Floristic diversity of Lawder District, Abyan Governorate, Yemen

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Abstract

The present study provides a detailed depiction of the floristic composition of Lawder District which located in the Centre of Abyan between longitudinal range 45º 20¯ to 45º 50¯ E and latitudinal range 13º 00¯ to 14º 00¯ N, with and altitudinal range of 1000 masl to 2500masl. This work was carried out to identify the floristic composition in Lawder District. The floristic study of Lawder District indicated the presence of 243 species belonging to 154 genera and 58 families. The major families based on the number of species were Euphorbiaceae, Apocynaceae, Asteraceae, Poaceae, Fabaceae, Solanaceae, Capparaceae and Boraginaceous, The biological spectrum explains that Chamephytes (35.80%), were the dominant, followed by Therophytes (25.52%, Hemicryptophytes (20.16%), Phanerophytes (14.40 %), Geophytes (2.06%), parasite (1.65 %), and Epiphytes (0.41`%). The dominance of Chamaephytes and Therophytes reveals a thero-chamaephytic phytoclimate for the investigated area.

The number of species was higher in the Herbs, which was represented by 52.27% of species, followed by the Shrubs 30.45%, Trees were represented by 13.17%, Lianas were represented by 2.90% and Parasite 1.23%.

Keywords: floristic diversity, families, plant species, life form.

Introduction

Flora in each region is the reaction of life community against environment conditions and Plant growth during past times. Life form of plants is different in different climates, in other words in each kind of climate, the percentage of growth forms of plants are different for each one showing the condition of climate and environment, so that if ecological factors are suitable for one species(22).

Generally, the floristic composition of a region and the biological spectrum, which is the representation percent of the number of species belonging to each life form, influenced by the climate and nature of the substrate material (19), and their distribution is closely associated with the topography of the region (7).

Floristic study of each region is really important and as an identity certificate for the region, it shows the existence of plants and their condition. Therefore, the study of geographical origin and floristic study of each region are the most important methods for management and protecting

existence reservoirs. Life form of plants is different in different climates, in other words_ in each kind of climate, the percentage of growth forms of plants is different and each one shows the condition of climate and environment so that if ecological factors are suitable for one species (22). Plants can be grouped in life-form classes based on their similarities in structure and function (25). A life form is characterized by plant adaptation to certain ecological condition (23).

Several workers have studied floristic composition and biological spectrum of different regions in Yemen. Previous studies reported that, there are about 2844 plant species belong to 1068 genera and 179 families in Yemen (2,5,6,7,11,12,13,16,17,18,20,21,28,29).

Aim of study

The main objective of the present work are to study the floristic diversity of the plant life at Lawder District, Abyan Governorate.

Methods

The study area is one of 11 districts in Abyan governorate with an area of about 1485 km2, located in the Centre of Abyan between longitudinal range 45º 20¯ to 45º 50¯ E and latitudinal range 13º 00¯ to 14º 00¯ N, with and altitudinal range of 1000 to 2500 masl, boarded by Al-Bieda governorate from the north, Al-Wadea and Khanfar from the south, Modia from the east, Sibah and Sarrar from the west (31). Lawder lays in low to medium altitude mountains (Alawdali plateau).Topographically Lawder consists of several sharply defined habitats; mountains, wadis, hills, slopes, cliffs, and open areas, with an altitudinal range between 1000 to 2500 masl. Furthermore; the soil in Lawder district is mainly in the form of sandy loam at the plateau except in mountain areas where there are rocky clusters (31). The climatic features of the studied area is characterized by rainy season stretches from November to April. The maximum mean temperature is 37.7ºC, during June, and the minimal mean was28.2°C in February.

Field trips were carried on, during the period May 2014 to January 2018, Classifying all vascular plants in life-forms. The specimens were identified by Dr. Al-Gifri as well as by the utilization of the available literature for (1,3,4,5,6,7,8,11,13,14). Life forms of species were classified on the basis of life forms as defined by Raunkiaer (26).

