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The Benthic Algae of Beykavağı Pond (Kadınhanı/ Konya)

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Abstract

The composition and seasonal changes in the benthic algae of the Beykavağı Pond within Konya borders have been periodically studied through April 2010 and March 2011. Moreover, some physical and chemical values of the pond water was included as variable. In general, Ochrophyta were dominant in terms of species number and abundance during the study period. A total of 77 taxa belonging to 6 divisions have been identified, including Ochrophyta (35 taxa), Cyanobacteria (22 taxa), Chlorophyta (14 taxa), Charophyta (3 taxa), Euglenophyta (2 taxa) and Myzozoa (1 taxa). Seasonal rises have been dense through whole period except winter season.

Keywords: Beykavağı pond, Benthic algae, Physical and chemical values.

INTRODUCTION

Lakes, forming an important part of freshwater resources in the world, show different properties depending on their location and this may lead changes in the species living there. In addition, since lake ecosystems contain less amount of water than seas, they are affected more by environmental factors damaging the organisms in the aquatic ecosystem. Algae which are responsible for the primary productivity are mainly affected by the damage in the aquatic ecosystems, therefore all links in the food chain are affected negatively by these damages on these creatures which form the first link of this chain, and also problems in the flow of energy start to arise from the first step. In addition, depending on the contamination of a water source, it is possible for certain algal species to increase. Knowing the toxic effects of excessively increased algal species makes it possible to prevent the damage they can give the water sources or allows an early intervention. For these reasons, algae are significant displays of the pollution in aquatic ecosystems.

Due to their importance, while studies on algal flora in fresh-water ecosystems in Turkey have been conducted, in Gönülol et al. (1996)'s study named as "A Check-list of the freshwater algae of Turkey", it is understood that more than 100 studies have been made in the lakes, ponds and puddles in Turkey [1].

Thanks to many researchers, studies related to benthic algae and fresh waters in Turkey have spread across the country. Geldiay, one of the first examples of these studies starting from the interior regions, examined the macro and micro fauna of Çubuk Dam and Eymir Lake comparatively and gave the list of existing algae and their monthly abundances [2]. Güner, examined Karagöl's macro and micro vegetation and made determinations at species level [3]. Elmacı, investigated the composition and seasonal changes of algae in the Akşehir Lake coastal zone [4]. Şahin, studied the benthic algae of Uzungöl [5]. Akköz, studied the algal flora of Beşgöz Lake [6]. Gürbüz, investigated the composition, density and seasonal changes of benthic algae at two research stations chosen from Palandöken Pond [7]. Çetin, studied the benthic diatoms of the Ordüzü Dam Lake from the samples (epilithic, epipelic and epiphytic) taken from various habitats [8]. Karacaoğlu, studied the phytoplankton of Lake Uluabat from a taxonomic viewpoint [9]. Atıcı, studied the phytoplanktonic algal flora of Bayındır Dam Reservoir [10]. Şahin, investigated the epipelic and epilithic algae of Küçükgöl Lake [11]. Pala, investigated the seasonal variaotions of epilithic diatoms in Keban Dam Lake [12]. Temel, examined the benthic algal communities of Ömerli Dam Lake [13]. Çelekli, examined the phytoplankton community of Lake Abant except Bacillariophyta [14]. Kolaylı, investigated algae in the Karagöl coastal region from a taxonomic viewpoint [15]. Sıvacı, investigated the seasonal variation of epilithic diatom Tödürge Lake [16]. Zaim, studied the planktonic diatom compositon of Lake Kaz [17]. Akköz, examined the composition and seasonal changes of benthic algae in Suğla Lake [18]. Kolaylı, investigated the seasonal changes in the composition of benthic algae of Karagöl except Bacillariophyta [19]. Polge, studied the epipelic algal flora in the Küçükmece Lagoon [20]. Sevindik, examined the phytoplankton composition of Çaygören Reservoir [21].

No study has been made before in Beykavağı Pond which forms our study area. It is intended in our study to measure some physical and chemical values to determine the water quality parameters of pond water and the benthic algae composition of Beykavağı Pond and this study is aimed to contribute to the literature on algal flora studies in Turkey.

