Checklist and analysis of the flora and vegetation of Wadi Zaza at AI-Jabal AI Akhdar (Cyrenaica, Libya)

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Checklist and analysis of the flora and vegetation of Wadi Zaza at Al-Jabal Al Akhdar (Cyrenaica, Libya)

Abstract

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The flora of Wadi Zaza (Cyrenaica Libya) was studied and statistically analysed. Total figures of the flora are: 61 families, 213 genera and 336 species. Two families belongs to Gymnosperm and the remaining 59 families to Angiosperms. Dicotyledons are represented by 278 species, 176 genera, and 52 families and Monocotyledons by 56 species, 35 genera and 7 families. The life forms show the predominance of Therophytes with 57,14%. Chamaephytes constitute 22,91%, Cryptophytes 14,28%, Fhanerophytes 5,35% and Hemicryptophytes 0,29%. *Polygonum alpinum* is a new record for Libya.

Introduction

Due to the prevailing aridity in the Cyrenaica, the majority of the vegetation is located in the wadies (valleis), as refugial sites for many species, one of which, Wadi Zaza was selected for the present study.

Floristic studies including this region were published by Della-Cella (1819), Pacho (1827), Durand & Barratte (1910), Vaccari (1914), Pampanini (1931), Maire & Weiller (1939), Brullo & Furnari (1979), Brullo (1978, 1979, 1982, 1983 and 1984), El-Sherif & al. (1991) and El-Sherif & Sing (1996).

Location and physiography

The study area is located on the eastern coast of the gulf of Sirte on the Mediterranean coast in the Cyrenaica region (Fig. 1). It lies between 20° 45' 00" and 20° 30' 00" E longitude and 32° 15' 00" and 32° 30' 00" N latitude on the North east region, Al-Jabal Al-Akhdar (Green mountains).

The Wadi (Valley) Zaza length in north south direction is about 38 km, and it extends from the city of Benghazi for about 55 km eastward. It is bordered by the Mediterranean sea in the north and the wadi arises from the sea level to about 380 m.

It is limited by abrupt slopes in the form of two successive escarpment.

Between the two escarpments lies a strip of country with gentle slopes (Fig. 2).

Fig. 1. The study area on the eastern coast of the gulf of Sirte.

Due to karst erosion suffered, a series of inland drainage basin were created, these with their thick deposits of Terra Rossa, from the fertile plains of Al Marj and Al Abyar.

The basin of Wadi Zaza, usually large with respect to other wadies in the vicinity of the northwestern part of Farzugh-Al Hamidah uplift. It is supposed, however, that this basin composed of a major basin followed by a sub-basin that drains into the first one through karstic passages or over flows across flat and poorly defined watershed during the flood periods.

Abundant, steep, dissected, superimposed, consequent gullies with northwest trend, normal to the scarp show generally a coarse texture and the concentration of trees and shrubs suggests a plentiful water supply. Thus dissected alluvial fans and debries flows are common where the canyons debauch at the distinct boundary between the lower escarpment and gently sloping pedmont plain.

Climate

The climate of the study area is comparable to that of Benghazi, with mean temperatures of about 20 °C.The high precipitation and humidity of the Al Jabal Al Akhder result in forested areas on the slope of the northern face of the escarpment and perennial vegeta-

Fig. 2. Gentle slopes in Wadi (Valley) Zaza.

tion on the upper plateau. Rainfall increases with increase in elevation from the upper Al-Jabal Al-Akhdar area, decreases to wards the interior, and is rare in the desert.

The average annual rainfall on the upper part of the Al-Jabal Al-Akhdar is about 450 mm, whereas it is about 250 mm on the coastal plains. The rainy season is from October to March with January and December as the wettest months, (rainy days are about 35-50) and rain formations generally occur in coincidence with westerly or north-westerly winds. Other precipitations, such as snow, hail, dew, etc. are of no specific importance. During winter rainfall is of a torrential character, and thus causes a number of difficulties, such as an incomplete soil absorption and the consequent surface run–off, originating alluvial and erosion phenomena. Every 3 or 4 years there are particularly heavy rains causing serious floods in some areas

Average annual temperatures, in the Barce area, are 17,8 °C, with maximum peaks in the June – August period during which at times 48 °C. are attained, and minimum values in December - January, which are rarely below zero.