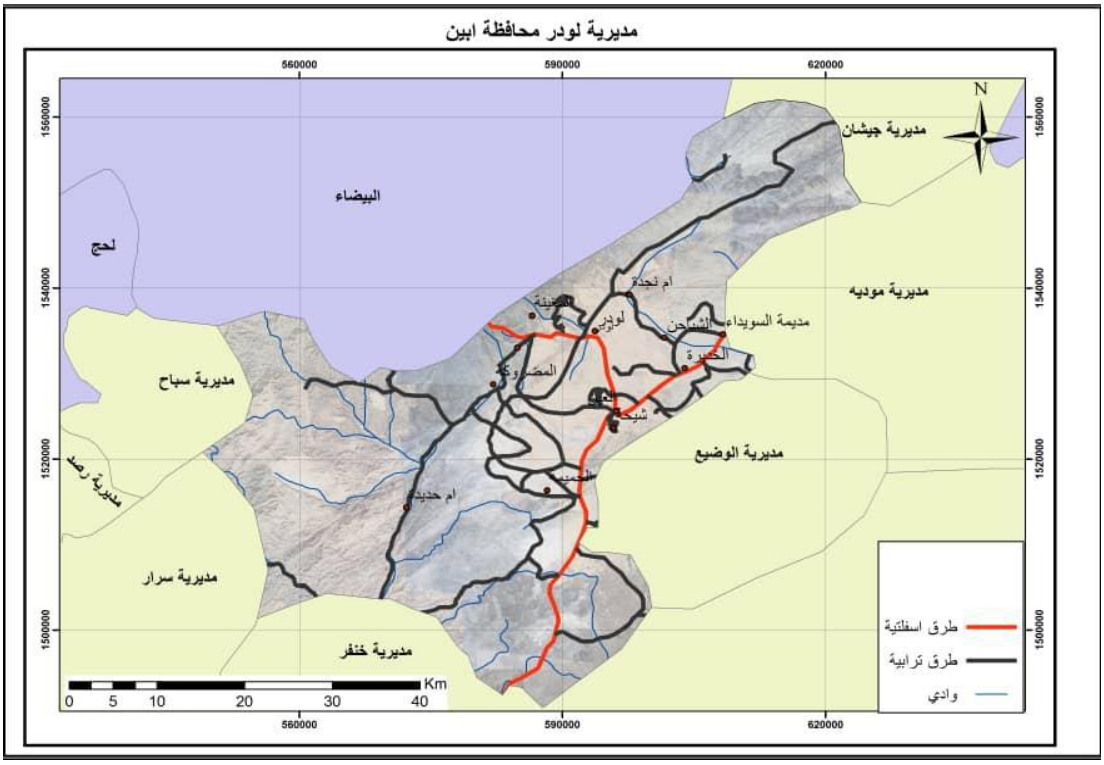

Fig. 1: The Borders of Lawder district (Source: Yemen Remote sensing and GIS Center 2020)

Results and Discussion

Our results are summarized in Table 1.

Table 1. List of Wild Plants in Lawder District, Abyan Governorate

Family	Scientific name	Duration	Life Growth	Life form
Acanthaceae	*Acanthus arboreus*Forssk	Per	Shrub	Ch
	Anisotes trisulcus(Forssk) Nees	Per	Shrub	Ch
	Barleria proxima Lindau	Per	Shrub	Ch
	Blephoria ciliaris(L.) B . L . Burtt	Per or Ann	Herb	He
	Blepharis linariifolia Pers	per	Herb	He
	Eubolium virid(Forssk)Alstone	Per	Shrub	Ch
Asparagaceae	*Dracaena ombet* Heuglin ex Kotschy &Peyr	Per	Tree	Ph
	*Dracaena serrulata*Baker .	Per	Tree	Ph
	*Sansevieria ehrenbergii*Schweinf .ex Baker	Per	Herb	G
	Sansevieria forskaliana (Schult. F.) F. N. Hepper	Per	Herb	G
Aizoaceae	*Aizoon canariese*L	Ann	Herb	Th
	Glinus lotoides L.	Ann	Herb	Th

Family	Scientific name	Duration	Life Growth	Life form
	Trianthema crystellina L	Ann	Herb	Th
	Trianthema portulacastrum L.	Ann	Herb	Th
	Trianthema triquetra Wild.	Ann	Herb	Th
Aloeaceae	*Aloe ahmeransins* Favell , M.B.Mill & Al- Gifri	Per	Shrub stemless	He
	Aloe fleurentiniorum Lavr anos.L.E.Newton,	Per	Shrub stemless	He
	*Aloe inermis*Forssk	Per	Shrub stemless	He
	*Aloe lanata*T.A. Macloy &Lavranos	Per	Shrub stemless	He
	Aloe sabaea Schweinf	Per	Tree	Ph
	*Aloe vacillan*Forssk	Per	Shrub stemless	He
	Aloe vera (L.) Burm .f	Per	Shrub	He
Amaranthaceae	*Achyranthes aspera* L.	Per	Herb	He
	Aerva javanica (Burm . f.) Juss ex: Schult	Per	Herb	He
	Amaranthus ascendens Lois	Ann	Herb	Th
	Amaranthus graecizans L	Ann	Herb	Th
	Amaranthus tricolor L.	Ann	Herb	Th
	Amarathus viridis L,	Ann	Herb	Th
	Digera muricata(L.) Mart.	Ann	Herb	Th
Anacardiaceae	*Rhus flexicaulis* Bake	Per	Shrub	Ch
Apocynaceae	*Adenium obesum* (Forssk) Reem &Schult .	Per	Small tree	Ph
	Angolluma commulata(A.Berger)Plowes	Per	Herb	He
	Calotropis procera (Ait) Aiton	Per	Small tree	Ph
	Caralluma awdeliana (Defl) Berger	Per	Herb	He
	Caralluma deflersiana (Defl.) Bergor.	Per	Herb	He
	Carolluma hexagona Lavranos	Per	Herb	He
	Caralluma solenophora lavranos	Per	Herb	He
	Ceropegia arabica H . Huber	Per	Liana	Ch
	Ceropegia botrys K. Schum	Per	Liana	Ch
	Cerapegia rupicola Deflers	Per	Liana	Ch
	Ceropegia variegate Decne	Per	Liana	Ch
Apocynaceae	*Desmidorchis Penicillate*(Deflers)Plowes	Per	Herb	He
	Duvalia sulcata N.E.Br	Per	Herb	He
	Gomphocarpus fruticosus (L.) W.T.Aiton	Per	Shrub	Ch
	LeptadeniaPyrotechnica(Forssk.)Decne	Per	Shrub	Ch
	Monolluma quadrangula (Forssk) plowes	Per	Herb	He
	Pergularia tomentosa L	Per	Liana	Ch
	Rhytidocaulon macrolobum Lavr.	Per	Shrub	Ch
	Sarcostemma forskaolianum Schult	Per	Shrub	Ch
	Sarcostemma viminale (L.) R. Br	Per	Shrub	Ch

