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# THE PHYTOPLANKTON COMPOSITION OF KADIKÖY RESERVOIR (KEŞAN-EDİRNE)

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**Abstract:** This study was carried out between June 2011 and May 2012 at different depths of three stations in Kadıköy Reservoir in Turkish Thrace. A total of seventyfour phytoplanktonic algal taxa belonging to Chlorophyta, Ochrophyta, Cyanophyta, Euglenophyta, Charophyta, and Dinophyta were recorded during the study period. Members of Chlorophyta were found to constitute the dominant group in the lake. Some physico- chemical variables and trophic state of lake water were determined.

***Key words:*** Kadıköy Reservoir, Phytoplankton, Chlorophyll-*a*, Trophic status

## Kadiköy Baraj Gölü'nün (Keşan-Edirne) Fitoplanton Kompozisyonu

**Özet:** Bu çalışma Haziran 2011-Mayıs 2012 tarihleri arasında Trakya'da bulunan Kadıköy Baraj Gölü'nde belirlenen 3 istayonda ve bu istasyonlardan seçilen üç farklı derinlikte yapılmıştır. Çalışma süresince Chlorophyta, Ochrophyta, Cyanophyta, Euglenophyta, Charophyta, ve Dinophyta divizyolarına ait toplam 74 fitoplanktonik alg taksonu belirlenmiştir. Kadıköy Baraj Gölü'nde Chlorophyta üyeleri genel olarak hâkim organizma grubu olmuştur. Barajın bazı fiziko-kimyasal değişkenler ve trofik durumu belirlenmiştir.

***Anahtar kelimeler:*** Kadıköy Baraj Gölü, Fitoplankton, Klorofil-*a*, Trofik durum

## Introduction

Studies in inland waters in Turkey dates back to 1970s in which floristic records were given in Eğridir and Mogan Lakes (Demirhindi 1972; Tanyolaç & Karabatak 1972). Studies concerning dam lakes started in 1980s with those in Kurtboğazı Dam Lake, followed by Beytepe, Alap, Çubuk, Bayındır and Altınapa Dam Lakes (Aykulu & Obalı 1981; Ünal 1984; Gönülol 1985; Yıldız, 1985). Floristic studies on algal compositions of inland water bodies are increasing in number particularly with studies in lakes and ponds.

The importance of floristic studies is obvious when one takes into consideration the extinction of some algal species as a result of climate change and industrial pollution. This, in turn, highlights the need of determination and monitoring of water quality parameters of natural lakes, dam lakes and fluvial systems related with these lakes and the algal taxa responsible for primary production and zooplantonik and bentic organisms feeding on them. Reservoirs differ from natural lakes by human affect on their formation, water levels and water resting time. Investigation of physical, chemical and biological parameters of reservoir ecosystems are important in revealing characteristics of transition from fluvial to lake ecosystems and lake ecosystem succession.

This study was performed in order to investigate relationship between phytoplankton assemblages and physico-chemical variables in Kadıköy Reservoir (Keşan-Edirne). Kadıköy Reservoir is important since no limnological data has been obtained so far from the lake, thus the results will contribute not only to data about the lake but also to algal biodiversity of the country as a whole.

## Materials and Methods

*Study area*

Kadıköy Reservoir is located in Keşan city borders in Edirne province and was constructed between 1969-1973 on Derbent Stream in order to provide water for agricultural irrigation, industrial and daily use and to prevent flood. The lake surface area is 6.20 $km^2$ at normal water-level. The area using irrigation water from the lake covers 4.428 hectares and the annual amount of daily use water is 2 $hm^3$ (http://www2.dsi.gov.tr).

Water samples were taken at monthly intervals between December 2011 and February 2012 at 3 stations on the lake. Station 1 was the deepest station and 4 samplings were performed here from surface water and from 3 depths of 1, 5 and 15 meters. Station

2 was at the centre of the lake and samplings in this station were performed at a 5 meters depth. Station 3 was located at the meeting point with Derbent Stream and a subsurface sampling was performed here at 1 and 5 meters (Figure 1).


