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PLANT BIODIVERSITY AND VEGETATION ANALYSIS OF CHILAT, NORTH TIB, AMARA PERSIAN FOOTHILLS DISTRIC IRAQ

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Abstract

A total of 127 species belong to 101 genera and 37 families of vascular plants were recognized . Fabaceae (19 spp), Astraceae (18 spp), Poaceae (18 spp), Chenopodaceae (8 pp) and Brassicaceae (7 spp) were the largest families.The annuals (therophytes) and the perennial herbs were the most frequent indicating the spring charachteristic physiognomy of the studied area.The plant biodiversity of Chilat in spring based on Shannon Weiner index was 2.07 and Simpson index was 0.194 , but the highest species richness value based on the same indices respectively were 2.15 and 0.16 in station 1. In spring the annual *Plantago boisseri* has the hightest frequency with a relative abundance 20% and IVI 80.31,while the most dominant perennial species were *Pennisetum divisum* , *Hamada salicornica* ,*Cornulaca monocantha* and *Artemsia herba-alba* . Based on Sorenson's Coefficient , the similarity between the two stations studied was 0.604 and the Jaccard Coefficient was 0.433. *Ziziphus nummularia* is very common Big shrub species forming a characteristic community recognized here for the first time.

Keywords : *Biodiversity , Vegetation , Chilat , Tib , Amara , Iraq .*

Introduction

Upper plains and Foothills Region is one of the most important and divers physiographic region of Iraq . Acording to Guest(1966) , this region is divided into five districts of that the eastern district which run along the Persian border southwordly to Tib in Amara province is the Persian Foothills Distric (FPF) . The southern part of this district which lies between 32° 25 N and 47 25 E about 60 Km N-N.N.E Amara and run in S.E. direction to Tib is called Jabal Hamrin (Red mountain) . The FPF, including Jabal Hamrin , is a very rich district in plant and animal diversity , in some places deers can be seen grazing on the top of Jabal Hamrin . Guest(1966) (Flora of Iraq V.1) provided an introduction to the flora of Iraq with an account of the Topography , geology , soil , climate and ecology of Iraq . He described the vegetation and phytogeographic subdivision of Iraq , mentioning 25 Assoociations in the Iraqi desert. Thalen (1979) (Translated in Arabic by Unis, M. and Alani H. 2012) is the most important ecological work on the desert of Iraq, he gave details about the utilization of desert shrub rangelands in Iraq and the vegetation types and dominant communities.

The plant species , growth , life and communities of the FPF are similar to that in the desert region of Iraq . Malih (2015) in his Ph.D.thesis on the vegetation and biodiversity of the southern desert SDS of Iraq mentioned 180 species and 15 obvious plant communities in the desert of Basrah province .

Al-mayah *et al.* (2016) in the Ecology and Flora of Basrah presented 20 plant association with 6 halophytic communities in Basrah and adjacent area, Also they gave a floristic account for the species and their distribution in Basrah , Amara and Thi Qar .

Several local plant ecological studies have been published on small scales in different places of Iraq e.g. Weiner & Al-Hilli (1975) studied the vegetation of Jabal Sanam in SDS S.S.W. of Basrah . Chaudri *et al. (*1971) determined the plant indicators of alluvial soils of central Iraq . Batanouny & Hilli (1973) provided a phytosociological study of the Glauraf Adhaim Desert (DGA) .Al-Ani and Hdad (1973) studied the seasonal chauches in the plant behavior of Falluja and Skanderiya gypsum desert flora but no studies have been published on the FPF district particularly Chilat and wadi Tib .

Study Area

Chilat (Chlat) lies in Persian Foothills District (FPF) between Tib and Badra at alt. 150 m. about 25 Km N.E. of Ali Al-Gharbi some 85 Km N. Amara on down slope of southern Hamrin foothills near to the Iranian border were the Hamrin small foothill running along the Persian frontier in S.E.direction to Tib post . The study area is bounded by Badra to the North , Tib to the South , Iran to the East and Eastern Alluvial plain District (LEA) to the West . Its total surface area is about 125 square Km. with length from North to South about 30 Km. Topographicaly its ranges from (West to East) flat to wavy to hillsides with some depression with very shallow water . The soils vary from loose sands to gravel sands to compact gravel sands or sometimes clayey . The vegetation cover is vary seasonally depending on soil moisture which depends on the time , amount and season of rain . The physiognomy of

the area is characteristic and interesting in spring and dominated by many annual and perennial herbs , while in Summer and Autumn nearly all the annuals die . In general the area in Autumn is dominate by shrubs or bushes rarely trees of closed communities sometimes of halophytes . There are any scientific research available on this area . Guest (1966) in his gazettes of place names in Iraq only referred to the name of this area as Chilat or Chlat but he mistakenly mentioned that it lies between Mandli and Badra. *Ziziphus nummularia* , *Ephedra foliata* , *Periploca aphylla* , and *Hamada salicornica* are the most common species . The climate is a long hot summer and a short variable winter.

