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# Plant diversity of Al- Balqa Governorate, Jordan

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**Listing and describing plant diversity in terms of the status of flowering vascular plants in Al-Balqa Governorate (North West Amman/Jordan) has been evaluated. Collections of plant specimens have been made during the field trips that have been conducted, in order to study and evaluate the composition and the diversity of the flowering wild plants in Al-Balqa Governorate. A total number of 527 species belonging to 296 genera and 61 families have been recorded. A number of 91 medicinal plants are recorded; some examples are known as medicinal plants like: *Arum palaestinum*, *Achillea santolina*, *Carduus australis*, and others. Poisonous plants such as *Retama raetam*, *Solanum luteum*, *Ferula communis* etc. were also recorded. A number of 30 recorded species are considered as endemic such as *Daucus carota* and *Apium nodiflorum*, and some others are known as edible plant species like: *Salvia hierosolymitana*, *Gundelia tournefortii*, *Eruca sativa* etc. a number of 25 species are endangered such as: *Gundelia tournefortii, Sinapis alba, Sternbergia clusiana* and *Cistus creticus*. Some reported species are rare like: *Lactuca serriola*, *Varthemia iphionoides*, *Echium judaeum*, *Lupinus varius*, *Iris atrophosca* and others. Deciduous Oak (*Quercus ithaburensis*) forest is occurring in the study area mixed with remnants of wild olive (*Olea europaea*), and with shrubs such as *Crataegus azarolus*, and a wild almond tree (*Amygdalus communis),* also with herbaceous bushes such as *Dactylis glomeratus*, *Urginea maritima*, *Colchicum hierosolymitanum, Sarcopoterium spinosum*, *Euphorbia hierosolymitana*, *Salvia indica*, *Alcea setosa*, and *Tulipa stylosa*. However the study area is considered as one of the richest geographical area in Jordan in terms of its plant diversity, but unfortunately the area is negatively affected by different factors that are contributing in the habitat loss and degradation.**

**Key words:** Plant diversity, Flora, Al-Balqa, Jordan.

## INTRODUCTION

The main purpose of this study is to survey plant diversity and to identify the flowering plants in Al- Balqa area, and to report the potential of the plant species recorded in terms of its economic, medicinal, poisonous, edible, and ornamental values, as well as the ecological status in terms of endemic, rare, threatened and endangered taxa.

Al- Balqa governorate falls within the Mediterranean phytogeographical region in Jordan and it is considered as subhumid Mediterranean bioclimatic region (Al-Eisawi, 1996). This region is characterized by having the best rainfall and the best vegetation. The area is characterized by its natural *Pinus halepensis* forests especially in Zai

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and Dibeen in Salt area; the deciduous Oak forests of *Quercus ithaburensis* and *Pistacia atlantica* in As- Baihi near Salt area (Al- Eisawi, 1996). Plant biodiversity in Jordan is exposed to several threats leading to sharp decline in most of the Jordanian flora and the extinction of several species. Many species have become at risk, or were classified as threatened or endangered or even extinct on the regional and global levels. This situation has resulted from various natural and man-made activities, as well as from general lack of knowledge and awareness (Oran, 2014; Oran and Abu Zahra, 2014). The rich Jordan diversity of species can be classified into different classes of vegetation, such as herbs, shrubs and trees.

This study is assessing the flowering wild plants of AL-Balqa Governorate diversified and focusing on the diversity of wild plants in an attempt to protect and conserve the plant resources in the study area. AL-Balqa area is a name given to area covering some places in the north, North West of the country (Map 1). Salt, AL-Fuhais, Mahes, and Ghour.

There are some studies that were published which deals with the situation of the wild flowering plants in Jordan Al- Eisawi (1982, 2013) (Oran, 2014; Oran and Al-Eisawi, 2015; Oran, 2015). Other studies related to medicinal plants in Jordan (Oran et al., 1998, Oran, 2014). A previous study conducted by Al- Mohaisen et al. (2005), on plant diversity of Al- Fuhais area. A number of 238 species was recorded. A recent study by Al-Rawashdeh et al. (2013) listed a number of 296 medicinal plants in Wadi shuaib are that explained the effect of climate change on the surrounding vegetation. The edible plants in Jordan were identified by Takruri and Al- Eisawi et al. (1989). The poisonous plants were reported by Abu Irmaileh (1989). An ethnobotanical survey for the northern high mountains in Jordan including the Salt area is published on 2015.

This study has been surveying and identifying mainly the wild flowering plants in Al- Balqa areas, list of studied plants is included in Table 1. The medicinal plants used in folk medicine by locals are shown in Table1; Map of the study area is also presented (Figure 1). Some selected photographs for some plant species are shown in Figure 2A to L.

The numbers of vouchers specimens for those collected and identified for the different areas of Al- Balqa study area are also shown in Table 1. The voucher specimens are deposited at the herbarium of Department of Biological of Sciences/ University of Jordan/ Amman (AMM). The plant specimens are identified and checked out based on using the available flora of Flora palaestina, Volume 1, 2, 3, and 4 (Zohary, 1966; Feinbrun- Dothan, 1986), and also revised online using International Plant Names Index (IPNI) website, plant taxonomist and myself as plant taxonomist. The determination for some plants that are identified as endemic, rare, endangered are evaluated based on the experience of the author of the flora of Jordan, that IUCN standards cannot fit to.

