

# Wetland flora of Şanlıurfa, Turkey

Ömer Faruk Kaya<sup>1</sup> & Salih Bozancı<sup>2</sup>

<sup>1</sup> Department of Biology, Faculty of Arts and Science, Harran University, Şanlıurfa, Turkey; e-mail: phytosociologist@gmail.com (corresponding author); ORCID: <https://orcid.org/0000-0003-3969-8939>

<sup>2</sup> Graduate School of Natural and Applied Sciences, University of Harran, Şanlıurfa, Turkey; ORCID: <https://orcid.org/0000-0002-0622-0165>

Received: April 09, 2022 ▷ Accepted: August 09, 2022

**Abstract.** The aim of this study is to determine the plant list of the habitats located within the borders of Şanlıurfa Province and called wetlands (rivers, streams, streamlets, wet meadows, etc.). According to the plant samples collected during this floristic study, 112 taxa (81 species, 23 subspecies and eight varieties) belonging to 36 families and 81 genera have been identified. Sixty-eight of these taxa are dicotyledon, 43 are monocotyledon, and one taxon has been determined as fern. In terms of chorology, the identified taxa are Euro-Siberian (22), Irano-Turanian (9), Mediterranean (2) and Eastern Mediterranean elements (2). In terms of life forms, there have been determined hemicryptophytes (57), therophytes (30), cryptophytes-helophytes (7), phanerophytes (7), cryptophytes-hydrophytes (7), and cryptophytes-geophytes (3).

**Key words:** Wetlands, flora, Şanlıurfa, Southeast Turkey

**Citation:** Kaya, Ö.F. & Bozancı, S. Wetland Flora of Şanlıurfa, Turkey. --Phytologia Balcanica, 28 (2): 239-248. --ISSN 1310-7771 (print), 1314-0027 (online).

---

## Introduction

Wetlands are transition areas between the terrestrial and aquatic ecosystems, with the water layer usually at the surface, near the surface, or covered by shallow water (Cowardin & al. 1979).

According to other definitions, wetlands consist of water-loving ecosystems, represented by wet or saturated soils dominated by hydrophilic plants. Wetlands are shaped by the interaction of climate, soil drainage and topography. In addition, other features such as the structure of bedrock and water or soil properties

also affect certain characteristics of the wetlands, like composition and productivity of the vegetation to be formed (Banner & Mackenzie 2000).

Wetland systems are sensitive to changes in the quantity and quality of water reserves. A significant impact on wetlands is expected as major global changes in climate alter hydrological regimes (Erwin 2008).

In terms of ecosystem, wetlands have the highest rate of organic matter production per unit of area after tropical forests (Yazıcı & Şahin 1999).

Although conservation activities for wetland ecosystems with important functions have started in the

1960s, that called for global cooperation to achieve that goal. The Ramsar Convention signed in 1971 played an important role in the realization of that cooperation (Arı 2006).

When evaluated in terms of wetlands, Turkey can be considered relatively rich. The most comprehensive study for determining the plants in these areas has been “Wetland Plants and Vegetation of Turkey” by Seçmen & Leblebici (2008). In that study, 228 areas have been qualified and studied as wetlands.

In terms of wetlands, Southeastern Anatolia is one of the poorest in Turkey. Seçmen & Leblebici (2008) did not provide any records in their study, except for the immediate surroundings of that region. According to a literature review related to the Province of Şanlıurfa in Southeastern Anatolia, no plants in any area defined specially as wetland have been studied.

In an attempt to fill in this gap, the present study has investigated the flora adapted to aquatic life in or around streams, seasonal aquatic areas, marshes, areas with high ground water, and artificial ponds in Şanlıurfa in Southeastern Anatolia. Furthermore, it has contributed to the definition of the flora of wetlands in the Şanlıurfa Province, thus providing a foothold for researchers who will work on this subject.

## Material and methods

To determine the wetland flora of Şanlıurfa, plant samples have been collected periodically from specified habitats during the vegetation period of the plants. Vegetative and generative parts of the plants have been collected as characteristic samples of the taxa in terms of diagnosis. For identification of plants, the studies of Davis (1965-1985), Davis & al. (1988), Güner & al. (2000), and whenever necessary, the study of Seçmen & Leblebici (2008) have been used.

A list of the flora has been compiled, according to the current taxonomic status of the plants by Güner & al. (2012). The plant taxa of the wetland flora of Şanlıurfa are given in alphabetical order. Abbreviations of the taxa follow Brummitt & Powell (1992) and Raunkiaer (1934) has been consulted for determination of life forms.

The list of taxa was arranged as follows: family, taxon name (species, subspecies or variety), locality number, life form, and phytogeographical region and endemism status, if any.

## Results

The Şanlıurfa Province, located geographically in Southeastern Anatolia, borders on Syria in the south, Gaziantep in the west, Mardin in the east, Diyarbakır in the northeast and Adıyaman in the northwest. Topographically, the northern and southern parts of Şanlıurfa are quite different. In contrast to the mountainous areas in the north, the southern parts are flat. Within the borders of Siverek district, volcanic Mt Karacadağ (1957 m) is the highest point. Other important elevations in the Province are: Tek Tek (801 m) eastwards of the Province center, Nemrut (800 m) in the south and Arat (850 m) in the west (Anonymous 2006).

