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# Determination of Morphological Characteristics of the Wetland Sediments Inekli, Azapli and Golbasi Lakes in the Eastern Mediterranean Region

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## Abstract

In this study, the most important wetlands in the Golbasi Depression in the Eastern Anatolian Fault Zone, morphological features of the Golbasi Lakes (Inekli, Azapli and Golbasi Lakes) have been examined. The lake, the water is sweet, but not suitable for drinking, because of included in the karstik tectonic lakes group in terms of formation. The extension of the lake, is east-west direction, it is seen that there is plateau area after the plain area is found to the south. This area, to determine for morphological characteristics, soil profiles were opened at 13 different locations. Inekli-1, Inekli-7, Azapli-1, Azapli-4 and Golbasi-1 profiles, on the ground formed on the main materials formed around the Golbasi Lakes, and Inekli-2, Inekli-3, Inekli-4, Inekli-5, Inekli-6, Azapli-2, Azapli-3 opened on materials that were transported to the lake area were profiles between Azapli and Golbasi Lakes. The soil colors of 43 soil horizons in each professor were determined dry and wet by using Munsell color scale, soil structures were investigated and the hardness, tackiness and plasticity properties of the soil were determined by the findings of this study.

**Keywords:** Golbasi Depression, wetland, soil, morphological property

## INTRODUCTION

In this study, wetlands are described as the natural systems which provide service to both local people and country with constituting the most fertile and the most substantial ecosystems of the earth. According to Ramsar Convention on Wetlands, wetlands are defined as 'areas of marsh, fen, peat land or water, whether natural or artificial, permanent or temporary, with water that is static or flowing, fresh, brackish or salt, including areas of marine water the depth of which at low tide does not exceed six meters' (Ministry of Environment, 2000). Wetlands which have such an importance have been forced to undergo various changes over time, either naturally or through human interference (Abacı Bayan, 2016). The fertility potential of lands of lake or wetlands which dried up for any reason and transform into terrestrial environment has affected the factors such as structure formation, plasticity and capacity of seed germination. It has been stated that aftermath of drying process of wetlands, whereas structure has not developed; in arid lands dried consistency is solid and rigid, moist consistency is stiff and very stiff, wet consistency is very sticky and has high plasticity; this situation has negatively affected plant development (Sari *et al*., 2003).

In a research conducted in the area of Kestel Lake, since lands are immature soils have recently reached terrestrial environment, their B horizon could not develop and they are lands with AC horizons. It has been stated that their colors as morphological distinctive features has generally values such as 2.5Y 4/2 and 5Y 4/3. It has been determined that clay textures are dominant in the soil, and the consistency properties of each soil series are very solid when they are dry, very stiff when they are moist and very sticky and very plastic when they are wet. On the other hand, it has been established that while structural structures in tillage depth, were strong moderate medium angular block, strong coarse angular block, strong moderate medium granular, strong coarse

granular; below tillage depth, they were found as massive for all the profiles. This has been explained by the fact that the territorial area is young and little or no affected by pedogenesis (Altunbaş & Sarı, 2011). In the study on the obtained areas as a result of drying process of Manay Lake, five soil types with significant differences in terms of physiography and soil relations have been selected in the agricultural land.

In these soils, they have found that there are four different physiographic units, including some physical, chemical and morphological features, alluvial fan, alluvial ridge, alluvial terrace and old lake basin, and five soil series with significant differences in terms of their characteristics and land use. It has been stated that there are high permeability depends on light and medium texture, holding low water and nutrient and gravelly interlayers that will prevent root growth on the soil on the alluvial fan and alluvial back physiographic units among the features that adversely affect the agricultural production potentials of the soil. It has been established that on the alluvial terraces,with high clay and lime content, depending on swelling and shrinkage due to vertical feature, possible physical damage to the plant root system and high clay and lime content, vertical feature, harmful drainage and high amount of changeable sodium in the old lake basins come to the fore. It has been emphasized that it is inevitable that there will be no successful results from the agricultural production practices to be done without considering these properties, as well as serious deterioration in soil properties and especially the occurrence of alkalinity problem in the old lake basins (Sarı *et al*., 2003).