## MATERIALS AND METHODS

1. In this botanical survey extensive field trips have been conducted to the study area of Al- Balqa Governorate (Salt, Mahes, Fuhais and Wadi Shuaib).
2. Identification of plant specimens was made by plant taxonomist and by using Flora palaestina Volume 1, 2, 3 and 4 (Zohary, 1966; Feinbrun- Dothan, 1986), and revised online by IPNI website.
3. Photographs have been made for some selected herbs, shrubs and trees or some plant species that are dominating the target area (Figure 2).
4. A list of all recorded plant species is provided. The names of the plant species in the provided list are arranged alphabetically according to their families, genera, and species (Table 1). Medicinal plants are also listed as well as edible, poisonous, endangered endemic and rare are also identified.

## RESULTS AND DISCUSSION

A total number of 527 species belongs to 296 genera and 61 families has been recorded, out of which a number of 100 medicinal plants was identified, some examples are *Arum palaestinum*, poisonous plants are listed in Table 1, A number of 30 recorded species are considered as endemic such as *Daucus carota,* and a number of 25 recorded species are endangered*,* all the recorded species are shown in Table 1, and photographs of some plant species are shown in Figure 2. Some plant species are known for their ornamental potential (Table 1).

## CONCLUSION AND RECOMMENDATIONS

The results showed a high floral diversity of the study area in terms of the number of plant species recorded. This diversity of plant species is a reflection of the prevailed supportive ecological conditions, with high mountains (900 to 1700 m), adequate rainfall of 400 to 600 mm/year, the best fertile soil type in the country. Plant biodiversity faces the danger of degradation and loss of many plant species as a result of both man-made and natural factors. Changes in biodiversity can directly reduce sources of food, fuel, structural materials and medicinal or genetic resources. These changes are occurring at rapid rate as a consequence of human activities, such as land-use, over- grazing probably climate change, increase of the populations, over exploitation of plant and animal species, and pollution of soil, water and air. Collective efforts are important to preserve and protect the wild species in Al- Balqa study area for its highly diversified plant species that are suffering the danger of degradations and eventual extinction. Jordan is also known for its high richness in Birds such as: ldfinch (*Carduelis carduelis*) common resident, Black bird (*Turdus merula)* very common resident in the geographical study area and Chucker

**Table 1.** The list of the plant species in the study area (Al- Balqa Governerate).

| Family | Scientific name | M | P | End | Ed | O | R | Plant No. |
|---|---|---|---|---|---|---|---|---|
| Acanthaceae | *Acanthus syriacus* Boiss. | + | | | | | | 12 |
| Amaranthaceae | *Amaranthus retroflexus* L. | | | | | | | 112 |
| | *Narcissus tazetta* L. | + | | | | + | | 91 |
| Amaryllidaceae | *Sternbergia clusiana* Ker Gawler | + | | | | + | | 104 |
| Anacardiaceae | *Pistacia atlantica* Desf. | + | | | + | | | 68 |
| | *P. palaestina* Boiss. | + | | | + | | | 16 |
| Apocynaceae | *Nerium oleander* L. | + | + | | | | | 92 |
| Araceae | *Arum hygrohpilum* Boiss. | + | + | | | | | 115 |
| | *A. palaestinum* Boiss. | + | + | | | | | 119 |
| | *Biarum angus* Tatum (Hooker. Fil.) N.E.Br. | + | + | | | | | 19.95 |
| | *Eminium spiculatum* (Blume) Kuntze | + | | | | | | 15.58 |
| Aristolochiaceae | *Aristolochia parvifolia* Sm | | | | | | | 168 |
| Asclepiadaceae | *Calotropis procera* (Aiton) Aiton fil | + | | | | | | 124 |
| Asteraceae | *Aaronsohnia factorovskyi* Warb. Et Eig | | | | | + | | 151 |
| | *Achillea fragrantissima (Forskal) Schultz Bip.* | + | | | | | | 166 |
| | *A. santolina* L. | + | | | | | | 271 |
| | *Anthemis cotula* L. | + | | | | + | | 155 |
| | *A. cornucopiae* Boiss. | | | | | + | | 20 |
| | *A. hussknechtii* Boiss.et Reuter | | | | | + | | 10 |
| | *A. palaestina* Reuter | | | | | + | | 6.143 |
| | *Calendula arvensis* L. | + | | | | + | | 49 |
| | *C. palaestina* Boiss. | | | | | + | | 246 |
| | *Cardus australis* Pomel. | + | | | | | | 105 |
| | *C. getulus* Pomel. | | | | | | | 77 |
| | *Carlina hispanica* Lam. | | | | | | + | 23 |
| | *Carthmus glaucus* Bieb. | | | | | | | 62 |
| | *C. tenuis (Boiss.et Blanche)* Bornm | | | | | | | 16 |
| | *Catananche lutea L.* | | | | | | | 110 |
| | *Centaurea cyanoides* Berggren et Wahlenb. | | | | | | | 118 |
| | *C. iberica* Trevex Sprengel | | | | | | | 75 |
| | *C. lutea* L. | | | | | | | 111 |
| | *C. pallescens* Delile | | | | | | | 5.29 |
| | *C. rigida* Banks et Sol. | | | | | | | 148 |
| | *Chardinia orientalis* (L.) O. Kuntze | | | | | | | 268 |
| | *Chrysanthemum coronarium* L. | | | | | + | | 171 |
| | *C. segetum* L. | | | | | + | | 74 |
| | *Cichorium pumilum* Jacq. | + | | | | + | + | 131 |
| | *Cirsium syriacum* (L.) Cass. | | | | | | | 75 |
| | *Conyza bonariensis (*L.) Cronquist | + | | | | | | 117 |
| | *Crepis aspera* L. | | | | | | | 102 |
| | *C. sancta* (L.) Bornm. | | | | | | | 40.81 |
| | *C. seneciodes* Delile | | | | | | | 148 |
| | *Dittrichia viscosa* (L.) Greuter | + | | | | | | 57 |
| | *Filago contracta* (Boiss.) Chrtek & Holub | | | | | | | 89 |
| | *F. dsertorum* Pomel. | + | | | | | | 153 |
| | *F. eriocephala* Guss. | | | | | | | 141 |
| | *F. gallica* L. | | | | | | | 145 |
| | *F. pyramidata* L. | | | | | | | 199 |
| | *Geropogon hybrida* (L.) Sch. Bip. | | | | | | | 94.114 |
| | *Gundelia tournefortii* L. | + | | | + | | | 17.39 |
| | *Hedypnois rhagadioloides* (L.) F. W. Schmidt | | | | | | | 10.33 |