Some sedimentary and basalt rock groups in the area were dated back to the Cenozoic (Tertiary). Clay series belonging to the Paleocene underlay that structure. At the top, lay Pleistocene basalt lavas of the Quaternary. Geomorphologically, the area was formed by fans of Pleistocene terraces of Quaternary and Holocene deposits and plains formed by valley floors. These geomorphological structures resulted from young tectonic movements. The surface features of the Province were shaped out in the Pliocene, the last period of the Cenozoic era. Hilvan, Siverek and Viranşehir districts were made of basalt stones, while the other parts of the Province were molded of limestones after eruption of the Karacadağ volcanic mass in the north of Şanlıurfa Province (Anonymous 2006).

During the present floristic study carried out in the wetland habitats (rivers, streams, creeks, wet meadows, etc.) of Şanlıurfa, 112 taxa (81 species, 23 subspecies and eight varieties) belonging to 36 families and 81 genera have been identified. Sixty-eight nine of these taxa are dicotyledon, 42 monocotyledon, and one is fern.

To avoid unnecessary repetition, a great number of habitats with quite small areas have not been considered during the study. When listing the localities in the plant list (Table 1), only the locality number of the

collected plant sample and the collector's number in parentheses are indicated. Other locality numbers notify the habitats where the plants have been observed. Only the endemic taxa determined in this study are marked with a black circle (•) in Table 1.

Wetland plants, recorded earlier from Şanlıurfa but not collected during this study, have been also in-

cluded in the list, as well as locality information from the relevant publications (Davis 1965-1985; Adıgüzel & Aytaç 2001; Aslan 2002; Ertekin 2002) are featured in Table 2.

The map of the study area and information about 51 localities of plant collection are shown in Fig. 1 and Table 3.

**Table 1.** Plant list

Names of plant taxa	Life form	Choro type	PH No	Locality No
<i>ALISMATACEAE</i>				
<i>Alisma lanceolatum</i> With.	H	UNK	41	12
<i>AMARANTHACEAE</i>				
<i>Salsola incanescens</i> C.A.Mey.	Th	IT	65	45
<i>Salsola kali</i> L.	H	UNK	100	5, 10
<i>APIACEAE</i>				
<i>Conium maculatum</i> L.	H	UNK	89	11,35,51
<i>APOCYNACEAE</i>				
<i>Cionura erecta</i> (L.) Griseb.	Ph	EM	77	14
<i>ARACEAE</i>				
<i>Lemna minor</i> L.	Cry-Hyd	UNK	99	6,15,16
<i>ASTERACEAE</i>				
<i>Bellis perennis</i> L.	H	ES	21	11,46
<i>Cirsium arvense</i> (L.) Scop.	H	UNK	104	2,21
<i>Eclipta prostrata</i> (L.) L.	Th	UNK	66	6
<i>Pulicaria dysenterica</i> (L.) Bernh. subsp. <i>dysenterica</i>	H	UNK	108	7,40
<i>BRASSICACEAE</i>				
<i>Barbarea plantaginea</i> DC.	H	UNK	57	2,8,40
<i>Calepina irregularis</i> (Asso) Thell.	Th	UNK	120	2
<i>Lepidium latifolium</i> L.	H	UNK	70	3,4 8
<i>Nasturtium officinale</i> (L.) R.Br.	H	UNK	65,82	2,3,4,6,12,20,22,23, 25,31,39,41,42,50
<i>BUTOMACEAE</i>				
<i>Butomus umbellatus</i> L.	Cry-G	ES	124	12,18
<i>CERATOPHYLLACEAE</i>				
<i>Ceratophyllum demersum</i> L.	Cry-Hyd	ES	28	3
<i>CONVOLVULACEAE</i>				
<i>Calystegia sepium</i> (L.) R.Br. subsp. <i>sepium</i>	H	UNK	111	2,6,10,11
<i>Convolvulus arvensis</i> L.	H	UNK	53	10,11
<i>CYPERACEAE</i>				
<i>Bolboschoenus maritimus</i> (L.) Palla var. <i>maritimus</i>	Cry-He	UNK	130	2,6,9,10,13,29
<i>Cyperus fuscus</i> L.	Th	ES	131	4,9,10,12,13
<i>C. longus</i> L. subsp. <i>longus</i>	H	UNK	30	2,5,6,10,19
<i>Eleocharis uniglumis</i> (Link) Schult. subsp. <i>uniglumis</i>	Cry-He	UNK	59	2,13
<i>Scirpoides holoschoenus</i> (L.) Soják subsp. <i>holoschoenus</i>	Cry-He	UNK	140	2,4,8,10,11,17,22
<i>EQUISETACEAE</i>				