Within this study, it has been searched that the morphological characteristics and horizon descriptions of the lands of Inekli, Azapli and Golbasi Lakes which are among the most significant wetlands of the Eastern Mediterranean region of Turkey.

## MATERIAL and METHOD

### Material

### Working area and features

Golbasi Lakes located within the borders of Adiyaman province, one of the most important wetlands of our country, has been determined as the research area.

Golbasi Lakes (Inekli-Azapli-Golbasi), which constitute the most important wetland between the Mediterranean Region and the Southeastern Anatolian Region, are located in the Golbasi Depression within the Eastern Anatolian Fault Zone.

The average elevation of the depression ditch in the Northeast and Southwest is 885 m. 1687 hectare area that includes the Golbasi, Inekli and Azapli Lakes has been declared as "Golbasi Lakes Nature Park" according to the National Parks Law no 2873 and has been protected and has been still continuing its feature as the wetland ecosystem (Master Plan, 2004).


**Figure 1.**The locations of the soil profiles opened in the ovary where Golbasi Lake is located

## Climate and hydrological features

In Golbasi Lake and around the lake, as if predominantly a terrestrial climate has been seen, partly the influence of the Mediterranean climate can be seen. The total precipitation amount is 680.3 mm according to the long-term data, while the lowest temperature is -14.4°C and the highest temperature is 45.3°C (Master Plan, 2004). As the hydrological characteristics of Golbasi Lake, there are varying changes in depth and surface of the lake due to annual and seasonal level of changes in the lake (Biricik, 1994). Golbasi (5 $km^2$), Azapli (4 $km^2$) and Inekli (3 $km^2$) are located in the depressions of Golbasi Lake depression bed. Golbasi is the biggest in terms of surface area and Inekli Lake is the smallest. Azapli Lake is located between these two lakes (Akdemir, 2004; Biricik, 1994).

## Geological features

In Adiyaman, there has been Lower Cretaceous Aged Limestone at the bottom and these lime stones are semi-crystallized and dolomitic. The geological formation existed in Cambrian and tertiary period, and Golbasi lake as narrow lake basin was changed in the Tertiary Period and it has come to the current state over time. It has been formed from marls and has been composed of clays and sandy beds. It has mostly arisen from main marl of the valley, schist, limestone, red and brown conglomerates.

Golbasi Lake, which has carstic-tectonic origin, is located in a depression ditch in the Northeast-Southwest direction (Akdemir, 2004). The pit area in which Golbasi, Azapli and Inekli Lakes is a depression with tectonic origin. This depression is on the Eastern Anatolian Fault Zone, which is one of the most important extension of tectonic states of the earth crust in Anatolia.

The Golbasi depression and the ophiolitic formations around it are located on the old basic site belonging to the Permo-Carboniferous. These lakes were affected by large-scale tectonic events and were later subject to erosion. Over time, the lake waters have been leveled and descended to sea level. Upper Cretaceous formations are common in Golbasi Lake and around it. Furthermore, in the west of Golbasi, Holocene alluvium extends northeast-southwest direction (Biricik, 1994). The GPS coordinates of the lands obtained from the wetlands of Golbasi Lakes, the altitudes from the sea level and the vegetation are shown in Table 1.