**Figure 1.** The map to Kadıköy Reservoir and the selected three stations.

*Water Quality Parameters*

A Van Dorn water sampler was used to obtain water samples just below the surface of the water body in order to determine some physico-chemical properties of the lake such as water temperature, dissolved oxygen amount, pH, nitrogen in nitrite and nitrate forms and phosphate values. Water temperature, pH, dissolved oxygen (DO) and conductivity were measured on site during samplings using field type equipments and Total Phosphorus (TP), $NO_3$-N and $NO_2$-N were measured in laboratory in accordance with APHA-AWWA-WPCF methods (APHA, 1992). Chlorophyll-*a* was determined by spectrophotometrically according to Nusch (1980) and water transparency was measured using a secchi disc.

*Phytoplankton Analysis*

Sampled phytoplankton specimens were identified by investigation of temporary preparations. For this purpose, water samples were filtered from Whatman GF/A paper with the help of a water trompe and dissolved in 10% glycerine. An Uthermol counting chamber was used to calculate the organism number per liter (Uthermohl 1958; Round 1973). The taxonomic books (Husted 1930; Cleve-Euler 1952; Pestalozzı 1955, 1982; Prescott 1973; Komarek & Fott 1983; Krammer & Lange-Bertalot 1991a, 1991b,1999) were used for the identification of algal species. All species were checked in algaebase cite (Guiry et.al, 2010).

The Carlson's trophic state indices (Carlson 1977) were utilized in order to calculate the trophic state of reservoir based on values of chlorophyll-*a* ($TSI_{CA}$), total phosphate ($TSI_{TP}$), and Secchi disk depth ($TSI_{SD}$).

A Bray-Curtis analysis was performed to reveal similarities, if any, among stations based on algal species diversity and abundance (Bray & Curtis 1957).

## Results

*Physico-chemical findings*

The mean values for pH, dissolved oxygen, nitrite, nitrate, phosphate, water transparency and chlorophyll-a were given in Table 1.

**Table 1.** The mean values of some physico-chemical parameters in Kadıköy Reservoir.

| Water Temp. | DO | pH | $NO_2$- N | $NO_3$- N | Secchi | Chl-*a* |
|---|---|---|---|---|---|---|
| 16,5 | 7.56 | 8.28 | 0.037 | 1.778 | 98 | 8,67 |

Water temperature °C, (DO) Dissolved Oxygen (mg $L^{-1}$), Nitrite Nitrogen (mg $L^{-1}$), Nitrate Nitrogen (mg $L^{-1}$), Secchi (cm) and Chlorophyll-*a* (µg $L^{-1}$)

