

Floristic Composition of the Plants of the Cholistan Desert, Pakistan

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ABSTRACT

A floristic survey of Cholistan desert was carried out during 2009-2011 and total of 38 families, 106 genera and 154 species were documented from the area. Among families, 33 families belong to Dicotyledons of 79 genera and 115 species, while the 38 species of 26 genera belong to 4 families of Monocotyledons and 1 family of gymnosperms with 1 genus and 1 species. The largest family was Poaceae with 34 species followed by Papilionaceae and Zygophyllaceae with 10 species while Asteraceae with 9 species respectively. The life form of plant species was determined by following the Raunkier's method. Therophytes comprised of 74 species (48%), Chamaephyte 40 species (26%), Hemicryptophyte 18 species (12%), Phanerophyte 19 species (12%) and Cryptophyte 3 species (2%) of the flora of the area. It will be helpful and serve for the conservation and sustainable utilization of plant resources of the study area.

Keywords: Floristic Composition; Life Form; Habit; Cholistan Desert; Pakistan

1. Introduction

The Cholistan desert covering an area of 26,000 km², lies within South of Bahawalpur in the Punjab extending through the Nara and Thar deserts of Sindh between 27°42'N and 29°45'N latitude and 69°52'E and 75°24'E longitude (**Figure 1**) [1] at an altitude of about 112 m above sea level [2].

Historically, the Cholistan desert was a cradle of Hakra River Civilization which flowed through the area during 1200 BC regularly and became irregular about 600 BC. Cholistan received heavy monsoon downpours along with the Indus valley civilization including Mohenjo Daro and Harappa of world's oldest civilization about 5000 years ago. Cholistan desert was created during Pleistocene and recent periods by thick mantle deposition of sands [3,4]. A gradual change in monsoon winds along with other causes increases the aridity and ultimately converts the area into a desert [5].

The climate of the Cholistan desert is sub-tropical, arid and semi-arid, scorching harsh, with monsoon rainfall influenced by periodic long droughts. The relative humidity is very low with high rate of evaporation [6]. The

mean annual rainfall varies between 100 mm to 250 mm. The mean summer temperature is 34°C - 38°C, and the winter temperature is 15°C - 20°C with highest temperature reaching over 51.6°C [7]. Topographically, the area can be divided into two geomorphic regions based on parent material, soil and vegetation. The northern region which constitutes the desert margins adjoining with canal irrigated areas covers about 7770 km² known as Lesser Cholistan. The wind resorted sandy desert covers about 18,130 km² in the southern region known as Greater Cholistan [8-10].

The soil of the Cholistan desert is very poor in having organic matters. The pH ranges between 8.6 and 10.0 saline and saline-sodic respectively. In Cholistan desert, two sources of water, one is rainfall and other is sub-soil water. Rain water is collected in "Tobas" man-made ponds or natural depression. The second source of water is underground water at the depth of 30 to 90 m. It is brackish and not fit for drinking and agriculture because it contains total dissolved salts about 9000 - 27,000 ppm mg/L [11]. The vegetation of Cholistan desert comprises of xerophytic species adapted to wide range of severe temperature, moisture and edaphic conditions. The dis-