Materials and Methods

Two stations were selected for biodiversity analysis in Chilat, station 1 to the North and station 2 to the South.Transect and quadrat methods were used for vegetation analysis.Three line transects(50 m) were taken in each direction to record the species present and their cover precent . Five(1 m) quadrats were taken in each area to determine frequency, abundance, density,cover and biodiversity.Samples were taken monthly, species were photographed, collected , mounted and deposited in Basrah university Herbarium (BSRA) . Rechinger (1964), Townsed & Guest (1966-1985) , Davis 1982 , Ghazanfer and Edmenson(2013-2016) and Al-mayah *et al*. (2016) were followed for species identification . Enviromental factors such as air and soil temparture , soil moisture , PH , soil texture and salinity were measured using multipurpose aparatus. Altitude was determined by the Global positioning system (GPS) .

Table 1 : Species present during the spring 2016 in Chilat

Family	Species	Months 2016				Duration	Life form
		Ja.	Fe.	Ma	Ap		
Ephedraceae	*Ephedra foliata* Boiss. ex C.A.Mey.	+	+	+	+	Perennial	Shrub(switch)
Apiaceae	*Anisosciadium lanatum* Boiss.			+		Annual	Herb
	Oliveria decumbens Vent.				+	Annual	Herb
Asclepidaceae	*Periploca aphylla* Decne.	+	+	+	+	Perennial	Shrub(Switch)
Asteraceae	*Anthemis deserti* Boiss.		+	+		Annual	Herb
	Artemisia herba-alba Asoo.	+	+	+	+	Perennial	Shrublet
	Asteriscus pygmaeus (DC.) Coss.et Dur.		+	+		Annual	Stemless herb
	Atractylis cancellata L.			+	+	Annual	Herb
	Calendula arvensis L.	+	+	+	+	Annual	Herb
	Carduus pycnocephalus L.			+		Annual	Herb
	Carthamus oxycantha M. Bieb.				+	Annual	Herb
	Centaurea bruguierana (DC.) Hand. Mazz			+	+	Annual	Herb
	Centaurea sp.				+	Annual	Herb
	Echinops sphaerocephalus L.	+	+	+	+	Annual	Herb
	Filago pyramidata L.	+	+	+		Annual	Herb
	Gymnarrhena micracantha Desf.			+		Annual	Stemless herb
	Ifloga spicata (Forssk.) Sch.- Bip.		+	+	+	Annual	Herb
	Launaea mucronata (Forssk.) Musch.	+	+	+	+	Perennial	Herb
	Picris desertorum Nab.	+		+		Annual	Herb
	Reichardia tingitana (L.) Roth.	+	+			Annual	Herb
	Senecio glaucus L.	+	+	+		Annual	Herb
	Xanthium strumarium L.	+	+	+	+	Annual	Herb
Boraginaceae	*Arnebia decumbens* (Vent.) Coss.et Kral.				+	Annual	Herb
	Arnebia tinctoria Forssk.			+		Annual	Herb
	Anchusa strigosa Banks & Sol.	+	+	+	+	Perennial	Herb
	Heliotropium bacciferum Forssk.	+	+	+	+	Perennial	Shrublet
	Heliotropium europaeum L.			+		Perennial	Herb
	Moltkiopsis ciliata (Forssk.) Johnst.	+	+	+	+	Perennial	Herb
Brassicaceae	*Brassica tournefortii* Gouan.	+		+		Annual	Herb
	Cakile arabica Vel. & Bornm.	+	+	+	+	Annual	Herb
	Diplotaxis acris (Forssk.) Boiss			+		Annual	Herb
	Diplotaxis harra (Forssk.) Boiss.		+	+	+	Annual	Herb
	Matthiola longipetala (Vent.) DC.	+	+	+		Annual	Herb
	Savignya parviflora (Del.) Webb.		+	+		Annual	Herb
	Strigosella grandiflora (Bunge) Boch.			+		Annual	Herb
Capparidaceae	*Capparis spinosa* L.	+	+	+	+	Perennial	Shrublet
Caryophyllaceae	*Gypsophila capillaris* Forssk.				+	Annual	Herb
	Paronychia arabica (L.) Del.	+	+	+	+	Annual	Herb
	Pteranthus dichotomous Forssk.				+	Annual	Herb
	Silene villosa Forssk.		+	+	+	Annual	Herb
	Spergella fallax (Lowe.) Kra. In Sturm				+	Annual	Herb
Chenopodiaceae	*Bassia eriophora* (Schrad.) Aschers	+		+		Annual	Herb
	Caroxylon imbricatum (Forssk.) Maq.	+	+	+	+	Perennial	Shrub
	Chenopodium murale (L.) Fuentes			+		Annual	Herb
	Cornulaca aucheri Moq.		+		+	Annual	Herb