MATERIAL AND METHODS

Study Area

Konya-Kadınhanı-Beykavağı Pond, forming our research area, is located in Central Anatolia Region and in Upper Sakarya Basin (number 12). The pond is located 1 km south of Beykavağı Village and on Kestel River. The average altitude of this area is 1225 m. Agricultural areas around the residential areas in Beykavağı and Şahören Villages are irrigated from the pond. Beykavağı Village is located from 12 km from the district center of Kadınhanı, 57 km from the city center of Konya and 7 km from the Konya-Afyon highway. Transportation from the pond to village is made with a stabilized road 1km in length. Kestel River and its tributaries constitute the water source of Beykavağı Pond. The most important arms forming Kestel River are Kanca, Ketele and Kumrus streams. The slope of the longest arm of the river changes from 3% to 40%. A large part of the study area is covered with pine forests. The research area is under the influence of the continental climate experienced in Konya, hot and dry in summer, cold and rainy in winter [22]. The properties of the pond after 2008 when the Beykavağı Pond Project was completed are given in Table 1.

Table 1. Properties of Beykavağı Pond.

Type	**Zoned Earthfill**
Rainfall Area (Normal Lake Area)	162.000 m²
Annual average water	1.900.000 m³/year
Annual water for irrigation	1.791.000 m³/year
Height (from river bed)	38.0 m
Height (from the ground)	42.0 m
Total storage volume	1.8 hm³
Total body volume	498.000 m³
Active volume	1.6 hm³
Dead volume	0.2 hm³
Flow rate of full water drain mechanism	32.70 m³/s

The location of Beykavağı Pond in the Konya Province is given in Figure 1. Benthic algae in the pond were investigated by the samples taken from four different designated stations in Beykavağı Pond. The samples were taken from plants, stones and sediments from designated stations between April 2010 and March 2011 on a monthly basis. The map of Beykavağı Pond is given in Figure 2.

Figure 1. The location of Beykavağı Pond in Konya Province.

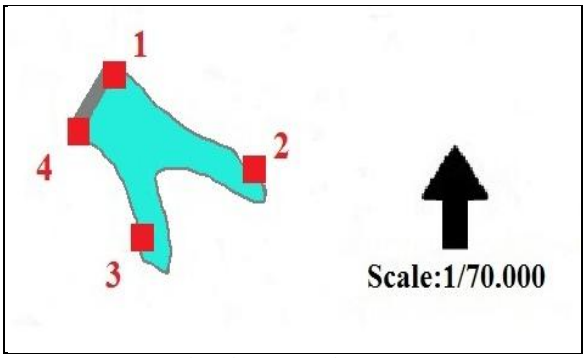


Figure 2. The Map of Beykavağı Pond.

1. Station: Located in the first place where water can be seen while going from Beykavağı Village to the dam. It is adjacent to the dam wall. The base is covered with black gravel mud. The station location was determined by GPS as 38° 8' 29'' North latitude and 32° 15' 32'' East longitude.

2. Station: It is located where the water bends when we continue down the road after the first station. The base is covered with red clay soil. The station location was determined by GPS as 38° 8' 18'' North latitude and 32° 15' 54'' East longitude.

3. Station: It is located just opposite and parallel of the 2. Station. Waters feeding the pond enter here. The base is brown and has a soft structure. The station location was determined by GPS 38° 8' 17'' North latitude and 32° 15' 38'' East longitude.

4. Station: It is located just at the opposite of the first station and parallel to the dam wall. The base is brown and contains a gravelly mud type. The station location was determined by GPS as 38° 8' 23'' North latitude and 32° 15' 26'' East longitude.