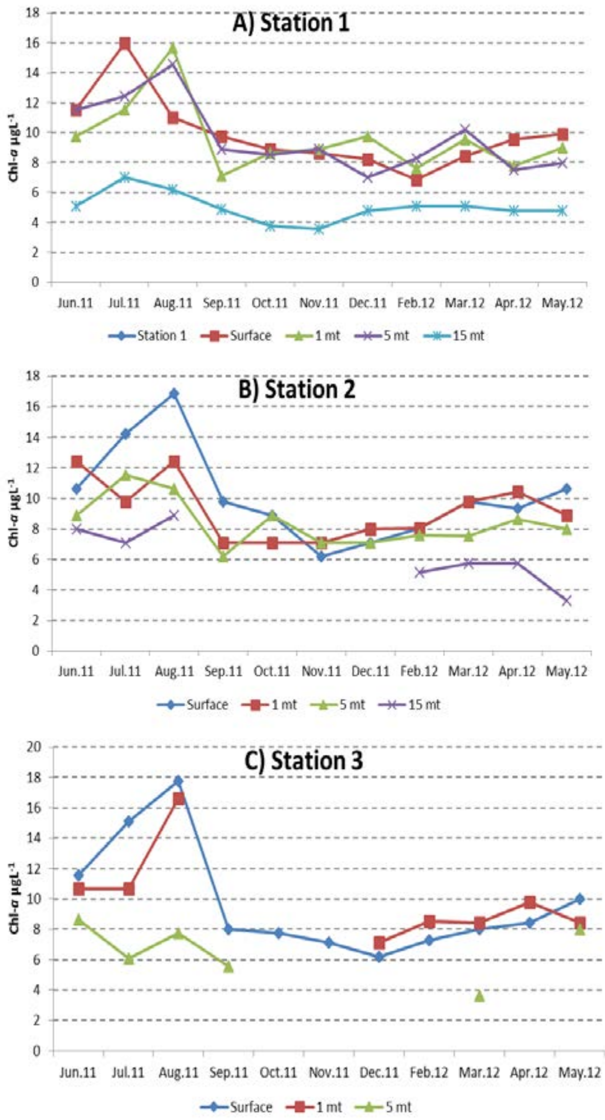


**Figure 2.** Chlorophyll-*a* values in a) station 1, b) station 2 and c) station 3 with respect to sampling depths.

The highest and lowest Chlorophyll-a values in summer during which water temperature and transparency were highest were measured in August and May in subsurface and 15 meters samplings, respectively, in Station 3 (Figure 2a, b, c). Water transparency was found to be at its highest in July in Station 2 and lowest in October in Station 3 (Figure 3).

Total Phosphorus was found to be at its highest in February 2012 and lowest in August 2011 (Figure 4).

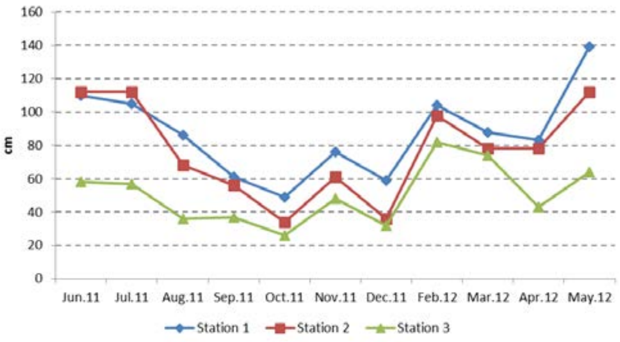


**Figure 3.** Monthly variation of Secchi disc depths in three stations.

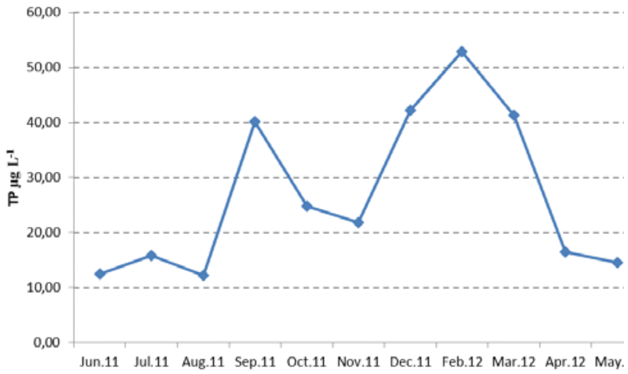


**Figure 4.** Monthly Total phosphorus values in Kadıköy Reservoir.

*Phytoplankton species diversity*

A total of 74 taxa were identified in the lake. Chlorophyta was the most abundant group with 28 taxa followed by Ochrophyta (23 taxa), Euglenophyta (9 taxa), Cyanophyta (6 taxa), Charophyta (5 taxa) and Dinophyta (3 taxa) (Figure 5). All identified taxa are considered as cosmopolitan species of inland waters in Turkey (Table 2).