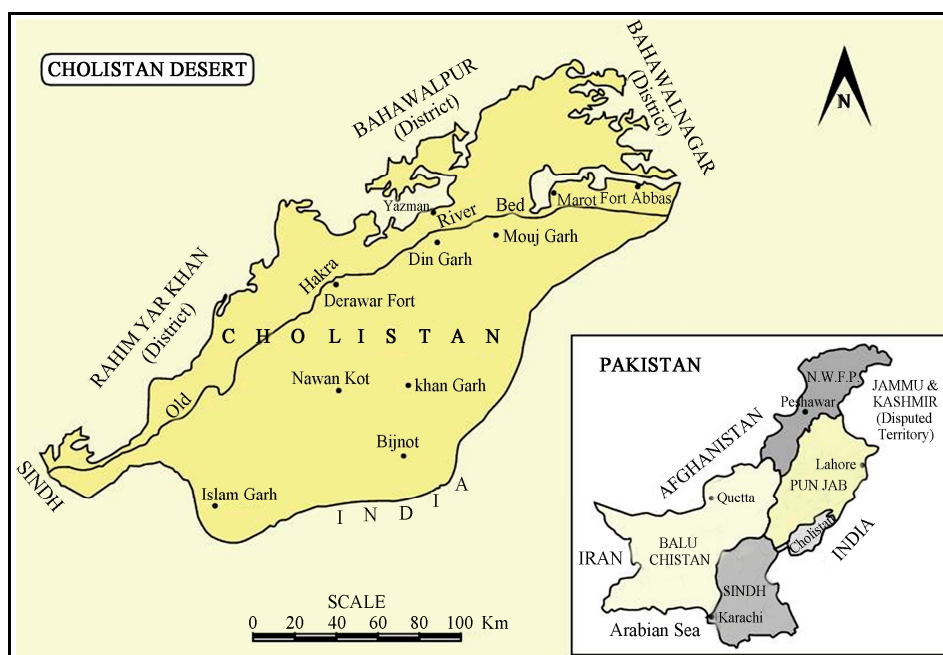


Figure 1. Location map of the Cholistan desert.

tribution pattern of vegetation depends on the topography and soil chemical composition of the area [12-14].

The local plants identification and introduction of an area is very important to introduce the specific species of the local area and their occurrence, growing season, finding new species and the effect of climatic conditions like drought and over-grazing on vegetation [10,15]. Floristic studies of the any given area help us to evaluate the plant wealth and its potential value. Many workers have contributed to floristic studies of different regions include Rigamoto & Tyagi [16], Balos & Akan [17], Qureshi & Bhatti [18], Abdullahi *et al.*, [19], Jabeen *et al.*, [20], Marwat *et al.*, [21], Fazal *et al.*, [22], Shaheen & Qureshi [23], Udayakumar *et al.*, [24], Qin *et al.*, [25], Saeed *et al.*, [26] and Youcef *et al.*, [27]. Related works from adjoining areas include Baig *et al.*, [28], Arshad & Rao [29] Hameed *et al.* [30] Arshad *et al.*, [31] and Wariss [32].

Because of the diverse topographic features and microhabitats, the study area had a great potential for flourishing a rich plant biodiversity. Keeping into consideration, present study was planned with the objectives to investigate and document the floristic record of the study area. It will be helpful and serve for the conservation and sustainable utilization of plant resources of the area.

2. Materials and Methods

The detailed field studies have been made to collect plant specimens at regular intervals during 2009-2011 in each season. During field visits, 5 plants of each species have been collected, dried and mounted on standard herbarium sheets. The life form of all plants determined and plants

classified followed after Raunkiaer [33] and Mueller-Dombois, & Ellenberg [34]. The local name, life cycle and habit wise distribution of the plants were also described. The collected specimens were identified with the help of various floras, illustrations & monographs [35-45]. The voucher specimens were deposited in the herbarium of Cholistan Institute of Desert Studies, The Islamia University of Bahawalpur.

3. Results and Discussion

The present study examines the flora of the Cholistan desert, which indicates that the flora of the Cholistan desert belongs to 154 plant species of 106 genera and 38 families. Among the existing families, 33 families are dicotyledons, 4 families of monocotyledons and 1 family of gymnosperms (**Table 1**). The largest family of the area is Poaceae with 34 species. Papilionaceae and Zygophyllaceae are with 10 species. Asteraceae is present with 9 species. Aizoaceae, Cappariaceae, and Chenopodiaceae are represented with 6 species each. Asclepiadaceae, Amaranthaceae and Solanaceae are represented with 5 species. The families with 4 species are Boraginaceae, Convolvulaceae, Cucurbitaceae, Euphorbiaceae and Mimosaceae. Brassicaceae, Cyperaceae, Molluginaceae, Nyctaginaceae, Polygonaceae and Rhamnaceae have 3 species each. Malvaceae, Portulacaceae, Tamaricaceae and Tiliaceae are represented by 2 species. The rest of thirteen families are represented with one species.

