

Floristic Composition of the Plant Cover at Surt Region in Libya.

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ABSTRACT

The goals of the present study were to record and document the floristic composition of the plant cover at Surt region in Libya during spring 2010 to summer 2011 and to use the obtained data in the sustainable development of Surt region. The flora of coastal habitats at Surt, Libya (salt marshes, sand dunes and non cultivated sandy lands) comprises 231 species, related to 147 genera and belonging to 37 families. Among the recorded species 123 annuals, 105 perennials and 3 biennials, family Poaceae comprises 27 species (11.69%), both of Asteraceae and Fabaceae includes 26 species for each (11.26%) these three families were the main leading families representing collectively about 34.21% (79 species) of the total number of the recorded species in the study area. The coastal habitats in the Mediterranean coast of Surt are characterized by their specific floristic composition and dominant communities where the salt marsh habitat was represented by 66 species and dominated by: *Suaeda pruinosa* Lang cover percentage (90%), *Arthrocnemum macrostachyum* (Moric.)K. Koch (85%), *Halocnemum strobilaceum* (Pall.) M. Bich. (85%), *Tamarix nilotica* (Ehrenb.) Bunge (85%), *Zygophyllum album* L. (75%). On the other hand the sand dune habitat was represented by 143 species and dominated by *Echinops spinosus* L. (80%), *Moltkiopsis ciliata* (Forssk) I.M. Johnest.(80%), *Calotropis procerra* W. T. Aiton (77%), *Panctarium maritimum* L.(75%), *Silene succulenta* Forssk (75%). *Heliotrobium curassavicum* L. (40%). The non cultivated sandy land was represented by 90 species and dominated by: *Chenopodium murale* L. (85%), *Bassia indica* L. (85%) *Amaranthus graezicans* L. (80%), *Cynanchum acutum* L. (75%). The most common life forms were the Therophytes which represented by 141 species (61%) of the total recorded species followed by Cryptophytes 32 species (13.9%). Hemicryptophytes and Chamaephytes were represented by 24 species (10.3%) and Phanerophytes 10 species (4.3%). This study is considered as the pioneer study at Surt area and may be fruitful in further studies and in sustainable development of Surt. Key words: Flora, salt marsh, sand dunes, soil, life forms, costal habitats, Surt, Libya.

INTRODUCTION

Libya is located between trans. 19 30 22 S. and 32 56 08 N. and long. 9 23 16 W., 25 08 51 E. The Mediterranean coastal land of Libya extends for about 1970 km. from the border of Egypt at the east to the border of Tunisia at the west. This narrow arid coastal belt is divided into three sections (the western from Tunisia at west to Muskrat at east, the eastern from the border of Egypt at east to Dorsia at west and the middle at Surt between Muskrat and Dorsia,) EL-Barasi *et al* (2011) The study area is located at Surt region which occupying the northern part of the middle section. Surt has a great natural plant wealth which could be used in different purposes by the local inhabitants for example; grazing, feeding, medicine, manual industries, building materials, etc. EL-Barasi *et al.* (2011) and Yacoub *et al.* (2013). Due to until now most of the research and studies concentrated on the eastern and western part of Libya, as example; Sherif *et al.*(1991) study the flora of Wadi Muquis at ELGabal EL Akhder eastern Libya , Asker (1998) study the flora of Wadi el-Asra at the eastern of Libya, EL Habony (1999) study the flora and vegetation of the Mediterranean cost of Libya from Tobruk to the Egyptian borders and EL Hmaeedy (2000) study the vegetation and flora of wadi EL-Ager at the eastern desert of Libya but there is no published studies dealing with the flora and natural plant diversity at Surt. In view of all of these, it was deemed necessary to investigate an integrated floristic studies to record and document the natural plant wealth in the costal habitats at Surt in Libya including the records of plant species, families and life- forms spectra to be used as data base in the Libyan flora especially at Surt region

and to attract the attention for the economic potentialities as well as the uses of this natural plant species for the sustainable development in Surt (Libya). This study is considered as a pioneer and leading study concerning the natural floristic composition at Surt in Libya.

MATERIALS AND METHODS

The Study Area

Surt is located between 31.0 North and 31.3 South and 16.30 west and 17 east above sea level by 100 meter nearly. It is considered as a part in the middle section of Mediterranean coastal strip of Libya .It is considered as a semi arid area include some Wadis like Wadi Telal at the west. It is also characterized by different habitat types including costal salt marshes, sand dunes and arable non cultivated sandy lands (El Deftar and Issawi, 1977) as shown in Fig(1).