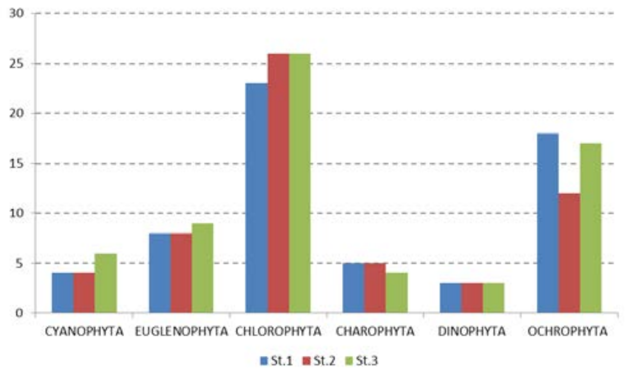


**Figure 5.** The spatial distribution of phytoplankton taxa identified in the lake with respect to stations.

The highest cell number in Station 1 was measured in July (subsurface sampling) and in August (1, 5 and 15 meters samplings) and the lowest was measured in December (5 meters sampling) and February (subsurface, 1 and 15 meters samplings). The highest cell number in Station 2 was measured in August in all sampling depths and the lowest was measured in February (subsurface, 1 and 5 meters samplings) and March (15 meters samplings). No sampling was performed in this station in September, October, November and December due to low water levels. The highest cell number in Station 3 was similar to that of Station 2 and the lowest numbers was measured in February (subsurface and 1 meter samplings) and in March (5 meters sampling). Due to low water levels in Station 3, 1 meter samplings in October and November and 5 meters samplings in September, October, November, December, February and April could not be performed. Chlorophyta appeared to be the dominant group in the lake in terms of cell counts followed by Dinophyta as the second dominant group (with three taxa). Other algal groups were recorded with low abundance values (Table 3).

**Table 3.** Abundance of taxonomic groups of phytoplankton and their contributions to total phytoplankton abundance in Kadıköy Reservoir.

| Phytoplankton Group | Abundance (cells $L^{-1}$) | | Contribution (%) |
|---|---|---|---|
| | Range | Mean | Mean |
| Chlorophyta | 10300-47220 | 29543 | 56,45 |
| Charophyta | 220-7040 | 3150 | 6,02 |
| Ochrophyta | 1360-4820 | 3695 | 7,06 |
| Cyanophyta | 70-3180 | 2549 | 4,87 |
| Dinophyta | 7610-2730 | 11466 | 21,91 |
| Euglenophyta | 130-2980 | 1935 | 3,70 |