**Table 1.** Inekli Lake (I), Azaplı Lake (AZ), Golbasi Lake (GB) Coordinates of the profiles opened in the wetlands, elevations and vegetation

| Profile No | Coordinates | | Altitude | Vegetation |
|---|---|---|---|---|
| | E | N | m | |
| Inekli-1 | 37368120 | 4176930 | 901 | Weed |
| Inekli-2 | 37369158 | 4174285 | 884 | Wheat field |
| Inekli-3 | 37366942 | 4175759 | 882 | Weed |
| Inekli-4 | 37368025 | 4176701 | 877 | Reeds |
| Inekli-5 | 37368220 | 4176607 | 868 | Inside the natural site |
| Inekli-6 | 37369193 | 4172440 | 877 | Reeds |
| Inekli-7 | 37366827 | 4176358 | 892 | Attack |
| Azapli-1 | 37372527 | 4180376 | 883 | Plowed area |
| Azapli-2 | 37371149 | 4179536 | 870 | Alfalfa-meadows |
| Azapli-3 | 37374751 | 4179974 | 878 | Reeds end point |
| Azapli-4 | 37373229 | 4177539 | 893 | Wheat field |
| Azapli-Golbasi | 37377059 | 4181419 | 886 | Cultivated area |
| Golbasi-1 | 37380429 | 4184168 | 884 | Weed |

## Method

In research area, coordinates of sample points have been determined by means of GPS, with cross-sectioning the lake face and soil profiles have been opened. As far as possible, the main material has been tried to reach in opened profiles and horizon identification has been made. The geographical coordinates of the sample points have been determined by GPS. In Inekli, Azapli and Golbasi Lakes, thirteen soil profiles have been opened, 43 soil horizons have been obtained and the horizon has been identified by morphological examination according to the standard procedure of (Master Plan, 2004). Munsel color scale and 10 % hydrogen chloride (HCl) have been used for total calcium carbonate ($CaCO_3$) control, for determination of the color from the morphological characteristics of the soils. All horizons found in each profile have been examined and identified.

In accordance with principals which have been declared by Jackson (Jackson, 1962), soil samples have been taken and they have been dried in laboratory environment. After filtering them by 2 mm sieve, value of water saturation (Demiralay, 1993), soil reaction (Thomas, 1996) and electrical conductivity (Tuzuner, 1990) contents have been determined.

## RESULTS and DISCUSSION

The results obtained in this study carried out in order to search the morphological characteristics of the soils formed in the wetlands of the Inekli, Azapli and Golbasi Lakes in Eastern Mediterranean Region are shown in Table 2. When the table is examined, Inekli-1, Inekli-7, Azapli-1, Azapli-4 and Golbasi-1 profiles have been opened above soils which were arisen from main materials in Golbasi Lake and its surroundings; Inekli-2, Inekli-3, Inekli-4, Inekli-5, Inekli-6, Azapli-2, Azapli-3 and profiles between Azapli-Golbasi have been opened above the materials which have been transported to the lake area. It has been found that the average pH values of Inekli Lake soils is 7.66 and the total salt content value is 0.13 % and the pH values of Azapli is 7.95, total salinity value is 0.09 %. It has been determined that the pH values of Golbasi Lake soil is 8.01 and total salinity value is 0.05 %. It has been determined that horizons in profile Inekli-1 have a sequence of A1/A2/A3/C. It has been observed that when the soil is dry, its color is reddish; when it is moist, its color is dark brown. While the structure of the upper horizons is weak, small and granular, the lower horizon is determined as massive.

The profile soil is very rigid when it is dry; slightly sticky and plastic when it is wet. It has been observed that as the surface is turned from the horizon towards the lower horizons, the rate of sandiness and gravel increases. It has been observed that the Inekli-2 profile horizons have a