Family	Species	Months 2016				Duration	Life form
		Ja.	Fe.	Ma	Ap		
	Cornulaca monocantha Del.	+	+	+	+	Perennial	Shrublet
	Halothamnus iraqensis Botsch.	+	+	+	+	Perennial	Shrublet
	Hamada salicornica (Moq.) Iljin.	+	+	+	+	Perennial	Shrub(Switch
	Suaeda vermiculata Forssk.	+	+	+	+	Perennial	Shrub
Cistaceae	*Helianthemum lipii* (L.) Dum. Cours.	+	+	+	+	Perennial	Subshrub
Cleomaceae	*Cleome glaucescens* DC.	+	+	+	+	Perennial	Woody herb
	Cleome noeana Boiss.	+	+	+	+	Annual	Herb
Convolvulaceae	*Convolvulus oxyphyllus* Boiss.	+	+	+	+	Perennial	Shrublet
Cucurbitaceae	*Citrullus colocynthis* (L.) Schrad.	+	+	+	+	Perennial	Prostrate herb
Cusutaceae	*Cuscuta planiflora* Ten.	+	+	+	+	Annual	Parasite
Dipsacaceae	*Scabiosa olivieri* Coult.			+		Annual	Herb
	Scabiosa palaestina L.			+	+	Annual	Herb
Euphorbiaceae	*Chrozophora tinctoria* (L.) Raf.			+	+	Annual	Herb
Fabaceae	*Alhagi graecorum* Boiss.	+	+	+	+	Perennial	Shrublet
	Astragalus annularis Forssk.		+	+		Annual	Herb
	Astragalus dactylocarpus Boiss.	+	+	+	+	Perennial	Subshrub
	Astragalus fasciculifolius Boiss.	+	+	+	+	Perennial	Subshrub
	Astragalus hamosus L.		+			Annual	Herb
	Astragalus schimperi Boiss.		+	+		Annual	Herb
	Astragalus spinosus (Forssk.) Muschl.	+	+	+	+	Perennial	Subshrub
	Astragalus tribuloides Del.	+	+			Annual	Herb
	Hippocrepis bicontorta Lois.			+		Annual	Herb
	Hippocrepis unisiliquosa L.		+	+		Annual	Herb
	Lotus halophilus Bioss. & Sprun.	+	+	+		Annual	Herb
	Medicago laciniata (L.) Mill.			+		Annual	Herb
	Medicago polymorpha var.vulcaris	+		+		Annual	Herb
	Onobrychis crista-galli (L.)Lam.			+		Annual	Herb
	Trifolium tomentosum L.		+			Annual	Herb
	Trigonella hamosa L.				+	Annual	Herb
	Trigonlla stellata Forssk.		+	+		Annual	Herb
	Vicia monantha Retz.				+	Annual	Herb
	Vicia sativa L.			+		Annual	Herb
Geraniaceae	*Erodium pulverulentum* (Cav.) Willd.	+		+		Annual	Herb
Lamiaceae	*Salvia comperssa* Vent.	+	+	+	+	Perennial	Shrublet