**Table 2.** The list of the planktonic algal species obtained in Kadıköy Reservoir during the study period

| **CHLOROPHYTA** | Jun. 11 | Jul. 11 | Aug. 11 | Sep. 11 | Oct. 11 | Nov. 11 | Dec. 11 | Jan. 12 | Feb. 12 | Mar. 12 | Apr. 12 | May. 12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Trebouxiophyceae** | | | | | | | | | | | | |
| *Botryococcus braunii* Kütz. | | | | | | | | x | x | x | x | x |
| *Crucigenia rectangularis* (Näg.) Gay | x | x | x | x | | | | | | | | x |
| *Crucigenia tetrapedia* (Kirch.) Kuntze | x | x | x | x | | | x | | | | | x |
| *Chlorella* sp. | x | x | x | x | x | x | | x | x | x | x | x |
| *Dictyosphaerium* sp. | | x | x | x | | x | | | | | | x |
| *Lagerheimia ciliata* (Lag.) Chod. | | | x | | x | | x | | | x | | |
| *Oocystis* sp. | x | x | x | x | | x | | x | x | x | x | x |
| **Chlorophyceae** | | | | | | | x | | | | | |
| *Coelastrum astroideum* De Notaris | x | x | x | x | x | x | x | x | x | x | x | x |
| *Coelastrum microporum* Nägeli | x | x | x | x | x | x | x | | x | | x | x |
| *Coelastrum reticulatum* (Dang.) Senn | x | x | x | | | x | | | | | | x |
| *Kirchneriella* sp. | x | x | x | x | | | x | | | | | |
| *Monoraphidium contortum* (Thu.) K..-L. | x | x | x | x | x | x | x | x | x | x | x | x |
| *Monoraphidium minutum* (Nägeli) K..-L. | x | x | x | x | x | x | x | | x | x | x | x |
| *Pediastrum boryanum* (Turp.) Men. | x | x | x | | | | x | | | | | x |
| *Pediastrum duplex* Meyen | x | x | x | x | x | x | | | | | x | x |
| *Pediastrum simplex* Meyen | x | x | x | x | x | x | | | | | | x |
| *Pediastrum tetras* (Ehren.) Ralfs | x | x | x | | | | x | | | | | x |
| *Scenedesmus bijuga* (Turp.) Lag. | | | | | | | x | | | | | |
| *Scenedesmus abundans* (Kirch.) Chod. | x | x | x | x | x | x | | | | x | x | |
| *Scenedesmus acuminatus* (Lager.) Chod. | x | x | x | x | | | | | | | | x |
| *Scenedesmus acutus* Meyen | x | x | x | x | | | x | | | x | x | x |
| *Scenedesmus dimorphus* (Turp.) Kütz. | x | x | x | x | | | x | | | | x | x |
| *Scenedesmus quadricauda* (Turp.) Bréb. | x | x | x | x | x | x | x | x | x | x | x | x |
| *Schroederia* sp. | | | | x | x | x | x | | x | x | x | x |
| *Tetraedron caudatum* (Corda) Hans. | | x | x | x | x | x | x | | x | x | x | x |
| *Tetraedron minimum* (Braun) Hans. | x | x | x | x | x | x | | | x | x | x | x |
| *Tetraedron trigonum* (Nägeli) Hans. | | | | | | | x | | x | | x | |
| *Tetrastrum staurogeniiforme* Lemm. | x | x | x | x | x | x | | | x | x | x | x |
| **CHAROPHYTA** | | | | | | | | | | | | |
| **Conjugatophyceae** | | | | | | | x | | | | | |
| *Closterium pronum* Bréb. | x | x | x | x | x | x | | | x | x | x | x |
| *Closterium* sp. | x | x | x | | | | | | | | | |
| *Cosmarium* sp. | x | x | x | x | x | x | | | | | | |
| *Staurastrum paradoxum* Meyen | x | x | x | x | x | | | | x | x | x | x |
| *Staurastrum punctulatum* Bréb. | x | x | x | x | x | | | | x | x | x | x |
| **OCHROPHYTA (Bacillariophyta)** | | | | | | | | | | | | |
| **Coscinodiscophyceae** | | | | | | | | | | | | |
| *Aulacoseira italica* (Ehr.) Simon. | | x | | x | | | x | | | | | x |
| *Cyclotella meneghiniana* Kütz. | x | x | x | x | x | x | x | x | x | x | x | x |
| *Melosira varians* Agardh | x | | | x | x | | | | | | | x |
| **Bacillariophyceae** | | | | | | | | | | | | |
| *Amphora ovalis* (Kütz.) Kütz. | | | x | | x | x | x | x | x | | | |
| *Cymatopleura elliptica* (Bréb.) Smith | x | | | | x | | x | x | x | | x | x |
| *Cymatopleura solea* (Bréb.) Smith | x | x | | x | | x | x | x | x | x | | |
| *Cymbella cymbiformis* Agardh | x | | | | | | x | | x | | | |
| *Cymbella tumida* (Bréb.) van Heurck | x | x | | | | x | x | | x | | x | |