Data Collection and Analysis

Epiphytic, epilithic and epipelic algae forming benthic flora and water samples were taken from the four different stations mentioned above between April 2010 and March 2011 periodically once in a month. To take the algae (epipelic) samples living on sediment, a 0.8cm wide and 100 cm long glass rod was used. While one side of the glass rod was closed with a finger tip, the muddy water that enters the pipe by dipping the other side of the glass rod into the water and by removing the finger while moving on the sediment was stored in the pipe by closing the finger again, the stored sample was put into 1lt plastic bottles. This process continued until the bottles are filled. Then, the samples obtained were brought to the laboratory as soon as possible, after keeping the samples for a few hours, the water on the top was removed and poured into a petri box with a 10 cm diameter so it can be 1cm thick. After removing the mud, the water on the top was removed with the help of a water straw leaving a tiny layer. Then five of 20x20 mm^2 lamellae were placed and the petri box was left on a smooth surface which had exposed to morning sunlight. The next morning from 09:00 to 10:00, identifications of algae except diatom ones were made by removing the lamellae and by making temporary preparat with 1-2 drops of 40% glycerine water [23]. The reason why the lamellae were removed at around 09:30 is that algae in the mud move upwards to the daylight by phototaxis movement and, as a result, they attach to the lamellae. A count was made through the line in the middle of each lamella in the field of view.

Definition of algae, excepting diatoms, is made while they are alive, the identifications of diatoms were made after giving them a permanent preparat shape. For these diagnoses, firstly, the diatoms need to be free of organic materials. For this purpose, the lamellae that remained on the mud in the petri box were washed with distilled water and they were waited for sedimentation of diatom shells,

then after pouring the excess water remained on the top, equal amounts of nitric acid (HNO_3) and sulfuric acid (H_2SO_4) mixture were added. This mixture was then boiled for 15-20 minutes in fume hood and then it was washed with distilled water to clean diatom shells of acid. Diatom shells removed from acid were dried and they were made permanent preparat with medium filling material "Entella". Through the straight line in the middle of the lamella, the abundance of degrees of the preparat species were measured [24]. In the identifications of algae, Husted [25], Cleve- Euler[26], Round [23], Round[27], Prescott [28] and Patrick- Raimer [29] works have been used.

The stone and plant samples collected to investigate algae which depend or in other words living on stones (epilithic) and plants (epiphytic) were washed with distilled water in the laboratory and the identifications of the non-diatom algae were made in the temporary preparats that were prepared by scraping.

The Olympus brand CX31 model research microscope was used in the study of algae. Photo shoots were made with Olympus brand Camedia C-5060 model digital camera. The figures and pictures are presented in the appendix section. Since the authors of the present species are given in the results section, they were not written again in the appendix. Measurements are given in micron meters (µm).

In Beykavağı Pond, physical and chemical measurements; conductivity, temperature, pH and dissolved oxygen values were taken during collection of the samples. For other analysis, water samples kept in one liter bottles were taken to the laboratory and measured in a short time. Temperature measurements were made using oxygen meter measure apparatus in a Hach Lange branded device. Turbidity measurements were made in the laboratory with a Hack Lange 2100 AN brand turbidimeters device. Ammonium, phosphate, chloride, magnesium, nitrate, nitrite, potassium, sulfate and water hardness measurements from the collected water samples were made with a Hach Lange DR2800 brand spectrophotometer. Biochemical oxygen demand (BOI5) was recorded by Velp Scientifica brand B.O.D sensor devices. Chlorophyll-a measurements were done in the laboratory with Hach Lange DR 2800 brand spectrophotometers. The amount of chlorophyll-a was calculated with aid of the following formula which was found by Richard and Thomson [30] and its absorption coefficients were revised by Parsons and Strickland [31].

$$Klorofil - a(mg/m^3) = \frac{v(11{,}6xD_{665} - 0{,}14xD_{630} - 1{,}31xD_{645})}{IxV}$$

V= Volume of the lake water filtered for the measurements (l).
v= Volume of acetone used for extraction (ml).
l= Diameter of spectrophotometer force (cm).

RESULTS

Some physical and chemical values measured in Beykavağı Pond are given in Table 2. The Benthic algae of Beykavağı pond consist of algae (epilithic) living dependable on the stones, algae (epipelic) located on sediments and algae (epiphytic) living dependably on the plants inside the water in the coastal region. Algae forming this group were examined by the methods mentioned in the material and method section and total of 77 species were determined. The list of identified species is given in Table 3 according to their alphabetical and taxonomic order.