Frosts, occurring only at altitudes over 300 meters a.s.l. are rare and short – lived, and generally do not damage crops since they take place in wintertime, when vegetation is still, later frosts are exceptional.

The general temperature trend appears remarkably constant in the course of time, contrary to the rainfall pattern.

Predominant winds blow directions: a westerly, northwesterly one, whence the sea

winds blow: these are damp and when arrested by Gebel barrage, cause beneficial rainfall. Such winds predominate in the fall-winter seasons, which is in effect the rainy period.

The second main wind stream originates from the southern quadrant, originating the well-known Ghibli: a hot, very dry, often violent wind blowing from the desert which – besides causing unfavourable living conditions – can also cause heavy damages to crops, especially during the spring, when vegetation is in full bloom. The nature of this wind, together with the poor soil physical conditions, exasperates soil evaporation and plant transpiration phenomena, causing serious water unbalances.

Materials and methods

Plants were collected upon several visits from 1999 to 2001. The specimens have been deposited in the Cyrenaica Herbarium, Botany Department, Garyounis University.

Results

Enumeration of the taxa

All plants collected in the study area are indicated below. For the arrangement of families the system of K. Pilger & H. Melchior (1954, 1962) has been followed. Within each family genera and species are arranged alphabetically.

1. GYMNOSPERMS

1. Ephedraceae
1. Ephedra alata Decne.
2. Cupressaceae
1. Juniperus phoenicea L.

2. ANGIOSPERMS

I. DICOTYLEDONEAE

1. Fagaceae
1 Quercus coccifera L
2. Urticaceae
1 Urtica pilulifera L.
3. Polygonaceae
1. Polygonum alpinum L.
2. Polygonum argyrocoleum Steud.
3. Polygonum aviculare L.
4. Polygonum balansae Boiss.& Reut.
5. Polygonum equisetiforme Sibth.& Sm.
6. Polygonum maritimum L.
4. Caryophyllaceace
1. Cerastium illyricum Ard.
2. Petrorhagia illyrica (Ard.) Ball & Heywood

3. Polycarpon prostratum (Forssk.) Aschers. & Schweinf.
4. Silene cerastioides L.
5. Silene cyrenaica Maire & Weiller
6. Silene gallica L.
7. Spergularia marina (L.) Griseb.

5. Illecebraceae

1. aronychia arabica (L.) DC.
2. Paronychia capitata (L.) Lam.
3. Pteranthus dichotomus Forssk.

6. Chenopodiaceae

1. Chenopodium ambrosioides L.

7. Amaranthaceae

1. Amaranthus graecizans L. subsp. *silvestris* (Vill.) Brenan
2. Amaranthus hybridus L.
3. Amaranthus standleyanus Parodi ex Covas
4. Amaranthus viridis L.

8. Ranunculaceae

1. Adonis dentata Delile
2. Adonis microcarpa DC.
3. Clematis cirrhosa L.
4. Ranunculus asiaticus L. var. *albus* L.
5. Ranunculus asiaticus L. var. *flavus* L.
6. Ranunculus asiaticus L. var. *roseus* L.
7. Ranunculus asplenoides L.
8. Ranunculus bullatus L. subsp. *cytheraceus* (Hal.) Vierhappor & Rech.
9. Ranunculus cyclocarpus Pamp.
10. Ranunculus ficaria L.
11. Ranunculus paludosus Poir.