| CHLOROPHYTA | Jun. 11 | Jul. 11 | Aug. 11 | Sep. 11 | Oct. 11 | Nov. 11 | Dec. 11 | Jan. 12 | Feb. 12 | Mar. 12 | Apr. 12 | May. 12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Gyrosigma attenuatum* (Kütz.) Cleve | | | | | | | | | x | | | x |
| *Gyrosigma macrum* (Smith) Grif.&Henf. | | | x | | | | | | | | | |
| *Navicula capitata* Ehr. | | | | | | x | x | | | | | x |
| *Navicula* sp. | x | x | x | x | x | x | | x | x | x | x | |
| *Navicula viridula* (Kütz.) Kütz. | x | x | x | | | | x | | | | | x |
| *Cocconeis placentula* Ehren. | | | x | | x | x | x | | | | | |
| *Nitzschia acicularis* (Kütz.) Smith | x | x | x | x | x | x | x | | | x | x | |
| *Nitzschia palea* (Kütz.) Smith | x | | x | | | x | | | x | x | x | x |
| *Nitzschia sigmoidea* (Nitz.) Smith | x | | x | | x | | | | x | | x | |
| *Nitzschia* sp. | | x | x | x | x | x | | | x | | | |
| *Rhoicosphenia curvata* (Kütz.) Grun. | | | | | x | x | | | | | | |
| **Fragilariophyceae** | | | | | | | | | | | | |
| *Diatoma vulgare* Bory | | | | | | x | | x | | | | |
| *Fragilaria crotonensis* Kitton | x | | | | | | x | | | | | |
| *Ulnaria ulna* (Nitz.) Compère | x | | x | x | | x | | x | x | x | x | x |
| **Chrysophyceae** | | | | | | | | | | | | |
| *Dinobryon divergens* Imhof | x | x | x | | | | | | | | | x |
| **EUGLENOPHYTA** | | | | | | | | | | | | |
| **Euglenophyceae** | | | | | | | x | | | | | |
| *Euglena texta* (Duj.) Hüb. | x | x | x | | | | | | x | | x | x |
| *Euglena acus* (O.F.Müller) Ehren. | | x | | x | | | | | | | | x |
| *Euglena polymorpha* P.A.Dang. | x | x | x | x | | | x | x | x | | | x |
| *Euglena tuberculata* Swirenko | | x | x | x | x | x | x | | x | | x | |
| *Phacus longicauda* (Ehren.) Duj. | x | x | x | x | x | x | x | | | | x | x |
| *Phacus acuminatus* Stokes | x | x | x | x | x | x | | | | | | x |
| *Strombomonas* sp. | | x | x | x | | | x | | | | | x |
| *Trachelomonas volvocina* (Ehr.) Ehr. | x | x | x | x | x | x | x | x | x | x | x | x |
| *Trachelomonas hispida* (Perty) Stein | x | x | x | x | x | x | | x | x | x | x | x |
| **CYANOBACTERİA (Cyanophyta)** | | | | | | | | | | | | |
| **Cyanophyceae** | | | | | | | | | | | | |
| *Microcystis aeruginosa* (Kütz.) Kütz | x | x | x | x | x | x | | | | | | x |
| *Chroococcus* sp. | x | x | x | x | x | | | x | | | | x |
| *Merismopedia* sp. | x | x | x | | | x | | | | | | |
| *Oscillatoria limosa* Agardh | | | | | x | | x | x | | | | x |
| *Oscillatoria tenuis* Agardh | | | | | | x | | | | | | |
| *Spirulina* sp. | | | | | | x | | | | | | |
| **DINOPHYTA** | | | | | | | | | | | | |
| **Dinophyceae** | | | | | | | | | | | | |
| *Peridiniopsis cunningtonii* Lemm. | x | x | x | x | | x | | | | x | x | x |
| *Peridinium cinctum* (Müller) Ehren. | x | x | x | x | | x | | | x | | x | x |
| *Ceratium hirundinella* (Müller) Duj. | | x | x | | | | | | | | | x |

When floristic compositions of monthly samples were used to obtain a similarity index through the cluster analysis, July and August were found to have very similar floristic compositions and, although all stations revealed a somewhat same similarity, December was grouped to be the outgroup among the stations with the least similarity (Figure 6). TSI values of Kadıköy Reservoir was calculated according to Carlson (1977) considering Chlorophyll_*a* ($TSI_{CA}$), Secchi disc ($TSI_{SD}$) and total phosphate ($TSI_{TP}$) values (Table 4). The results showed that $TSI_{SD}$ values ranged within 60.74-74.72, $TSI_{CA}$ values within 39.06-54.73, $TSI_{TP}$ values within 12,51-52.89 and CTSI values ranged within 37.92-52.21 (Figure 7).

**Table 4.** Carlson's trophic state index values and classification of lakes.

| TSI values | TrophicStatus | Attributes |
|---|---|---|
| < 30 | Oligotrophic | Clear water, oxygen throughout the year in the hypolimnion |
| 30-40 | Oligotrophic | A lake will still exhibit oligotrophy, but some shallower lakes will become anoxic during the summer |
| 40- 50 | Mesotrophic | Water moderately clear, but increasing probability of anoxia during the summer |
| 50-60 | Eutrophic | Lower boundary of classical eutrophy: Decreased transparency, warm-water fisheries only |
| 60-70 | Eutrophic | Dominance of blue-green algae, algal scum probable, extensive macrophyte problems |
| 70-80 | Eutrophic | Heavy algal blooms possible throughout the summer, often hypereutrophic |
| >80 | Eutrophic | Algal scum, summer fish kills, few macrophytes |