The soil at the study area is deep and characterized by its sandy and loamy sandy in texture with low water-holding capacity. It contains high concentrations of Cu, Mg, and S. On the other hand the hydrogen ion concentration (pH) is highly alkaline and ranged between 10 and 13 (Alaib and Ihsaeen, 2008).

The climate of the study area is considered as arid climate according to the rainfall which ranged between 59 and 74 mm/ year. and the wide range of temperature variation in both winter and summer season, where it ranged between 31 C° and 45 C° in summer and between 16 C° and 2 8 C° in winter. The data of the different climatic variables, rainfall, temperature, wind velocity and the relative humidity are taken from Surt Metrological Station (2010) as shown in Table (1).



Fig (1): Location map of the study area

Month	Temp .C°	Climatic variables			
		R.H.%	W.V. Km/lh.	Atmospheric pressure(node)	R.F. mm/year
Jan.	14.2	69	8.2	17.6	42.9
Feb.	14.7	67	8.8	17.4	42.5
Mar.	16.5	68	9.0	15.2	17.2
Apr.	20.2	67	9.3	12.5	4.5
May	21.5	70	8.2	12.2	3.6
Jun.	24.3	74	7.8	14.5	0.8
Jul.	25.4	78	7.4	12.9	0.5
Aug.	27.2	75	6.8	15.5	0.2
Sep.	27.7	73	7.6	16.0	9.8
Oct.	24.0	67	7.4	17.0	26.9
Nov.	14.3	66	8.2	17.2	29.3
Dec.	15.2	65	21.8	18.7	43.4
Total	-	-	-	185.7	221.6
annual mean					18.6

Temp. = Temperature W.V. = Wind Velocity R.F. = Rainfall R.H. = Relative Humidity.

A field trips were arranged during March 2010 to March 2011 for vegetation monitoring and records in different habitats of the study area (salt marshes, sand dunes and non cultivated sandy lands), where 180 stands were selected, 60 stands were chosen in each habitat type in the study area and the stand size is 20x20m. Complete list for the surveyed species with their relating taxonomic families, life form spectra and cover percentages were recorded. The arrangement of families was according to Engellare's system. Identification and updating of Latin names of the recorded species were according to Boulos (1995,1999, 2000, 2002, 2005 and 2009), Jafri and El-Gadi (1979 - 1987), Tackholm (1974) and EL -Gadi (1988 - 1989). The abundance of species was determined according to Braun-blauquet cover abundance scale as the following :-5.>75%, 4 from 50-75%, 3 from 25 -

50%, 2 from 5-25% and 1 from 1-5%. Life forms of the species were described according to Raunchier (1934). The plant cover was estimated using the line intercept methods (Canfield, 1941) for application of this estimates five paralleled lines each of 20 meter length were laid out in each stand and the degree of human impacts were described visually.

Five soil samples were collected from each stand and mixed then take 100 gm from it for the determination of mechanical analysis (soil texture) by using sieve series (Piper,1947) .with different diameters start from >2mm to < 0.063 mm in diameter, electrical conductivity measured directly by using YSI model 33S.C.T.meter , organic carbon% where the oxidizable organic carbon (as indication of organic matter) was determined by using Walkely and Black rapid titration method (Jackson, 1962). calcium carbonate % was

determined according to Allen *et al.*(1974). Hydrogen ion concentration (pH) was determined according to Sawyer and McCarty (1978)).

RESULTS AND DISCUSSION

The floristic composition revealed that, the flora of the coastal habitats at Surt, Libya (salt marshes, sand dunes and non cultivated lands) comprises 231 species, related to 147 genera and belonging to 37 families. Among the recorded species 108 annuals and 123 perennials (Poaceae comprises 27 species (11.69%), Asteraceae and Fabaceae include 26 species each (11.26%) these three families were main leading families representing collectively about 34.21% (79 species) of the total number of recorded species in the study area). Family Chenopodiaceae represented by 23 species (10%), Brassicaceae represented by 16 species (6.9%), Caryophyllaceae represented by 10 species (4.3%) and both of families Polygonaceae and Lamiaceae were represented by 9 species each (3.9%), Zygophyllaceae 8 species (3.5%) and Apiaceae 6 species (2.3%) as shown in Fig. (2). The coastal habitats are divided into three habitat types namely, salt marshes, sand dunes and non cultivated sandy lands. On the other hand each habitat is characterized by its own floristic composition and dominant species where the salt marshes habitat was represented by 66 species. This habitat was dominated by: *Suaeda pruinosa* Lang with cover percentage of 90%, *Arthrocnemum macrostachyum* (Moric.) K. Koch (85%), *Haloecnemum strobilaceum* (Pall.) M. Bich. (85%), *Tamarix nilotica* (Ehrenb.) Bunge (85%), *Zygophyllum album* L. (75%). On the other hand, the sand dune habitat was represented by 143 species dominated by *Echinops spinosus* L. (80%), *Moltkiopsis ciliata* (Forssk.) I.M. Johnst. (80%), *Calotropis procerra* W. T. Aiton (77%), *Panctarium maritimum* L. (75%), *Silene succulenta* Forssk. (75%). *Heliotrobium curassavicum* L. (40%). The non cultivated sandy lands was represented by 90 species dominated by weeds *Chenopodium murale* L. (85%), *Bassia indica* L. (85%) *Amaranthus graezicans* L. (80%), *Cynanchum acutum* L. (75%).