Table 2. Some physical and chemical values measured in Beykavağı Pond.

	Apr.10	May.10	Jun.10	Jul.10	Aug.10	Sep.10	Oct.10	Nov.10	Dec.10	Jan.11	Feb.11	Mar.11
Ammonium (NH_4^+-N)	0.082	0.069	0.066	0.070	0.062	0.074	0.042	0.052	0.054	0.060	0.059	0.071
BOD (BOD, mg/ L)	33.690	29.785	35.315	34.245	24.420	26.105	13.425	9.055	8.130	9.715	15.495	15.120
Turbidity (NTU)	2.888	2.073	1.041	0.912	2.653	5.523	1.395	3.523	2.516	2.708	3.995	3.171
Dissolved oxygen (DO, mg/ L)	9.060	7.855	8.060	8.025	7.675	7.988	8.320	8.783	8.588	9.040	10.550	10.050
Conductivity (µS/cm)	191.900	193.850	187.350	187.875	188.425	190.100	195.600	195975	195.025	194.050	193.100	191.825
Phosphate (PO_4^{3-}-P)	0.110	0.124	0.127	0.128	0.143	0.126	0.159	0.148	0.137	0.136	0.129	0.125
Chloride (Cl^-)	-1.643	-1.573	-1.100	0.793	-1.318	3.065	3.843	4.363	3.708	2.888	2.710	1.583
Chlorophyll-a (mg/ m^3)	3.644	3.062	3.531	3.867	3.568	1.898	1.899	1.816	1.926	3.146	3.699	3.792
Magnesium (Mg^{2+})	18.175	18.275	16.600	16.975	18.200	17.550	20.425	20.650	20.350	20.825	21.175	20.525
Nitrate (NO3-N)	0.170	0.216	0.188	0.195	0.208	0.217	0.161	0.159	0.171	0.180	0.191	0.180
Nitrite (NO_2-N)	-0.013	0.003	-0.004	-0.004	-0.013	-0.019	0.005	0.003	0.002	-0.003	-0.003	-0.006
pH	8.383	8.315	8.258	8.273	8.305	8.318	8.280	8.265	8.228	8.310	8.332	8.324
Potassium (K^+)	-0.125	-0.275	-0.150	-0.150	0	0.050	-0.100	0	-0.125	-0.150	0.050	0.050
Temperature (°C)	13.050	20.750	23.675	23.750	23.575	21.875	14.625	10.700	9.475	8.375	5.625	6.325
Water Hardness (°dH)	11.175	13.925	9.675	9.975	10.675	10.975	12.475	11.425	11.350	11.375	11.375	11.300
Sulfate (SO_4^{2-})	26.550	26.325	15.800	28.600	33.350	36.875	43.925	35.150	33.225	32.650	36.775	34.425

Table 3. Benthic algae identified in Beykavağı Pond (a:Found in Epiphytic algal community. b: Found in Epilithic algal community. c: Found in Epipelic algal community).