Names of plant taxa	Life form	Choro type	PH No	Locality No
<i>Equisetum arvense</i> L.	H	UNK	111	2,11
<b>EUPHORBIACEAE</b>				
<i>Euphorbia chamaesyce</i> L.	Th	UNK	190	14,25,32,49
<i>E. helioscopia</i> L. subsp. <i>helioscopia</i>	Th	UNK	171	2,35
<b>FABACEAE</b>				
<i>Alhagi maurorum</i> Medik. subsp. <i>maurorum</i>	H	IT	153	10,45
<i>Trifolium repens</i> L. var. <i>repens</i>	H	UNK	149	9,10
<i>T. resupinatum</i> L. var. <i>resupinatum</i>	Th	UNK	137	9,10,23,25
<b>GENTIANACEAE</b>				
<i>Blackstonia perfoliata</i> (L.) Huds. subsp. <i>perfoliata</i>	Th	UNK	200	2
<i>Centaureum erythraea</i> Rafn. subsp. <i>erythraea</i>	Th	UNK	201	40
<b>HALORAGACEAE</b>				
<i>Myriophyllum spicatum</i> L.	Cry-Hyd	UNK	207	10,15,51
<b>IRIDACEAE</b>				
<i>Iris pseudacorus</i> L.	Cry-G	UNK	182	11
<b>JUNCACEAE</b>				
<i>Juncus articulatus</i> L. subsp. <i>articulates</i>	H	ES	160, 205	2,4,9,12,18,35,49
<i>J. effusus</i> L. subsp. <i>effuses</i>	H	UNK	253	2,6,9,10,15,40
<b>LAMIACEAE</b>				
<i>Lycopus europaeus</i> L.	H	ES	118	2
<i>Scutellaria galericulata</i> L.	H	UNK	83	1
<i>Vitex agnus-castus</i> L.	Ph	M	149	1,14,15,47
<b>LYTHRACEAE</b>				
<i>Lythrum junceum</i> Banks & Sol.	H	M	230	2
<i>L. salicaria</i> L.	H	ES	217	40
<b>ONAGRACEAE</b>				
<i>Epilobium hirsutum</i> L.	H	UNK	303	36
<i>E. montanum</i> L.	H	ES	222	1
<b>ORCHIDACEAE</b>				
<i>Orchis coriophora</i> L. subsp. <i>coriophora</i>	Cry-G	UNK	212	1
<b>PLANTAGINACEAE</b>				
<i>Plantago afra</i> L.	Th	UNK	33	2,6
<i>P. lanceolata</i> L.	H		25,88	2,6,7,9,10,14,15,18
<i>Veronica anagallis-aquatica</i> L.			8,17	2,6,7,9,10,14,15,21,22,24,38,39,43,44,48
<i>V. reuterana</i> Boiss.	Th	IT	63	2,40
<b>POACEAE</b>				
<i>Aeluropus lagopoides</i> (L.) Thwaites var. <i>lagopoides</i>	H	UNK	263	45
<i>Alopecurus myosuroides</i> Huds. subsp. <i>myosuroides</i>	Th	ES	310	1,9
<i>Arundo donax</i> L.	H	UNK	350	30
<i>Catabrosa aquatica</i> (L.) P.Beauv.	H	UNK	313	6,10
<i>Cornucopiae cucullatum</i> L.	Th	EM	374	1
<i>Cynodon dactylon</i> (L.) Pers. var. <i>dactylon</i>	H	UNK	288	2,3,7,8,10,13,26

Names of plant taxa	Life form	Choro type	PH No	Locality No
<i>Echinochloa crus-galli</i> (L.) P.Beauv.	Th	UNK	340	1,2
<i>Hordeum bulbosum</i> L.	H	UNK	289	1,9
<i>Imperata cylindrica</i> (L.) Raeusch.	H	UNK	239	14,42
<i>Phragmites australis</i> (Cav.) Steud.	H	ES	341	6,28,29,30,36,48
<i>Polypogon monspeliensis</i> (L.) Desf.	Th	UNK	271	6,13,15
<i>Saccharum ravennae</i> (L.) L.	H	UNK	269	2,44
<i>Sclerochloa dura</i> (L.) P.Beauv.	Th	ES	139	15
POLYGONACEAE				
<i>Polygonum lapathifolium</i> L.	Th	UNK	324	6
<i>P. salicifolium</i> Brouss. ex Willd.	H	UNK	361	1,2
<i>Rumex conglomeratus</i> Murray	H	UNK	305	1,6,12
<i>R. crispus</i> L.	H	UNK	379	2,6
POTAMOGETONACEAE				
<i>Groenlandia densa</i> (L.) Fourr.	Cry-Hyd	ES	389	3
<i>Potamogeton nodosus</i> Poir.	Cry-Hyd	UNK	399	15,24,50
<i>P. perfoliatus</i> L.	Cry-Hyd	UNK	400	3
PRIMULACEAE				
<i>Anagallis arvensis</i> L. var. <i>arvensis</i>	T	UNK	344	2
<i>A. arvensis</i> L. var. <i>caerulea</i> (L.) Gouan	T	UNK	380,346	2,7,8,40
RANUNCULACEAE				
<i>Ranunculus sphaerospermus</i> Boiss. & C.I.Blanche	Cry-Hel	UNK	2	12,13,14,15,16,17,18
ROSACEAE				
<i>Rubus sanctus</i> Schreb.	Ph	UNK	191	2,8,11,51
<i>Sanguisorba minor</i> Scop. subsp. <i>lasiocarpa</i> (Boiss. & Hausskn.) Nordborg	H	UNK	176	1,2,9
SALICACEAE				
<i>Populus euphratica</i> Olivier	Ph	UNK	13	3
<i>Salix acmophylla</i> Boiss.	Ph	IT	307	2,9,42
<i>S. alba</i> L. subsp. <i>alba</i>	Ph	ES	329	2,8,9
SCROPHULARIACEAE				
• <i>Scrophularia mesopotamica</i> Boiss.	H	IT	119	1
TAMARICACEAE				
<i>Tamarix smyrnensis</i> Bunge	Ph	UNK	22	2,9,40,42
TYPHACEAE				
<i>Sparganium erectum</i> L. subsp. <i>microcarpum</i> (Neuman) Domin	H	ES	146	12
<i>Typha domingensis</i> (Pers.) Steud.	Cry-Hel	UNK	87	2,4,6,10,11,24,27,28,31,32,33,48,49
VERBENACEAE				
<i>Verbena officinalis</i> L. var. <i>officinalis</i>	Hem	UNK	107	2,6