Family	Scientific name	Duration	Life Growth	Life form
Aricaceae	*Hyphaenea thebaica*(L.) Mart.	Per	Tree	Ph
Aristolochiaceae	*Aristolochiabracteolate*Lam.	Per	Herb	He
Asteraceae	*Conyza bonariensis*(L.)Cronquist	Ann	Herb	Th
	Eclipta prostrate (L.) L	Per	Herb	He
	Flaveria trinervia (Spreng.) Mohr.	Ann	Herb	Th
	Guizotia scabra(Vis.)Chiov.	Ann	Herb	Th
	Kleinia anteuphorbium (L.) Haw	Per	Shrub	Ch
	Kleinia semperviva DC	Per	Shrub	Ch
	Lactuca scariola L	Ann	Herb	Th
	Launaea procumbens (Roxb.)Ram. Et.Raj.	Ann	Herb	Th
	Onopordon sibthorpianum Boiss and Helder	Per	Herb	He
	Pluchea dioscordis (L.) DC	Per	Shrub	Ch
	Pluchea ovalis (Pers) DC	Per	Shrub	Ch
Asteraceae	*Pulicaria jaubertii* Gamal – Eldin	Ann	Herb	Th
	Pulicaria undulate (L.) C.A. Mey	Ann	Herb	Th
	Psiadia punctulata(DC.)Vatke	Per	Herb	He
	Sonchus oleraceus (L.)L.,	Ann	Herb	Th
	Sonchus tenerrimus L	Ann	Herb	Th
	Vernonia cinerea (L.) Less.	Ann	Herb	Th
	*Xanthium spinosum*L.,	Ann	Shrub	Th
	Xanthium strumarium L	Ann	Shrub	Th
Balanitaceae	*Balanitesaegyptiaca* (L.) Delile.	Per	Tree	Ph
Boroginaceae	*Heliotropium bacciferum*Forssk.	Per	Herb	He
	Heliotropium curassavicum L	Per	Herb	He
	Heliotropium lasiocarpum Fiscer&C.A.Mey	Per	Herb	He
	Heliotropium longiflorum(A.DC.) Jaub.&Spach,	Per	Herb	He
	Heliotropium ramoissimum(Lehm)Sieber exDE	Per	Herb	He
	Heliotropium rariflorum Stocks	Pre	Herb	He
	Heliotropium zeylanicum (Burm) Lam	Per	Herb	He
Brassicaceae	*Diplotaxis erucoides* L. DC	Ann	Herb	Th
	Farsetia stylosa R.Br.,	Per	Herb	He
	Lepidium sativum L.,	Ann	Herb	Th
	Schouwia purpurea (Frossk.)Schweinf.	Ann	Herb	Th
Burseraceae	*Boswellia sacra*Flueck	Per	Tree	Ph
	Commiphora gileadensis(L.) C.	Per	Tree	Ph
	Commiphora kataf (Forssk) Engl	Per	Tree	Ph
	Commiphora myrrha (Nees) Engl	Per	Tree	Ph
Cactaceae	*Opuntia ficus-indica* (L.)Mill.	Per	Shrub	Ch
Caesalpiniaceae	*Delonix elate* (L.)Gamble	Per	Tree	Ph
	*Senna alexandrina*Mill	Per	Herb	Ch
	Senna holosericea(Fresen.)Greuter	Per	Herb	Ch

