



## FLORISTIC ANALYSIS OF ALGOFLORA OF THE AKBUURA RIVER

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### Abstract

The article presents the results of floristic research carried out in the period 1999 – 2005, 2018-2021 on the Akbuura river basins, that 260 species and varieties and forms (211 species, 45 variations, 4 forms) were identified, which belong to 79 genera, 46 families, 22 orders, 16 classes and 9 divisions: *Cyanophyta* - 45, *Rhodophyta* - 1, *Xanthophyta* - 1, *Chrysophyta* - 1, *Bacillariophyta*-147, *Pyrrophyta* -3, *Euglenophyta* - 5, *Chlorophyta* -56, *Charophyta* -1.

**Keywords:** Algae flora, analysis, Akbuura river.

### INTRODUCTION

For a systematic analysis of the species composition of the algal flora of the r. Akbuurs, we used the results of our own research (Alimjanova and Shaiimkulova, 2008; Olimjonova and Shaiimkulova, 2004; Shaiimkulova and Alimjanova, 2005), on the basis of which we compiled a systematic list of the structure of the river algal flora, which formed the basis of this analysis. Divisions, classes, orders, families and genera in the list of systematic structures of the river are located according to the "Keys to freshwater algae of the USSR" [2-11,13-16,18-20] (Vinogradova *et al.*, 1980; Green algae, 1980; Hollerbakh and Polyansky, 1951; Hollerbakh and Krasavina, 1983; Dedusenko-Shchegoleva *et al.*, 1959&1962; Zabelina *et al.*, 1951; Kiselev, 1954; Matvienko, 1954; Moshkova and Gollerbakh, 1986; Muzafarov *et al.*, 1981) of all issues, taking into account the work of Uzbek, Ukrainian and foreign algologists, and the species and varieties of algae - according to the Latin alphabet. Peculiar ecological conditions of the river - fast current (3.7-4.2 m / s, sometimes 4.2-4.7 m / s), transparency (sometimes greatly reduced to 3-4 cm, and sometimes crystal clear), insignificant content of nutrients, erosion of the coastal area, impact anthropogenic factors (discharge of various effluents, etc.), - determines the lack of overgrowth or very weak development of typical planktonic species and contributes to the formation of algoflora in the form of phytobenthos groups, films, fouling. In various algal groupings of the river, we identified 211 species, 45 variations, 4 forms of algae belonging to 79 genera, 46 families, 22 orders, 16 classes and 9 divisions: *Cyanophyta* - 45, *Rhodophyta*-1, *Xanthophyta*-1, *Chrysophyta*-1, *Bacillariophyta* -147, *Pyrrophyta* -3, *Euglenophyta* -5, *Chlorophyta* -56, *Charophyta* -1 (Table 1). The analysis of the taxonomic structure of the river algal flora shows that *Bacillariophyta* is distinguished by the richness and diversity among the divisions, in which there are 104 species, 42 variations, 1 form, i.e. more than half (56.96%) of the total number of algae. The second place is taken by representatives of the *Chlorophyta* division - 52 species, 3 variations, 1 form or 21.53%, the third - by the *Cyanophyta* division - 43 species, 2 forms, or 16.93%.

*Euglenophyta*, in comparison with other divisions, includes only 5 species of algae, or 1.92% of their total number, the *Pyrrophyta* division - 3 species, or 1.15%. Other divisions (*Rhodophyta*, *Xanthophyta*, *Chrysophyta*, *Charophyta*) include one (0.38%) species each. We associate the diversity, species richness in the algal flora of diatoms with the presence of various ecological conditions R. Akbuura. Taxonomic analysis of the structure of the river algal divisions shows that 147 of the noted species, variations and forms of diatoms are combined into 34 genera belonging to 9 families, 3 orders, and 2 classes (Table 2). The *Pennatophyceae* class unites 140 species, variations and forms of diatoms, or makes up 95.25% of algae in the department, and *Centrophyceae* - only 7 species and varieties, or 4.75%. In the class *Pennatophyceae*, the species richness are distinguished by the families *Naviculaceae* West (71), *Fragilariaceae* (Kuetz.) D.T. (28), *Achnanthaceae* (Kuetz.) Grun. (13), *Nitzschiaceae* Hass. (12); the rest are poorer. For example, in the family *Epithemiaceae*Hust. - 5 species, in *Eunotiaceae*Kuetz. - 4, in *Tabellariaceae* Pant. - 1. Representatives of the *Naviculaceae* West among the families (71) make up about half (48.3%) of all diatom species. *Cymbella* Ag is considered to be rich in species among genera (21), *Navicula* Bory (18), *Nitzschia* Hass. (11), *Gomphonema* Ag. (10), the rest have from 1 to 9 species of algae. Analysis of the species structure of representatives of the division *Chlorophyta* found in the r. Akbuure, indicates that the 56 species, variations and forms noted are combined into 22 genera belonging to 19 families, 8 orders and 5 classes (Table 3). The *Conjugatophyceae* class includes 23 species, or 41.71% of the total in the division; class *Clorococophyceae* - 21 species, or 37.5%, class *Ulothrichophyceae* - 7 (12.5%). The remaining classes include a small number of species: in *Siphonocladophyceae* - 3 (5.3%), in *Siphonophyceae* - 2 (3.5%). The families *Scenedesmaceae* Oltmans (8), *Ankistrodesmaceae* Korsch. are noted for the largest number of species (5), *Spirogyraceae* Randh. (5), and in other families 1 - 3 types of algae. Among the genera of green algae, the species are rich in *Closterium* Nitzsch. (7), *Scenedesmus* Meyen (6), *Cosmarium* Corda (6). Representatives of the division *Cyanophyta* were found to have 45 species and forms belonging to 16 genera, 12 families, 5 orders, and 3 classes (Table 4). The class *Hormogoniophyceae* includes 31 species, or 68.8% of their total number (45). Among the genera, *Oscillatoria* Vauch has the largest number of species.