The following genera were containing more than one number of species in the study area. The Genus *Cenchrus* and *Eragrostis* were with 4 species. *Aristida*, *Boerhavia*,

Table 1. List of plant species of Cholistan desert.

Families	Species	Local Name	Life form	Habit	Life Cycle
1) Aizoaceae	<i>Gisekia pharnaceoides</i> Linn.	Baluka Sag	Therophyte	Herb	Annual
	<i>Limeum indicum</i> Stocks. ex. T. Anderson	-	Therophyte	Herb	Annual
	<i>Sesuvium sesuvioides</i> (Fenzl.) Verdc.	Barri Ulwaiti	Therophyte	Herb	Annual
	<i>Trianthema portulacastrum</i> Linn.	Wisah	Therophyte	Herb	Annual
	<i>Trianthema triquetra</i> Rottler. ex. Willd	Choti Ulwaiti	Therophyte	Herb	Annual
	<i>Zaleya pentandra</i> Linn.	Itsit, Wisah	Chamaephyte	Herb	Perennial
2) Amaranthaceae	<i>Aerva javanica</i> (Burm. f.) Juss. ex J.A. Schultes, var. <i>bovei</i> Webb	Bui	Chamaephyte	Subshrub	Perennial
	<i>Aerva javanica</i> (Burm. f.) Juss. ex J.A. Schultes, var. <i>javanica</i>	Bui	Chamaephyte	Subshrub	Perennial
	<i>Amaranthus graecizans</i> subsp. <i>thellungianus</i> (Nevski) Gusev	-	Therophyte	Herb	Annual
	<i>Amaranthus viridis</i> Linn.	-	Therophyte	Herb	Annual
	<i>Digera muricata</i> (L.) Mart.	Tandla, Tandula	Therophyte	Herb	Annual
3) Asclepiadaceae	<i>Calotropis procera</i> subsp. <i>hamiltonii</i> (Wight) Ali	Ak	Phanerophyte	Shrub	Perennial
	<i>Caralluma edulis</i> (Edgew.) Hook. f.	Seetu, Pippun	Therophyte	Herb	Perennial
	<i>Leptadenia pyrotechnica</i> (Forssk.) Decne	Khip	Phanerophyte	Shrub	Perennial
	<i>Oxystelma esculentum</i> (Linn. f.) R. Brown	Dudhani	Chamaephyte	Climber	Perennial
	<i>Pentatropis spiralis</i> (Forssk.) Decne.	-	Phanerophyte	Climber	Perennial
4) Asphodelaceae	<i>Asphodelus tenuifolius</i> Cav.	Piazi	Therophyte	Herb	Annual
5) Asteraceae	<i>Echinops echinatus</i> Roxb.	Unt katar	Chamaephyte	Herb	Perennial
	<i>Eclipta alba</i> Hassk.	Bhangra	Chamaephyte	Herb	Perennial
	<i>Gnaphalium luteo-album</i> Linn.	-	Therophyte	Herb	Annual
	<i>Launaea capitata</i> (Spreng.) Dandy	-	Therophyte	Herb	Annual
	<i>Launaea nudicaulis</i> Less.	Bhattal, Dudhkal	Chamaephyte	Herb	Perennial
	<i>Launaea resedifolia</i> (Linn.) O. Kuntz.	-	Therophyte	Herb	Annual
	<i>Oligochaeta ramosa</i> (Roxb.) Magenitz.	Barim Dandi	Chamaephyte	Herb	Perennial
	<i>Pulicaria crispa</i> (Cass.) Benth. & Hook. f.	Bui	Chamaephyte	Subshrub	Perennial
	<i>Xanthium strumarium</i> Linn.	-	Chamaephyte	Shrub	Annual
6) Boraginaceae	<i>Arnebia hispidissima</i> (Lehm.) A. DC.	-	Therophyte	Herb	Annual
	<i>Heliotropium crispum</i> Desf.	Kali Bui	Chamaephyte	Subshrub	Perennial
	<i>Heliotropium europaeum</i> Linn. var. <i>lasiocarpum</i> (F. & M.) Kazmi	-	Therophyte	Subshrub	Annual
	<i>Heliotropium strigosum</i> Willd. subsp. <i>Strigosum</i>	Gorakh Pan	Therophyte	Herb	Perennial
7) Brassicaceae	<i>Farsetia hamiltonii</i> Royle	Fareed Buti	Chamaephyte	Shrub	Perennial
	<i>Farsetia jacquemontii</i> Hook.f. & Thoms. subsp. <i>jacquemontii</i>	Fareed Buti	Chamaephyte	Shrub	Annual
	<i>Malcolmia africana</i> (Linn.) R. Br. var. <i>Africana</i>	--	Therophyte-	Herb	Annual
8) Caesalpinaceae	<i>Cassia italica</i> (Mill.) F.W.Andr. subsp. <i>italica</i>	Deasi Sana	Therophyte	Shrub	Annual
9) Cappariaceae	<i>Capparis decidua</i> (Forsskal.) Edgew.	Karir	Phanerophyte	Tree	Perennial
	<i>Capparis spinosa</i> Linn.	Kubber	Chamaephyte	Shrub	Perennial
	<i>Cleome brachycarpa</i> Vahl. ex. DC.	Noli, Kastoori	Therophyte	Herb	Perennial
	<i>Cleome scaposa</i> DC.	Noli, Kastoori	Therophyte	Herb	Annual
	<i>Cleome viscosa</i> Linn.	-	Therophyte	Herb	Annual
<i>Dipterygium glaucum</i> Decne.	Fehl	Chamaephyte	Subshrub	Perennial	
10) Caryophyllaceae	<i>Spergularia marina</i> (Linn.) Griseb.	-	Therophyte	Herb	Annual