sequence of A/AC/C. The soil color has been determined as between reddish and brown when it is dry and it is very dark brown to dark reddish when it is moist. While the structure of the upper horizons is determined as weak, small and granular, the lower horizon is determined as medium, medium and granular. While soils are dry their structure is rigid, sticky and plastic when they are wet. Microbial activity is very dense in the surface horizon and this density disappears as it goes down to the lower horizons.It has been determined that the Inekli-3 profile horizons have a sequence of A/B/CB/C. While the soil color was dry, it was dark gray with a pale green color, while it was moist when it was between black and dark gray. The structure of the profile soil is defined as weak, small and semi-angular block. The profile soil is very rigid when it is dry; very sticky and very plastic when it is wet. It has been observed that plant root was seen very intense in the surface horizon. It has been determined that horizons in profile Inekli-4 have a sequence of A/AC/C. The soil color was light yellowish brown while it was dry and dark brown when it was damp. While the structure of the upper horizons is medium, small and granular, the lower horizon is determined as massive. While soils are dry their structure is very rigid, very sticky and very plastic when they are wet. On the surface horizon, the plant root was quite intense.It is found that the horizons in profile Inekli-5 have a sequence of Oa/Oe/C. The soil color was black when dry, and black and brown when it was moist. While the structure of the upper horizons is medium, small and granular, the lower horizon is determined as massive. While soils are dry their structure is very rigid, slightly sticky and slightly plastic when they are wet. Plant roots and mussel shells in the all horizons were quite intense. It has been determined that horizons in profile Inekli-6 have a sequence of A/AB/B/CB/C. When the soil color was dry, it was observed to vary between gray to light brown and moist to black to dark gray.

The structure of the upper horizons is weak, small and granular, and the lower horizon is massive. The soil is very hard when it is dry, very sticky and very plastic when wet. It is found that the horizons in profile Inekli-7 have a sequence of Ap/AC/C. The soil color was brown when it was dry, dark brown when it was moist.

The structure of the soil is weak, small and granular. The soil is loose when it is dry, very sticky and very plastic when wet. It has been determined that horizons in profile Azapli-1 have a sequence of A/AC/C. The soil color was light brown while it was dry and yellowish brown when it was moist. It is determined that the soil structure is weak, small and granular in the surface horizon while the middle and bottom horizons are massive. Soils vary from loose to hard while dry, slightly wet and slightly plastic. It has been observed that the Azapli-2 profile horizons have a sequence of A/AC/C. It was determined that the soil color changed from gray to light brown while it was dry and dark brown when it was moist. The soil structure is determined to be weak, small and granular in the surface horizons and massive in the bottom horizon. Soils vary from loose to hard while dry, very wet and very plastic. Rust spots were seen in the middle and lower horizons.It has been determined that horizons in profile Azapli-3have a sequence of Ap/A/AC/C. It was observed that the soil color changed between light gray and brown while it was dry and dark grayish brown when it was moist. Soil structure; Small, and block in the surface horizon, weak, small and granular in the middle horizons, and massive in the bottom horizon. The soil is very hard when it is dry, very sticky and very plastic when wet. In all the horizons there were quite intense mussel shells. It is found that the horizons in profile Azapli-4 have a sequence of A/AC/C. The soil color was light yellowish brown when dry and brown when moist. The soil structure was determined as weak, medium and semi-angular block in the surface horizon, weak, medium and granular in the middle horizons, and massive in the bottom horizon. The soils are very hard when dry, very sticky and very plastic when wet. Azapli-Golbasi profile opened between Azapli Lake and Golbasi Lake. It has been determined that horizons this profile has a sequence of A/AC/C. The soil color was brown when dry, dark brown when it was damp. The soil structure is weak, small and granular on the surface horizon, weak, middle and block on the middle horizon, weak, small and block on the bottom horizon. The soils are very hard when dry, very sticky and very plastic when wet. Golbasi-1 profile is opening in

the Golbasi Lake area. It is found that the horizons in profile has a sequence of A/C. The soil color was dark brown when dry, while it was found to be between reddish brown and damp. It is seen that the soil structure is massive. Soils are dry, loose, wet and not sticky and plastic.