Family	Scientific name	Duration	Life Growth	Life form
	Senna italica Mill	Per	Herb	Ch
	Senna occidentallis L.	Ann or Per	Herb	Ch
Capparaceae	*Cadaba heterotricha*Stocks	Per	Shrub	Ch
	Cadaba farinosa Forssk	Per	Shrub	Ch
	Cadaba glandulosa Forssk.	Per	Shrub	Ch
	Cadaba rotundifolia Forssk.	Per	Shrub	Ch
	Capparis cartilPaginea Decne.,	Per	Shrub	Ch
	*Capparis spinosa*L.	Per	Shrub	Ch
	*Cleome paradoxa*R. Br.,	Ann	Herb	Th
	Dipterygium glaucum Decne	Ann	Herb	Th
	*Maerua crassifolia*Forssk.	Per	Tree	Ph
Chenopodiaceae	*Chenopodium murale* L	Ann	Herb	Th
	*Halothamnus bottae*Jaub.&Spach	Per	Shrub	Ch
	Suaeda aegyptica(Hasselq.) .Zohary	Ann	Herb	Th
	Suaeda fruticosa Forssk . ex. J.F.Gmel	Per	Shrub	Ch
	Salsola forskalii Schweinf.	Per	Shrub	Ch
	Salsola spinescens Moq	Per	Shrub	Ch
Combretaceae	*Conocarpus lancifolius*.Engl.	Per	Tree	Ph
Commelinaceae	*Commelina benghalensis* L	Ann or Per	Herb	Th
Convolvulaceae	*Convolvulus arvensis* L	Per	Herb	He
	Convolvulus glomeratus Choisy	Per	Herb	He
Cucurbitaceae	*Bryonia cretica* L	Per	Herb	He
	Citrullus colocynthis(L.)Schrad.,	Ann	Herb	Th
	Cucumis prophotarum. Var	Ann	Herb	Th
	Kedrostis gijef (J . f Gmel) C .Jeffrey	Per	Shrub	Ch
	Momordica balsamina (L)	Per	Liana	Ch
Cyperaceae	*Cyperus rotundus* L	Per	Herb	G
Euphorbiaceae	*Acalypha fruticosa* Forssk	Per	Shrub	Ch
	Chrozophora oblongifolia(Delile)Juss .	Per	Shrub	Ch
	Chrozophora tinctoria(L.) A.Juss.,	Per	Shrub	Ch
	Euphorbia ammak Schweirf	Per	Tree	Ph
Euphorbiaceae	*Euphorbia balsamifera* Aiton	Per	Shrub	Ch
	Euphorbia cactus Ehrenb ex . Boiss	Per	Shrub	Ch
	Euphorbia cuneata Vahl	Per	Shrub	Ph
	Euphorbia fruticosa Forssk	Per	Shrub	Ch
	Euphorbia inarticulate Schweinf	Per	Shrub	Ch
	Euphorbia helioscopia L.	Ann	Herb	Th
	Euphorbia hirta L.	Ann	Herb	Th
	Euphorbia granulata Forssk	Per	Shrub	Th
	Euphorbia peplus L.	Ann	Herb	Th
	Euphorbia schimperi Presl	Per	Shrub	Ch
	Euphorbia serpens Kunth	Ann	Herb	Th
	Euphorbia triaculeata Forssk	Per	Shrub	Ch
	Jatropha glauca Vahl	Per	Shrub	Ch
	Jatropha pelargoniifolia.Courbai	Per	Shrub	Ch