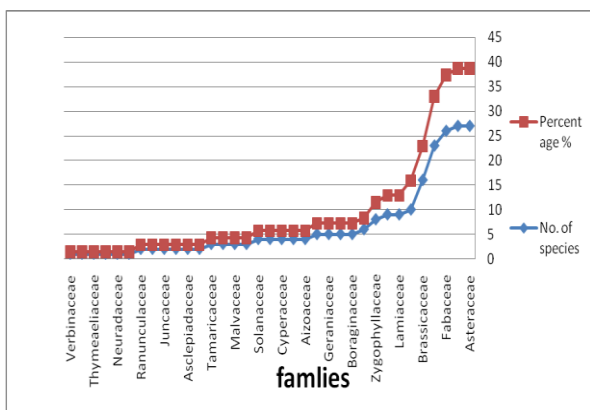


Figure (2): The recorded families and percentages values of plant species in the study area.

The most common life forms were the Therophytes which represented by 141 species (61%) of the total recorded species followed by Cryptophytes 32 species (13.9%). Hemicryptophytes and Chamaephytes were represented by 24 species (10.3%) and Phanerophytes 10 species (4.3%).It has been observed that, the dominant life form was Therophytes which represented by 141 species (61%) of the total recorded species, Among the recorded species, some species have important economic uses like medicine, grazing, fuel, food, industry and other uses (Yacoub *et al.* 2013). Two of the recorded species are poisonous namely, *Calotropis procera* L. and *Hyoscyamus muticus* L.

The results of soil analysis revealed that, the pH ranged between 10 and 13 with mean value of 11.2 in salt marshes habitat, 10.5 in sand dune and 10.25 in non-cultivated sandy lands .The salinity values ranged between 2.8 and 9.4 g/l with mean value of 8 g/l in salt marsh habitat, 6.5 g/l in sand dune habitat and 4.5 g/l in non-cultivated sandy lands, while the calcium carbonate contents ranged between 2 and 30.2 % . On the other hand the organic carbon % ranged between 0.2 and 3.6 % with mean value of 1.2 % at salt marsh, 1.55 % in sand dune and 2.05 % in non-cultivated land. The soil texture is sandy and sandy loamy in nature in all the studied habitats as shown in Table (2).

The potential and the economic uses of the recorded species at Surt were assessed based on; field observation, information collected from local inhabitants and literature review. The economic uses are classified into 6 major groups: grazing, fuel, medicinal uses, human food, timber and other uses (manual industries, ornamental, sand binder and oil and dye extractions) as reported by El Kady (1989).

1- Grazing

The domestic and wild animals can graze and browse about 60 species which comprises relatively high percentages of the total economic species. The highly palatable species comprise *Aeluropus lagopoides*, *Phragmites australis*, *Echinochloa colona*, *Cynodon dactylon*, *Echinochloa crus-galli*, *Alhagi graecorum*, *Melilotus indicus*, *Medicago polymorpha*, *Trigonella stellata*, *Cyperus rotundus*, *Avena fatua*, *Avena barbata*, *Retama raetam* (Forssk.) and *Bassia indica* (El Kady 1989) and Abdalla (2010).

2-Fuel

Most of the shrubby species are cut and harvested for fuel such as *Arthrocnemum macrostachyum*, *Haloecnemum strobilaceum*, *Sarcocornia fruticosa* *Suaeda pruinosa*, and *Tamarix nilotica* (Abdulla, 2010

3-Medicinal uses

Fifty five species are of popular medicinal uses for example *Teucrium* sp. which is used in treating diabetes by the local inhabitants, *Panctarium maritimum* which is used in treating the skin disease like diarrhea and eczema and *Polygonum maritimum* which is used in

treating the urinary system and kidney disease (EL-Kady, 1989). This is confirmed by the finding of Batanouny (1999). *Polygonum equisetiforme Plantago ovate, Peganum harmala Cynara sp. Sonchus oleraceus, Salvia sp., Daucus Sp., Deverra tortuosa* were medicinal plants as mentioned by Bogdadi *et al.* (2007) whom use the water extract of these species

as antimicrobial agent against some microbes and they stated that the water extract of these plants are more effective against microbes. *Alhagi graecorum* which is antirheumatic, laxative, diuretic. On the other hand, the boiled leaves of *Emex spinosa* is used for relief of dyspepsia, biliousness. (Personal Communication with the local peoples at Surt).