Divisio:	**Charophyta**	**Divisio:**	**Ochropyhta**
Ordo:	**Desmidiales**	**Ordo:**	**Achnanthales**
	Closterium lunula (O.F. Müller) Nitzsch ex Ralfs (b,c)		*Cocconeis disculus* (Schumann) Cleve in Cleve & Jentzsch (b)
Ordo:	**Zygnematales**		*C. placentula* Ehrenberg (a,b,c)
	Mougeotia sp. (a,b,c)	**Ordo:**	**Bacillariales**
	Spirogyra sp. (a,c)		*Denticula elegans* Kützing (a,b)
Divisio:	**Chlorophyta**		*Nitzschia amphibia* Grunow (c)
Ordo:	**Chaetophorales**		*N. obtusa* (Grunow) W.Smith
	Chaetocnema irregulare Nowakowski (a)		*N. palea* (Kützing) W.Smith (a,c)
	Protoderma viride Kützing (a)		*N. sigmoidea* (Ehrenberg) W.Smith (a,c)
	Stigeoclonium nanum Kützing (a,b)		*N. tenuis* W.Smith (a,c)
Ordo:	**Chlamydomonadales**	**Ordo:**	**Cymbellales**
	Haematococcus lacustris (Girod) Rostafinski (a)		*Cymbella amphicephala* Nägeli (a)
Ordo:	**Chlorellales**		*C. cistula* (Ehrenberg) Kirchner (c)
	Geminella sp.(c)		*C. deliculata* Kützing (a,c)
	Oocystis borgei J. Snow (c)		*C. helvetica* Kützing (a,b,c)
	O. pusilla Hangsgirg (a)		*C. microcephala* Grunow (a,b,c)
Ordo:	**Cladophorales**		*C. turgidula* Grunow. (a,b,c)
	Cladophora insignis (C.Agardh) Kützing.(a,b)		*C. prostrata* (Berkeley) Cleve (a,b,c)
	C. oligoclona Kützing (a,c)		*C. ventricosa* Kützing. (b,c)
Ordo:	**Oedogoniales**	**Ordo:**	**Fragilariales**
	Oedogonium sp. Link (b)		*Diatoma elongatum* (Lyngbye) C.Agardh (a,c)
Ordo:	**Sphaeropleales**		*D. vulgare* Bory (a,b,c)
	Pediastrum muticum Kützing (a,c)		*Fragilaria intermedia* Grunow (b)
	Scenedesmus bijuga (Turpin) Lagerheim.(a,b)		*Synedra pulchella* (Ralfs ex Kützing) Kützing (a,b,c)
	S. incrassatulus Bohlin (a)		*S. ulna* (Nitzsch.) Ehrenberg (a,c)
Ordo:	**Ulotrichales**	**Ordo:**	**Naviculales**
	Ulothrix variabilis Kützing (a,b)		*Amphipleura pellucida* (Kützing) Kützing (a)
Divisio:	**Cyanobacteria**		*Gyrosigma acuminatum* (Kützing) Rabenhorst (a,c)
Ordo:	**Chroococcales**		*Navicula atomus* (Kützing) Grunow (b)
	Aphanothece clathrata West & G.S. West (a,c)		*N. cuspidata* Kützing (a,b,c)
	Chroococcus minor (Kützing) Nägeli (c)		*N. lanceolata* (C. Agardh) Ehrenberg
	C. pallidus Nägeli (a,b)		*N. oblonga* Kützing (c)
	C. turgidus (Kützing) Nägeli (a)		*N. radiosa* Kützing (a)
	Gloeocapsa aeruginosa Kützing (a)		*N. viridula* Kützing (c)
Ordo:	**Nostocales**		*Pinnularia divergens* W. Smith (b)
	Anabaena sp.(c)		*P. interrupta* W.Smith (a,c)
	Calothrix parietina (Naegeli) Thuret (a)		*P. molaris* Grunow (b)
	Fischerella muscicola (Thuret) Gomont (c)	**Ordo:**	**Rhopalodiales**
	Gloeotrichia longiarticulata G.S.West (a)		*Epithemia sorex* Kützing (a,b)

	G. natans (Hedwig) Rabenhorst ex Bornet & Flahault (c)	**Ordo:**	**Surirellales**
	Stigonema mesentericum Geitler (b)		*Cymatopleura solea* (Brébisson) W.Smith (a,b,c)
Ordo:	**Oscillatoriales**	**Ordo:**	**Thalassiophysales**
	Oscillatoria limnetica Lemmermann (a,b,c)		*Amphora ovalis* (Kützing) Kützing (c)
	O. limosa (Roth) C.Agardh (a)		
	O. minima Gicklhorn (c)		
	O. splendida Greville (b,c)		
Ordo:	**Pseudanabaenales**		
	Lyngbya aestruarii (Mert.) Liebmann (b,c)		
	L. lagerheimii (Moebius) Gomont (a,b)		
	Spirulina laxa G.M. Smith (a)		
	S. nordstedtii Gomont (c)		
Ordo:	**Synechococcales**		
	Aphanocapsa elachista West & G.S.West (c)		
	Merismopedia elegans G.M. Smith (a)		
	M. glauca (Ehrenberg) Näegeli (a,b)		
Divisio:	**Euglenozoa**		
Ordo:	**Euglenales**		
	Euglena gracilis G.A.Klebs (a)		
	Trachelomonas pulcherrima var. minor Playfair (a,b,c)		
Divisio:	**Myzozoa**		
Ordo:	**Peridinales**		
	Peridinium inconspicuum Lemmermann (a,b)		