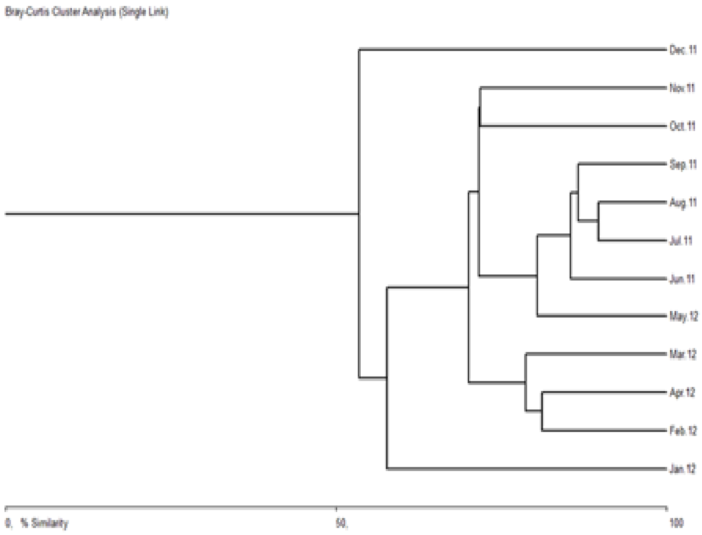


**Figure 6.** Results of clustering analyses based on differences in the floristic composition of phytoplankton (Bray-Curtis distance).

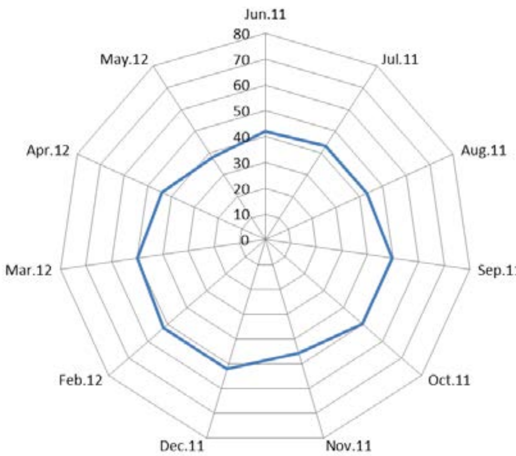


**Figure 7.** Carlson Trophic State Index, Kadıköy Reservoir 2011-12

## Discussion

Water level fluctuations in dam lakes are higher in comparison to the natural lakes due to the use of water for different purposes. This human controlled water level changes in dam lakes directly affects the aquatic life forms. The present study in Kadıköy Reservoir showed that water levels in the lake varied during the study period not only because of evaporation but mainly as a result of water discharge for irrigation and drinking water reservoir.

The pH measurements in the lake showed that lake water was slightly alkaline with pH values ranging from

7.3 to 8.7. $NO_3$-N was all measured in low levels and dissolved oxygene values were measured between 2.6 and 11.6 mg $L^{-1}$. Chlorophyll-*a* values varied within 3.32-17.76 µg $L^{-1}$ during the whole sampling period but the highest levels were measured in summer months due to the increase in phytoplankton abundance, and reached it lowest values in February following a decline starting in September. The phytoplankton abundance in Kadıköy Reservoir reached its maximum in summer months in contrast to the mesotrophic Hasan Uğurlu (Samsun) and Kemer Dam Lakes where higher phytoplankton abundance was reported in autumn (Gönülol & Obalı 1998; Özyalın & Ustaoğlu 2008).

The total number of taxa recorded in the lake was 74 and the highest taxa in addition to the highest abundance were found in August (55 taxa). Chlorophyta was found to be the dominant group in the lake with a %56.45 abundance value. Interestingly, Dinophyta followed Chlorophyta with a value of %21.92 but this group was represented with only 3 species. Ochrophyta and Charophyta were found throughout the year, but in low numbers. Euglenophyta members were high in number during summer and autumn months at 5 and 15 meters. When Cyanophyta was considered, *Microcystis aeruginosa* (indicator species of eutrophy) increase particularly in July, August and September samples was significant as in the case of Ömerli Reservoir (Albay & Akçaalan 2003) but, in contrast, did not dominate Kadıköy Reservoir.