Table (2): The mean results of the physico-chemical characteristics of the soil samples collected from different habitats at the study area.

Parameters	Habitats								
	Salt marshes			Sand dunes			Non cultivated sandy lands		
values	Min.	Max.	Mean	Min.	Max.	Mean	Min.	Max.	Mean
pH	10	13	11.5	9	12	10.5	10.0	11..5	10.25
E C g/L	6.6	9.4	8	4.5	8.5	6.5	2.8	6.4	4.55
O C %	0.2	2.2	1.2	0.3	2.8	1.55	0.51	3.6	2.05
CaCO ₃ %	12.2	30	21.1	2	30.2	16.6	7.5	23.1	15.3
Sand %	20	82	51	15	60	37.5	6	66	36
Silt %	10	66	38	25	70	47.5	9	69.4	39.2
Clay %	1	24	12.5	3	27	15	5.6	44	24.8

Min. =Minimum, Max. = Maximum, O C: Organic carbon, EC: Electrical conductivity as salinity indicator.

4- Timber

For Timber and manual industries by the local inhabitants such as, *Juncus acutus Juncus rigidus* (Personal Communication with the local peoples at Surt). It could be concluded that, the costal habitats at Surt have a large number of plant species with many uses and benefits. On the other hand this study is considered as the pioneer study and it may be used as a data base for the monitoring and conservation program for this important part of the coastal Mediterranean strip of Libya.

5- Human food

Fruits, flowers and vegetative parts of 32 species are used in human food .as example: *Amaranthus lividus* which is eaten by the local inhabitants (Personal Communication with the local peoples at Surt).

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APPENDIX (1) The Floristic list and cover percentages of the recorded plant species in the study area.