**Table 1.** Contd.

| | | | | | | |
|---|---|---|---|---|---|---|
| | *Helichrysum sanguineum* (L.) Kostel | | | + | | 9 |
| | *Hyoseis scarba* L. | | | + | | 16 |
| | *Inula crithmoides* L. | + | | | | 90.138 |
| | *I. graveolens L.* (Desf.) | + | | | | 50 |
| | *Lactuca serriola* L. | + | + | | | 136.23 |
| | *L. viminea (L.)* J.et C. Presf. | | | | | 18.115 |
| | *Launaea mucronata* (Forskal) Muschler | | | | | 144 |
| | *Leontodon tuberosum* L. | | | | | 42 |
| | *Notobasis syriaca* (L.) Cass. | | | | | 122 |
| | *Onopordum alexandrinum* Boiss. | + | | + | | 140 |
| | *Pallenis spinosa* (L.) Cass. | | | | | 13 |
| | *Phagnalon rupestre* (L.) DC. | + | | | | 39 |
| | *Picnomon acarna* (L.) Cass. | | | | | 44 |
| | *Picris damascena* Boiss. & Gaill | | | | | 30.81 |
| | *P. galilaea* (Boiss.) Bentham & Hooker fill. | | | | | 45.51 |
| | *Pluchea dioscoridis* (L.) DC. | | | | | 154 |
| | *Pulicaria arabica* (L.) Cass. | | | | | 25 |
| | *Reichardia tingitana* (L.) Roth | | | + | | 240 |
| | *Rhagadiolus stellatus* (L.) Gaertner | | | | | 35 |
| | *Scorzonera papposa* DC. | | | + | | 11.103 |
| | *Senecio vernalis* Waldst. & Kit | + | | + | | 104 |
| | *Sonchus oleraceous* L. | + | | | | 53.44 |
| | *Thrincia tripolitana* Sch. Bip. | | | | | 10.89 |
| | *T. tuberosa* (L.) DC. | | | | | 86 |
| | *Tolpis barbatus* (L.) Gaertn. | | | + | | 113 |
| | *T. virgata* (Desf.) Bertol. | | | | | 101 |
| | *Tragopogon collinus* DC. | | | + | | 157 |
| | *Urospermum picroides* (L.) Scop. Ex F. W. Schmidt | | | + | | 35 |
| | *Varthemia iphioides* Boiss.et Bl. | + | | | + | 83 |
| | *Xanthium brasilicum* Vell. | | | | + | 115 |
| Brassicaeae | *Matthiola aspera* Boiss. | | | + | | 140 |
| | *M. longipetala* (Vent.) DC. | | | + | | 78 |
| | *Microthlaspi perfoliatum* (L.) F. K. Meyer | | | | | 142 |
| | *Nasturtium officinale R. Br.* | + | | | | 131 |
| | *Neslia apiculata* Fischer C. A. Meyer & Ave- Lall. | | | | | 114 |
| | *Raphanus sativus* L. | | + | | | 97.119 |
| | *Sinapis alba* L. | + | + | + | | 147 |
| | *S. arvensis* L. | + | | | | 105 |
| | *Sisymbrium erysimoides* Desf. | | | | | 6.42.39 |
| | *Torularia torulosa* (Desf.) O. E. Schulz | | | | | 142 |
| Campanulaceae | *Campanula strigosa* Banks & Sol. | | | | | 77 |
| | *Legousia falcata* (Ten.) Fritsch | | | + | | 29 |
| Caprifoliaceae | *Lonicera etrusca* Santi | + | | + | + | 67 |
| Caryophyllaceae | *Cerastium dichotomum* L. | | | | | 127 |
| | *Dianthus judiacus* Boiss. | | | + | | 90 |
| | *D. strictus* Banks et Sol. | | | | | 82.37 |
| | *Gypsophila arabica* Barkoudah | | | + | | 20 |
| | *Minuartia formosa (*Fenzl) Mattf. | | | | | 84.116 |
| | *M. globulosa* (Labill.) Schinz & Thell. | | | + | + | 137 |
| | *M. picta* (Sibth. & Sm.) Bornm | | | | + | 121 |
| | *Polycarpon tetraphyllum* (L.) L. | | | | | 38 |
| | *Paronychia argentea* Lam. | + | | | | 98 |