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Table 1. The systematic composition of the algal flora of the r. Akbuura

Algae division	Quantity								
	Classes	Orders	Families	Genus	Species	Variations	Forms	Total	Percentage of total quantity
<i>Cyanophyta</i>	3	5	12	16	43	-	2	45	16.93
<i>Rhodophyta</i>	1	1	1	1	1	-	-	1	0.38
<i>Xanthophyta</i>	1	1	1	1	1	-	-	1	0.38
<i>Chrysophyta</i>	1	1	1	1	1	-	-	1	0.38
<i>Bacillariophyta</i>	2	3	9	34	104	42	1	147	56.96
<i>Pyrrophyta</i>	1	1	1	2	3	-	-	3	1.15
<i>Euglenophyta</i>	1	1	1	1	5	-	-	5	1.92
<i>Chlorophyta</i>	5	8	19	22	52	3	1	56	21.53
<i>Charophyta</i>	1	1	1	1	1	-	-	1	0.38
Total: 9	16	22	46	79	211	45	4	260	100.00

Table 2. Systematic structure of algae of the division Bacillariophyta

Classes	Orders	Families	Quantity				
			Genus	Species	Variations	Forms	Total
<i>Centrophyceae</i>	<i>Discoidales</i>	<i>Coccinodiscaceae</i> Kuetz.	2	5	2	-	7
		<i>Tabellariaceae</i> Pant.	1	1	-	-	1
		<i>Fragilariaceae</i> (Kuetz.) D.T.	5	18	10	-	28
		<i>Eumotiaceae</i> Kuetz.	1	3	1	-	4
<i>Pennatophyceae</i>	<i>Araphinales</i> Schutt. <i>Raphinales</i>	<i>Achnantheaceae</i> (Kuetz.) Grun.	4	10	3	-	13
		<i>Naviculaceae</i> West.	14	49	21	1	71
		<i>Epithemiaceae</i> Hust.	3	3	2	-	5
		<i>Nitzschiaceae</i> Hass.	2	11	1	-	12
		<i>Surirellaceae</i> (Kuetz.) Grun.	2	4	2	-	6
Total: 2	3	9	34	104	42	1	147

Table 3. Systematic structure of algae of the division Chlorophyta

Classes	Orders	Families	Quantity				
			Genus	Species	Variations	Forms	Total
<i>Chlorococophyceae</i>	<i>Tetrasporales</i> <i>Chlorococcales</i>	<i>Tetrasporaceae</i> Lemm.	1	1	-	-	1
		<i>Characiaceae</i> (Naegeli)	1	1	-	-	1
		Wille in Varming	1	3	-	-	3
		<i>Hydrodictyaceae</i> S.F.Gray – Dumortier Orth. Mut.Cohn.	1	1	-	-	1
		<i>Botryococcaceae</i> Wille	1	2	-	-	2
		<i>Oocystaceae</i> Bohlin.	3	6	2	-	8
		<i>Scenedesmaceae</i> Oltmans.	1	5	-	-	5
		<i>Ankistrodesmaceae</i> Korsch.	1	3	-	-	3
		<i>Ulothrichaceae</i> Kuetz.	1	2	-	-	2
		<i>Chaetophoraceae</i> (Harv.) De- Toni et Levi.	1	1	-	-	1
<i>Ulothrichophyceae</i>	<i>Oedogoniales</i>	<i>Aphanochaetaceae</i> (Printz.) Bourr.	1	1	-	-	1
		<i>Oedogoniaceae</i>	1	-	1	-	1
<i>Siphonocladophyceae</i>	<i>Cladophorales</i>	<i>Cladophoraceae</i> (Hass.) Wittr.em.	1	3	-	-	3
<i>Siphonophyceae</i>	<i>Vaucheriales</i>	<i>Vaucheriaceae</i> (S.F. Gray) Dumor.	1	2	-	-	2
		<i>Mougeotiaceae</i> Randh.	1	1	-	-	1
<i>Conjugatophyceae</i>	<i>Desmidiiales</i>	<i>Zygnemataceae</i> Randh.	1	2	-	-	2
		<i>Spirogyraceae</i> Randh.	1	5	-	-	5
		<i>Peniaceae</i>	1	1	-	-	1
		<i>Closteriaceae</i>	1	6	-	1	7
Total: 5	8	19	22	52	3	1	56