Family	Species	Life form	Life span	Cover % of species at each Habitat		
				S M	S D	N CL
Aizoaceae	<i>Mesembryanthemum crystallinum</i> L.,	Th	Ann	75	5	2
	<i>Mesembryanthemum nodiflorum</i> L.,	Th	Ann	74	9	4
	<i>Mesembryanthemum forsskaolii</i> Hochst. and Bioss.	Th	Ann	70	3	5
	<i>Aptenia cordifolia</i> L.	Th	Ann	40	12	5
Alliaceae	<i>Allium roseum</i> L.,	Th	Per	56	40	5
	<i>Asphodelus tenuifolius</i> Cav.	Th	Ann	34	-	-
Amaranthaceae	<i>Amaranthus graezicans</i> L.	Th	Ann	-	10	76
	<i>Amaranthus hybridus</i> L.	Th	Ann	-	30	62
	<i>Amaranthus lividus</i> L.	Th	Ann	-	33	65
Amaryllidaceae	<i>Pancratium maritimum</i> L.	Cr	Per	10	87	2
	<i>Pancratium sickenbergi</i> Asch. and Schweinf.	Cr	Per	7	72	-
	<i>Pancratium feotidum</i> L.	Cr	Per	-	12	-
	<i>Narcissus elegans</i> L.	Cr	Per	-	45	-
Asclepiadaceae	<i>Calotropis procera</i> (W.T.Aiton.)	Ph	Per	-	46	13
	<i>Cynanchum acutum</i> L.	H	Per	-	34	75
Boraginaceae	<i>Heliotropium curassavicum</i> L.	Ch	Per	-	40	-
	<i>Anchusa humilis</i> (Desf.) I.M. Johnst.	Th	Ann	-	43	-
	<i>Moltkiopsis ciliata</i> (Forssk.) I.M. Johnst	Ch	Per	-	72	-
	<i>Gastrocotyle hispida</i> Foesk.	Ch	Per	-	35	-
	<i>Echium angustifolium</i> Mill. subsp. <i>sericeum</i> .	Ch	Per	-	50	-
Caryophyllaceae	<i>Paronychia arabica</i> (L.) Dc.	Th	Ann	-	25	-
	<i>Silene arabica</i> Bioss.	H	Per	-	75	10
	<i>Silene rubella</i> L.	Th	Ann	-	35	-
	<i>Silene villosa</i> Forssk.	Th	Ann	-	45	-
	<i>Silene succulenta</i> Forssk.	H	Per	-	40	20
	<i>Polycarbon tetraphyllum</i> L.	Th.	Ann	-	25	-
	<i>Spergularia marina</i> (L.) L.	Th	Bie	45	-	-
	<i>Spergulla fallax</i> (Lowe) E. Krouse	Th	Ann	10	-	-
	<i>Vacoria diandra</i> L.	Th	Ann	10	-	-
	<i>Agathophora alopecuroides</i> (Delile) Fenzl. Bung.	Ph	Per	3	10	-
Chenopodiaceae	<i>Atriplex halimus</i> L.	Ph	Per	65	-	-
	<i>Atriplex semibaccata</i> R.Br.	H	Per	20	-	-
	<i>Atriplex portulacoides</i> L.	Ch	Per	75	-	-
	<i>Atriplex lindleyi</i> Moq.	Ch	Per	35	-	-
	<i>Atriplex glauca</i> L.	Ph	Per	25	-	-
	<i>Atriplex leucoclada</i> Bioss.	Ph	Per	20	-	-
	<i>Atriplex nummularia</i> Lndl.	Ph	Per	25	-	-
	<i>Bassia indica</i> (Weight) A.J.Scott.	Th	Ann	-	-	85
	<i>Bassia muricata</i> (L) Asch	Th	Ann	-	--	75
	<i>Bassia eriophore</i> (Schard.) Asch.	Th	Ann	-	-	45
	<i>Arthrocnemum macrostachyum</i> (Moric.) Koch.	Ch	Per	85	-	-
	<i>Halochnemum strobilaceum</i> (Pall.) M. Bieb.	Ch	Per	85	-	-
	<i>Suaeda vera</i> Forssk. J.F. Gmel	Ch	Per	80	-	-
	<i>Suaeda pruinosa</i> Lang.	Ch	Per	75	-	-
	<i>Suaeda maritima</i> (L.) Dumort.	Th	Ann	70	-	-
	<i>Chenopodium album</i> L.	Th	Ann	-	-	85
	<i>Chenopodium murale</i> L.	Th	Ann	-	-	70
	<i>Chenopodium ambrosoides</i> L.	Th	Bie	-	-	55
	<i>Chenopodium opitifolium</i> Schrod. Koch and ziz.	Th	Ann	-	-	45
	<i>Beta vulgaris</i> L.	Th	Ann	-	-	30
<i>Cornulaca monacantha</i> Delile.	Ch	Per	-	45	-	
<i>Salsola kali</i> L.	Th	Per	-	55	-	
<i>Sarcocornia fruticosa</i> (L) A.J.Scott.	Ch	Per	65	-	-	
Asteraceae	<i>Arnebia tinctoria</i> Forssk.	Th	Ann	-	35	-
	<i>Limbarda crithmoides</i> (L.) Dumort	H	Per	65	-	-
	<i>Symphotrichum squamatum</i> (Spreng.) Nesom	H	Per	-	40	10
	<i>Artemisia scoparia</i> L.	H	Per	20	-	-
	<i>Artemisia monosperma</i> Delile	H	Per	15	-	-
	<i>Asteriscus hierochunticus</i> (Michon) Wiklund.	Th	Per	-	25	10
	<i>Urospermum picroides</i> (L.) F.W. Schmidt	H	Ann	-	45	20
	<i>Senecio vulgaris</i> L.	Th	Ann	-	55	10
	<i>Senecio gluaca</i> L.	Th	Ann	-	25	20
	<i>Sonchus oleraceus</i> L.	Th	Ann	-	-	35
<i>Echinops spinosus</i> Turra.	H	Per	-	45	-	