Golbasi Lakes have been conserving the current natural situation of the lands of the lake face. It has been evaluated that the clay level is higher than other areas in Golbasi region where the natural conditions have been at least deteriorated as a sign that the natural state of water and thin matter transport is higher in the lost areas due to erosion. In other words, while the water in the area is draining through drainage channels, the materials in the form of clay are removed from the area. In this research, average saturation value of the lands of the Inekli, Azapli and Golbasi Lakes is 76.4 %, the average pH value is 7.78, and the total salt value averagely is 0.12 % have been estimated. It has been observed that in the C horizon of the Inekli-5 profile, the saturation and total salt value of the soil is high and the pH value is the lowest. Saturation and total salinity values have been found as the lowest in GB-1 profile, with the lowest percentage of silt and clay, and percentage of sand is ranked as the highest. The highest pH value of the soil has been seen in the Inekli-6 profile C horizon. When the average values of the Golbasi Lake soils are taken into consideration, it has been determined that pH is in the saline class of mild alkali and salinity class (Table 2). Soil reaction is important for plant growth, and pH has a major impact on the plant's intake of nutrients and the water solubility of toxic ions, and the activity of microorganisms (Yaras & Dasgan, 2012). The pH level of soil affects many physical, chemical and biological events that occur directly or indirectly in the soil (Foy, 1992).