Continued

11) Chenopodiaceae	<i>Chenopodium album</i> Linn.	Bathu	Therophyte	Herb	Annual
	<i>Chenopodium murale</i> Linn.	-	Therophyte	Herb	Annual
	<i>Haloxylon salicornicum</i> (Moq.) Bunge.	Lana	Chamaephyte	Shrub	Perennial
	<i>Haloxylon stocksii</i> (Boiss.) Benth. & Hook.	Khar, Sajji	Chamaephyte	Shrub	Perennial
	<i>Salsola imbricata</i> Forssk. var. <i>imbricata</i>	Lani	Chamaephyte	Shrub	Perennial
	<i>Suaeda fruticosa</i> Forssk. ex J. F. Gmelin	Kali Lani	Chamaephyte	Shrub	Perennial
12) Convolvulaceae	<i>Convolvulus prostratus</i> Forssk.	Hiran Buti	Hemicryptophyte	Herb	Perennial
	<i>Convolvulus scindicus</i> Stocks.	Hiran Buti	Hemicryptophyte	Herb	Perennial
	<i>Convolvulus stocksii</i> Boiss.	Hiran Buti	Hemicryptophyte	Herb	Perennial
	<i>Cressa cretica</i> Linn.	Oin	Chamaephyte	Herb	Perennial
13) Cucurbitaceae	<i>Citrullus colocynthis</i> (Linn.) Schrad.	Kor Tumma	Hemicryptophyte	Herb	Perennial
	<i>Cucumis melo</i> var. <i>agrestis</i> Naudin	Chibbar	Therophyte	Herb	Annual
	<i>Mukia maderaspatana</i> (Linn.) M.J. Roem.	Gwala Kakri	Hemicryptophyte	Climber	Perennial
	<i>Praecitrullus fistulosus</i> (Stocks) Pangalo	Jangli Tindy	Hemicryptophyte	Herb	Perennial
14) Cyperaceae	<i>Cyperus conglomeratus</i> Rottb. subsp. <i>conglomeratus</i> Kukkonen	Monghan	Cryptophyte	Sedge	Perennial
	<i>Cyperus rotundus</i> Linn.	Deela	Cryptophyte	Sedge	Perennial
15) Ephedraceae	<i>Ephedra ciliata</i> Fisch. & Mey. ex C. A. Meyer	Phog	Phanerophyte	Shrub	Perennial
16) Euphorbiaceae	<i>Chrozophora sabulosa</i> Kar. & Kir.	Nilkari	Chamaephyte	Herb	Annual
	<i>Euphorbia granulata</i> Forssk.	Hazar Dani	Therophyte	Herb	Annual
	<i>Euphorbia indica</i> Lam.	-	Therophyte	Herb	Annual
	<i>Euphorbia prostrata</i> Ait.	Hazar Dani	Therophyte	Herb	Annual
17) Malvaceae	<i>Abutilon indicum</i> (Linn.) Sweet,	Gidarwar	Phanerophyte	Shrub	Perennial
	<i>Abutilon muticum</i> (Del.ex DC.) Sweet	Gidarwar	Phanerophyte	Shrub	Perennial
18) Mimosaceae	<i>Acacia jacquemontii</i> Benth.	Banwali	Phanerophyte	Tree	Perennial
	<i>Acacia nilotica</i> (Linn.) Delile	Kikar	Phanerophyte	Tree	Perennial
	<i>Prosopis cineraria</i> (Linn.) Druce	Jand, Jandi	Phanerophyte	Tree	Perennial
	<i>Prosopis juliflora</i> (Swartz) DC.	Maskit	Phanerophyte	Tree	Perennial
19) Molluginaceae	<i>Glinus lotoides</i> Linn.	Phatokar	Therophyte	Herb	Annual
	<i>Mollugo cerviana</i> (L.) Seringe	Padi	Therophyte	Herb	Annual
	<i>Mollugo nudicaulis</i> Lamk.	-	Therophyte	Herb	Annual
20) Neuradaceae	<i>Neurada procumbens</i> Linn.	Chappari	Therophyte	Herb	Annual
21) Nyctaginaceae	<i>Boerhavia procumbens</i> Banks ex Roxb.	Bishkhira	Chamaephyte	Herb	Perennial
	<i>Boerhavia repens</i> Linn.	-	Chamaephyte	Herb	Perennial
	<i>Boerhavia rubicunda</i> Steud.	-	Therophyte	Herb	Annual
22) Orobanchaceae	<i>Cistanche tubulosa</i> (Schrenk) Hook. f.	Phaphorr	Parasite	Herb	Annual
23) Oxalidaceae	<i>Oxalis corniculata</i> L.	Khatti buti	Therophyte	Herb	Annual
24) Papilionaceae	<i>Alhagi maurorum</i> Medic	Jawahan	Chamaephyte	Shrub	Perennial
	<i>Atylosia platycarpa</i> Benth.	-	Therophyte	Subshrub	Perennial
	<i>Crotalaria burhia</i> Buch.-Ham. ex Benth.	Chag	Chamaephyte	Shrub	Perennial
	<i>Indigofera argentea</i> Burm. f.	-	Therophyte	Herb	Annual
	<i>Indigofera hochstetteri</i> Baker	-	Therophyte	Herb	Annual
	<i>Indigofera sessiliflora</i> DC.	-	Therophyte	Herb	Annual
	<i>Melilotus officinalis</i> (Linn.) Pall.	Sinji	Therophyte	Herb	Annual
	<i>Rhynchosia capitata</i> (Heyne ex Roth) DC.	-	Therophyte	Herb	Annual
	<i>Sesbania bispinosa</i> (Jacq.) W.F. Wight	Jintar	Phanerophyte	Shrub	Annual
	<i>Tephrosia purpurea</i> (Linn.) Pers.	Jhill	Chamaephyte	Shrub	Annual