	Teucrium polium L.	+	+	+	+	Perennial	Shrublet
Malvaceae	*Malva parviflora* L.	+	+	+	+	Annual	Herb
	Malva aegyptia L.				+	Annual	Herb
Orobanchaceae	*Cistanche tubulosa*(Schenk.) Wight.		+	+	+	Annual	Pararsite
	Orobanche cernua L.			+	+	Annual	Pararsite
	Phelipanche aegyptiaca (Pers.) Pomel.	+	+	+	+	Annual	Pararsite
Papaveraceae	*Papaver dubium* L.	+	+			Annual	Herb
Plantaginaceae	*Plantago afra* L.	+	+			Annual	Stemless herb
	Plantago boisseri L.	+	+	+	+	Annual	Stemless herb
	Plantago lagopus L.		+	+	+	Annual	Stemless herb
	Plantago ovata Forssk.			+		Annual	Stemless herb
	Plantago psamophyila Agn. et Ka′ bi				+	Annual	Stemless herb
Polygonaceae	*Emex spinosus* (L.) Campd.	+		+	+	Annual	Herb
	Polygonum aviculare L.				+	Annual	Herb
	Rumex vesicarius L.		+			Annual	Herb
Primulaceae	*Anagalis arvensis* L.	+	+	+		Annual	Herb
Resedaceae	*Reseda arabica* Boiss.		+	+	+	Annual	Herb
	Reseda aucheri Boiss.	+	+	+	+	Perennial	Herb
	Reseda decursiva Forssk.		+	+		Annual	Herb
Rhamanaceae	*Ziziphus nummularia* (Burm.f.)Wight et Arn	+	+	+	+	Perennial	Big shrub
Rosaceae	*Neurada procumbens* L.		+	+	+	Annual	Prostrate herb
Rubiaceae	*Galium tricornutum* Dandy.			+	+	Annual	Herb
Rutaceae	*Haplophyllum tuberculatum* (Forssk) AdrJuss	+	+	+	+	Perennial	Woody herb
Salixaceae	*Populus euphratica* Oliv.	+	+	+	+	Perennial	Tree
Tamaricaceae	*Tamarix aucheriana* (Decne. ex Walp.) Baum.	+	+	+	+	Perennial	Big shrub
Zygophyllaceae	*Fagonia bruguieri* DC.	+	+	+	+	Perennial	Subshrub
	Fagonia glutinosa Del.	+	+	+	+	Perennial	Prostrate herb
Alliaceae	*Allium macrochaetum* Boiss & Haussk.			+	+	Perennial	Bulbs
Asphodelaceae	*Asphodelus tenuifolius* Cav.	+	+	+		Annual	Herb
Cyperaceae	*Cyperus aucheri* Jaub et. Sp.	+	+	+	+	Perennial	Sedge
Poaceae	*Aegilops crassa* Boiss.			+		Annual	Grass
	Aegilops kotschy Boiss.				+	Annual	Grass
	Avena barbata Pott ex Link			+		Annual	Grass
	Bromus lanceolatus Roth. *var.lanceolatus*			+		Annual	Grass