**Table 1.** Contd.

| | | | | | | |
|---|---|---|---|---|---|---|
| | *P. desertorum* Boiss. | | | | | 33.103 |
| | *P. sinaica* Fresen. | + | | | | 109 |
| | *Pteranthus dichotomus* Forskal | | | | | 99 |
| | *Silene aegyptiaca* (L.) L. fil. | | | | + | 164 |
| | *S. conoidea* L. | | | + | + | 31.63 |
| | *S. crassipes* Fenzl | | | | | 114 |
| | *S. damascena* Boiss. & Gaill | | | | | 154 |
| | *S. trinervis* Banks et Sol. | | | | | 72 |
| | *S. vulgaris* (Moench) Gracke | + | | | | 488 |
| | *Spergularia diandra* (Guss.) Helder.et Sart. | | | | | 159 |
| | *Vaccaria pyramidata* Medikus | + | | | | 126 |
| | *Velezia rigida* L. | | | | | 21.50 |
| Chenopodiaceae | *Atriplex halimus* L. | + | | | | 102 |
| | *Beta vulgaris* L. | | | + | | 49 |
| | *Chenopodium album* L. | + | | | | 272 |
| | *C. murale* L. | | | | | 136 |
| | *Salsola vermiculata* L. | | | | | 134 |
| Cistaceae | *Cistus creticus* L. | | + | | + | 47 |
| | *C. solvifolia* (L.) Webb. | + | | | + | 36 |
| | *C. villosus* Acut. | | | | + | 132 |
| Cistaceae | *Fumana arabica* (L.) Spach | | | | + | 170 |
| | *F. thymifolia* (L.) Webb. | | | | | 23 |
| | *Helianthemum aegyptiacum* (L.) Miller | | | | + | 46.53 |
| | *H. lasiocarpum* Desf. | | | | | 26.31 |
| | *H. ledifolium* (L.) Miller | | | | | 6.19 |
| | *H. salicifolium* (L.) Miller | | | | + | 27 |
| | *Tuberaria guttata* (L.) Fourr. | | | | | 131 |
| Convolvulaceae | *Convolvulus althaeoides* L. | + | | | | 125 |
| | *C. arvensis* L. | + | | | + | 9.145 |
| | *C. betonicifolius* Mill | | | | | 81 |
| | *C. dorychnium* L. | | | | | 123 |
| | *C. scammonia* L. | + | | | | 100 |
| | *C. siculus* L. | | | | | 134 |
| Crassulaceae | *Sedum caespitosum* (Cav.) DC. | + | | | + | 41 |
| | *Umbilicus intermedius* Boiss. | | | | + | 166 |
| Cucurbitaceae | *Bryonia syriaca* Boiss. | + | | | | 169 |
| Cyperaceae | *Cyperus conglomerates* Rottb. | | | | | 56 |
| | *Scripus holoschoenus* L. | | | | | 44 |
| Dipsacaceae | *Cephalaria plimosus* (L.) Coult. | | | | | 22 |
| | *C. syriaca* (L.) Coult. | | | | | 16.75 |
| | *C. tenella* Paine | | | | | 6.23 |
| | *Pterocephalus brevis* Coult. | | | | | 7.27 |
| | *Scabiosa argentea* L. | | | | | 127 |
| | *S. eremophila* Boiss. | | | | | 128 |
| | *S. palaestina* L. | | | | | 221 |
| | *S. prophyroneura* Blakelock | | | | | 47 |
| | *S. prolifera* L. | | | | | 140 |
| Euphorbiacea | *Andrachne telephioides* L. | | | | | 141 |
| | *Euphorbia aleppica* L. | | | | | 104 |
| | *E. aulacosperma* Boiss. | | | | | 12.139 |
| | *E. chamaepeplus* Boiss. Gaill. | | | | | 78 |
| | *E. geniculata* Ortega | | | | | 18.88 |