Family	Scientific name	Duration	Life Growth	Life form
	Jatropha spinosa Vahl	Per	Shrub	Ch
	Phyllanthus fraternus Webster.	Per	Herb	Th
	Phyllanthus maderaspatensis.L.	Per	Herb	Ch
	Ricinus communis L	Per	Tree	Ph
	Rhynchosia memnonia (Del.)Dc.	Per	Liana	He
Fabaceae	*Alhagi maurorum*.Medik	Per	Herb	Ch
	Cadia purpurea (Picc.)Ait	Per	Shrub	Ch
	Crotalaria incana L	Ann or Per	Herb	Th
	Indigofera articulata Gouan	Per	Shrub	Ch
	Indegofera coerulea Roxb	Per	Shrub	Ch
	Indigofera oblongifolia Forssk	Per	Shrub	Ch
	Indigofera spinosa Forssk .	Per	Shrub	Ch
	Indigofera tinctoria L	Per	Herb	Ch
	Medicago laciniata.(L.)Mill.	Ann	Herb	Th
	Medicago sativa.L	Per	Herb	Ch
	Tephrosia purpurea (L.) Pers	Per	Herb	Ch
Geraniaceae	*Erodium ciconium*(L.)LHer.	Ann	Herb	Th
Hydnoraceae	*Hydnora johannis* Bece	Per	Parasite	P
Lamiaceae	*Leucas articifolia* (Vahl.) R.Br.	Per	Herb	Ch
	Leucas inflate Benth	Per	Herb	Ch
	Marrubium vulgare L.	Per	Herb	Ch
	Nepeta deflersiana Schweinf.exHedge,	Per	Herb	Ch
	Ocimum basilicum L	Per	Herb	Ch
	Ocimum forsskalii Benth	Per	Herb	Ch
	Origanum syriacum L .	Per	Herb	Ch
	Plectranthus comosus Sims	Per	Shrub	Ch
	Teucrium yemense Deft	Per	Shrub	Ch
Longaniaceae	*Buddleia polystachya* Fresen	Per	Tree	Ph
Loranthaceae	*Oncocalyx doberae* (Schweinf.)J.R.L.Wood.	Per	Herb	Epi
Malvaceae	*Abutilon pannosum* (Forst.f.)Schlecht	Per	Herb	Ch
	Hibiscus meidiensis Ulbr	Per	Shrub	Ch
	Malva praviflora L.	Per	Herb	He
	Pavonia triloba Guill.&Per	Ann or Per	Herb	Ch
Meliaceae	*Azadirachta indica* A.Juss.	Per	Tree	Ph
Mimosaceae	*Acacia asak* (Forssk .) Willd	Per	Tree	Ph
	Acacia etbaica Schweinf	Per	Tree	Ph
	Acacia hamulosa Benth	Per	Shrub	Ch
	Acacia nilotica (L .) Delile	Per	Tree	Ph
	Acacia tortilis (Forssk.) Hayne	Per	Shrub	Ch
	Pithecellobium dulce(Roxb.)Benth.	Per	Tree	Ph
	Prosopis juliflora (SW.) DC	Per	Tree	Ph
Moraceae	*Ficus carica*L.,	Per	Tree	Ph
	Ficus cordata Thunb	Per	Tree	Ph
	*Ficus populifolia*Vahl.	Per	Tree	Ph
	Ficus sycomorus L.	Per	Tree	Ph

Family	Scientific name	Duration	Life Growth	Life form
	Ficus vasta Forssk	Per	Tree	Ph
Nyctaginaceae	*Boerhavia repens* L	Ann	Herb	Th
	*Commicarpus ambiguus*Meikle,	Per	Herb	Ch
	Commicarpus mistus Thulin	Per	Herb	Ch
	Commicarpus plumbagineus (Cav.) Standl	Per	Herb	Ch
Orobanchaceae	*Cistanche phelypoea* (L.)Cout.	Per	Parasite	P
	Orobanche cernua Loefl	Per	Parasite	P
Oxalidaceae	*Oxalis corniculata* L.	Ann	Herb	Th
Papaveraceae	*Argemonemexicana*L.,	Per	Herb	He
Plantagonaceae	*Plantago lanceolata* L.	Per	Herb	He
Plumbaginaceae	*Plumbago zeylanica* L.	Ann	Herb	Th
Poaceeae	*Brachiaria leersioides* (Hochst.)Stapf	Ann	Herb	Th
	Cenchrus ciliaris L .	Ann	Herb	Th
	Chloris barbata Sw.	Ann	Herb	Th
	Cynodon dactylon (L.)Pers.	Per	Herb	G
	Dactyloctenium aegypium (L.) Willd .	Ann	Herb	Th
	Dichanthium annulatum (Forssk.) Stapf.	Ann	Herb	Th
	Echinochloa colona (L.) Link.	Ann	Herb	Th
	Halopyrum mucronatum(L.)Stapf	Per	Herb	He
	Odyssea mucronata (Forssk) Stapf	Per	Herb	He
	Sporobolus spicatus(Vahl)Kunth	Per	Herb	He
Polygalaceae	*Polygala erioptera* DC	Ann	Herb	Th
Polygonaceae	*Rumex nervosus* Vahl	Per	Shrub	Ch
	Rumex vesicarius	Per	Shrub	Ch
Portulacaceae	*Portulaca grandiflora*	Per	Herb	He
	Portulaca oleracea L	Ann	Herb	Th
	Portulaca quadrifida L	Ann	Herb	Th
Resedaceae	*Ochradenus baccatus* Del ile.	Per	Shrub	Ch
	Reseda sphenocleoides Defl.	Per	Shrub	Ch
Rhamnaceae	*Berchemia discolor* (Klotzsch) Hemsl. L	Per	Tree	Ph
	Ziziphus spina-christi (L.) Willd	Per	Tree	Ph
Rutaceae	*Ruta chalepensis* L	Per	Herb	e
Salvadoraceae	*Salvadora persica* (L .)	Per	Shrub	Ch
Sapindaceae	*Dodonaea viscosa* (L .)Jacq	Per	Shrub	Ch
Scrophylariaceae	*Anticharis glandulosa* Asch	Ann	Herb	Th
	Bacopa monnieria Hayata&Matsum	Ann	Herb	Th
	Striga hermonthica (Del i) Benth	Ann	Herb	P
Solanaceae	*Datura innoxia* Mill	Ann	Herb	Th
	Datura stramonium..L.	Ann	Herb	Th
	Lycium shawii Roem & Schults	Per	Shrub	Ch
	Solanum coagulans Forssk.,	Per	Shrub	He
	Solanum forsskalii Dunal	Per	Shrub	Ch
	Solanum incanum L	Per	Shrub	Ch
	Solanum nigrum L	Ann	Herb	Th
	Solanum villosum . Mill	Ann	Herb	Th
	Withania somnifera (L .) Dunal	Per	Herb	Ch
Stercullaceae	*Melhania ovta* Spreng	Per	Shrub	Ch