Family	Species	Months 2016				Duration	Life form
		Ja.	Fe.	Ma	Ap		
	Bromus tomentellus Boiss.			+		Annual	Grass
	Cutandia dichotoma (Forssk.) Trab.			+		Annual	Grass
	Cutandia memphitica (Speremg.) Benth.		+	+		Annual	Grass
	Cynodon dactylon (L.) Pers.	+	+	+	+	Perennial	Grass
	Hordeum glaucum Stoud.			+		Annual	Grass
	Lolium rigidum Gaud.		+			Annual	Grass
	Panicum turgidm Forssk.	+	+	+	+	Perennial	Grass
	Pennisetum divisum (Gmel.) Henr.	+	+	+	+	Perennial	Grass
	Phalaris minor Retz.			+	+	Annual	Grass
	Phragmites australis (Cav.)Trin.ex Staud.	+	+	+	+	Perennial	Grass
	Polypogon monspeliensis (L.) Desf.			+		Annual	Grass
	Schismus barbatus (L.) Thell.	+	+	+		Annual	Grass
	Stipa capensis Thunb.		+	+		Annual	Grass
	Stipagrostis plumosa (L.) Munroex T.anders	+	+	+	+	Perennial	Grass
Total 37	127	63	79	105	76		

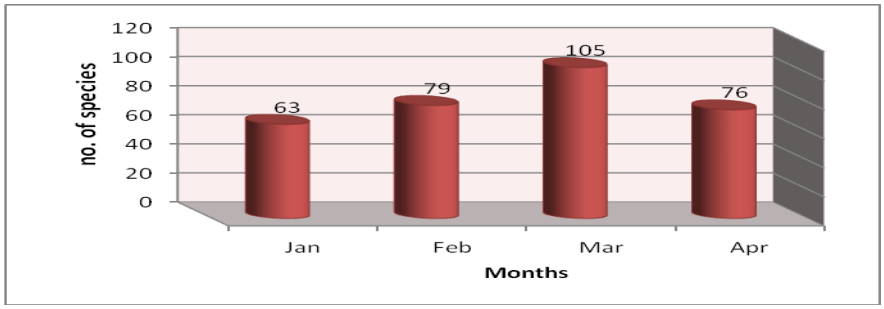
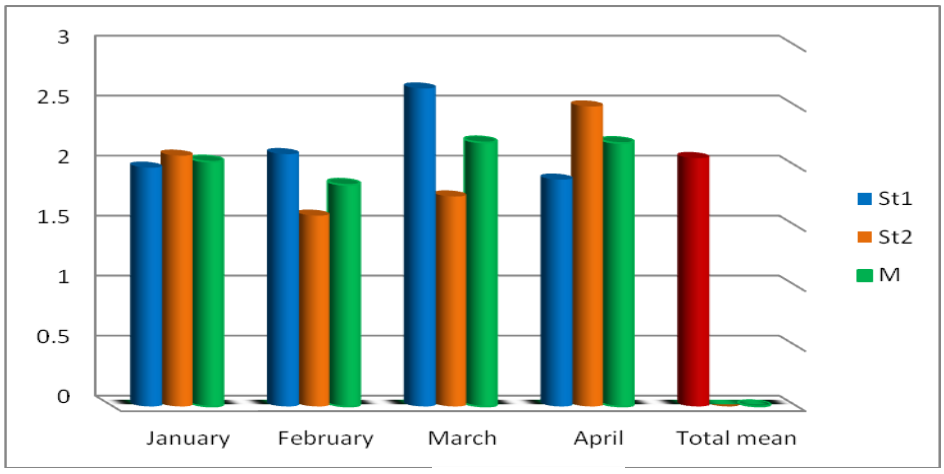


Fig 1 : number of species in months .

Table 2 : Biodiversity indices in station 1 & station 2.

Months	Shannon – Weiner index			Sampson index		
	St1	St2	Mean	St1	St2	Mean
January	1.99	2.09	2.04	0.2196	0.183	0.201
February	2.103	1.59	1.84	0.1414	0.312	0.227
March	2.65	1.75	2.2	0.0928	0.281	0.187
April	1.89	2.5	2.195	0.222	0.099	0.161
Total mean	2.15825	1.9825	2.07	0.169	0.219	0.194



A

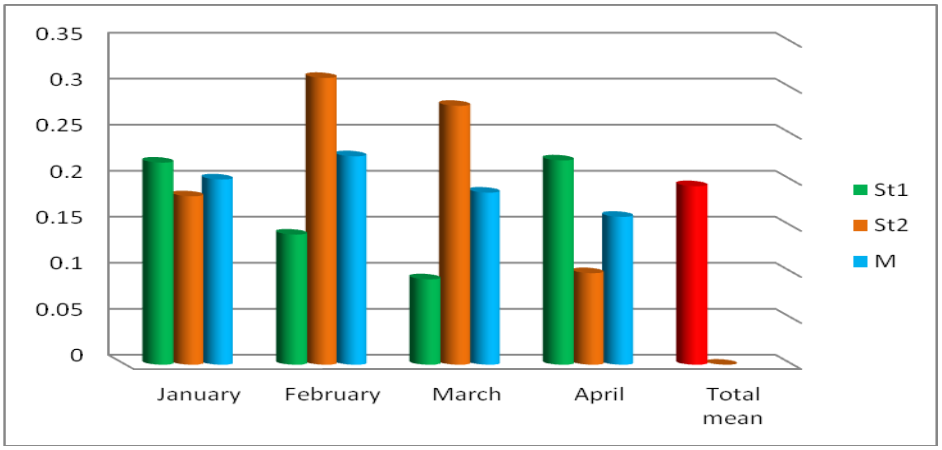


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Fig 2 : Plant biodiversity indices. A : Shannon-Weiner index , B : Simpson index