TSI values of the lake, which was calculated according to Carlson (1977) pointed out that the water of the lake showed a transition from mesotrophic character during some periods of the year. In accordance with this finding about the trophic level of the lake, *Scenedesmu*s and particularly *Pediastrum* representatives, which were both shown to occur in great numbers in most oligo-mesotropic lakes in Turkey, were recorded in high numbers during the study period (Aykulu & Obalı 1981; Gönülol & Obalı 1998a; 1998b; Baykal et al. 2004; Obalı 1984; İşbakan et al. 2002; Albay& Akçaalan 2003; Kıvrak & Gürbüz 2005; Özyalın & Ustaoğlu 2008; Çelekli & Öztürk 2014). For instance, *Pediastrum boryanum*, *Pediastrum* *simplex*, *Pediastrum duplex* and sometimes *Pediastrum tetras* belonging to Chlorophyta were frequently observed in this study. It has been reported that *Pediastrum* species are more common in eutrophic waters than in oligotrophic waters (Hutchinson 1967). On the other hand, these species are characteristic of mesotrophic lakes.

Dinophyta was found as subdominant group in the lake after Chlorophyta and was represented with *Ceratium hirundinella*, *Peridinium cinctum* and *Peridiniopsis cunningtonii*. *C. hirundinella*, a species considered as an indicator of mesotrophic waters by Rawson (1956), was recorded in low numbers during summer and *P. cinctum* and *P. cunningtonii*, which were reported to be commonly found in oligotrophic and mesotrophic water, were found in high numbers (Rawson 1956; Eloranta 1995; Reynolds et al. 2002). The dinoflagellate in Kadıköy Reservoir, *P. cinctum* and *P. cunningtonii*, showed its main cell number peaks in the summer and early autumn seasons, similar to the cases in Boyansko Blato Reservoir in Bulgaria (Stoyneva 2003) and Alleben Reservoir in Turkey (Çelekli & Öztürk 2014).

Members of Desmids are characteristic species of oligotrophic lakes, as reported by Hutchinson (1967) and they usually prefer oligotrophic lakes (Rawson 1956; Hutchinson 1967; Wetzel 1983). Members of this group, namely *Staurastrum* and *Closterium* species were frequently sampled in the lake during our study period. Danilov et al (2001) reported that *Trachelomonas volvocina* and *T. hispida* formed a considerable part of abundance at all depths in eutrophic lakes, while *T. volvocina* was only occasionally found near bottom in oligotrophic lakes. In the present study, *T. volvocina* was found mainly in 5 and 15 meters samples and Euglena texta was recorded in subsurface and 1 meter samples in summer and autumn months. However, although low in number, *T. volvocina* was sampled in the upper parts, *E. texta* in the lower parts of the water coloumn. *Dinobyron divergens*, an indicator of waters with low phosphate concentrations (Hutchinson 1944; Lee 1980; Sandgren 1988), was also occasionally recorded in the lake.

The most abundant chlorophytes in lake were *Crucigenia tetrapedia* and *Tetraedron minimum*. Some species, such as *Monoraphidium*, *Botryococcus* and *Oocystis* which were reported to be adapted to oligotrophy and mesotrophy (Komárek & Fott, 1983; Komárek & Marvan, 1992; Reynolds,1988; Rosén, 1981; Willén, 1992) were also found occasionally throughout the study. On the other hand, certain *Scenedesmus* species (considered to be indicators of strong eutrophication), *Tetraedrum minimum* and *Microcystis aeruginosa* were found although their abundances were low, and they were never biomass dominants.

In conclusion, Kadıköy Reservoir has a mesotrophic character considering the phytoplankton species found in the lake. However, a bloom formation due to the increase in *M. aeruginosa* was recorded in the lake in summer months. This shows that the lake is in the eutrophication process and in a sensitive situation. Therefore, the lake has to be monitored and necessary measures should to be taken.

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