Family	Scientific name	Duration	Life Growth	Life form
	Sterculia africana (Forssk.)Flori	Per	Tree	Ph
Tamaricaceae	*Tamarix aphylla* (L .) H.,Karst	Per	Tree	Ph
Tiliaceae	*Corchorus deressus* (L .) Christ	Per	Herb	He
	Corchorus trilocularis L	Per	Herb	He
	Grewia erythraea Schweinf	Per	Shrub	Ph
	Grewia velutina (Forssk) Lam	Per	Shrub	Ph
Urticaceae	*Forsskaolea tenacissima* L	Per	Shrub	Ch
Verbenaceae	*Phyla nodifora*(L.)greene	Per	Herb	G
Vitaceae	*Cissus quadrangularis* L	Per	Shrub	He
	Cissus rotundifolias Vahl	Per	Shrub	He
Zygophllaceae	*Fagonia indica* Burm f	Per	Herb	He
	Peganum harmala L	Per	Herb	He
	Tribulus bimucronatus Viv	Ann	Herb	Th
	Tribulus terrestris L.,	Ann	Herb	Th
	Zygophyllum simplex L.	Ann	Herb	Th

Abbreviations of life form categories used in the paper are included in alphabetical order: Ch = Chamaephytes; Th = Therophytes; Ph = Phanerophytes; He = Hemicryptophytes; G = Geophytes; Ep = Epiphytic; P = Parasites.

Floristic analysis:

A total of 243 plant species were studied and recorded from the study area. These taxa belonged to 154 genera and 58 families. Enumeration of species is shown along with habit and life-from in Table 1.

The families, with the highest number of species recorded , were Euphorbiaceae, Apocynaceae, Asteraceae, 23.20,19 sp. Each of them respectively, Fabaceae11ps., Poacaea 10 sp. Each of them and Lamiaceae, Solanaceae, Capparaceae represented by 9 sp. For each of them, respectively Mimosaceae, Aloeaceae, Amaranthaceae and Borginaceae 7 sp. Each of them as shown in table2. And fig.2.

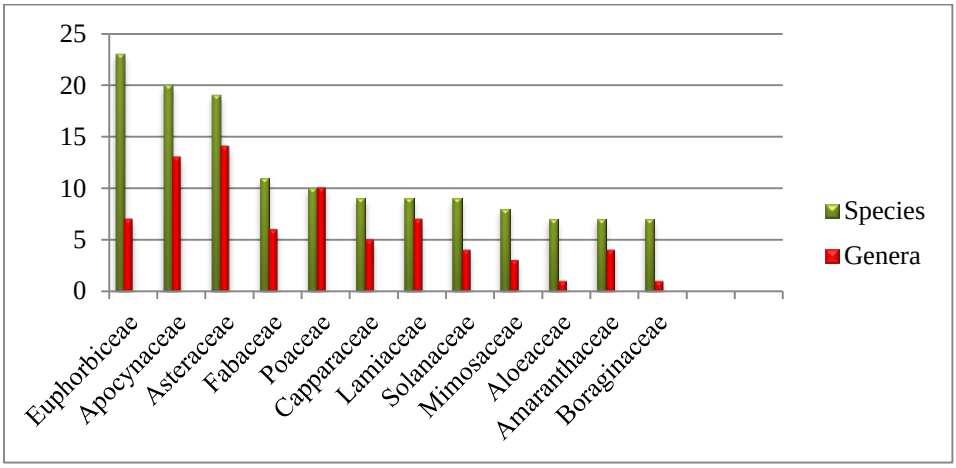

Figure.2. The largest 12 family according the number of genera and species in the study area.