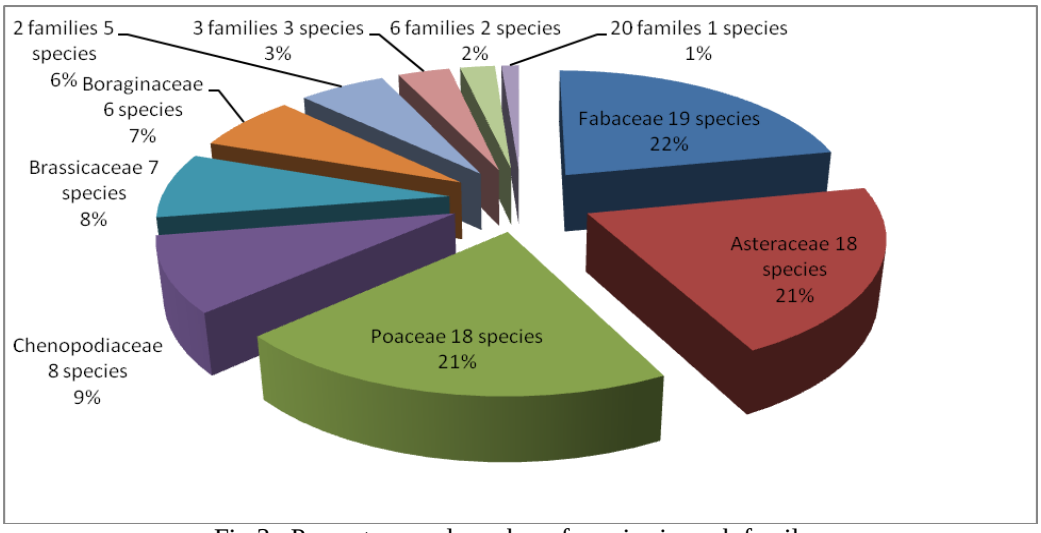

Fig.3 : Percentage and number of species in each family .

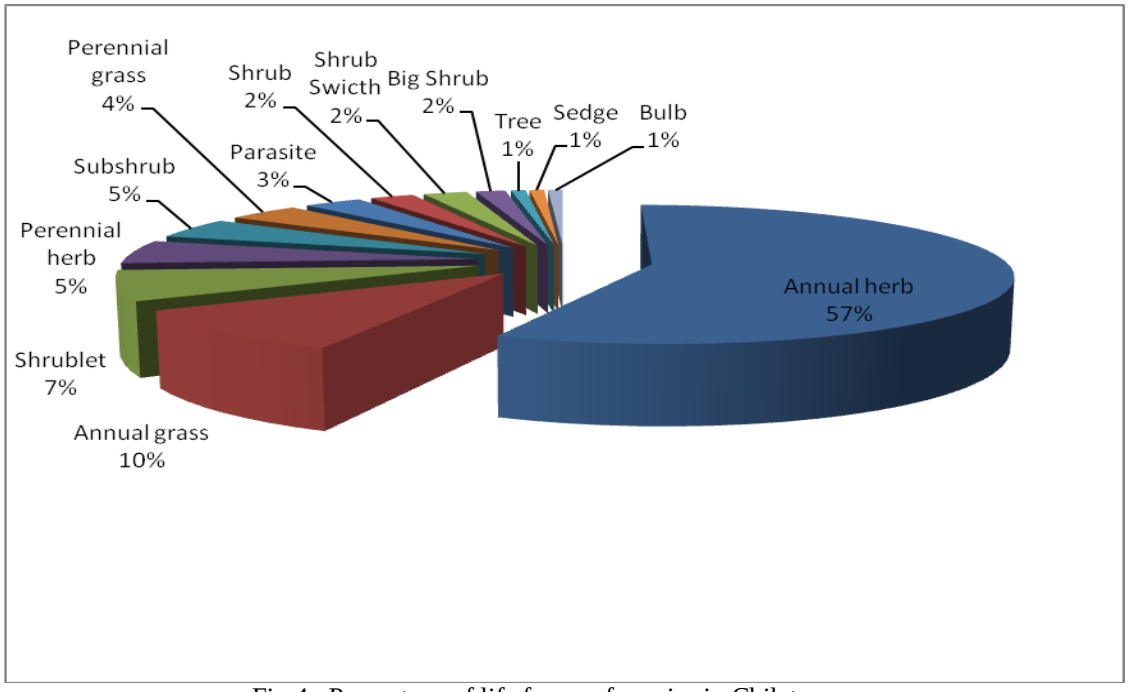

Fig.4 : Percentage of life forms of species in Chilat .

Tabe 3 : Relative frequency RF , Relative density RD , Relative cover RC and important value index IVI for species in station 1and station 2 .