9. Guttiferae

1. Hypericum empetrifolium willd.

10. Papaveraceae

1. Papaver hybridum L.
2. Papaver rhoeas L. var. *rhoeas*

11. Fumariaceae

1. Fumaria judaica Boiss.

12. Capparaceae

1. Capparis spinosa L. subsp. *orientalis* (Duh.) Jafri

13. Brassicaceae

1. Alyssum montanum L.
2. Biscutella didyma L.
3. Capsella bursa-pastoris (L.) Medik. var. *rubella* (Reut.) Rapin
4. Cardaria draba (L.) Desv.
5.Coronopus squamatus (Forssk.) Asch.
6. Didesmus aegyptius (L.) Desv.
7. Didesmus bipinnatus (Desf.) DC.

8. *Diplotaxis harra* (Forssk.) Boiss.
9. *Enarthrocarpus pterocarpus* (Pers.) DC.
10. *Hirschfeldia incana* L.
11. *Matthiola fruticulosa* (L.) Maire
12. *Sinapis alba* L.
13. *Sinapis flexuosa* Poir.
14. *Sisymbrium erysimoides* Desf.
15. *Sisymbrium irio* L.

14. Crassulaceae

1. *Sedum album* L.
2. *Sedum caespitosum* (Cav.) DC.
3. *Sedum hispanicum* L.
4. *Sedum litoreum* Guss.
5. *Sedum rubens* L.

15. Rosaceae

1. *Sanguisorba minor* Scop.
2. *Sarcopoterium spinosum* (L.) Spach

16. Fabaceae

1. *Anthyllis henoniana* Coss. ex Batt.
2. *Anthyllis tetraphylla* L.
3. *Anthyllis vulneraria* L. subsp. *maura* (Beck) Lindb.
4. *Astragalus taubertianus* Aschers. & Barbey
5. *Calicotome villosa* (Poir.) Link
6. *Ebenus pinnata* Aiton
7. *Hymenocarpos circinatus* (L.) Savi
8. *Lathyrus aphaca* L.
9. *Lathyrus gorgonei* Parl.
10. *Lotus corniculatus* L.
11. *Lotus cytisoides* L.
12. *Lotus ornithopodioides* L.
13. *Medicago littoralis* Rohde
14. *Medicago minima* L.
15. *Medicago polymorpha* L.
16. *Medicago tornata* (L.) Mill.
17. *Medicago truncatula* Gaertn.
18. *Medicago turbinata* L.
19. *Melilotus indicus* (L.) All.
20. *Melilotus italicus* (L.) Lam.
21. *Melilotus sulcatus* Desf.
22. *Onobrychis crista-galli* (L.) Lam.
23. *Ononis hispida* Desf.
24. *Ononis reclinata* L.
25. *Psoralea bituminosa* L.
26. *Scorpiurus muricatus* L.
27. *Spartium junceum* L.

28. Tetragonolobus purpureus Moench
29. Trifolium angustifolium L.
30. Trifolium campestre Schreb.
31. Trifolium purpureum Lois.
32. Trifolium scabrum L.
33. Trifolium stellatum L.
34. Trifolium tomentosum L.
35. Vicia laxiflora Brot.
36. Vicia monantha Retz.
37. Vicia sativa L. var. cuus L.
38. Vicia villosa Roth.

17. Caesalpiniaceae
1. Ceratonia siliqua L.

18. Oxalidaceae
1. Oxalis pes-caprae L.

19. Geraniaceae
1. Erodium glaucophyllum (L.) L'Hér.
2. Erodium gruinum (L.) L'Hér.
3. Erodium keithii Guift.
4. Erodium malacoides (L.) L'Hér.
5. Erodium moschatum (L.) L'Hér.
6. Erodium touchyanum Delile
7. Geranium brutium Gasp.
8. Geranium columbinum L.
9. Geranium dissectum L.
10. Geranium molle L.
11. Geranium robertianum L.

20. Linaceae
1. Linum nodiflorum L.
2. Linum strictum L. var. *spicatum* Pers.

21. Euphorbiaceae
1. Chrozophora obliqua (L.) Juss.
2. Euphorbia bivonae Steud.
3. Euphorbia falcata L.
4. Euphorbia helioscopia L.
5. Euphorbia peplus L.
6. Mercuialis annua L.
7. Ricinus communis L.