**Table 2.**Morphological characteristics of the soil of research areas

| Horizon | Depth (cm) | Color (Dry, Humid) | | Structure | Consistency (Dry,Humid, Wet) | Qualifications features |
|---|---|---|---|---|---|---|
| | | Inekli Lake (Profile No: I-1) | | | | |
| A1 | 0-15 | D 10 YR6/3 | M 10 YR 3/3 | 1fgr | vh, fr, ss, np | cm, pb (1-2 mm) |
| A2 | 15-39 | D 10 YR 6/3 | M 10 YR 3/4 | 1fsbk | vh, fr, ns, sp | cm, pb (5-10 mm) |
| A3 | 39-69 | D 5 YR 5/6 | M 5 YR 3/4 | 1fgr | vh, fr, ss, sp | cm, pb (1-2 mm) |
| C | +69 | D 10 YR 5/6 | M 7,5 YR 4/6 | k | vh, fr, ss, sp | cm,pb |
| | | Inekli Lake (ProfileNo: I-2) | | | | |
| A | 0-17 | D 7,5 YR 4/4 | M 7,5 YR 3/3 | 1fgr | sh, fr, ss, sp | cm, ba (1-2 mm) |
| AC | 17-30 | D 5 YR 4/4 | M 5 YR 3/3 | 1fgr | so, fr, vs, vp | cm (1-2 mm) |
| C | +30 | D YR 4/3 | M 5 YR 3/4 | 2mgr | vh, fr, vs, vp | cm (2-5 mm) |
| | | Inekli Lake (ProfileNo: I-3) | | | | |
| A | 0-12 | D 2,5 Y 4/1 | M 2,5 Y 2,5/1 | 1fbk | vh, fr, ms, sp | cm, pr (5-10 mm) |
| B | 12-28 | D 2,5 Y 4/1 | M 2,5 Y 2,5/1 | 1fbk | vh, fi, vs, vp | cm (5-10 mm) |
| CB | 28-42 | D 5 Y 5/1 | M 5 Y 3/1 | 1fbk | vh, fi, vs, vp | cm (5-10 mm) |
| C | +42 | D 2,5 Y 6/3 | M 2,5 Y 4/4 | 1fbk | vh, fi, vs, vp | cm (5-10 mm) |
| | | Inekli Lake (ProfileNo: I-4) | | | | |
| A | 0-26 | D 2,5 Y 6/3 | M 10 YR 3/3 | 2fgr | vh, fr, ss, sp | cm, pr (1-2 mm) |
| AC | 26-60 | D 2,5 Y 6/4 | M 10 YR 3/4 | 2fgr | vh, fr, vs, vp | cm, pr (1-2 mm) |
| C | +60 | D 2,5 Y 6/3 | M 10 YR 3/1 | k | vh, fi, vs, vp | cm, pr (1-2 mm) |
| | | Inekli Lake (Profile No: I-5) | | | | |
| Oa | 0-10 | D 2,5 Y2,5/1 | M 10 YR 2/1 | 2fgr | vh, fi, ns, np | cm, pr, ms (1-2mm) |
| Oe | 10-18 | D 2,5 Y 6/3 | M 2,5 Y 4/3 | 2fgr | vh, fr, ss, sp | cm, pr, ms (1-2mm) |
| C | +18 | D 5 Y 2,5/2 | M 2,5 Y 2,5/1 | k | vh, fr, ss, sp | cm, ms |
| | | Inekli Lake (ProfileNo: I-6) | | | | |
| A | 0-20 | D 10 YR 5/1 | M 7,5YR 2,5/1 | 1fgr | vh, fr, vs, vp | cm (1-2 mm) |
| AB | 20-32 | D 10 YR 4/2 | M 10 YR 3/1 | 1fgr | vh, fr, vs, vp | cm (1-2 mm) |
| B | 32-42 | D 7,5 YR 5/1 | M 2,5 Y 2,5/1 | 1fgr | vh, fr, vs, vp | cm (1-2 mm) |
| CB | 42-60 | D 7,5 YR 5/1 | M 7,5 YR 3/1 | 1fgr | vh, fr, vs, vp | cm (1-2 mm) |
| C | +60 | D 2,5 Y 5/1 | M 2,5 Y 5/3 | k | vh, fr, vs, vp | cm |
| | | Inekli Lake (Profile No: I-7) | | | | |
| Ap | 0-17 | D 10 YR 6/4 | M 10 YR 3/6 | 1fgr | sh, fr, vs, mp | cm (1-2 mm) |
| AC | 17-27 | D 7,5 YR 4/4 | M 10 YR 3/3 | 1fgr | sh, fr, vs, vp | cm (1-2 mm) |
| C | +27 | D 7,5 YR 5/4 | M 7,5 YR 3/3 | 1fgr | vh, fi, vs, mp | cm (1-2 mm) |
| | | AzapliLake (Profile No: AZ-1) | | | | |
| A | 0-13 | D 10 YR 6/2 | M 10 YR 4/6 | 1fgr | sh, fr, ms,mp | cm (1-2 mm) |
| AC | 13-25 | D 10 YR 6/3 | M 10 YR 4/6 | k | h, fr, ms, mp | cm |
| C | +25 | D 2,5 Y 7/3 | M 10 YR 5/6 | k | vh, fi, ss, mp | cm |
| | | AzapliLake (Profile No: AZ-2) | | | | |
| A | 0-11 | D 2,5 Y 6/1 | M 2,5 Y 3/3 | 1fgr | sh, fr, ss, sp | cm (1-2 mm) |
| AC | 11-27 | D 2,5 Y 5/6 | M 2,5 Y 3/2 | 1fgr | sh, fr, vs, sp | cm (1-2 mm) |
| C | +27 | D 2,5 Y 6/6 | M 10 YR 3/4 | k | h, fr, vs, mp | cm |
| | | AzapliLake (Profile No: AZ-3) | | | | |
| Ap | 0-28 | D 2,5 Y 5/1 | M 2,5 Y 3/2 | 1fsbk | vh, fr, vs, vp | cm, ms (5-10 mm) |
| A | 28-42 | D 2,5 Y 7/1 | M 10 YR 4/2 | 1fgr | vh, fr, vs, vp | cm, ms (1-2 mm) |
| AC | 42-60 | D 2,5 Y 7/1 | M 2,5 Y 5/2 | 1fgr | vh, fr, vs, vp | cm, ms (1-2 mm) |
| C | +60 | D 5 Y 7/1 | M 2,5 Y 4/2 | k | vh, fi, vs, vp | cm, ms |
| | | AzapliLake (Profile No: AZ-4) | | | | |
| A | 0-16 | D 10 YR 6/4 | M 10 YR 4/3 | 1mbk | vh, fr, vs, vp | cm (10-20 mm) |
| AC | 16-32 | D 10 YR 5/4 | M 10 YR 4/3 | 1mgr | h, fr, vs, vp | cm (2-5 mm) |
| C | +32 | D 2,5 Y 6/3 | M 10 YR 4/4 | k | h, fr, vs, vp | cm |
| | | Azapli Lake- Golbasi Lake (Profile No: AZ-GB) | | | | |
| A | 0-21 | D 7,5 YR 4/2 | M 7,5 YR 3/3 | 1fgr | vh, fr, vs, vp | cm, pb (1-2 mm) |
| AC | 21-48 | D 7,5 YR 4/3 | M 7,5 YR 3/4 | 1msbk | vh, fr, vs, vp | cm, pb (10-20 mm) |
| C | +48 | D 7,5 YR 4/3 | M 7,5 YR 3/3 | 1fsbk | vh, fi, vs, vp | cm, pb (5-10 mm) |
| | | Golbasi Lake (Profile No: GB-1) | | | | |
| A | 0-70 | D 5 YR 3/3 | M 7,5 YR 3/3 | k | sh,fr,ns,np | cm, pb (1-2 mm) |
| C | +70 | D 2,5 YR 3/3 | M 2,5 YR 5/3 | k | sh,fr,ns,np | cm, pb |