Station	Species	RF	RD	RC	IVI
Station 1	*Anagalis arvensis*	3.030303	0.518135	0.538793	4.087231
	Asphodelous tounifolius	3.030303	1.554404	2.155172	6.73988
	Atractylis cancellata	3.030303	0.518135	1.077586	4.626024
	Avena barbata	3.030303	10.36269	13.46983	26.86282
	Bassia europhoria	3.030303	3.108808	5.387931	11.52704
	Calandula arvensis	6.060606	2.072539	1.885776	10.01892
	Carduus pycnocephalus	3.030303	0.518135	0.538793	4.087231
	Centaurea bruguierana	3.030303	1.554404	2.693966	7.278673
	Chrozophora tinctoria	6.060606	2.072539	1.346983	9.480128
	Erodium laciniatum	3.030303	1.036269	1.077586	5.144159
	Filago pyramidata	3.030303	2.590674	4.310345	9.931321
	Heliotropium europium	3.030303	1.554404	8.081897	12.6666
	Hippocrepis unisiliqusa	3.030303	5.181347	8.081897	16.29355
	Hordium glaucum	9.090909	8.290155	3.93319	21.31425
	Lotus halophilus	6.060606	3.626943	2.693966	12.38151
	Medicago laciniata	3.030303	2.072539	4.310345	9.413187
	Onobrychis grista-galli	3.030303	0.518135	1.077586	4.626024
	Orabanche cernua	3.030303	2.072539	5.387931	10.49077
	Plantagp boisseri	9.090909	17.09845	7.165948	33.3553
	Schismus barbatus	6.060606	12.95337	7.273707	26.28768
	Senecio desfontanii	3.030303	0.518135	1.077586	4.626024
	Stipa capensis	6.060606	3.626943	1.885776	11.57332
	Trigonella stelata	3.030303	1.036269	1.077586	5.144159
	Vicia monantha	3.030303	15.54404	13.46983	32.04417
Station 2	*Asphodelous tounifolius*	15.38462	8.290155	4.17204	27.84681
	Astragalus annularis	3.846154	1.036269	3.792763	8.675187
	Cakile Arabica	3.846154	1.036269	6.068421	10.95084
	Cutandia memphitica	3.846154	5.181347	5.309869	14.33737
	Fagonia bruguieri	3.846154	1.036269	3.034211	7.916634
	Hamada salicornica	3.846154	1.554404	22.75658	28.15714
	Lotus haplophilus	11.53846	19.68912	10.11151	41.33909
	Malcolmia grandiflora	3.846154	3.626943	7.585527	15.05862
	Malva parviflora	3.846154	1.554404	3.792763	9.193321
	Matthiola longipetala	3.846154	2.590674	7.585527	14.02235
	Neurada procumbens	3.846154	1.036269	7.585527	12.46795
	Pennisetum divisum	3.846154	1.554404	2.275658	7.676216
	Plantagp boisseri	19.23077	48.18653	12.8954	80.31269
	Reseda Arabica	15.38462	3.626943	3.034211	22.04577

Results and Discussion

A total of 127 species belong to 101 genera and 37 families of vascular plants were recorded from various places of Chilat in spring 2016. *Ephedra foliata* was the only Gymnospermae species found in our area. It is a climbing switch plant always associated with *Ziziphus nummularia*.The largest family in number of species was Fabaceae with 19 species , Asteraceae with 18 species and poaceae with 18 species , while the most diverse family in number of genera was the Asteraceae with 17 genera. The number of species in the two stations studied was nearly unequal with 97 species in station 1 and 85 in station 2 and they are differ in their biodiversity.Fifty five species were shared between the two stations reselting in 40-60 percent similarity on sorenson's and Jaccard's indices respectively .

Species Richness

Species richness in both stations varies monthly and seasonally depending on the temperature suitability and the rainfall amount, the number of species recorded in January (winter) was 63 species rising gradually to become

79 species in February reaching its highest level 105 species in March then declined with the rising of temperature to 76 in April and then to nearly all annuals disappear in the summer season .

Life Forms

Life form of all species recorded in Chilat are shown in Fig.4 . The annuals or therophytes constituted 85 species of herbs and grasses .The annual herbs represented 57% while annual grasses represented 10% , followed by shrublets constitute 9 species about 7% of the total species recorded in the area .Other life forms record were perennial herbs 5% also subshrubs 5% , perennial grasses 4%, parasite 3% ,each of shrubs, shrubs(switch) and big shrubs were about 2% , and also each of tree, bulb and sedge were about 1% .

Plant Biodiversity

According to Shannon-Weiner index as shown in table 2 and Fig.2 , the highest value of biodiversity was in station 1 in March and the lowest value was in station 2 in February but the mean value of the biodiversity in spring in Chilat was 2.07, but according to Simpson index the highest value of biodiversity was in March and April in station 1 and 2 respectively and the lowest value was in February in station 2 , but the mean value of biodiversity for Chilat in spring was 0.194 ,that means the plant biodiversity in whole Chilat for 2016 was rich.