22. Anacardiaceae
1. Pistaica lentiscus L.
2. Rhus tripartita (Ucria) Grand.

23. Rhamnaceae
1. Rhamnus lycioides L.
2. Zizyphus lotus (L.) Lam.

24. Malvaceae

1. *Malva aegeptia* L.
2. *Malva sylvestris* L.
3. *Malva parviflora* L.

25. Cistaceae

1. *Cistus parviflorus* Lam.
2. *Cistus salvifolius* L.
3. *Fumana arabica* (L.) Spach
4. *Fumana scoparia* Pomel
5. *Fumana thymifolia* (L.) Spach ex Webb
6. *Helianthemum virgatum* (Desf.) Pres.

26. Cucurbitaceae

1. *Bryonia cretica* L.
2. *Ecballium elaterium* (L.) A. Rich.

27. Theligonaceae

1. *Theligonum cynocrambe* L.

28. Apiaceae

1. *Ammi visnaga* (L.) Lam.
2. *Ammoides pusilla* (Brot.) Breistr.
3. *Anethum graveolens* L.
4. *Apium graveolens* L.
5. *Bunium pachypodum* P. W. Ball.
6. *Bupleurum gerardii* All.
7. *Bupleurum lancifolium* Hornem.
8. *Bupleurum semicompositum* L.
9. *Cuminum cyminum* L.
10. *Pimpinella peregrina* L.
11. *Pituranthos tortuosus* (Desf.) Benth.
12. *Scaligeria cretica* (Mill) Boiss.
13. *Scandix australis* L.
14. *Scandix veneris-pecten* L.
15. *Smyrnium olusatrum* L.
16. *Torilis leptophylla* (L.) Reichb.
17. *Lagoecia cuminoides* L.

29. Ericaceae

1. *Erica sicula* Guss.
2. *Arbutus pavarii* Pamp.

30. Primulaceae

1. *Anagallis arvensis* L. var. *caerulea* (L.) Gouan
2. *Cyclamen rohlfsianum* Aschers.

31. Plumbaginaceae

1. *Limonium lobatum* (L. s.) Chaz.

32. Oleaceae

1. *Olea europaea* L.
2. *Phillyrea angustifolia* L.

33. Gentianaceae

1. Centaurium pulchellum (Sw.) Druce

34. Asclepiadaceae

1. Caralluma europaea (Guss.) N.E.Br.
2. Periploca angustifolia Labill.

35. Rubiaceae

1. Crucianella maritima L.
2. Galium tricornutum Dandy
3. Galium verrucosum Huds.
4. Sherardia arvensis L.
5. Valantia hispida L.

36. Convolvulaceae

1. Convolvulus althaeoides L.
2. Convolvulus oleifolius Desr.
3. Convolvulus pentapetaloides L.
4. Convolvulus siculus L.
5. Convolvulus humilis Jacq.

37. Cuscutaceae

1. Cuscuta monogyna Vahl.

38. Boraginaceae

1. Anchusa aegypiaca (L.) DC.
2. Cerinthe major L.
3. Cynoglossum cheirifolium L.
4. Echium angustifolium Mill.
5. Echium plantagineum L.
6. Echium sabulicola Pomel
7. Echium setosum Vahl.
8. Heliotropium europaeum L.
9. Moltkiopsis callosa (Vahl) Wettst.

39. Lamiaceae

1. Lamium amplexicaule L.
2. Marrubium vulgare L.
3. Micromeria graeca (L.) Benth. ex Rchb.
4. Micromeria juliana (L.) Benth. ex Rchb.
5. Micromeria microphylla (D, Urv.) Benth.
6. Micromeria nervosa (Desf.) Benth.
7. Nepeta scordotis L.
8. Phlomis floccosa D. Don
9. Prasium majus L.
10. Rosmarinus officinalis L.
11. Salvia fruticosa Mill.
12. Salvia verbenaca L.
13. Sideritis curvidens Stapf.
14. Teucrium barbeyanum Aschers.
15. Teucrium brevifolium Schreber
16. Teucrium divaricatum Sieber ex Boiss.