**Legend:** PH - Personal Herbarium (S. Bozanci); **Life forms:** G - Geophyte; Cry - Cryptophyte; Hel - Helophyte; H - Hemicryptophyte; Hyd - Hydrophyte; Ph - Phanerophyte; Th - Therophyte. **Chorotype:** ES - Euro-Siberian; IT - Irano-Turanian; M - Mediterranean; EA - East-Mediterranean; UNK - Unknown

**Table 2.** List of plants not collected during this study but mentioned in literature as wetland plants

Names of plant taxa	Life form	Choro type	Reference
<i>ASTERACEAE</i>			
<i>Inula britannica</i> L.	H	ES	Balos & Akan 2008
<i>CAMPANULACEAE</i>			
<i>Campanula sclerotricha</i> Boiss.	H	IT	Aslan 2002
<i>CYPERACEAE</i>			
<i>Carex divisa</i> Huds.	H	ES	Davis 1965-1985; Aslan 2002
<i>C. hordeistichos</i> Vill.	H	UNK	Davis 1965-1985
<i>C. pseudocyperus</i> L. subsp. <i>pseudocyperus</i>	Hem	ES	Davis 1965-1985; Aslan 2002
<i>Eleocharis palustris</i> (L.) Roem. & Schult. subsp. <i>palustris</i>	Cry-Hel	UNK	Davis 1965-1985
<i>Schoenoplectus tabernaemontani</i> (C.C.Gmel.) Palla	Cry-Hel	UNK	Aslan 2002
<i>Scirpus sylvaticus</i> L.	H	UNK	Aslan 2002
<i>EUPHORBIACEAE</i>			
<i>Euphorbia microsphaera</i> Boiss.	Th	IT	Davis 1965-1985
<i>FABACEAE</i>			
<i>Galega officinalis</i> L.	H	ES	Ertekin 2002
<i>Lotus palustris</i> Willd.	H	UNK	Aslan 2002
<i>Medicago lupulina</i> L.	H	UNK	Aslan 2002
<i>HYDROCHARITACEAE</i>			
<i>Najas minor</i> All.	Cry-Hyd	UNK	Aslan 2002
<i>JUNCACEAE</i>			
<i>Juncus bufonius</i> L.	Th	UNK	Aslan 2002
<i>LAMIACEAE</i>			
<i>Mentha aquatica</i> L.	H	UNK	Aslan 2002
<i>M. x piperita</i> L. ( <i>M. aquatica</i> L. x <i>M. spicata</i> L.)	H	UNK	Aslan 2002
<i>M. pulegium</i> L.	H	UNK	Aslan 2002
<i>MALVACEAE</i>			
<i>Althaea cannabina</i> L.	H	UNK	Adıgüzel & Aytaç 2001
<i>Geranium dissectum</i> L.	Th	UNK	Davis 1965-1985
<i>PLANTAGINACEAE</i>			
<i>Veronica anagalloides</i> Guss. subsp. <i>anagalloides</i>	Th	UNK	Aslan 2002
<i>V. hispidula</i> Boiss. & A.Huet subsp. <i>hispidula</i>	Th	IT	Adıgüzel & Aytaç 2001
<i>POACEAE</i>			
<i>Alopecurus arundinaceus</i> Poir.	H	ES	Davis 1965-1985
<i>Echinochloa colona</i> (L.) Link	Th	UNK	Aslan 2002
<i>Hordeum geniculatum</i> All.	Th	ES	Adıgüzel & Aytaç 2001
<i>Phleum alpinum</i> L.	H	ES	Aslan 2002
<i>POLYGONACEAE</i>			
<i>Rumex pulcher</i> L. subsp. <i>pulcher</i>	H	UNK	Adıgüzel & Aytaç 2001
<i>RANUNCULACEAE</i>			
<i>Ranunculus lateriflorus</i> DC.	Th	UNK	Davis 1965-1985
<i>ROSACEAE</i>			
<i>Geum urbanum</i> L.	H	ES	Aslan 2002
<i>Potentilla reptans</i> L.	H	UNK	Aslan 2002
<i>VERBENACEAE</i>			
<i>Verbena supina</i> L.	Th	UNK	Adıgüzel & Aytaç 2001; Aslan 2002