**Table 1.** Contd.

| | | | | |
|---|---|---|---|---|
| | *E. helioscopia* L. | + | | 49.59 |
| | *E. heterophylla* L. | | | 155 |
| | *E. hierosolymitana* Boiss. | | | 177 |
| | *E. macroclada* Boiss. | | | 196 |
| | *E. peplis* L. | | | 109 |
| | *E. peplus* L. | | | 51 |
| | *Mercurialis annua* (L.) | + | | 71 |
| | *Ricinus communis* L. | | | 89 |
| Fabaceae | *Acacia farnesiana* (L.) Willd. | | | 160 |
| | *A. gerrardii* Bentham | | | 127 |
| | *A. lancifolia* Miller | | | 218 |
| | *Albizzia lebbeck* Benth | | | 116 |
| | *Anagyris foetida* L. | | | 217 |
| | *Astragalus annularis* Forskal | | | 3.214 |
| | *A. cocephalus* Boiss. | | | 83 |
| | *A. cretaceous* Boiss. & Kotschy | | | 34 |
| | *A. cruciatus* Link. | | | 65 |
| | *A. palaestinus* Eig. | | | 166 |
| | *A. sanctus* Boiss. | | | 216 |
| | *Calycotome villosa* (Poiret) Link. | | + | 49.255 |
| | *Coronilla critica* L. | | | 253 |
| | *C. scorpioides* (L.) Koch | | | 264 |
| | *Hippocrepis unisiliqosa* L. | | | 4.150 |
| | *Hymenocarpos circinnatus* (L.) Savi | | | 86.21 |
| | *Lathyrus cicera* L. | | + | 23.46 |
| | *L. digitatus* (M. B.) Fiori | | | 130 |
| | *L. hierosolymitanus* Boiss. | | + | 160 |
| | *L. pseudocicera* Pamp. | | | 99 |
| | *Lens esculenta* Moench | | | 215 |
| | *Lotus collinus* (Boiss.) Heldr. | | | 79.153 |
| | *L. corniculatus* L. | | | 15.85 |
| | *L. creticus* L. | | | 108 |
| | *L. cytisoides* L. | | | 107 |
| | *L. tenuis* Waldst. & Kit. | | | 121 |
| | *Lupinus palaestina* L. | | | 47 |
| | *L. varius* L. | | | 211 |
| | *Medicago granadensis* Willd. | | | 40.156 |
| | *M. lanciniata* (L.) Miller | + | + | 47 |
| | *M. orbicularis* (L.) Bartal. | | | 150 |
| | *M. polymorpha* L. | | | 113 |
| | *M. radiata* L. | | | 151 |
| | *M. rugosa* Desv. | | | 248 |
| | *M. sativa* L. | | | 144 |
| | *M. truncatula Gaertn* | | | 267 |
| | *Onobrychis caput- galli* (L.) Lam. | | | 190 |
| | *O. crista- galli* (L.) Lam. | | | 253 |
| | *O. kotschyana* Fenzl | | | 166 |
| | *O. squarrosa* Viv. | | | 157 |
| | *Ononis antiquorum* L. | + | | 188 |
| | *O. natrix* L. | + | | 139 |
| | *Physanthyllis tetraphylla* (L.) Boiss. | | | 138 |
| Geraniaceae | *Erodium laciniatum* (Cav.) Willd. | | | 235 |

**Table 1.** Contd.

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | *E. malacoides (*L.) L' Her. | | | | | | | 204 |
| | *E. moschatum* L. L' Her. | | | | | | | 221 |
| | *E. touchyanum* Delile | | | | | | | 122 |
| | *Geranium molle* L. | | | | | + | | 231 |
| | *G. tuberosum* (L.) | | | | | | | 33.244 |
| Hypecoaceae | *Hypecoum imberbe* Sibth.et Sm. | | | | | | | 185 |
| Hypericaceae | *Hypericum olivieri* (Spach) Boiss. | | | | | | | 113 |
| | *H. serpyllifolium* Lam. | | | | | | | 181 |
| | *H. triquetrifolium* Turra | | | | | | | 189 |
| Iridaceae | *Crocus hermoneus* L. | + | + | | + | + | | 156 |
| | *Gladiolus italicus* Miller | | + | | + | + | | 202 |
| | *Gynandriris sisyrinchium* L. | | + | | + | + | | 209 |
| | *Iris atrofusca* Baker | | | + | | + | + | 137 |
| | *I. barnumae* Baker et Foster | | | + | | + | | 176 |
| | *Romulea bulbocodium* (L.) Seb. & Mauri | | | + | | + | | 173 |
| Juncaceae | *Juncus bufonius* L. | | | + | | | | 218 |
| Lamiaceae | *Ajuga chia* Schreber | + | | + | | + | | 127 |
| | *A. orientalis* L. | | | | | | | 219 |
| | *Ballota saxatilis* Sieber ex C. Presl | | | | | | | 224 |
| | *B. undulata* (Fresen) Benth. | | | | | | | 225 |
| Liliaceae | *Asparagus acutifolius* L. | | | + | | | | 1.229 |
| | *A. aphyllus* L. | | | + | | | | 3.230 |
| | *Asphodeline brevicaulis (*Breto) Gay | | + | | | + | | 235 |
| | *A. brevicaulis (*Breto) Gay | | | | | + | | 173 |
| | *Asphodelus aestivus* Brot.= microcarpus L. | | + | | | + | | 182 |
| | *A. fistulosus* L. | + | | | | + | | 185 |
| | *Bellevalia flexuosa* Boiss. | | | | + | + | + | 217 |
| | *Colchicum hierosolymitanum* Feinbr. | | + | | | + | | 122 |
| | *Fritillaria libanotica* (Boiss.) Baker | | | | | + | | 216 |
| | *Gagea aritime* C. Koch. | | | | | | | 219 |
| | *G. aritime* (Pallass) Schult. Fill. | | | | | | | 211 |
| | *Muscari aritime* Guss. | | | | | + | | 212 |
| | *M. neglectum* Guss.ex Ten | | | | | | | 210 |
| | *M. Pulchellum* Heldr. & Start | | | | | + | | 21.89 |
| | *Ornithogallum* montanum Cry. | | | | | + | | 55.88 |
| | *O. narbonensis* L. | | | + | | + | | 78.86 |
| | *O. umbellatum* L. | | | | | + | | 89 |
| | *Tulipa agenensis* DC. | | | | | + | | 87 |
| | *Urginea maritima* (L.) Baker | + | + | | | + | | 117 |
| Linaceae | *Linum mucronatum* Bertol. | | | | + | + | | 125 |
| | *L. pubescens* Banks & Sol. | | | | | + | | 119 |
| | *L. strictum* L. | | | | | | | 109 |
| Lythraceae | *Lythrum junceum* Banks et Sol. | | | + | | + | + | 209 |
| Malvaceae | *Alcea acaulis (Cav.)* Alef. | + | | + | | + | | 218 |
| | *A. setosa* (Boiss.) Alef. | + | | | | + | | 177 |
| | *Althaea hirsuta* L. | + | | | | + | | 217 |
| | *Lavatera cretica L.* | | | | | | | 214 |
| | *L. nicaeensis* All. | | | | | | | 215 |
| | *L. parviflora* L. | | | | | | | 234 |
| | *L. sylvestris* L. | | | | | | | 164 |
| | *Malvella sherardiana* (L.) Jaub & Spach | | | | | | | 163 |
| Orchidaceae | *Himantoglossum affine* (Boiss.) Schlechter | + | | + | | + | | 106 |