17. *Teucrium polium* L.
18. *Thymus capitatus* (L.) Hoffmanns. & Link

40. Solanaceae

1. *Datura innoxia* Mill.
2. *Lycium europaeum* L.
3. *Nicotiana glauca* R. C. Graham
4. *Solanum nigrum* L. var. *nigrum*
5. *Solanum nigrum* L. var. *villosum* L.
6. *Solanum sodomeum* L.

41. Globulariaceae

1. *Globularia alypum* Linn.

42. Plantaginaceae

1. *Plantago lagopus* L.
2. *Plantago notata* Lag.
3. *Plantago crypsoides* Boiss.

43. Caprifoliaceae

1. *Viburnum tinus* L.

44. Valerianaceae

1. *Centranthus calcitrapae* (L.) Dufr.
2. *Fedia caput-bovis* Pomel
3. *Valerianella petrovichii* Asherson
4. *Valerianella muricata* (Steven) J.W. Loudon

45. Dipsacaceae

1. *Scabiosa arenaria* Forssk.

46. Asteraceae

1. *Anacyclus clavatus* (Desf.) Pres.
2. *Anthemis cyrenaica* Coss. var. *cyrenaica*
3. *Anthemis secundiramea* Biv.
4. *Artemisia campestris* L.
5. *Artemisia judaica* L. subsp. *sahariensis* (Chevall) Maire
6. *Atracitylis delicatula* Batt. ex Chevall.
7. *Bellis sylvestris* Cyr. var. *cyrenaica* Beguinot
8. *Calendula arvensis* L.
9. *Carduus getulus* Pomel
10. *Carlina lanata* L.
11. *Centaurea alexandrina* Delile
12. *Centaurea melitensis* L.
13. *Chrysanthemum segetum* L.
14. *Cichorium pumilum* Jacq.
15. *Crepis senecioides* Delile subsp. *filiformis* (Viv.) Alavi
16. *Crepis senecioides* Delile subsp. *seneciodes*
17. *Dittrichia viscosa* (L.) Greuter
18. *Evax pygmaea* (L.) Brot.
19. *Francoeuria laciniata* Coss. & Durieu
20. *Hedypnois rhagadioloides* (L.) F. W. Schmidt

21. Helichrysum stoechas (L.) Moench
22. Hyoseris scabra L.
23. Hypochaeris achyrophorus L.
24. Hypochaeris glabra L.
25. Launaea nudicaulis (L.) Hook. f.
26. Launaea tenuiloba (Boiss.) O. Kuntze
27. Leontodon tuberosus L.
28. Mantisalca duriaei (Spach) Briq.& Cavill.
29. Notobasis syriaca (L.) Cass.
30. *Pallenis hierochuntica* (Michon) Greuter
31. Pallenis spinosa (L.) Cass.
32. Phagnalon rupestre (L.) DC.
33. Phagnalon saxatile (L.) Cass.
34. Picris asplenoides L.
35. Picris mauginiana Pamp.
36. Pulicaria vulgaris Gaertn.
37. Onopordum espinae Coss. ex Bonnet
38. Reichardia tingitana (L.) Roth
39. Rhagadiolus stellatus (L.) Gaertn.
40. Senecio gallicus Chaix
41. Senecio leucanthemifolius Poir.
42. Sonchus asper (L.) Hill
43. Sonchus tenerrimus L.
44. Silybum marianum (L.) Gaertn.
45. Tyrimnus leucographus (L.) Cass.
46. Xanthium spinosum L.

47. Myrtaceae

1. Myrtus communis L.

48. Scrophulariaceae

1. Kickxia aegyptiaca (L.) Nabelek subsp. *aegyptiaca*
2. Linaria laxiflora Desf. subsp. *laxiflora*
3. Linaria tarhunensis Pamp.
4. Linaria tenuis (Viv.) Spreng.
5. Linaria virgata (Poir.) Desf.
6. Misopates orontium (L.) Raf.
7. Parentucellia floribunda Viv.
8. Scrophularia canina L.
9. Verbascum sinuatum L.