Table 4. Systematic structure of algae of the division Cyanophyta

Classes	Orders	Families	Quantity				
			Genus	Species	Variations	Forms	Total
<i>Chroococophyceae</i>	<i>Chroococcales</i> Geitler	<i>Coccobactriaceae</i> Elenk.Sauv.	1	1	-	-	1
		<i>Merismopediaceae</i> (Meyen)Elenk.	1	3	-	1	4
		<i>Gloeocapsaceae</i> Elenk. et Hollerb.	2	5	-	-	5
		<i>Gomphosphaeriaceae</i> Elenk.	1	1	-	1	2
<i>Chamaesiphonophyceae</i>	<i>Dermocarpales</i> Geitler	<i>Chamaesiphonaceae</i> Geitl.	1	2	-	-	2
		<i>Stigonemataceae</i> (Kirhn.) Geitl.	1	2	-	-	2
		<i>Nostocaceae</i> Kuetz. emend. Elenk.	1	2	-	-	2
		<i>Anabaenaceae</i> Elenk.	1	1	-	-	1
<i>Hormogoniophyceae</i>	<i>Nostocales</i> (Geitl.) Elenk. <i>Oscillato-riales</i> Elenk.	<i>Scytonemataceae</i> (Kuetz.) J. Elenk.	1	1	-	-	1
		<i>Rivulariaceae</i> (Meneg.) Elenk.	2	3	-	-	3
		<i>Oscillatoriaceae</i> (Kirhn.) Elenk.	3	20	-	-	20
		<i>Plectonemataceae</i> Elenk.	1	2	-	-	2
Total: 3	5	12	16	43	-	2	45

The division Euglenophyta refers to five species of algae belonging to one genus, one family, one order, one class (Table 5).

Table 5. Systematic composition of algae from the Euglenophyta and other divisions

Division	Classes	Orders	Families	Quantity	
				Genus	Species
<i>Eugle-nophyta</i>	<i>Euglenophy-ceae</i>	<i>Euglenales</i>	<i>Euglenaceae</i> Klebs.	1	5
<i>Pyrro-phyta</i>	<i>Peridineae</i> ( <i>Dinomonadophyceae</i> )	<i>Peridinales</i>	<i>Peridiniaceae</i> Pauls.	2	3
<i>Rhodo-phyta</i>	<i>Bangiophyceae</i>	<i>Bangiales</i>	<i>Bangiaceae</i> (Gray) Naeg.	1	1
<i>Xantho-phyta</i>	<i>Heterococ-cophyceae</i>	<i>Heterococcales</i>	<i>Characiopsidaceae</i> Pasch.	1	1
<i>Chryso-phyta</i>	<i>Chrysocapsi-phyceae</i>	<i>Hydrurales</i>	<i>Hydruraceae</i> Pasch.	1	1
<i>Charo-phyta</i>	<i>Charaphyceae</i>	<i>Charales</i>	<i>Characeae</i> Ag.emend. Hollerb.	1	1
Bcero 6	6	6	6	7	12

(16), followed by *Merismopedia* (Meyen) Elenk. (4) and *Gloeocapsa* (Kuetz.) Hollerb. emend. (four). The Pyrrophyta division contains only three species and two genera (genus *Peridinium* Ehr. and genus *Ceratium* Schrank) (Table 5). One species is represented by the divisions Rhodophyta - *Bangiaatropurpurea* (Roth.) Ag., Xanthophyta - *Characiopsisborziana* Lemm., Chrysophyta - *Hydrurusfaetidus* Kirchn., Charophyta - *Chara vulgaris* L. Wallr (Table 5).

## Conclusions

1. Algological studies were carried out along the course of the Akbuura river basin in the period 1999-2005 and 2018-2020 yy. Collected 455 algological samples and their processing revealed 260 species, varieties and forms and established their systematic affiliation, adopted in the system of algology.
2. In various algal groupings of the river, 211 species, 45 variations, 4 forms of algae belonging to 79 genera, 46 families, 22 orders, 16 classes and 9 divisions were identified: Cyanophyta, Rhodophyta, Xanthophyta, Chrysophyta, Bacillariophyta, Pyrrophyta, Euglenophyta, Chlorophyta, Charophyta.
3. In terms of biological diversity, diatoms dominate mainly - 147, then green - 56, blue-green - 45. Algae in other sections is very, very poor, and represents from 1 to 5 species and varieties.

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