**Table 1.** Contd.

| | | | | | |
|---|---|---|---|---|---|
| | *Limodorum abortivum* (L.) Swar. | | + | + | 209 |
| | *Ophrys fusca* Link | + | + | + | 223 |
| | *O. sphegodes* Miller | + | + | + | 15.224 |
| | *Orchis anatolica* Boiss. | + | + | + | 144 |
| | *O. galilaea (Bornm.et Schulze)* Schltr. | | + | + | 57 |
| | *O. saccata* Ten. | | + | + | 136 |
| | *O. simia* Lam. | + | + | + | 4.141 |
| | *O. tridentata* Scop. | | + | + | 17.149 |
| | *Orobanche aegyptiaca* Pers. | | + | + | 93 |
| Papaveraceae | *Papaver argemone* L. | | | + | 105 |
| | *P. hybridum* L. | | | + | 115 |
| | *P. polytrihcum* Boiss.et Ky. | | + | + | 42 |
| | *P. subpiriforme* Fedde | | | + | 47.215 |
| | *Roemeria hybrida* (L.) DC. | + | | + | 56.94 |
| Plantaginaceae | *Limonium lobatum* (L. fill.) O. Kuntze | + | | + | 31.56 |
| | *Plantago afra* L. | + | | | 12.72 |
| | *P. ciliata* Desf. | | | | 20 |
| | *P. cretica* L. | | | | 96.41 |
| | *P. cylindrical* Forskal | | | | 47.31 |
| | *P. major* L. | + | | | 56.94 |
| | *P. psyllium* L. | | | | 10.56 |
| Plumbaginaceae | *Plumbago europaea* L. | + | | | 35.21 |
| Poceae | *Aegilops ovata* L. | | | | 150 |
| | *Aegilops biuncialis* Vis. | | | | 60.210 |
| | *Alopecurus utriculatus* Banks et Sol. | | | | 51.231 |
| | *Arrhenatherum kotschyi* Boiss. | | | | 144.16 |
| | *A. palaestinum* Boiss. | | | | 167 |
| | *Avena barbata* Pott ex Link. | | + | | 90.217 |
| | *A. fatua* L. | | | | 35.22 |
| | *A. sterilis* L. | | | | 66.105 |
| | *Brachypodium distachyon* (L.) Beauv. | | | | 34.82 |
| | *Briza maxima* L. | | | | 36.229 |
| Poceae | *Bromus lanceolatus* Roth. | | | | 209 |
| | *B. madritensis* L. | | | | 188 |
| | *B. rubens* L. | | | | 176 |
| | *B. sterilis* L. | | | | 206 |
| | *B. tectorum* L. | | | | 208 |
| | *Catabrosa aquatica* (L.) Beauv. | | | | 199 |
| | *Catapodium rigidum* (L.) C. E. Hub. | | | | 191 |
| | *Crithopsis delileana* (Schultes) Ros. | | | | 177 |
| | *Cyndon dactylon* (L.) Pers. | | | | 125 |
| | *Cynosurus cobratus* Lehm.ex Steu. | | | | 161 |
| | *C. elegans* Desf. | | | | 179 |
| | *Dactylis glomerata* L. | | | | 233 |
| | *Digitaria sanguinalis* (L.) Scop. | | | | 225 |
| | *Echinaria capitata* (L.) Desf. | | | | 227 |
| | *Echinochloa colonum* (L.) Link. | | | | 37.77 |
| | *Hordeum bulbosum L.* | | | | 72 |
| | *H. marinum* Hudson | | | | 70 |
| | *H. spontaneum* C. Koch. | | | | 66.78 |
| | *Lamarckia aurea* (L.) Moench | | | | 62 |
| | *Lolium rigidum* Gaud | | | | 63 |