49. Orobanchaceae

1. Orobanche lavandulacea Rchb.

50. Thymelaeaceae

1. Thymelaea hirsuta (L.) Endl.

51. Verbenaceae

1. Verbena supina L.

52. Tamaricaceae

1. *Tamarix nilotica* (Ehrenb.) Bunge

II. Monocotyledons

1. Alliaceae

1. *Allium erdelii* Zuec.
2. *Allium longanum* Pamp.
3. *Allium orientale* Bois.
4. *Allium roseum* L.
5. *Allium ruhmerianum* Asch.

2. Liliaceae

1. *Androcymbium gramineum* (Cav.) Macbride
2. *Asparagus acutifolius* L.
3. *Asphodelus microcarpus* Salzm. & Viv.
4. *Bellevalia sessiliflora* (Viv.) Kunth
5. *Gagea reticulata* (Pall.) Schult.
6. *Muscari racemosum* (L.) Mill.
7. *Ornithogalum arabicum* L.
8. *Ornithogalum tenuifolium* Guss.
9. *Ornithogalum umbellatum* L.
10. *Tulipa sylvestris* L. var. *mediterranea* Pamp.
11. *Urginea autumnalis* (L.) El-Gadi
12. *Urginea maritima* (L.) Baker
13. *Urginea undulata* (Desf.) Steinh.

3. Amaryllidaceae

1. *Narcissus tazetta* L.

4. Iridaceae

1. *Gladiolus byzantinus* Mill.
2. *Iris planifolia* (Mill.) Turand & Schinz
3. *Iris sisyrinchium* L.
4. *Romulea bulbocodium* (L.)Sebast. & Mauri
5. *Romulea cyrenaica* Beguinot
6. *Romulea ramiflora* Ten.

5. Poaceae

1. *Avena barbata* Pott ex Link.
2. *Avena sativa* L.
3. *Avena sterilis* L.
4. *Briza maxima* L.
5. *Bromus alopecuros* Poir.
6. *Bromus diandrus* Roth
7. *Bromus madritensis* L.
8. *Bromus rigidus* Roth
9. *Bromus rubens* L.
10. *Cutandia memphitica* (Spreng.) Richter
11. *Cyndon dactylon* (L.) Pres.
12. *Dactylis glomerata* L.

13. *Gastridium ventricosum* (Gouan) Schinz & Thell.
14. *Gaudinia fragilis* (L.) P. Beauv.
15. *Hordeum murinum* L. subsp. *glaucum* (Steud.)
16. *Lagurus ovatus* L.
17. *Lamarckia aurea* (L.) Moench
18. *Lophochloa cristata* (L.) Hyl.
19. *Phalaris paradoxa* L.
20. *Phalaris minor* Retz.
21. *Poa sinaica* Steud.
22. *Sorgum halepense* (L.) Pres.
23. *Trachynia distachya* (L.) Link
24. *Trisetaria macrochaeta* (Boiss.) Maire

6. Araceae

1. *Arisarum vulgare* Targ.-Tozz.
2. *Arum cyrenaicum* Hruby

7. Orchidaceae

1. *Ophrys bombyliflora* Link
2. *Ophrys fusca* Link
3. *Ophrys speculum* Link
4. *Orchis cyrenaica* Dur. & Barr.
5. *Orchis italica* Poir.

Life form spectrum

A total of 336 species recorded in the study area were classified into life forms according to Raunkiar's classification (Raunkiar's 1934). The biological spectrum of the species is of 57,14% Therophytes, 22,91% Chamaephytes, 14,28% Cryptophyte and 5,35% phanerophytes, 0,29% Hemicryptophyte.

Statistical analysis

The plants collected from the wadi (Vally) belong to 61 families, 213 genera and 336 species. Two families belong to Gymnosperms and the remaining 59 to Angiosperms. Dicotyledons are represented by 278 species, 176 genera, and 52 families and Monocotyledons by 56 species, 35 genera and 7 families.