	<i>Echinops galalensis</i> Schwein. f..	H	Per	-	30	-
	<i>Reichardia tingitana</i> (L) Roth.	Th	Ann	-	45	-
	<i>Launaea mucronata</i> (Forssk.)Muhl..	H	Per	-	65	-
	<i>Conyza aegyptiaca</i> (L.)Dyand	Th	Ann	-	45	15
	<i>Carthamus glaucus</i> M.Bieb.	Th	Ann	10	25	-
	<i>Ifloga spicata</i> (Forssk.)Sch. Bip.	Th	Ann	10	-	-
	<i>Sonchus asper</i> (L.)Hill	Th	Ann	-	-	20
	<i>Centaurea dimmorpha</i> Viv..	H	Per	-	10	-
	<i>Carduus pycnocephalus</i> L.	Th	Ann	5	15	-
	<i>Echinops blancheanus</i> L.	Th	Ann	-	20	-
	<i>Launaea capitata</i> (Spreng.)Dandy	Th	Ann	-	20	-
	<i>Lactuca serriola</i> L.	Th	Ann	-	25	-
	<i>Pluchea dioscoroides</i> (L.)DC.	Ph	Per	-	-	85
	<i>Filago desertorum</i> Pomel.	Th	Ann	-	20	-
	<i>Filago pyramidata</i> L.	Th	Ann	-	15	-
Convolvulaceae	<i>Convolvulus oxyphyllus</i> L.	H	Per	-	-	10
	<i>Convolvulus arvensis</i> L.	H	Per	-	-	30
	<i>Convolvulus lanatus</i> Vahl.	H	Per	-	-	20
	<i>Cressa cretica</i> L.	H	Per	45	-	-
	<i>Convolvulus buschiricus</i> L.	H	Per	-	-	10
Brassicaceae	<i>Brassica tournifortii</i> Gouam	Th	Ann	-	-	15
	<i>Brassica rapa</i> L.	Th	Ann	-	-	5
	<i>Cakile maritima</i> Scop.	Th	Ann	-	20	-
	<i>Hussonia pinnata</i> Viv. Jafri	Th	Ann	-	5	-
	<i>Erucaria pinnata</i> (Viv.)Tachl and Boulos	Th	Ann	-	10	-
	<i>Sisymbrium irio</i> (L.Gaertn)	Th	Ann	-	20	15
	<i>Lobularia arabica</i> (Boiss.)Muschl	Th	Ann	-	20	-
	<i>Lobularia libyca</i> (Viv.) C.F. Meissn	Th	Ann	-	15	-
	<i>Lepidium sativum</i> L.	Th	Ann	-	25	-
	<i>Capsella bursa-pastoris</i> (L.)Medik	Th	Ann	-	20	-
	<i>Farsetia aegyptia</i> Turra.	Ch	Per	-	25	-
	<i>Deplotaxis harra</i> (Forssk.)Boiss.	H	Per	-	45	-
	<i>Sinapis arvensis</i> L.	Th	Ann	-	35	-
	<i>Matthiola fruticulosa</i> (L.)Maire	H	Per	-	25	-
<i>Malcolmia pygamaea</i> (DC.)Boiss	Th	Ann	-	-	5	
<i>Cronopus didymus</i> (L.)Sm.	Th	Ann	-	10	5	
Cynomoriaceae	<i>Cynomorium coccineum</i> L.	P,Cr	Per	15	-	-
Cyperaceae	<i>Cyperus capitatus</i> Vand.	Cr	Per	-	65	-
	<i>Cyperus conglomeratus</i> Rottb.	Cr	Per	-	85	-
	<i>Cyperus laevigatus</i> L.	Cr	Per	45	-	-
	<i>Cyperus rotundus</i> L.	Cr	Per	-	5	10
Euphorbiaceae	<i>Euphorbia peplus</i> L.	Th	Ann	-	5	15
	<i>Euphorbia prostrata</i> Aiton.	Th	Ann	-	-	10
	<i>Euphorbia retusa</i> Forssk.	Th	Ann	-	15	5
	<i>Euphorbia terracina</i> L.	H	Per	-	5	-
Frankeniaceae	<i>Frankenia arabica</i> L.	H	Per	-	5	-
	<i>Frankenia pulverulenta</i> L.	Th	Ann	-	5	-
Geraniaceae	<i>Erodium laciniatum</i> (Cav) Wild.	Th	Ann	-	15	-
	<i>Erodium ciconium</i> (L.)L.Her.	Th	Ann	-	20	-
	<i>Erodium glaucophyllum</i> (L.)L.Her.	H	Per	-	15	-
	<i>Erodium bryomifolium</i> L.	Th	Ann	-	10	-
	<i>Monsonia nivea</i> (Decne)Webb	H	Per	-	10	-

Floristic Composition of the Plant Cover at Surt Region in Libya.