Table 2. The largest 12 family according the number of genera and species in the study area

Family	Species	Genera
Euphorbiceae	23	7
Apocynaceae	02	13
Asteraceae	19	14
Fabaceae	11	6
Poaceae	10	10
Capparaceae	9	5
Lamiaceae	9	7
Solanaceae	9	4
Mimosaceae	7	3
Aloeaceae	7	1
Amaranthaceae	7	4
Boraginaceae	7	1

Life from analysis:

The life forms of the collected species revealed that the Chaemophytes dominated the flora of the studied area representing 87sp., followed by the therophytes 62 and Hemicryptophytes 49 sp., Phanerophytes 35 sp., geophytes 5sp., parasites 4 and Ep. 1sp., Table 3. Figure 3. shows the biological spectrum or the life form spectrum of the given 243 species in the study area.

Table3. Different life –forms calasses of the Wild Plants in Lawder District

Life form classes	Abbreviation	No. of species	Percentage
Chamaephytes	Ch	87	35.80%
Therophytes	Th	62	25.52%
Hemicryptophytes	He	49	20.16%
Phanerophytes	Ph	35	14.40%
Geophytes	G	5	2.06%
Parasites	P	4	1.65%
Epiphytic	Ep	1	0.41%
Total		**243**	**100**

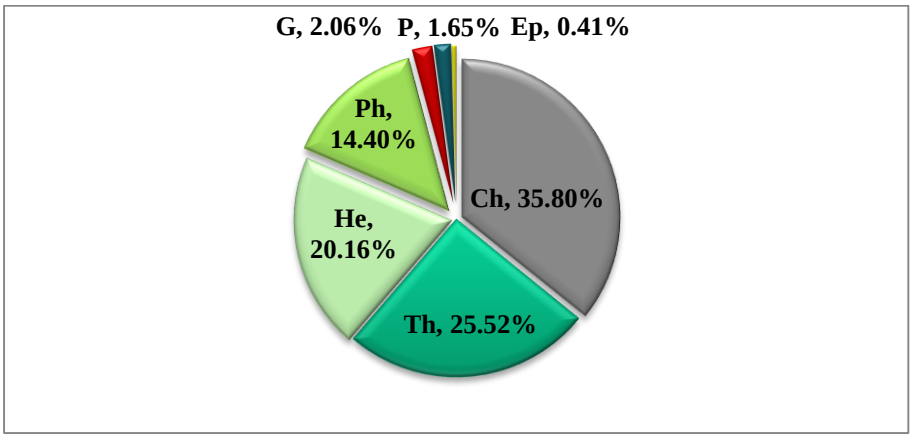

Figure 3. Different life –forms classes of the Wild Plants in Lawder Distric

The vegetation of Lawder District showed the percentage of chamaephytes (35.80%), Therophytes (25.52%) followed by that of Hemicryptophytes (20.16%), Phanerophytes (14.40%), geophytes (2.06%), parasite (1.65%), and epiphytes (o.41%). The chamaephytes and Therophytes together constitute 61.32% of the life-forms as shown in Table 3. and Fig. 3.

The biological spectrum in the present study ranged from chamaephytes, Therophytes, Phanerophytes, Hemicryptophytes, Geophytes, Parasites and Epiphytes. Chamaephytes and Therophytes were the dominant forms, the dominance of the Chamaephytes and Therophytes may be attributed to the hot dry climate, geological factors and the topography (3, 4). Chamaephytes and Therophytes are associated with a dry climate (1,9,29), and are characteristics vegetation type of desert flora, as influenced by microclimate and soil conditions (26). Life forms of the prevailing flora exhibited a great diversity and reflects a typical desert flora.

These results agree with the life form spectra in desert habitats in other parts of Yemen (e.g Al-Hawshabi(6), as well as Similar results that were observed in Hema Faid Region of Ha'il Province,

Saudi Arabia (10) in Tabuk province, north Saudi Arabia (8), in Hafer Albatin region, northeastern Saudi Arabia (23)

Habitat analysis:

The Trees and shrubs represent about 43.62% of the total species, while the herbs were represented by 52.27 %. Analysis of the habit shows that herbs predominate with 127 species (52.27%) followed by Shrubs with 74 species (30.45%), Trees with 32 species (13.17%), Liana with 7 species (2.90%) and Parasites with 3 species (1.23%) , as shown in Figure 4.