Continued

	<i>Aeluropus lagopoides</i> (Linn.) Trin. ex Thw.	-	Hemicryptophyte	Grass	Perennial
	<i>Aristida adscensionis</i> Linn.	Lumb	Therophyte	Grass	Annual
	<i>Aristida funiculata</i> Trin. & Rupr.	Lumb	Therophyte	Grass	Annual
	<i>Aristida hystricula</i> Edgew.	Lumb	Therophyte	Grass	Annual
	<i>Brachiaria ramosa</i> (Linn.) Stapf	Lumb	Therophyte	Grass	Annual
	<i>Cenchrus biflorus</i> Roxb.	Bhurrat	Therophyte	Grass	Annual
	<i>Cenchrus ciliaris</i> Linn.	Dhaman	Hemicryptophyte	Grass	Perennial
	<i>Cenchrus prieurii</i> (Kunth) Maire	Dhaman	Therophyte	Grass	Annual
	<i>Cenchrus setigerus</i> Vahl.	Dhaman	Hemicryptophyte	Grass	Perennial
	<i>Cymbopogon jwarancusa</i> (Jones) Schult.	Khavi, Kittran	Hemicryptophyte	Grass	Perennial
	<i>Cynodon dactylon</i> (Linn.) Pers.	Khabbar, Talla	Hemicryptophyte	Grass	Perennial
	<i>Dactyloctenium aegyptium</i> (Linn.) Willd.	Gandhala Ghaa	Therophyte	Grass	Annual
	<i>Dichanthium annulatum</i> (Forssk.) Stapf	-	Chamaephyte	Grass	Perennial
	<i>Digitaria sanguinalis</i> (Linn.) Scop.	-	Hemicryptophyte	Grass	Perennial
	<i>Echinochloa colona</i> (Linn.) Link	Sanawakri	Therophyte	Grass	Annual
	<i>Eragrostis barrelieri</i> Day.	-	Therophyte	Grass	Annual
25) Poaceae	<i>Eragrostis ciliaris</i> (Linn.) R. Br.	-	Therophyte	Grass	Annual
	<i>Eragrostis japonica</i> (Thunb.) Trin.	-	Therophyte	Grass	Annual
	<i>Eragrostis minor</i> Host	-	Therophyte	Grass	Annual
	<i>Lasiurus scindicus</i> Henr.	Sewan, Ghorka	Hemicryptophyte	Grass	Perennial
	<i>Leptothrium senegalense</i> (Kunth) W.D.	-	Therophyte	Grass	Annual
	<i>Ochthochloa compressa</i> (Forssk.) Hilu	Chimber	Hemicryptophyte	Grass	Perennial
	<i>Panicum antidotale</i> Retz.	Murrot, Bansi	Hemicryptophyte	Grass	Perennial
	<i>Panicum turgidum</i> Forssk.	Murrot	Hemicryptophyte	Grass	Perennial
	<i>Pennisetum divisum</i> (Gmel.) Henr.	-	Hemicryptophyte	Grass	Perennial
	<i>Phalaris minor</i> Retz.	-	Therophyte	Grass	Annual
	<i>Polypogon monspeliensis</i> (Linn.) Desf.	Dumbi citi	Therophyte	Grass	Annual
	<i>Saccharum bengalense</i> Retz.	Sarkanda, Kany	Chamaephyte	Grass	Perennial
