosarcina minor, Palmella miniata, Dictyococcus mucosus species were found to be similar.

The degree of similarity of the soil algoflora of the comparative regions was calculated using the formula developed by P. Jaccard [14]. Table 2 shows the similarity coefficient of species in the cultivated soils of the plains of Namangan region and Tashkent region.

Table 2. Similar species are found in cultivated soils of Namangan region and Tashkent region

Indicators	Namangan region (Khusanova, **2022)**	Tashkent region Kibrai (Musaev, **1960)**	Tashkent region Zangiota District (Ormanov, **1975)**
Number of type	108	190	106
Number of categories	40	15	8
Number of similar type		22	16
Similarity coefficient (Jaccard)		0,08	0,08

As can be seen from the table, the researches were carried out in low plain areas, and 108 species and species of soil algae were identified in the cotton growing area of Namangan region. A comparative analysis of soil algae in wheat and cotton cultivated areas of Qibray district of Tashkent region revealed the similarity of 22 species (KJ=0.08) and 16 species and types of soil algae in cotton cultivated areas of Zangiota district (K_J=0,08).

5. Conclusions

According to the comparative analysis, it was found that the soil algoflora of the Tashkent region differs from the soil algoflora of our researched regions. The reason for this can be explained by their ecological differences and remote geographical location, as well as the influence of anthropogenic factors.

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