**Table 1.** Contd.

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | *Lophochloa berythea* (Boiss. & Blan. ) Bor | | | | | | 61.65 |
| | *Oryzopsis holciformis* (M. B. ) Hach. | | | | | | 67 |
| | *O. miliacea* (L.) Asc.et Sch. | | | | | | 74 |
| | *Pennisetum setaceum* (Forskal) Chiov. | | | | | | 71.83 |
| | *Phalaris minor* Retz | | | | | | 92 |
| | *Poa bulbosa* L. | | | | | | 81.90 |
| | *Polypogon virids* (Gouan) Breistr. | | | | | | 137 |
| | *Psilurus incurvus* (Gouan) Schinz et Thell. | | | | | | 235 |
| | *Setaria verticillata* (L.) P. Beauv. | | | | | | 224 |
| | *Sorghum halepense (L.) Pers.* | | | | | | 133 |
| | *S. virgatum* (Hackel) Stepf | | | | | | 117 |
| | *Stipa capensis* Thunb. | | | | | | 67.88 |
| Polygonaceae | *Emex spinosa* (L.) Campd. | | | | | | 227 |
| | *Polygonum arenastrum* Bor. | | | | | | 220 |
| | *P. equisetiforme* Sibth et Sm. | | | | | | 234 |
| | *P. salicifolium* Brows.ex Willd. | | | | | | 134 |
| | *Rumex congloeratus* Murr. | | | | | | 132 |
| | *R. crispus* L. | | | | | | 131 |
| | *R. cyrius* Murb. | | | | | | 130 |
| | *R. pulcher* L. | | | | | | 129 |
| Primulaceae | *Anagallis arvensis* L. | + | + | | | | 13.267 |
| | *Asterolinon linum- stellatum* (L.) Duby | | | | | | 228 |
| | *Cyclamen persicum* Miller | + | | | | | 18.225 |
| Ranunculaceae | *Adonis aestivalis* L. | + | | | | + | 19 |
| Solanaceae | *Hyoscyamus aureus* L. | + | | | | | 67 |
| | *H. reticulatus* L. | + | | | | | 115 |
| | *Mandragora autumnalis* Bertol | + | + | | | | 80 |
| | *Solanum incanum* L. | | + | + | | | 22 |
| | *S. luteum* Mill. | + | + | | | | 105 |
| | *S. nigrum* L. | + | | | | | 83 |
| | *Withania somnifera (*L.) Dunal | + | + | | | | 65 |
| Tamaricaceae | *Tamarix aphylla (*L.) Karst. | + | | | | | 26.83 |
| Theligonaceae | *Theligonum cynocrambe* L. | | | | | | 558 |
| Thymelaeaceae | *Thymelaea passerina* (L.) Cosson & Gern. | | | | | | 124 |
| Typhaceae | *Typha domingensis* (Pers.) Steudel | + | | | | | 29.46 |
| Umbelliferae | *Ammi majus L.* | + | | | | | 170 |
| | *Anthriscus lamprocarpa* Boiss. | | | | | | 39 |
| | *Apium nodiflorum* (L.) Lag. | | | | + | | 169 |
| | *Artedia sqamata* L. | | | | | | 96.16 |
| | *Astoma seselifolium* Dc. | | | | | | 40.87 |
| | *Bifora testiculata* (L.) Schultes | | | | | | 80 |
| | *Bupleurum lancifolium* Hornem. | | | | | | 91.79 |
| | *Chaetosciadium trichosperum* (L.) Boiss. | | | | | | 102 |
| | *Daucus carota* L. | + | | | + | | 115 |
| | *D. dauriena* Lange | | | | | | 73 |
| | *Eryngium creticum* Lam. | + | | + | | | 98 |
| | *E. glomeratum* Lam. | | | | | | 105 |
| | *Exoacantha heterophylla* L. | | | | | | 176 |
| | *Ferula communis* L. | | + | | | | 101 |
| | *Foeniculum vulgare* Miller | + | | | | | 88.1 |
| | *Hippomarathrum* boissieri Reuter et Hausskn | | | | | | 159 |
| | *Lagoecia cuminoides* L. | + | | | | | 102 |

**Table 1.** Contd.

| | | | | |
|---|---|---|---|---|
| | *Orlaya daucoides* (L.) Greuter | | | 71 |
| | *Peucedanum spreitzenhoferi* Dingl | | | 119.15 |
| | *Pimpinella cretica* Poiret | | | 14 |
| | *P. olivieri* Boiss. | | | 24 |
| | *Scandix pectin*- veneris L. | | | 112.49 |
| | *Torilis arvensis* (Hudson) Link | | | 25 |
| | *T. leptophylla (*L.) Reichenb. Fill. | | | 161 |
| | *Tordylium aegyptiacum* (L.) Lam. | | | 17 |
| | *T. trachycarpum (Boiss.)* AL-Eisawi,Comb.nov | | | 4.12 |
| | *Turgenia latifolia* (L.) Hoffm | | | 96.22 |
| Urticaceae | *Parietaria alsinifolia* Delile | | | 81 |
| | *P. diffusa* Mert.et Koch | | | 42 |
| | *P. lusitanica* L. | | | 82 |
| | *P. officinalis* L. | | | 126 |
| | *P. punctata* Willd. | | | 127 |
| Urticaceae | *Urtica pilulifera* L. | + | | 101 |
| | *U. urens* L. | + | | 9 |
| Valerianaceae | *Valeriana italica* Lam. | | | 27 |
| | *Valerianella coronata* (L.) DC. | | + | 173 |
| | *V. vescaria* (L.) Moench | | | 88 |
| Verbenaceae | *Verbena officinalis* L. | | | 53 |
| Zygophyllaceae | *Fagonia mollis* Delile | | | 24 |
| | *Tribulus terrestris* L. | + | | 50 |