	<i>Sacharum spontaneum</i> Linn.	Sachi Sir	Chamaephyte	Grass	Perennial
	<i>Schoenefeldia gracilis</i> Kunth.	-	Therophyte	Grass	Annual
	<i>Sporobolus ioclados</i> (Nees ex Trin.) Nees	-	Hemicryptophyte	Grass	Perennial
	<i>Stipagrostis plumosa</i> (Linn.) Munro ex T. Anders.	-	Therophyte	Grass	Annual
	<i>Tragus berteronianus</i> Schult.	-	Therophyte	Grass	Annual
	<i>Tragus roxburghii</i> Panigrahi	-	Therophyte	Grass	Annual
26) Polygalaceae	<i>Polygala erioptera</i> DC.	-	Therophyte	Herb	Annual
27) Polygonaceae	<i>Calligonum polygonoides</i> Linn	Phog	Phanerophyte	Shrub	Perennial
	<i>Polygonum plebejum</i> R. Br.	Charri Hatha	Therophyte	Herb	Annual
	<i>Rumex dentatus</i> Linn. subsp. <i>klotzschianus</i> (Meisn.) Rech. f.	-	Therophyte	Herb	Annual
28) Portulacaceae	<i>Portulaca oleracea</i> Linn.	Lonak	Therophyte	Herb	Annual
	<i>Portulaca quadrifida</i> Linn.	Lonak	Therophyte	Herb	Annual
29) Resedaceae	<i>Oligomeris linifolia</i> (Vahl.) Macbride	-	Therophyte	Herb	Annual
30) Rhamnaceae	<i>Zizyphus mauritiana</i> Lam.	Beri	Phanerophyte	Tree	Perennial
	<i>Zizyphus nummularia</i> (Burm. f.) Wight & Arn.	Beri, Beri	Phanerophyte	Tree	Perennial
	<i>Zizyphus spina-christi</i> (Linn.) Willd.	Beri	Phanerophyte	Tree	Perennial
31) Rosaceae	<i>Potentilla heyneii</i> Roth	-	Therophyte	Herb	Annual
32) Salvadoraceae	<i>Salvadora oleoides</i> Decne.	Jal, Pilu, Wan	Phanerophyte	Tree	Perennial
33) Scrophulariaceae	<i>Anticharis linearis</i> (Benth.) Hochst. ex Aschers.	-	Therophyte	Herb	Annual
34) Solanaceae	<i>Nicotiana plumbaginifolia</i> Viv.	-	Therophyte	Herb	Annual
	<i>Physalis divaricata</i> D. Don	Mamooly	Therophyte	Herb	Annual
	<i>Solanum surattense</i> Burm. f.	Kandiari	Chamaephyte	Herb	Perennial
	<i>Withania coagulens</i> (Stocks) Dunal	Paneer	Chamaephyte	Shrub	Perennial
	<i>Withania somnifera</i> (Linn.) Dunal	Aksen	Chamaephyte	Shrub	Perennial
35) Tamaricaceae	<i>Tamarix aphylla</i> (Linn.) Karst.	Ukhan, Moora	Phanerophyte	Tree	Perennial
	<i>Tamarix dioica</i> Roxb. ex Roch	Lai	Phanerophyte	Shrub	Perennial