Asteraceae is the largest family with 46 species followed by *Fabaceae* with 38 species, *Poaceae* with 24, *Lamiaceae* with 18, *Apiaceae* with 17, *Brassicaceae* with 15, and *Liliaceae* with 13 species. *Geraniaceae* and *Ranunculaceae* have 11 species each, *Scrophulariaceae* and *Boraginaceae* with 9 species each, while both *Euphorbiaceae* and *Caryophyllaceae* have 7 species. *Solanaceae*, *Iridaceae*, *Polygonaceae*, *Cistaceae* have 4 species each. *Rubiaceae*, *Alliaceae*, *Crassulaceae*, *Convolvulaceae* and *Orchidaceae* have 5 species each. *Valerianaceae* and *Amaranthaceae* have 4 species each and *Plantaginaceae*, *Illecebraceae* and *Malvacea* 3 species each.

12 families where represented by 2 species *Papaveraceae*, *Rosaceae*, *Asclepiadaceae*,

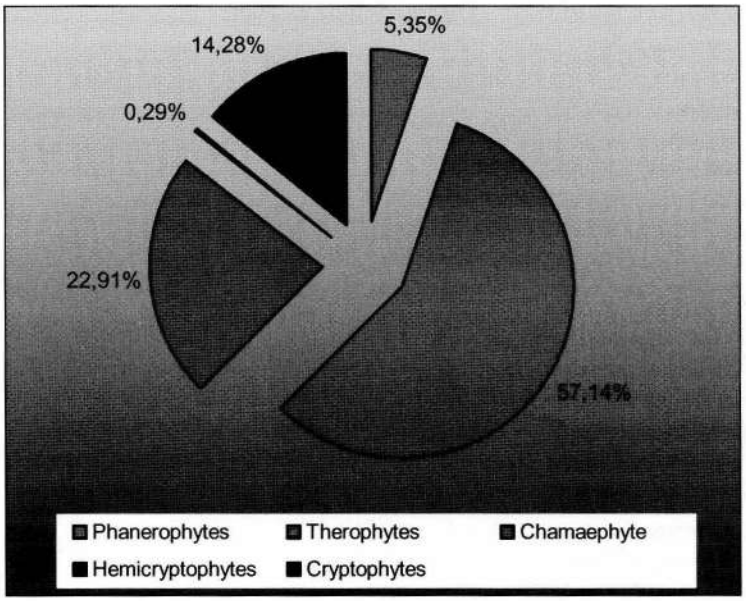

Fig. 3. Biological spectrum of species in the study area.

Primulaceae, *Ericaceae*, *Anacardiaceae*, *Rhamnaceae*, *Oleaceae*, *Cupressaceae*, *Linaceae*, *Cucurbitaceae* and *Araceae*.

The remaining 22 families present only one species in the area: *Myrtaceae*, *Globulariaceae*, *Caesalpiniaceae*, *Orobanchaceae*, *Dipsacaceae*, *Capparaceae*,

Table. 1. Percentage of Wadi Zaza flora in respect to the Libyan flora.

Taxon	Libyan flora	Wadi Zaza flora	Percentage
Families	155	61	**39.35 %**
Genera	787	213	**27.06 %**
Species	2059	336	**16.31 %**

Table. 2. Number of plant group in the study area.

Plant groups	Families	Genera	Species
Gymnosperms	2	2	2
Angiosperms	59	211	334
Dicotyledons	52	176	278
Monocotyledons	7	35	56
Total	61	213	336

Fumariaceae, *Thymelaeaceae*, *Verbenaceae*, *Plumbaginaceae*, *Urticaceae*, *Fagaceae*, *Gentianaceae*, *Theligonaceae*, *Guttiferae*, *Oxalidaceae*, *Chenopodiaceae*, *Cuscutaceae*, *Tamaricaceae*, *Caprifoliaceae*, *Ephedraceae*, *Amaryllidaceae*.

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