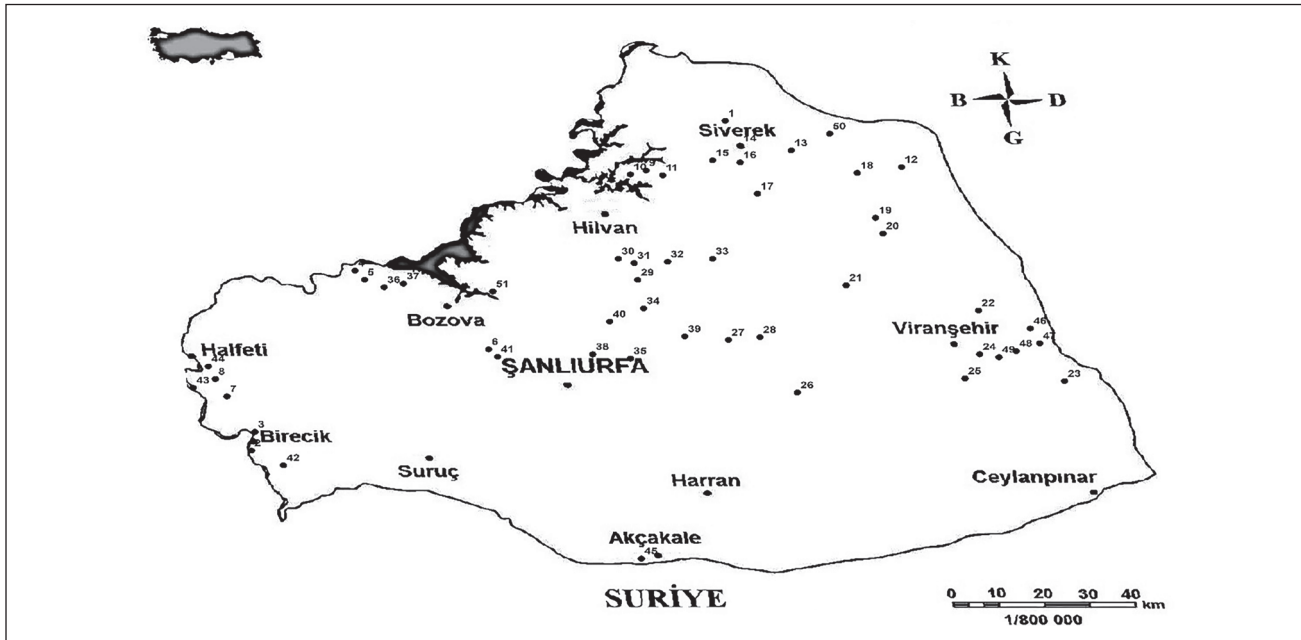


Fig. 1. Study area and locality numbers.

Table 3. Information on localities

No	Region name	X coordinate	Y coordinate
1.	Karacadağ-Simo Stream, SB	39,766864	37,780921
2.	Birecik, Bent stream, SE and RW	38,014765	37,020322
3.	Birecik, Euphrates riverside and RW	37,977023	37,031196
4.	Bozova, Irmakboyu (Narsait) village, SE	38,168695	37,406899
5.	Bozova, Özgören village, SE	38,224086	37,443898
6.	Bozova, Maşuk village, SE	38,326783	37,407668
7.	Birecik, Ayran village, SE	37,912244	37,145908
8.	Halfeti, Bulaklı village, SB (Reservoir)	37,891699	37,173522
9.	Siverek, Çaylarbaşı sub-district, Önder village, SE	39,111657	37,623351
10.	Hilvan, Şanlıurfa-Diyarbakır road, Cehennem Stream, SE and RW	39,064085	37,607104
11.	Siverek, Çaylarbaşı subdistrict, Önder village, SE	39,132081	37,614184
12.	Siverek, Karacadağ subdistrict, Damlıca village, SE and RW	39,593904	37,713732
13.	Siverek, Siverek-Karacadağ road, Küçük Çavuşlu village entrance, SE	39,531335	37,71795
14.	Siverek, Şanlıurfa-Diyarbakır road, Hacı Kamil stream, B I, SE and RW	39,262079	37,691216
15.	Siverek, Şanlıurfa-Diyarbakır road, Hacı Kamil stream, B II, SE and RW	39,214465	37,649684
16.	Siverek, Şanlıurfa-Diyarbakır road, Siverek entrance, SE	39,259821	37,688833
17.	Siverek, Siverek-Hilvan road, Başdeğirmen village, SE	39,191368	37,632043
18.	Siverek, Siverek-Viranşehir road, Yücelen village, Çemçayı B, SE	39,311131	37,68504
19.	Siverek, Siverek-Viranşehir road, Çemçayı stream, Hemo B, SE	39,338107	37,60401
20.	Siverek, Siverek Viranşehir road, Büyükkazanlı village entrance, SE	39,342138	37,582085
21.	Viranşehir, Yayık village, north location, pond and İnişli stream, SE	39,570523	37,347969
22.	Viranşehir, Sarıdüzü village, Çurçuf (Sulutepe) stream, SE and RW	39,721869	37,270805
23.	Viranşehir, Yolbilen village, Çurçuf-Duali (İbrahimağa) stream, SE and RW	39,759855	37,199265
24.	Viranşehir, Akçataş village, Sesiğ stream, SE and RW	39,610082	37,254396
25.	Viranşehir, Şanlıurfa-Mardin road, Sesiğ village, Sesiğ (İnişli) stream, SE and RW	39,603836	37,222839
26.	Haliliye, Şanlıurfa-Mardin road, Üçkonak village, SE	39,124283	37,147251