Continued

36) Tiliaceae	<i>Corchorus depressus</i> (Linn.) Stocks	Bao Phali	Chamaephyte	Herb	Perennial
	<i>Corchorus tridens</i> Linn.	-	Therophyte	Herb	Annual
37) Typhaceae	<i>Typha domingensis</i> Pers.	Kundir	Cryptophyte	Herb	Perennial
	<i>Fagonia bruguieri</i> var. <i>laxa</i> Boiss.	Dhman	Chamaephyte	Subshrub	Perennial
	<i>Fagonia indica</i> Burm. f.	Dhman	Chamaephyte	Subshrub	Perennial
	<i>Fagonia indica</i> Burm. f. var. <i>schweinfurthii</i> Hadidi	Dhman	Chamaephyte	Subshrub	Perennial
	<i>Peganum harmala</i> Linn.	Harmal	Chamaephyte	Herb	Perennial
	<i>Seetzenia lanata</i> (Willd.) Bullock	-	Chamaephyte	Herb	Perennial
38) Zygophyllaceae	<i>Tribulus longipetalus</i> Viv. subsp. <i>longipetalus</i>	Bhakhra	Chamaephyte	Herb	Perennial
	<i>Tribulus longipetalus</i> Viv. subsp. <i>macropterus</i> (Boiss.) Maire ex Ozenda & Quezel	Bhakhra	Chamaephyte	Herb	Perennial
	<i>Tribulus ochroleucus</i> (Maire) Ozenda & Quezel	-	-	-	-
	<i>Tribulus ochroleucus</i> (Maire) Ozenda & Quezel	Bhakhra	Therophyte	Herb	Annual
	<i>Tribulus terrestris</i> Linn.	Bhakhra	Therophyte	Herb	Annual
	<i>Zygophyllum simplex</i> Linn.	Alethi, Lonak	Therophyte	Herb	Annual

Table 2. Species total of the largest genera.