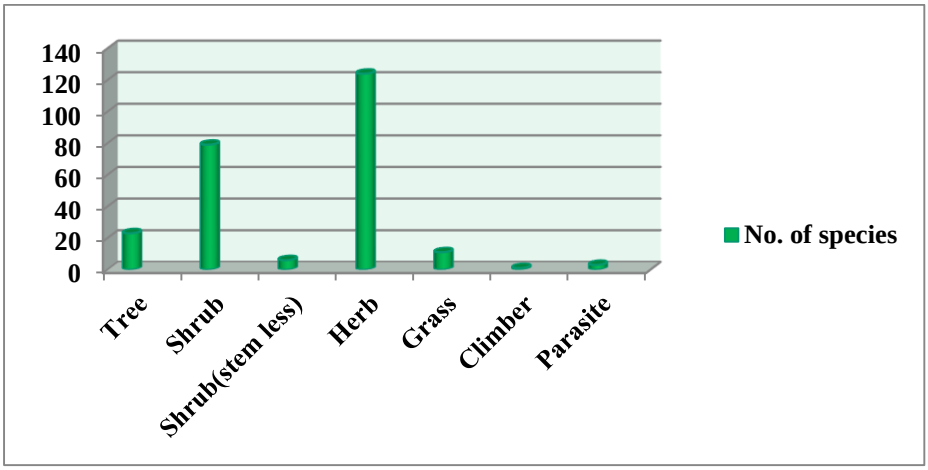

Fig.4. Show the Contribution of various plant habits

The dominant shrubs species were Acacia sp. which cover most of part of Lawder District as the climate of this region is arid.

The plant taxa of the study area were varied between perennial (179 species, 73.7%, annual (59 sp. 24.3%, and perennial, annual (5 sp., 2.05%. Fig.5). Study of the dominant families in terms of species richness revealed that Apocynaceae has high percentage (12.22%) of perennials, followed by Euphorbiaceae (10.55%) and family Asteraceae has high percentage (22.39%) of annuals.

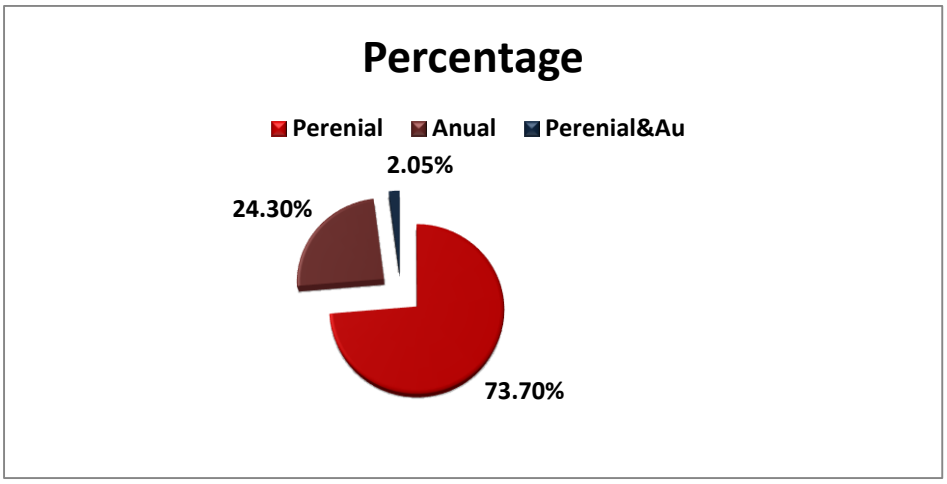

Fig. 5. Percentage of the studied species by life – span

Conclusion

To the best of our knowledge, the current investigation is the first floristic study in Lawder district and it has showen the importance of this region . Further studies are needed for more comprehensive analysis on the fluctuation of plant species composition, diversity and vegetation in the study area.

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التنوع الفلوري لمديرية لودر، محافظة أبين، اليمن

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الملخص

تقدم هذه الدراسة وصفًا تفصيليًا للتركيب الفلوري وشكل الحياة النباتية في مديرية لودر التي تقع في وسط محافظة أبين بين النطاق الطولي 50 °45 الى 20 ¯°45 شرقًا ونطاق خطوط العرض 00 ¯°13 إلى 00 ¯°14شمالًا مع مدى الارتفاعات من 1000 إلى 2500 masl. تم تنفيذ هذا العمل لتحديد التركيب الفلوري وشكل الحياة النباتية في مديرية لودر. أوضحت الدراسة الفلورية لمديرية لودر وجود 243 نوعًا نباتيًا تنتمي إلى 154 جنسًا وتضمها 58 فصيلة نباتية. الفصائل ذات الأغلبية في وجود الأنواع هي الفصيلة اللبنية والدفلية والمركبة تليها النجيلية والفابية والباذنجانية والكبارية ثم الحريقية . يوضح الطيف البيولوجي النسب التالية:

chamaephytes (35.80%),were the dominant followed by therophytes 25.52%, Phanerophytes (14.40%), hemicryptophytes (20.16%), geophytes (2.06%), parasite (1.65%), and Epiphytes (0.41`%).

مثلت الأعشاب بأكبر عدد من الأنواع حيث كانت نسبتها **52.27**%، تليها الشجيرات التي مثلت ب **30.45%**، والأشجار بنسبة 13.17%، والمتعرشات 2.90 %، الطفيليات 1.23%.

الكلمات المفتاحية: تركيب فلوري، فصائل نباتية، أنواع نباتية، أشكال الحياة.