The Dominant Species

Table 3 shows the important value index based on relative frequency , relative density , and relative cover for some common species during spring 2016 in Chilat . It is clear that *Plantago boisseri* has IVI 80.31 in station 2 and 33.36 in station 1 followed by *Lotus halophilus* 41 IVI in station 2 , followed by *Vicia monantha* 32 IVI in station 1.The big shrub *Ziziphus nummularia* forms the most dominant and important community in the whole area . *Ephedra foliata , Periploca aphylla , Capparis spinosa , Malva parviflora , Cynodon dactylon and Phalaris minor* are the most common associated species to *Ziziphus nummularia* . Other dominant perennial species forming obvious characteristic physiognomic feature were *Hamada salicornica* in both stations , and *Artemisia herba-alba , Pennisetum divisum and Cornulaca monocantha* in station 2.

Our results as shown in table 1 revealed that the vascular flora of Chilat consists of 127 species, 101 genera and 37 families. About more than fifty percent of the species belong to only six rich families , these families were Fabaceae(Leguminosae)with 19 sp., Asteraceae(Compositae) with 18 sp., Poaceae (Graminae) with 18 sp., Chenopodiaceae with 8 sp,. Brassicaceae(Cruciferae) with 7 sp,. and Boraginaceae with 6 sp. These families represent the biggest and most common families in Iraq as well as in the south west Asia fig. 3 . On the other hand, Asteraceae, Poaceae, Fabaceae and Brassicaceae constitute the main alien Plant species in our Area, the same has been found in Egypt as mentioned Abd El-Ghani and Abdel Khalik(2006). Asteraceae which is considered the largest family in term of genera (with 17 genera in our area) is considered also the largest family in the world with 25000 sp., 1600 genera (Heywood *et al*. 2007) . The wide spread of this family may be due to their high seed dispersal capability and wide range of ecological tolerance. According to Guest(1966) the area under study lies in the middle Saharo Arabian sub-region and the climate in this sub-region characterized by mild winter and a very hot and dry summer with a low mean average annual rainfall often about 150-200 mm.The higher cover percent of species were the therophytes (annuals) 70% followed by the chamaephytes (perennial shrubs), 18% . The variation in frequency, abundance and density between species may be due to habitat differences and regeneration conditions. As (Ashraf *et al.* 2009) believe.

The results of vegetation patterns and species richness show that there is a considerable differences between the species composition in the two stations studied . Station 1 charactrized by the presence of a tree *Populus euphratica* (a riverine plant) and the annual herb *Chrozophora tinctoria* in a wet places in depressions and station 2 by the occurrence of the perennial grass *Pennisetum divisum* and the perennial shrublet *Artemisia herba-alba*. The number of species recorded in each station is nearly unequal 97 in station 1 and 85 in station 2 and the similarity between the two stations according to Sorenson's index was 40% this may be due to the differenences in the availability of the amount of soil moisture and the edaphic characteristics of both stations, where the soil is sandy-clay in station 1 and sandy or sandy –gravely in station 2 same case has been found by (Malih, 2016) and (Al-Mayah *et al.* 2016).

The low value of plant biodiversity according to Simpson index 0.194 (table 2, Fig.2B) indicates that the vegetation in Chilat in spring 2016 is in a healthy condition with a high species diversity and abundance in comparision with other adjacent places with different adaphic conditions such as Eastern alluvial district which has a saline clay soil . *Plantago boisseri* which has the highest important value index (IVI) 80.31 forms the commonest and more abundance annual grazing species . *Ziziphus nummularia* which forms a leading and dominant tree like species in an obvious, widespread and characteristic community for the study area may indicate that this area including Wadi Tib may be the center of distribution of this species , and expunded westwardly to the southern desert of Iraq and also it may be the origin of the common *Z. spina-christi* in Iraq .

The various plant life forms recorded in Chilat (table 1) such as annual e.g. *Plantago* spp., *Anisosciadium lanatum* and *Medicago* spp. which have a short existence in spring and then survive the season of drought as seeds may be may be because of a mechanism of adaptation to face the dry and hot desert conditions such cases

emphasized by many authors Guest (1966), Thalin (2012), Malih(2016), while the persistent perennials such as *Artemisia herba-alba* , *Pennisetum divisum* and *Hamada salicornica* may need to have a different edaphic and environmental conditions .

The only endemic species recorded in this area , *Eremurus rechingeri* Wend., was mentioned by Rechinger (1964), Townsend & Guest(1985), Nature Iraq(s 2017). However the species was collected only once some 60 years ago and it was not confirmed in this study.

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