Poaceace	<i>Aeluropus lagopoides</i> (L.)Trin and Thwaites	H	Per	-	5	5	
	<i>Avena fatua</i> L.	Th	Ann	-	-	10	
	<i>Avena barbata</i> Pott and Link.	Th	Ann	-	-	35	
	<i>Cutandia dichotoma</i> Batt .Trab.	Th	Ann	-	5	10	
	<i>Cutandia memphetica</i> (Sperng.)Benth	Th	Ann	-	5	20	
	<i>Cynodon dactylon</i> (L.)Pers	Cr	Per	-	-	15	
	<i>Echinochloa colona</i> (L.) Link.	Th	Ann	-	5	10	
	<i>Denibera retroflexa</i> (Vahl.)Panz..	Th	Ann	-	5	10	
	<i>Phragmites australis</i> (Cav.)Trin.Steud.	Cr	Per	-	-	15	
	<i>Schismus barbatus</i> (L.)Thell.	Th	Ann	-	2	10	
<i>Leptochloa fusca</i> (L.)Kunth.	Cr	Per	-	15	20		
	<i>Lolium perenne</i> L.	H	Per	-	20	25	
	<i>Lolium multiflorum</i> lam.	Th	Ann.	-	25	25	
	<i>Phalaris minor</i> Retz	Th	Ann	-	5	10	
	<i>Setaria verticillata</i> (L)P.Beauv..	Th	Ann	-	25		
	<i>Imperata cylindrica</i> L.	Cr	Per	10	15	-	
	<i>Stipagrostis ciliata</i> (Desf.).	Cr	Per	-	15	10	
	<i>Stipagrostis scoparia</i> (Trin & Rupr.)DeWinter	H	Per	-	20	25	
	<i>Hordeum vulgare</i> L.	Th	Ann	-	-	30	
	<i>Hordeum marinum</i> L.	Th	Ann	-	5	15	
	<i>Setaria viridis</i> (L.)Beauv.	H	Ann	-	25	5	
	<i>Aegilops bicornis</i> (Forssk.)Jaub and Speh	Th	Ann	-	25		
	<i>Arundo donax</i> L.	Cr	Per	-	-	35	
	<i>Bromus scoparius</i> L.	Th	Ann	-	25	15	
	<i>Elymus farctus</i> (Viv.)Runem.ex Meld.	G	Per	-	25	5	
<i>Sphenopus divaricatus</i> (Gouan)Rchb.	Th	Ann	-	15	5		
Juncaceae	<i>Juncus rigidus</i> Desf.	Cr	Per.	70	-	-	
	<i>Juncus actus</i> L.	Cr	per	65	-	-	
Lamiaceae	<i>Salvia lanigera</i> poir	H	Per	-	65	-	
	<i>Mentha longifolia</i> (L.)Huds	H	Per	-	15	5	
	<i>Ajuga iva</i> (L.)Schreb.	H	Per	-	5	5	
	<i>Rosmarinus officinalis</i> L.	H	Per	-	25	-	
	<i>Salvia spinosa</i> L.	H	Per	-	55	-	
	<i>Salvia aegyptiaca</i> L.	Ch	Per	-	45	-	
	<i>Teucrium oliverianum</i> L.	H	Per	-	20	-	
	<i>Teucrium polium</i> L.	H	Per	-	35	-	
Fabaceae	<i>Leopoldia comosa</i> (L.)Parl.	H	Per	-	5	-	
	<i>Alhagi graecorum</i> Boiss.	H	Per	85	-	-	
	<i>Lotus arabicus</i> L.	Th	Ann	-	65	-	
	<i>Lotus halophilus</i> Boiss.	Th	Ann	-	25	-	
	<i>Lotus glaber</i> Mill.	H	Per	-	35	-	
	<i>Lotus cytisoides</i> L.	H	Per	-	15	-	
	<i>Astragalus bombycinus</i> Boiss.	Th	Ann	25	-	-	
	<i>Astragalus beoticus</i> L.	Th	Ann	10	-	-	
	<i>Astragalus caprinus</i> L.	H	Per	15	-	-	
	<i>Astragalus spinosus</i> (Forssk.)Muschl..	H	Per	5	-	-	
	<i>Astragalus peregrinus</i> Vahl.	Th	Ann	5	-	-	
	<i>Medicago polymorpha</i> L.	Th	Ann	-	10	20	
	<i>Medicago hispida</i> L.	Th	Ann	-	15	20	
	<i>Medicago laciniata</i> (L.)Mill.	Th	Ann	-	5	15	
	<i>Medicago sativa</i> L.	H	Per	-	5	5	
	<i>Medicago tornata</i> L.	Th	Ann	-	15	10	
	<i>Medicago littoralis</i> Rohde ex Loisel	Th	Ann	-	5	25	
	<i>Trifolium alexandrinum</i> L.	Th	Ann	-	20	35	
	<i>Trifolium resupinatum</i> L.	Th	Ann	-	15	25	
	<i>Trigonella stellata</i> Forssk.	Th	Ann	-	5	10	
	<i>Trigonella maritima</i> Poir	Th	Ann	-	5	15	
	<i>Ononis serrata</i> Forssk.	Th	Ann	5	5	15	
	<i>Retama raetam</i> (Forssk.)Web and Berthel	Ph	Per	15	5	-	
	<i>Vicia monantha</i> Retz.	Th	Ann	-	10	-	
	<i>Vicia sativa</i> L.	Th	Ann	-	20	-	
	<i>Melilotus indicus</i> L.	Th	Ann	-	5	-	
	Scrophulariaceae	<i>Linaria lenius</i> L.	Th	Ann	-	5	-
	Liliaceae	<i>Asparagus stipularis</i> Forssk.	Cr	Per	-	65	-
<i>Urginea undulata</i> (Desf.)Steinh.		Cr	Per	-	25	-	
Malvaceae	<i>Malva parviflora</i> L.	Th	Ann	-	-	15	
	<i>Malva sylvestris</i> L.	Th	Ann	-	-	25	
	<i>Sida alba</i> L.	Th	Bie	-	-	15	
Neuradaceae	<i>Neurada procumbens</i> L.	Th	Ann	-	55	-	