Algae in the coastal region of Beykavağı Pond consist of Charophyta, Chlorophyta, Cyanobacteria, Euglenozoa, Myzozoa and Ochrophyta species and the list of these species is given above Ochrophyta species in the determined species composed the dominant organism in terms of the number and the variety of species. This is followed by Cyanobacteria, Chlorophyta, Charophyta, Euglenozoa and Myzozoa species, respectively. In the specified habitats, Charophyta, Chlorophyta, Cyanobacteria, Euglonozoa, Myzozoa and Ochrophyta sections are represented by 3, 14, 22, 2, 1 and 35 species, respectively.

Species which belong to Charophya, Chlorophyta, Cyanobacteria, Euglonozoa, Myzozoa and Ochrophyta sections composed, 4%, 18%, 29%, 3%, 1% and 45% of the determined total algae species, respectively and these rates are given in Figure 3. The frequencies of benthic algae are given in Table 4.

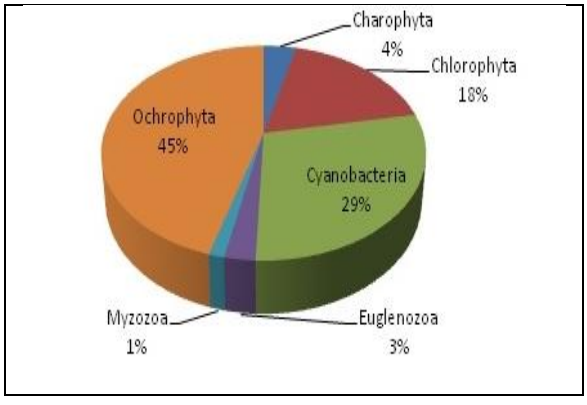


Figure 3. The percentages of Algae in Beykavağı Pond.

Table 4. The frequencies of benthic algae (The expression of the ratio of the number of recorded organism samples to the total number of sample in percentage, 100-80% Always available, 80-60% Mostly available, 60-40% Often available, 40-20% Sometimes available, 20-1% Rarely available).

		1.Station	2.Station	3.Station	4.Station
Number of recorded organism		10	10	10	10
Charophyta	*Closterium lunula*	20	10	20	0
	Mougeotia sp.	20	20	10	20
	Spirogyra sp.	0	0	20	10
Chlorophyta	*Cladophora* spp.	30	20	30	10
	Chaetocnema irregulare	20	10	0	10
	Geminella sp.	20	10	10	0
	Haematococcus lacustris	20	30	30	20
	Oedogonium sp.	10	30	30	10
	Oocystis spp.	0	10	20	0
	Pediastrum muticum	10	10	0	0
	Protoderma viride	10	0	20	10
	Scenedesmus spp.	20	20	10	0
	Stigeoclonium nanum	10	0	20	0
	Ulothrix variabilis	20	10	0	20
Cyanobacteria	*Anabaena sp.*	10	20	30	10
	Aphanocapsa elachista	20	30	10	10
	Aphanothece clathrata	10	20	20	0
	Calothrix parietina	20	0	20	10
	Chroococcus spp.	20	30	10	10
	Fischerella muscicola	10	10	0	0
	Gloeocapsa aeruginosa	20	10	10	20
	Gloeotrichia spp.	20	30	20	10
	Lyngbya spp.	20	10	30	20
	Merismopedia spp.	10	20	20	0
	Oscillatoria spp.	20	30	30	30
	Spirulina spp.	20	10	0	0
	Stigonema mesentericum	10	0	10	0
Euglenozoa	*Euglena gracilis*	20	0	0	10
	Trachelomonas pulcherrima	30	40	40	20
Myzozoa	*Peridinium inconspicuum*	10	10	0	0
Ochrophyta	*Amphipleura pellucida*	10	20	0	20
	Amphora robusta	20	30	0	10
	Cocconeis spp.	60	60	50	50
	Cymbella spp.	50	60	60	60
	Cymatopleura solea	20	10	30	10
	Denticula elegans	20	30	30	0
	Diatoma spp.	70	60	60	70
	Epithemia sorex	10	20	20	0
	Fragilaria intermedia	40	30	50	50
	Gyrosigma acuminatum	30	30	10	20
	Navicula spp.	90	100	100	80
	Nitzschia spp.	100	80	70	80
	Pinnularia spp.	30	40	30	50
	Synedra spp.	80	70	80	90