No	Region name	X coordinate	Y coordinate
27.	Haliliye, Edene village, pond edge	39,009503	37,291227
28.	Haliliye, Edene village, SE	39,008502	37,288395
29.	Karaköprü, Yığınak village, SE	38,669335	37,447826
30.	Karaköprü, Arıpınar village, RB	38,651403	37,472183
31.	Karaköprü, Arıpınarı village, SE	38,655983	37,474823
32.	Karaköprü, Bahçeli village (Titriş mound), SE	38,669606	37,475743
33.	Karaköprü, South entrance of Bahçeli village, SE	38,680646	37,476148
34.	Karaköprü, Büyük Ördek village, SE	38,679906	37,370173
35.	Karaköprü, Maşuk village, SE	38,776764	37,236993
36.	Bozova, between Karacaören-Özgören villages, SE	38,264567	37,424342
37.	Bozova, 1 km off Karacaören village, Karapınar location, SE	38,305143	37,433684
38.	Karaköprü, Maşuk village, SE	38,764559	37,232552
39.	Haliliye, Aşağı İçkara village, SE	38,890206	37,294999
40.	Karaköprü, Büyük Çömlekçi village, Wetland	38,734365	37,334198
41.	Karaköprü, Maşuk village entrance, SE	38,33397	37,397683
42.	Birecik, Şavi stream, SE	38,013168	36,946364
43.	Halfeti, Kavaklıca village, Euphrates riverside	37,857037	37,174743
44.	Halfeti, Kavaklıca village, wet places	37,867645	37,160623
45.	Akçakale, Akçakale-Ceylanpınar road, salty places	38,977483	36,713284
46.	Viranşehir, northwest of Adaköy village, Bakacak village stream	39,908043	37,315981
47.	Viranşehir, northwards of Türkeli village, Zok village, SE	39,933694	37,279281
48.	Viranşehir, southeast of Üçgül village, Işıklı stream, SE	39,900214	37,268594
49.	Viranşehir, Çame Garibi (Altınbaşak) stream, SE	39,866185	37,259821
50.	Siverek, Bucak-Kapıkaya road, Şılan stream	39,235565	37,816558
51.	Bozova, Büyükgöl pond, SE and RW	38,514918	37,347954

**Legend:** B - bridge; SB - stream bed; SE - streamside; RB - river bed; RW - running water

## Discussion and conclusion

In the result of field and literature surveys within the scope of this study, an attempt has been made to determine the wetland flora of Şanlıurfa. Consequently, 112 taxa (81 species, 23 subspecies and eight varieties) belonging to 36 families and 81 genera have been determined. Sixty-eight of these taxa are dicotyledons, 43 are monocotyledons and one is fern.

When evaluated according to their families, the identified wetland plant taxa proved to belong to nine families, accounting for 59% of the related taxa, which testifies to the taxa richness. These families are, respectively: *Poaceae* (18), *Cyperaceae* (11), *Lamiaceae* (7), *Fabaceae* (6), *Plantaginaceae* (6), *Asteraceae* (5), *Polygonaceae* (5), *Brassicaceae* (4), and *Rosaceae* (4) (Fig. 2).

When the identified taxa have been evaluated in terms of their chorology, they proved to be: Euro-Siberian (22), Irano-Turanian (9), Mediterranean (2), and East Mediterranean (2), respectively (Fig. 3).

Since the study area is in the Irano-Turanian phytogeographic region, apparent contradiction in this ranking can be explained by the possibility that the taxa distributed in the wetland habitats originate from the Euro-Siberian phytogeographical region. They are spread easily from the aquatic ecosystems to different geographical regions by the rivers.

Generally, as across the world and in Turkey, the wetlands in Şanlıurfa unfortunately also face the negative effects of the anthropogenic factor, including excessive agricultural irrigation, overgrazing, changing the direction of streambeds, and burning out of reeds and bushes in aquatic areas.