**Figure 1.** Map of Jordan showing Al- Balqa Governerate (The study area).

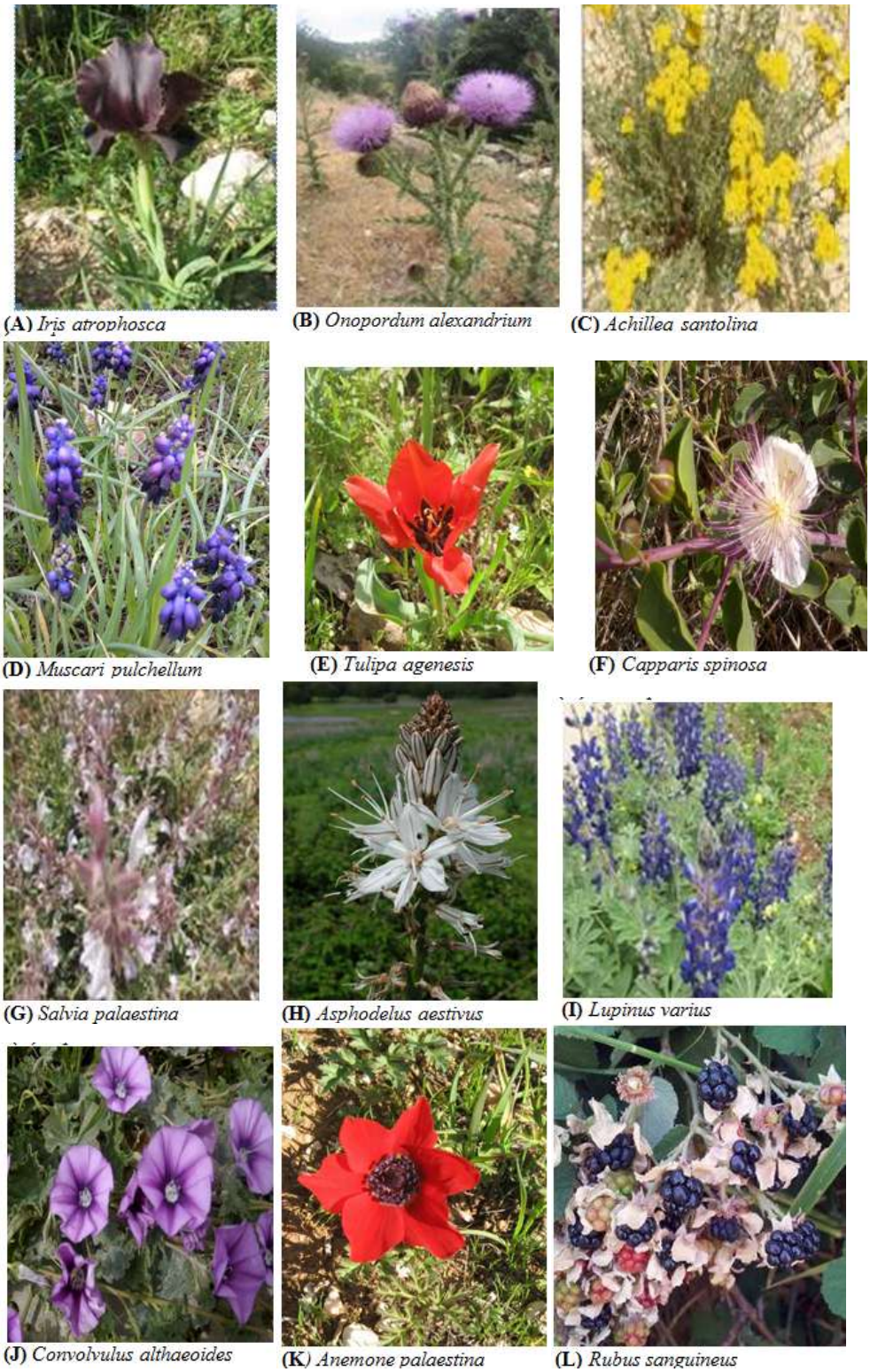


**Figure 2.** Some selected photographs for some plants.

(*Alectoris chukar)* very common resident; Reptiles such as: *Cyrtopodium kotschi* related to the Oak trees or Pine, *Pseudopus apodus* Common; and mamales such as: Red Fox (*Vulpus vulpus)* very common, common

Badger (*Meles meles)*, Arabian wolf *Canis lupus* common and Striped Hyena (*Hyaena hyaena)* common and others.

## Conflict of Interests

The authors have not declared any conflict of interests.

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