DISCUSSION

Navicula, *Nitzschia* species which are dominant, *Fragilaria*, which is mostly available and Amphora species that are rarely found in the epipelic algae composition in Beykavağı Pond are also found among *Cocconeis* and *Synedra* which are living epilithic and epiphytic unlike real epipelic species. This situation can be explained by the mixed habitats because of the water movements. *Cymbella ventricosa* and *Diatome vulgare*, algae living on the coastal region rocks in Beykavağı Pond dependently, are determined to be found often. In addition, these species are shown to be an indicator of the pollution in lakes. In Beykavağı Pond, there is *Pinnularia* species, Round, defined them as acidophilic species and spread in inefficient lakes, were seen [27]. Again, in Beykavağı Pond, determined *Fragilaria* species, *Amphora* species, *Nitzschia sigmoidea*, *Cymatopleura solea* and *Navicula* species are defined to have an increment in neutral and slightly alkaline waters, *Gyrosigma acuminatum*, *Amphora ovalis* species are defined to have an increment in alkaline waters. These results show parallelism with the alkaline property of Beykavağı Pond.

Samples belong to *Closterium* species which are known as the characteristic of oligotrophic lakes and belong to Charophyta section are found in Beykavağı Pond.

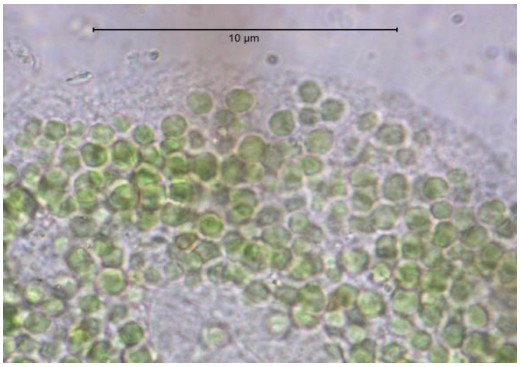
Oocystis types, which are located in the Chlorophyta section and usually found in semi-hard waters, are found in Beykavağı Pond.

Cyanobacteria section preferring eutrophic waters in terms of the number of species and diversity in Beykavağı Pond algae composition composites the second organisms group.

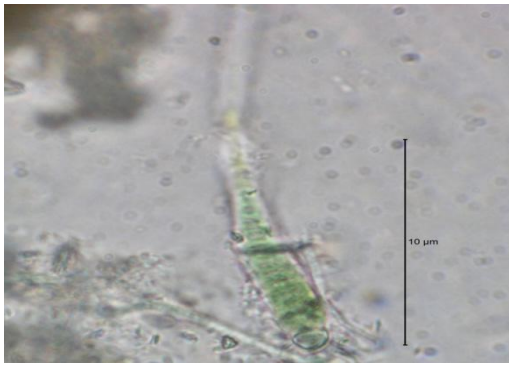
Generally, members of Euglenozoa section found excessively in water rich in organic materials is rarely found in our study area that is Beykavağı Pond having oligotrof properties.