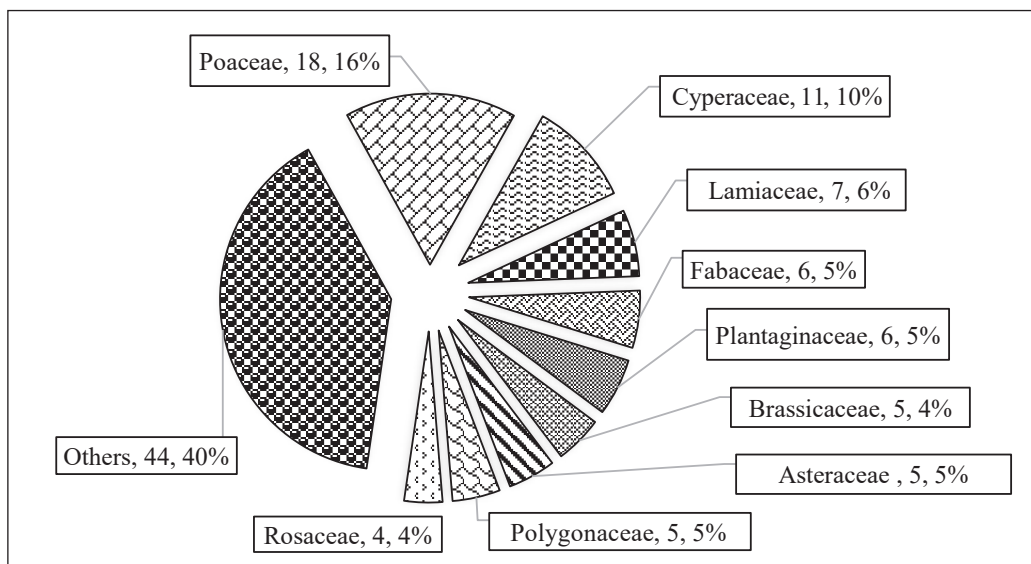


Fig. 2. Distribution of families identified in the area in terms of taxa numbers.

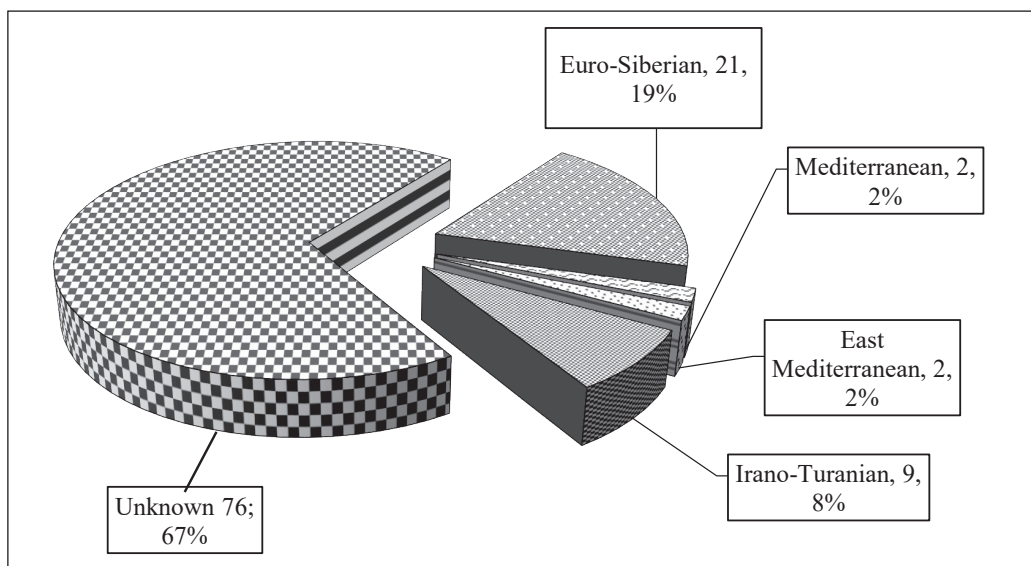


Fig. 3. Distribution of taxa identified in the area according to phytogeographical regions.