Orbanchaceae	<i>Cistanche phelypeae</i> (L)Cout..	P,Cr	Per	65	-	-
	<i>Orbanche arabica</i> L.	P,Cr	Per	55	-	-
	<i>Orbanche cernua</i> loeft	P,Cr	Per	35	-	-
Plantaginaceae	<i>Plantago lanceolata</i> L.	H	Per	25	-	-
	<i>Plantago major</i> L.	H	Per	-	-	-
	<i>Plantago notata</i> Lag.	Th	Ann	25	-	-
	<i>Plantago squarrosa</i> Murray	Th	Ann	15	-	-
	<i>Plantago ovata</i> Forssk..	Th	Ann	12		-
	<i>Emex spinosa</i> (L)Campd.	Th	Ann	-	5	-
Polygonaceae	<i>Polygonum aviculare</i> L.	Th	Ann	--	3	-
	<i>Polygonum macrocarpa</i> L.	Th	Ann	-----	2	-
	<i>Rumex vesicarius</i> L.	Th	Ann	25	-	-
	<i>Rumex dentatus</i> L.	Th	Ann	-	35	-
	<i>Polygonum equisetiforme</i> Sm.	Cr	Per	25	-	-
	<i>Rumex pictus</i> Forssk.	Th	Ann	-	35	-
	<i>Calligonum polygonoides</i> L.	Ph	Per	-	30	-
	<i>Prolongoa macrocarpa</i> L.	Ph	Per	-	15	-
Portulacaceae	<i>Portulaca oleraceae</i> L.	Th	Ann	-	-	25
Ranunculaceae	<i>Adonis dentata</i> Delile.	Th	Ann	-	35	-
	<i>Ranunculus scleratus</i> L.	Th	Ann	5	-	-
Solanaceae	<i>Solanum nigrum</i> L.	Th	Ann	-	-	25
	<i>Lycium schweinfurthii</i> Dammer.	Ph	Per	-	55	-
	<i>Hyoscyamus muticus</i> L.	Ch	Per	20	-	-
	<i>Nicotiana glauca</i> R.C.Graham.	Ph	Per	-	-	35
Tamaricaceae	<i>Tamarix nilotica</i> (Ehrenb.) Buge	Ph	Per	85	-	-
	<i>Tamarix tetragyna</i> Ehrenb.	Ph	per	45	-	-
	<i>Tamarix aphylla</i> (L.)H.Karst.	Ph	per	65	-	-
Thymeleaceae	<i>Thymeleae hirsuta</i> (L.)Endl.	Ph	Per	75	-	-
Apiaceae	<i>Daucus syrticus</i> Murb.	Th	Ann	-	30	
	<i>Ammi visnaga</i> (L.) lam.	Th	Ann	-	25	55
	<i>Daucus capillinus</i> L.	Th	Ann	-	15	-
	<i>Deverra tortuosa</i> (Desf.)DC.	Ch	Per	-	15	-
	<i>Deverra triradiata</i> Hochst.ex Boiss.	Ch	Per	-	5	-
	<i>Anethum graveolens</i> L.	Th	Ann	-	25	-
Urticaceae	<i>Urtica urens</i> L.	Th	Ann	-	-	45
Verbinaceae	<i>Phylla nodiflora</i> (L) Greene.	H	Per	-	-	25
Zygophyllaceae	<i>Zygophyllum album</i> L.f.	Ch	Per	75	-	-
	<i>Zygophyllum coccineum</i> L.	Ch	Per	50	-	-
	<i>Zygophyllum simplex</i> L.	Th	Ann	45	-	-
	<i>Zygophyllum aegyptium</i> Hosny	Ch	Per	20	-	-
	<i>Peganum harmala</i> L.	Ch	Per	-	20	-
	<i>Tribulus terrestris</i> L.	Th	Ann	-	30	-
	<i>Fagonia arabica</i> L.	Ch	Per	-	25	-
Nitarariaceae	<i>Nitraria retusa</i> L.	Ph	Per	40	-	-
Total				66	143	90