As a result of this study carried out between April 2010 and March 2011, it was concluded that, Beykavağı Pond is a poor pond in terms of algal flora and the number of species. It can be predicted among the main reasons that according to the values we obtained from the physical and chemical measurement results, the pond is a newly formed one and it has oligotrophic properties. According to the results we obtained from the laboratory measurements, Beykavağı Pond is located in the first quality according to "Turkish Water Pollution Control Regulation" [32], in terms of the values of ammonia, dissolved oxygen, temperature, pH, sulfate, nitrite and nitrate. In addition, values of chlorophyll-a are measured in the values appropriate to the same regulation. In the measurements, pond water was seen to have a slightly alkaline property and in the species identifications, the species living in alkaline environment were determined in the lake. In general, it can be said that the benthic algae composition we determined in Beykavağı Pond shows parallelism with the previous studies.

Some photograps of the organisms are given in the Figure 4.

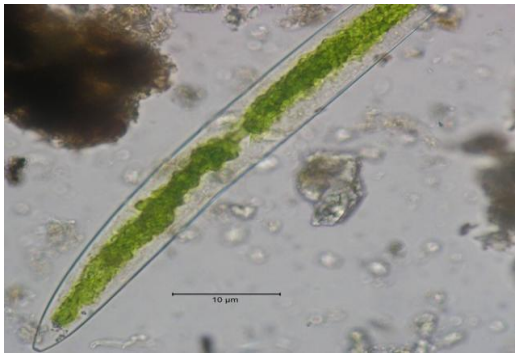


4.a.

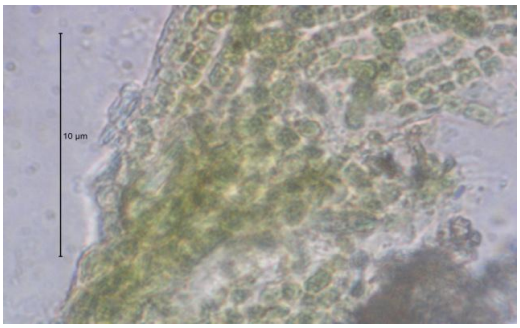


4.b.

4.c.

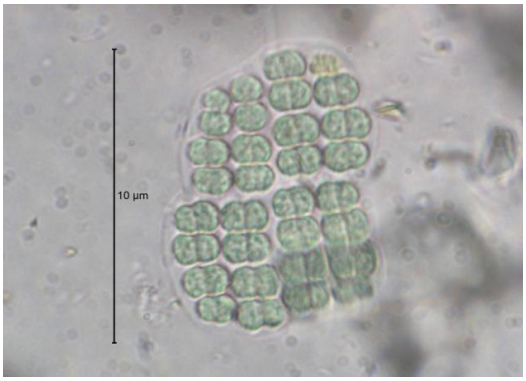


4.d.



4.e.

4.f.

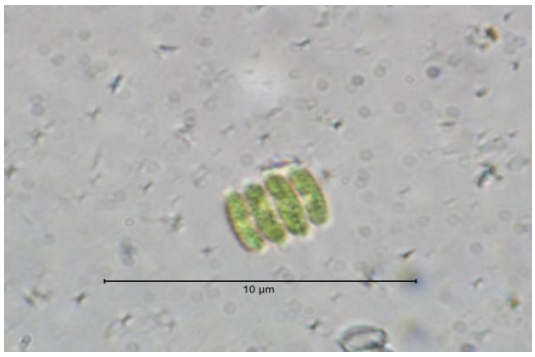


4.g.

4.h.

4.i.

4.j.



4.k.

4.l.

Figure 4. a. *Aphanocapsa elachista* West & G.S.West. b. *Calothrix parietina* (Naeg) Thuret. c. *Chaetocnema irregulare* Nowakowski d. *Closterium lunula* (Müll.) Nitzsch ex Ralfs. e. *Fischerella muscicola* (Thuret) Gomont. f. *Haematococcus lacustris* (Girod.) Rostafiniski. g. *Merismopedia elegans* G.M. Smith. h. *Oocystis borgei* J. Snow i. *Oscillatoria limosa* (Roth) C.A.Ag. j. *Peridinium inconspicuum* Lemmermann. k. *Scenedesmus bijuga* (Turpin) Lagerheim. l. *Spirulina laxa* G.M. Smith. (Scala 10 µ).

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