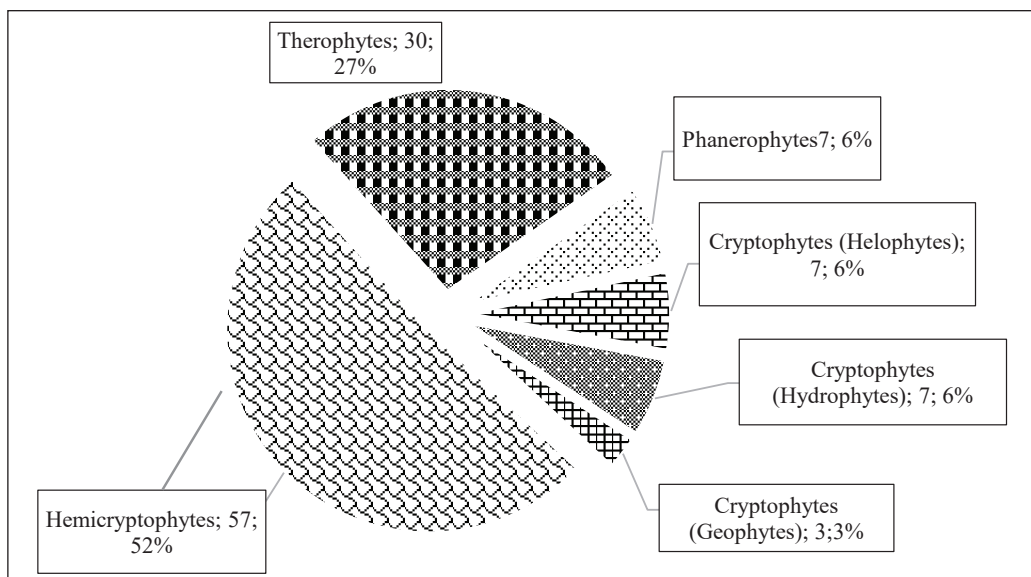


Fig. 4. Distribution of taxa by life forms (Raunkiaer 1934).

Another disadvantage is the fragmentation or destruction of habitats due to building of dams on the rivers. For example, the vegetation around the Atatürk and Birecik Dams on the Euphrates River and in the habitats in coastal areas (in-water, floating, swamp, etc.) has unfortunately deteriorated and disappeared in many places.

This is the first specific study into the wetland flora of Şanlıurfa. In the floristic and phytosociological studies carried out earlier within the borders of Şanlıurfa Province, any wetland was considered only as a habitat. Within the framework of this study, wetland habitats in the Province have been investigated thoroughly.

This study is going to facilitate the researchers who will proceed investigating the wetland vegetation in Şanlıurfa.

**Acknowledgement.** The authors are indebted to HÜBAP (The Scientific Research Projects Council of Harran University, Project No: HÜBAP-19358). They are also grateful to Dr. Hatice Tosyagülü Çelik (Iğdir University).

## References

- Adıgüzel N & Aytaç, Z.** 2001. Flora of Ceylanpınar State Farm (Şanlıurfa-Turkey). - *Flora Mediterranea*, **11**: 333-361.
- Anonymous.** 2006. Environmental Status Report of Şanlıurfa Province. T.C. Şanlıurfa Valiliği İl Çevre ve Orman Müdürlüğü, 240 p (in Turkish).
- Arı, Y.** 2006. A critical view of the Ramsar Convention approach for Nature conservation. - *Doğu Coğrafya Dergisi*, **11**(15): 275-302 (in Turkish).
- Aslan, M.** 2002. Plants, danger limits and conservation of Birecik Reservoir area. *MSc Thesis*. Çukurova University, Graduate School of Natural and Applied Sciences, Adana (in Turkish, unpubl.).
- Balos, M.M. & Akan, H.** 2008. Flora of the region between Zeytinbahçe and Akarçay (Birecik, Şanlıurfa, Turkey). - *Turkish Journal of Botany*, **32**(3): 201-226.
- Banner, A. & Mackenzie, W.** 2000. The Ecology of Wetland Ecosystems. 45 extension notes. Ministry of Forest Research Program, Victoria, BC. 12 p.
- Brummitt, R.K. & Powell, C.E.** (eds) 1992. Authors of Plant Names, Royal Botanic Garden, Kew.
- Cowardin, L.M., Carter, V., Golet, F.C. & Laroe, E.T.** 1979. Classification of Wetlands and Deepwater Habitats of the United States, U.S. Department of Interior Fish and Wildlife Service, Washington, U.S.A.
- Davis, P.H.** (ed.). 1965-1985. Flora of Turkey and the East Aegean Islands, vols. **1-9**. Edinburgh University Press, Edinburgh.
- Davis, P.H., Mill, R.R. & Tan, K.** (eds). 1988. Flora of Turkey and the East Aegean Islands, vol. **10** (supplement). Edinburgh University Press, Edinburgh.
- Ertekin, A.S.** 2002. Plant Diversity of Karacadağ. - Sürdürülebilir Kırsal ve Kentsel Kalkınma Derneği Yayını, Diyarbakır (in Turkish).
- Erwin, K.L.** 2008. Wetlands and global climate change: the role of wetland restoration in a changing world. - *Wetlands Ecology and Management*, **17**(1): 71-84.
- Güner, A., Aslan, S., Ekim, T., Vural, M. & Babaç, M.T.** (eds) 2012. Turkey Plant List (Vascular Plants). Nezahat Gökyiğit Botanik Bahçesi ve Flora Araştırmaları Derneği Yayını. İstanbul (in Turkish).
- Güner, A., Özhatay, N., Ekim, T. & Başer, K.H.C.** 2000. Flora of Turkey and the East Aegean Islands (Supplement 2). Vol. **11**. Edinburgh University Press, Edinburgh.
- Raunkiaer, C.** 1934. The Life Forms of Plants and Statistical Plant Geography. Oxford University Press, London.
- Seçmen, Ö. & Leblebici, E.** 2008. Wetland Plants and Vegetation of Turkey. Ege Üniversitesi Basımevi, İzmir (in Turkish).
- Yazıcı, H. & Şahin, İ.F.** 1999. Geographical Observations in Demiryurt (Tödürge-Sivas) Wetland and Its Surroundings. - *Türk Coğrafya Dergisi*, **34**: 19-30 (in Turkish).