No.	Genus	No. of Species	No.	Genus	No. of Species
1	<i>Cenchrus</i>	4	16	<i>Capparis</i>	2
2	<i>Eragrostis</i>	4	17	<i>Chenopodium</i>	2
3	<i>Aristida</i>	3	18	<i>Corchorus</i>	2
4	<i>Boerhavia</i>	3	19	<i>Cyperus</i>	2
5	<i>Cleome</i>	3	20	<i>Farsetia</i>	2
6	<i>Convolvulus</i>	3	21	<i>Haloxylon</i>	2
7	<i>Euphorbia</i>	3	22	<i>Mollugo</i>	2
8	<i>Fagonia</i>	3	23	<i>Panicum</i>	2
9	<i>Launaea</i>	3	24	<i>Portulaca</i>	2
10	<i>Heliotropium</i>	3	25	<i>Prosopis</i>	2
11	<i>Indigofera</i>	3	26	<i>Saccharum</i>	2
12	<i>Tribulus</i>	3	27	<i>Tamarix</i>	2
13	<i>Abutilon</i>	2	28	<i>Tragus</i>	2
14	<i>Acacia</i>	2	29	<i>Trianthema</i>	2
15	<i>Amaranthus</i>	2	-	-	-

Cleome, *Convolvulus*, *Euphorbia*, *Fagonia*, *Launaea*, *Heliotropium*, *Indigofera*, *Tribulus* and *Zizyphus* each were with 3 species. These genera were represented with 2 species in each *Abutilon*, *Acacia*, *Amaranthus*, *Capparis*, *Chenopodium*, *Corchorus*, *Cyperus*, *Farsetia*, *Haloxylon*, *Mollugo*, *Panicum*, *Portulaca*, *Prosopis*, *Rhynchosia*, *Saccharum*, *Tamarix*, *Tragus*, and *Trianthema* (Table 2).

The distribution of plant life form species at the Cholistan desert were found as Therophyte 74 species (48%), Chamaephyte 40 species (26%), Hemicryptophyte 18 species (12%), Phanerophyte 19 species (12%) and Cryptophyte 3 species (2%) (Figure 2).

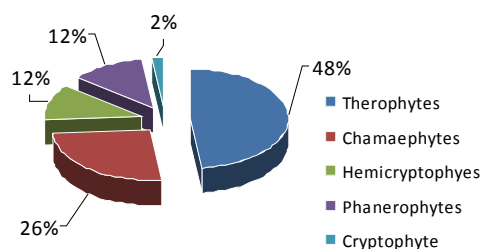


Figure 2. Life form distribution of plant species of Cholistan desert.

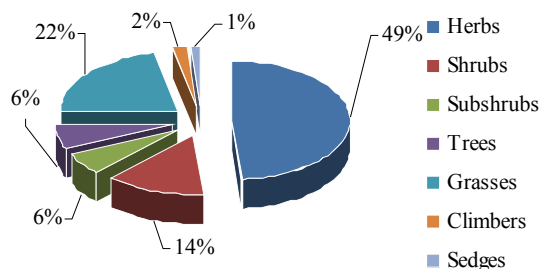


Figure 3. Habit-wise distribution of plant species of Cholistan Desert.

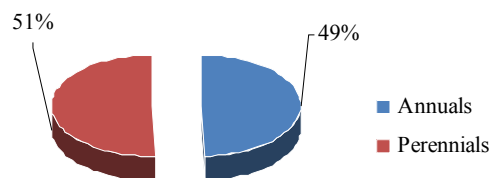


Figure 4. Graphical representation of life cycle of plant species of Cholistan desert.

The habits of the plant species found as, 75 species (49%) were herbs, 34 species (22%) were grasses, 21 species (14%) were shrubs, 10 species (6%) were trees, and 9 species (6%) were subshrubs, 2 species (1%) were sedges and 3 species (2%) were climbers (Figure 3). The life span or life cycle distribution of the plant species in the study area were represented by 79 species (51%) perennials and 75 (49%) annual species (Figure 4).

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