Type of soil structure: sbk-round corner block, bk-corner block, pt-plate, gr-granular, k-massive, sg-monolithic structure; grade: 1-weak, 2-medium, 3-strong; class: f-small, m-medium, c-rude; consistency: so-soft, sh-a bit hard, h-hard, vh-very hard, fr-loose, fi-tight, ns-not sticky, ss-slightly sticky, ms-sticky, vs-very sticky, np-not plastic, sp-some plastic, mp-plastic, vp-very plastic, cm-carbonate masses, ba-biological activity, pb-pebbles, ms-mussel shells, pr-plant root (Soil Survey Manuel, 1993).

## CONCLUSION

In this study, the soil of the wetlands of Inekli, Azapli and Golbasi Lakes in the Eastern Mediterranean Region has been analyzed. In total, 13 soil profiles have been opened in the research area of the study, 43 soil horizons have been defined in order to determine the morphological characteristics of soil on the degraded soil samples which have been taken from these horizons.

The research area has been evaluated as a sign that the degradation of the natural state of the soil is the least, and that it is lower in the areas that conserve the natural state of transport of water and thin matter due to erosion. It has been stated that the soil color of the Inekli Lake is gray, reddish and brown when it is dried; when it moist, the color is black, dark brown and dark gray. The soil structure has been found as weak, small, granular in the upper horizons and massive in the lower horizons. It has been observed that the soils are very solid when it is dry; very sticky and very plastic when it is wet. It has been also stated that plant roots and microbial activity are concentrated in the surface horizons of this area; the color of Azapli Lake is light brown when the soil is dry; the color is dark brown when it is moist. It has been found that the structure is generally weak, small and granular while it is massive at lower horizons. It has been mentioned that when the soil of Azapli Lake is dry, it is rigid; when the soil wet, it is very sticky and very plastic.

It has been determined that the color of Golbasi Lake is dark brown when the soil is dry; when it is moist, color of soil is reddish brown and the structure of the soil is generally massive; when it is dry, it is loose; when it is wet and it is sticky and not plastic. It has been seen that the pH value and the Golbasi Lakes which has distortion rate and maintains the wetland characteristics of the current condition is mildly alkaline and the total value of salinity is alkaline. This leads to the formation of an idea that the pH and the salinity values of soils are related to the elevation of the researched areas. The salinity of the soil is less in the soil of Golbasi Lakes. It is related to the land use as well as the geological location, as the area land is related to less decomposition.

As a result of all the morphological analyzes carried out in this research, it has been concluded that the soil failure is low and the soil of Golbasi Lakes which have been conserved by the Ministry of Forestry and Water Affairs maintain their wetland characteristics at a better level than the other lake areas. It has been determined that there are many factors which limit the agricultural production in the soil as a result of drying process of the wetlands.

It has been obtained as a result of this study that these fields do not provide the desired economic contribution to the people living in the region with the gaining these lands to the agricultural production, on the contrary the benefits obtained from wetlands are loss.

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